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- **Contact** sims@krs.co.kr
tel +82-42-869-9131 / fax +82-42-862-6038
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ease of use and efficiency

Nupas-Cadmatic latest software version, V6, is an extremely powerful tool for ship design and engineering. The most eye catching feature of V6 is the introduction of a new user interface that will further ease work and bring new efficiencies throughout the ship design process.

The new user interface combines a modern Office 2007 look and feel with enhancements welcomed by both novice and experienced users. It will change the way the software is used and allow for faster and more efficient work. In V6 it is available in Plant Modeller with other modules to follow in due course.

The software's easy-to-use 3D modelling tools can be used for early and basic design, detailed engineering, and the production of workshop drawings and generation of ready-to-use production data for production machinery.

With Nupas-Cadmatic you can successfully carry out the entire ship design project, right from the early start, up to the detailed engineering and final production phase. It improves engineering quality and shortens design and construction times. Nupas-Cadmatic seamlessly distributes engineering projects globally between different sites while ensuring effective communication between project partners.

Version 6 highlights

New GUI For the first time in history an Office 2007 style User Interface has been applied to 3D software, making it easier and faster to learn than comparable systems. Nupas-Cadmatic's intuitive and efficient User Interface speeds up design projects. **Distributed design** Nupas-Cadmatic's CoDesigner technology is the most advanced and easiest tool to use for distributed projects. It does not require massive hardware or very fast internet connections.

Easy administration Administration of 3D software has never been so easy. Nupas-Cadmatic has the most modern tools for library and catalogue management. **Internet-based technology** Nupas-Cadmatic was the first developer to launch an Internet-based 3D model viewer and data query tool on the market in 2003. Today eBrowser is the most advanced software to visualize 3D models, to walk through, to query data and to communicate design details interactively with other users and project parties. The internet-based technology has unlimited scope for easy integrations.

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Numeriek Centrum Groningen B.V.
Osloweg 110, 9723 BX Groningen, The Netherlands
Tel: +31 50 57 53 980, fax: +31 50 57 53 981

Cadmatic Oy
Itäinen Rantakatu 72, 20810 Turku, Finland
Tel: +358-2-412 411, fax: +358 2 412 4444

O P T I M I Z I N G R E S O U R C E S

Editor Nick Savvides
Assistant Editor Samantha Fisk
Design/Production Manager Sandy Defraigne
Group Sales Director John Payten
Assistant Advertisement Manager Daniel Payne
Advertisement Production Manager Stephen Bell
Subscriptions & Publications Manager Josie Pearlson
Publisher Mark J Staunton-Lambert

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 Editorial & Advertisement Office:
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 London SW1X 8BQ, UK
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 Telefax: +44 (0) 20 7245 6959
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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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Trading on misery

South Korean yards are fighting the recession, but the yard workers, like those in Europe before them, will bear the brunt of recession.

When Hong Kong trader Alessio Rastani said that he dreamed of a recession and explained that it is possible to make money from a major crisis even when millions of others lose their livelihoods, he could easily have been talking about the shipbuilding industry.

Korean yards believe that they have managed their way through the economic crisis. And, indeed, many of them appear to have followed good practice and planned ahead. It is a credit to the organisations and the South Korean Government that they will re-emerge, at least for this year, as the world's leading shipbuilder.

Having prolonged contracts, diversified and invested abroad the South Korean shipyards have attempted to learn from the mistakes made by those whose shipbuilding industries have substantially declined.

European and Japanese yards are struggling to keep body and soul together. Particularly difficult for the Japanese yards are the currency fluctuations which the yards say are having a detrimental effect on their businesses. Few new export orders have been made in Japan in recent months and the mood there was more resigned to losing further ground to Chinese, South Korean and emerging Asian yards.

Competition between nations for the export income that shipbuilding brings is very intense and a number of new players are expected to enter the competition soon with Vietnam already a small player, India and Bangladesh expecting to emerge in the coming years and Indonesia and the

Philippines also competing for a market share.

How is a high labour cost country meant to maintain high-earning export led business with so many, cheaper, options surrounding them? In South Korea the mantra has been two fold, diversify and if you can't beat them join them. To this end most of the major South Korean yards have invested abroad in low cost labour regions.

China, the Philippines and Vietnam have all been the beneficiaries of the Korean yard's economic muscle. That is the major yards have successfully invested abroad, with STX even making a relative success of its cruise ship building yards in France and Finland. Only Hanjin has met with resistance as Korean workers watched their jobs seemingly exported to emerging (cheaper) economies.

So much for the major yards, they have the economic clout to help them through the tough crises such as recession and tough competition. "They have the liquidity", one, more modest yard pointed out. Smaller yards have no such clout. They must live on their wits.

Yards like SPP and Sungdong have diversified and also found their niches where they can maintain their businesses. Other yards have been less fortunate, having been sucked into control by the banks, these yards could find that their time is limited; once current work is completed there will be a need for new orders to come through.

But for many this will not happen and the yards will most likely close.

Many people will suffer the pain of unemployment, not just yard workers but those who serviced the yards and those who lived and worked around the yards and their families. It is not a system that was designed by the yards, nor is it under their control. Yard managers respond logically to the situation that their businesses find themselves in and look to maintain the viability of the businesses.

The interests of the business becomes far more important in this scenario than any individual or their family. Profit drives logic, not social responsibility.

As the yards maintain their market share the workers, the corner stone of the wealth generated by the yards, are seemingly forgotten.

So when the Rastani's of this world, the banking leeches who feed off others hard work, dream of recessions and see an opportunity to be greedily seized upon it is easy to have a counter-dream where bankers are all made redundant and their families live in drudgery.

Of course this is neither likely nor really desirable. Technologically we have advanced to levels unimagined even as little as 50 years ago. Socially the changes are much slower. And socially we need to think about the legacy we leave, not just to former shipbuilding strongholds, but to the population of this world. We must modernise our habits so we can all benefit from the advances in technology. Not just the Rastanis. *NA*

Markets

Scrapping and new orders both up

Latest figures show that while ship scrapping has increased and new orders for larger sized container ships, above 10,000TEU, have also increased, confidence in the markets has, however, sunk to a three and half year low, according to a leading shipping advisory service.

According to the latest Moore Stephens shipping confidence survey fears about overtonnaging, and continuing uncertainty about the global economy, were the main reasons for the decline in confidence. The rising cost of marine fuels was also a cause for concern.

“In August 2011, the average confidence level expressed by respondents in the markets in which they operate was 5.3 on a scale of 1 (low) to 10 (high), compared to 5.6 in the previous survey in May 2011. This is the lowest figure recorded since the survey was launched in May 2008 with a confidence rating of 6.8, which remains the highest rating achieved thus far,” said Moore Stephens.

Meanwhile broker Braemar Seascope said that container ship orders are increasing at a “dramatic rate”. Since the beginning of this year 52 containerships of 10,000TEU and above have been ordered – compared to just 10 comparable vessels in the whole of 2010 and zero in 2009.

“This year’s containership orders add 765,000TEU to the post-panamax boxship orderbook. As of August 30th 2011, the total number of vessels of this size on order reached 158 ships, totalling 2.13 million TEU which represents 48% of the fully cellular orderbook,” said the broker.

Scrapping

Bulk market realignment starts

Braemar Seascope says its demolition brokers are seeing more work coming their way than usual. Dry cargo demand growth is running at strong levels due to the twin processes of industrialisation and urbanisation in emerging markets. Annual average demand growth between 2011 and 2015 is likely to match and may even exceed the annual 5.2% growth witnessed between 2004 and 2008 – the years of the superbloom in dry cargo vessel earnings.

However, Braemar says the massive amount of vessel ordering during and after the boom has

resulted in the currently depressed freight market for dry bulk carriers. Bulker fleet gross growth (ie counting new deliveries but not scrapping) is likely to be in the order of 12% a year until 2013 as more than 3000 newbuildings are added to the around 8,100 that were already in service at the end of 2010.

Braemar calculates that in order to bring net fleet growth (i.e. deliveries minus deletions) into line with demand growth expectations, every bulk carrier built before 1985 - nearly 1500 ships – would have to be scrapped by the end of 2013. This would bring fleet growth down to an average 6.3% a year.

“In other words, to return supply and demand growth to balance, the industry must scrap 12 bulk carriers every week for the next two years and four months without ordering any further bulkers for delivery before 2014”.

“According to the Braemar Seascope Demometer, 409 bulk carriers totalling almost 20 million dwt were sold for demolition in 2011 up to the end of August, at a rate of over 11 a week.”

This amount of scrapping far exceeds previous records of 11.8 million dwt in 1999 and 11.2 million dwt in 2009. If scrapping continues at this rate for the balance of 2011, some 29 million or 30 million dwt will be removed from the bulk carrier fleet, offsetting the 85 million dwt Braemar Seascope expects to be delivered in 2011.

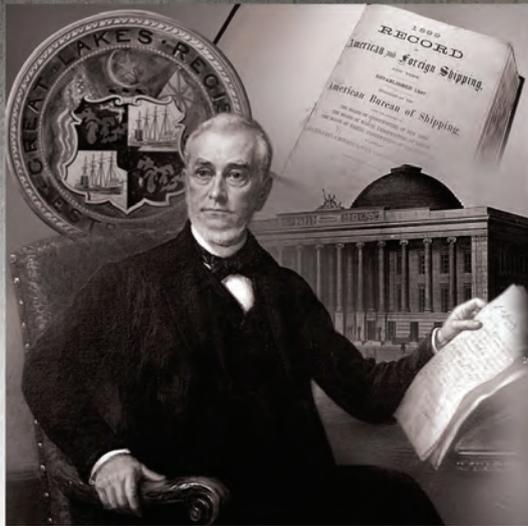
Braemar Seascope Research Manager Mark Williams, says: “There’s a good chance that bulk carrier fleet growth can be kept down to 9% this year if these levels of scrapping keep up. We just have to hope that the global economy pulls out of the doldrums and that demand keeps up with expectations.”

Gas Carriers

Sovcomflot prepares for Yamal

Russian shipping company Sovcomflot has said that it is now starting to research further in to the specific needs of the Yamal gas field project for which it will provide fleet support.

Like all projects Mr Pankov, Group Vice President, Sovcomflot highlighted that Yamal needs further research to provide the correct equipment for the job, with the decision being between larger gas carrying vessels or shuttle tankers to service the area. “You have two choices, you either use big vessels with high ice class or shuttle tankers for each section of different ice. It is not practical to run high ice class vessels in open waters as it is too



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expensive and we have looked into two different large scale vessels 170,000m³ and a 205,000m³, which in testing we found was too big to move in high ice conditions.”

The project was developed by Gazprom in the Yamal Pennisular in Russia, which will see the development of the area due to the natural gas reserves there.

Design

HHI break the ice

South Korean shipbuilder Hyundai Heavy Industries (HHI) has completed the final model performance tests for its 190,000dwt ice-breaking iron ore carrier design at the Institute for Ocean Technology in Canada.

When built the iron ore carrier will be the world's largest ice-breaking commercial ship and it will be able to navigate 1.7m thick ice-covered waters at a speed of 6knots. The ship will measure 310m in length and 51m in width.

An ice-breaking commercial ship is a special-purpose ship built to navigate through ice-covered waters without the help of an icebreaker. The Hyundai Heavy ice-breaking iron ore carrier will be able to carry twice as much cargo as any existing ice-breaking commercial ship. Moreover, the ship can also move two times faster with 5% increased fuel efficiency.

The ship will have a dual propulsion system equipped with two ring type propellers to increase mobility, a strengthened hull, and specially designed hull shape that will help to clear the ice.

The demand for ice-breaking commercial ships is expected to increase as exploration of natural resources like natural gas, oil, and iron ore in the Polar Regions is becoming more prevalent. The distance travelled can also be shortened by up to 40% between Asia and Europe when Arctic sailing routes are available.



HHI has also been developing a special welding technology for polar LNG carrier tanks and LNG FPSO since June 2010. This is part of the Company's long term strategy for the expected increase in demand for LNG carriers and LNG FPSOs to be used in the polar region as interest in natural gas development in that area has been growing.

In further developments HHI has agreed a US\$530 million order to build a new deepwater drillship for Noble Drilling Holding, a leading offshore drilling contractor for the oil and gas industry.

The order is the second of two options Noble Drilling Holding exercised from the contract the company signed with HHI last January. The original order was for two drillships with options for two more of the same class.

This latest order is the tenth drillship HHI has won this year and the dimensions of the four Noble vessels will be 229m in length and 36m in width with a maximum drilling depth of 12km from the surface of sea. The first vessel is due to be delivered by the end of 2014.

HHI's engine building subsidiary HiMSEN has also announced that it has won orders to supply HiMSEN marine engines for drillships being built for Noble Drilling Holding and Diamond Offshore Drilling Ltd.

The 98 HiMSEN engines, worth US\$150 million, will be installed in 15 drillships including nine ordered this year by HHI.

“This is a great moment for us as we used to have to import marine engines for our drillships. Now, shipowners are beginning to recognise the superior quality of our HiMSEN engines and have begun ordering in earnest. We're excited about this new development because it can considerably cut down on build and delivery times,” said a Hyundai Heavy official.

Usually, six to eight marine engines are installed in a drillship to generate power for the thrusters. Thrusters keep the drillship in position while operating.

Hyundai-HiMSEN engines are medium speed 4-stroke diesel engines developed in 2000. The eco-friendly HiMSEN engines installed in containerised packaged power plants.

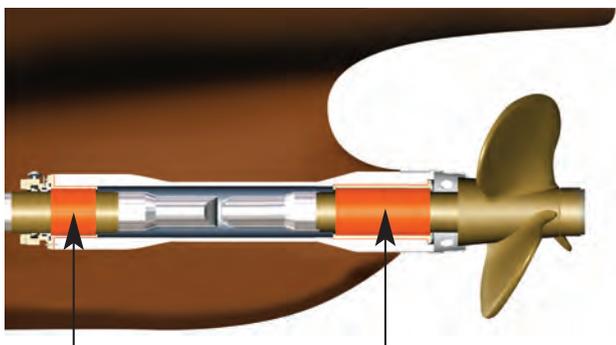
Since its first HiMSEN engine rolled off the line in 2001, Hyundai Heavy has achieved an aggregated production of 5000 HiMSEN engines, winning 35% of international medium speed marine engine markets.

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Ancillary equipment

Future-Proofing the Elcometer 456

Six months after the successful launch of their best selling Elcometer 456 range of coating thickness gauges, Elcometer are pleased to announce the release of the first in a series of software enhancements for the Elcometer 456.

“In order to keep our customers up to date with the latest inspection technologies we designed the Elcometer 456 to have a built-in user upgrade feature,” stated John Fletcher, technical support manager at Elcometer. “To future proof their Elcometer 456 all our customers have to do is connect their gauge to Elcometer’s ElcoMaster 2.0 data management software and follow the onscreen prompts, it’s that simple!”

In addition to general language and technical updates, this field-based upgrade installs a new graph review screen on Elcometer 456 Model T gauges, allowing users to view all their batch readings instantly on the gauge’s colour display.

Elcometer have a team of engineers already developing future upgrades to the Elcometer 456 dry film thickness range for release early in the New Year. ElcoMaster 2.0 data management system informs you of any available software updates as soon as you connect your gauge via the USB port.

www.elcometer.com

Elcometer updates its 456 meter.



Ancillary equipment

Gael Force Launches SeaLimpet

Specialist in marine engineering, equipment and aquaculture, Gael Force Group, has launched its latest SeaLimpet floating gravity-based mooring device for the subsea and renewables sectors and announces the completion of its first contract.

The SeaLimpet is a cylindrical concrete structure with specially configured in-built chambers which can be flooded with water or evacuated using compressed air, allowing it to be towed, floating to position and then flooded to sink under controlled conditions.

The SeaLimpet secures wind, wave and subsea installations to the seabed with pinpoint accuracy and, because it can be floated into position using non-specialist vessels, avoids the need for heavy transportation ships and cranes, significantly lowering deployment costs whilst reducing operational risk.

The first contract for Gael Force was secured with New Jersey-based renewable energy company Ocean Power Technologies (OPT), which commissioned an initial three 460tonne SeaLimpets for the deployment of its PowerBuoy wave energy device. The SeaLimpets have been delivered ready for use by OPT off the coast of Oregon. The value of the contract was £900,000.

www.gaelforcemarine.co.uk

Ancillary equipment

VIKING launches new helmets

Viking has launched its latest auto-darkening welding helmets the Viking 3350 Series from Lincoln Electric that features LCD optics for a clear, natural view in varied ambient light settings. The solar-powered helmets, augmented with a user-replaceable lithium battery, have a substantial 3.34inch height viewing area.

Viking helmets are ideal for stick, TIG, pulsed TIG, MIG, pulsed MIG and flux-cored welding, as well as gouging and grinding. An internal switch allows users to toggle shade control between 6-9 or 10-13 for handling plasma cutting up through heavy plate welding. Internally mounted controls can also be used to pre-test helmet/battery condition before welding.

Weighing in at 602g (21oz), the Viking 3350 helmets are lighter in weight than many auto-darkening helmets. Additionally, the

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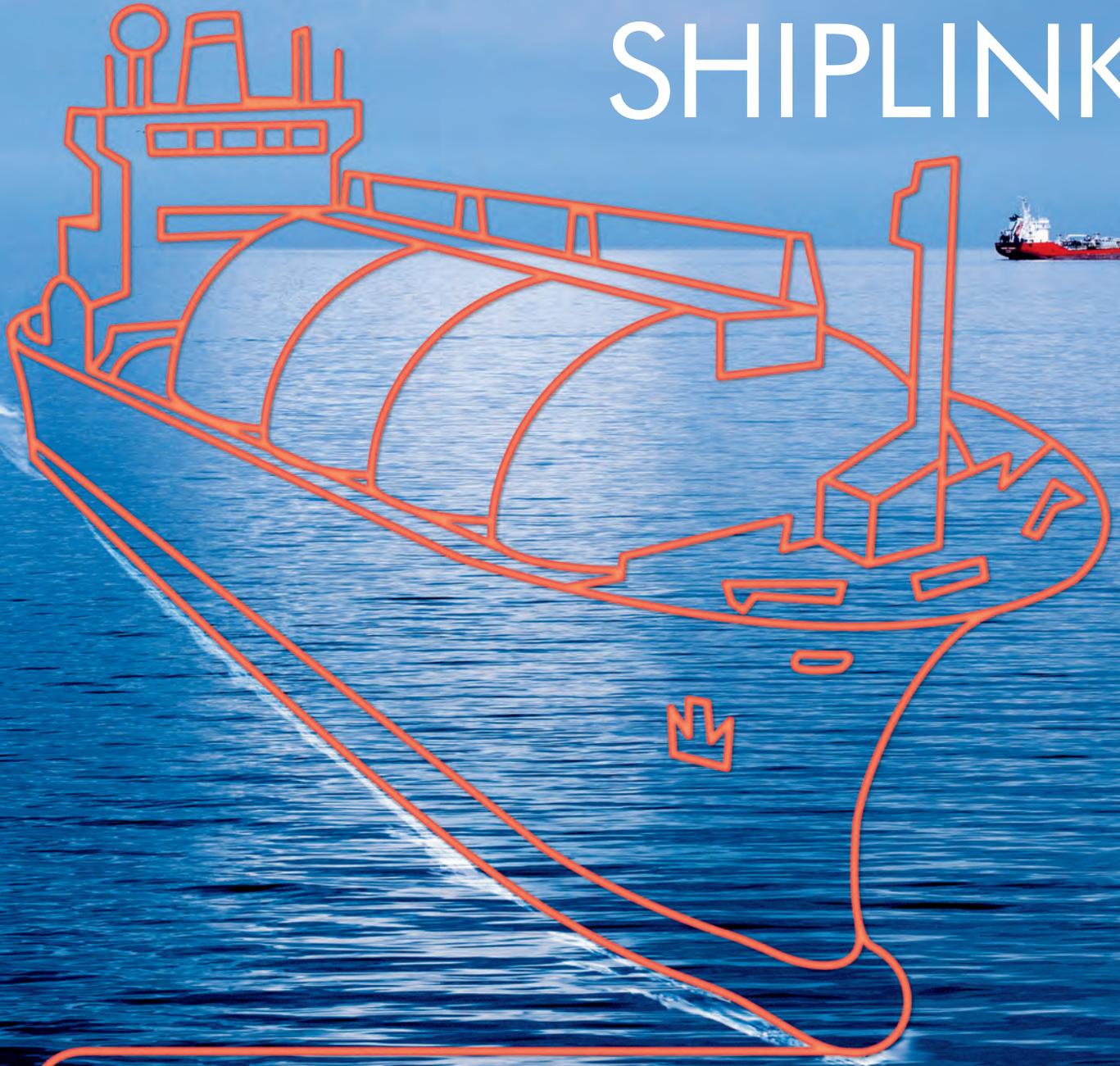


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helmet's "grind mode" control allows it to be used as a grinding shield for weld prep or post-weld clean-up activities. The helmets also are magnifying "cheater" lens and hard hat-adaptor capable. All Viking helmets meet ANSI Z87.1, CAN/CSA Z94.3 and CE Certifications.

Viking 3350 Series helmets come in standard black and four additional graphic styles – Patriot, Tribal, Motorhead and Chip Foose-designed Terracuda. The black helmets include a decal sheet, allowing the user to customize their helmet with flags, logos or letter characters.

www.lincolnelectric.com

Ancillary equipment

Bulk carrier goes green

JLMD Ecologic Group signed earlier this week a agreement with the Tianjin Xingang Shipyard (XGSIC) of China, to equip the future fleet of Louis Dreyfus Armateurs' green bulk carriers with the innovative Fast Oil Recovery System (FOR System).

The FOR System is designed to counter accidental pollution at sea. Following an incident, it enables fast and standardised pollutant recovery, directly from ships' tanks. The deal between JLMD System and Tianjin Xingang includes equipment of the FOR System on four to eight new bulk carriers (Handy and Cape size).

Mr Liu Shushan, deputy director of business department and economist of the Tianjin Xingang Shipyard, said: "We are proud that a Chinese shipyard is the first in the world to equip new build bulk carriers with the Fast Oil Recovery Systems. The Louis Dreyfus Armateurs vessels which we are to build will follow the best international environmental standards. Chinese shipyards are committed to build environmentally friendly vessels and

Lincoln electric launched latest auto-darkening helmet.

we are indeed ready and willing to include the most recent and efficient technological solutions in our design to build the green vessels of the future."

www.jlmdsystem.com

Ancillary equipment

Atlas Copco keeps it cool

Atlas Copco has introduced its latest LT KE water-cooled piston compressor, marine starting air compressor portfolio for up to 90kW.

The newly developed LT KE has a cast iron casing run from 18.5 to 90kW (25 to 125 hp). The new LT KE pistons can withstand ambient temperatures of up to 60°C/140°F . They also have a small footprint, noise levels as low as 91dB(a) and a vibration foundation of less than 14mm/sec. Both sea and fresh water can be used for the cooling of the LT KE. Synthetic oil is standard for the LT KE, but it can also run smoothly on mineral oil.

Due to forced air flow, the crankcase is heated much faster, which helps to eliminate condensate water. Together with a cooling water shut-off solenoid valve, no condensation can harm the compressor. When engineering the LT KE, special attention also went to easy installation, low maintenance requirements and low cost of ownership.

Like all Atlas Copco's marine air solutions, the new LT KE is fully certified according to all relevant marine class certifications. Atlas Copco is also developing a fully-certified, air-cooled version of the LT KE that will be launched in the first quarter of 2012. The marine industry can rely on Atlas Copco for complete and certified marine air solutions. www.atlascopco.com/marine

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Atlas Copco launches new marine compressor.



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In demand naval architects eye new jobs

Mark Charman, group CEO of specialist maritime recruitment firm, Faststream, analyses the results of an employment survey amongst naval architects from around the world.

Two thirds of naval architects in employment are looking for new jobs at the moment according to the results of a survey Faststream conducted this September. These are not just people who fear redundancy in the near future, but naval architects who feel perfectly secure in their positions and want to advance their career, change location or get a pay rise. Should this come as a surprise to anyone in the naval architecture business? Probably not. Most readers of *The Naval Architect* know that their skills are in demand and that there are numerous opportunities out there in a wide range of sectors including the shipping, defence and offshore markets. Indeed 87% of respondents said that they had been approached about one or more jobs in the past year. However, the results should be a wake-up call to any organisation which is not taking serious steps to ensure that its professional naval architect workforce remains motivated and is offered a serious career path.

Key findings of the Survey

36% of naval architects have not had a pay rise in past 12 months
68% are actively job hunting at the moment
67% are using recruitment agencies as well as undertaking their own research
Only 50% feel very/quite secure in their jobs
87% have been approached about a job in past 12 months with 36% approached 4 or more times
37% cited lack of career progression as a reason for leaving last job with only 18% citing salary.
57% of those who feel very secure in their job are currently job searching.



Faststream CEO Mark Charman says two thirds of naval architects are looking for work.

The demand for naval architects continues to grow unabated. Whilst the global surface fleet has nearly doubled in size since 2000 and offshore projects continue to expand in size and move into ever harsher environments requiring more and more naval architects, the supply of these professionals has remained relatively static. Whilst some universities such as Newcastle have developed partnerships with universities in Asia and are offering naval architecture degrees, we have not seen the pool of naval architects swell to the size required. The number of naval architects is not going to increase rapidly any time soon.

Naval architects, like most engineering professionals, take a huge amount of pride in their work and are not primarily motivated by salaries and bonus schemes. Being involved in exciting projects and applying one's skills to challenging situations are far more important to most naval architects than the size of the pay cheque at the end of the month. However, our survey shows that one third of naval architects have not had a pay rise in the past 12 months. In a market where a qualified naval architect has a large number of potential job opportunities to choose from, it is only natural that people will consider their career options.

If we look at the survey data more carefully some interesting and unexpected trends emerge. Of those who said that they felt

“very insecure” in their current job, half had 15 or more years experience under their belts and half worked for consultancies or design houses. In fact 79% of naval architects with 15 years or more experience said that they were currently actively looking for a new job. Is this because older naval architects are more pessimistic than their younger colleagues? Are they more prone to worrying about the clouds on the economic horizon? Or is it simply because they know that they are very employable and are perfectly prepared to move around?

Our survey showed that naval architects working for the classification societies felt the most secure in their jobs with 73% saying they felt secure and around two thirds having had a pay rise of 10% or less in the past year. This compares very favourably with the industry generally where only 20% of respondents to our survey said that they had a pay rise of 10% or less in the past year.

Classification societies are currently extremely busy and the nature of their work is changing, which is creating new and challenging opportunities in this sector. The demand is increasingly driven by the growth in the world fleet, which has started to change the emphasis from new construction work to more and more in-service support. The growth in the world fleet is also driving down freight rates in many sectors. As a result ship operators are continually looking for ways to keep vessels working as efficiently as possible. These shifts have had a direct impact on the nature of the naval architect's work within a classification society.

Another significant factor is the transition from prescriptive regulations to a more goal based approach, which requires naval architects to develop new skills. The ability to make sound professional judgements and to really understand the intent of the rules is important. Experience of ship construction and operation is also valuable. All aspects must be considered when assessing whether a design meets safety goals. The increasing complexity of regulations also means



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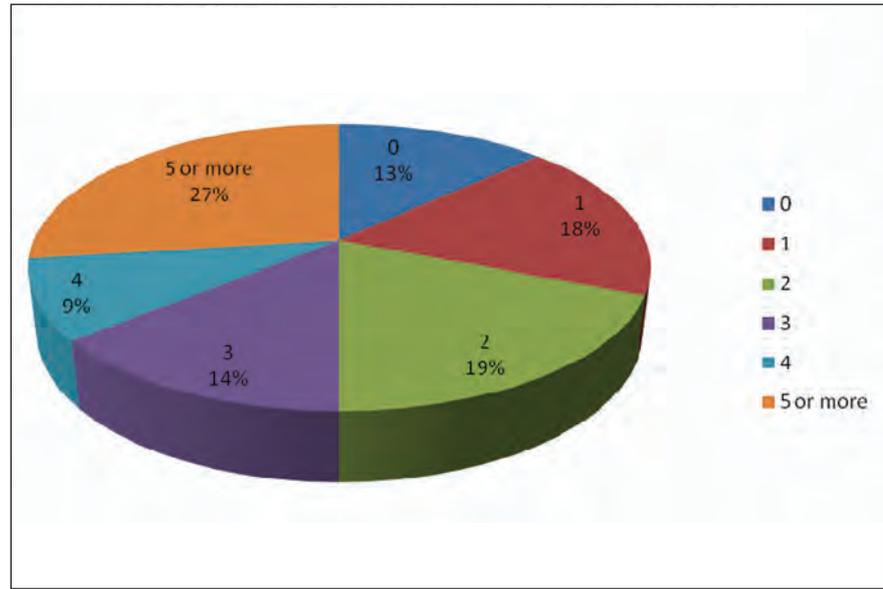
strong communication skills are vital for classification societies to help their clients understand the issues.

Acquiring these sorts of skills does not happen overnight and class societies are increasingly recognising this. Lloyd's Register (LR), which employs around 500 naval architects, like its rivals, is placing a huge amount of emphasis on retaining its talent. The company has implemented "Career Pathway" and "Leadership Pathway" programmes to help ensure that it keeps its best people motivated.

Robert Askins, a technical manager in LR's London office explains: "We aim to give people working at LR a sense of movement and progress in their careers. The pathways enable LR to identify strengths and improvement areas and to help people to develop in their areas of strength. Also the pathways give people a sense of direction in their career".

In terms of the skills LR looks for Robert Askins goes on to say: "We need people who are technically agile and are able to take a new situation and respond to it, this is vital if we are to respond to the constant changes in Regulations and technology."

LR puts a good deal of emphasis on its graduate training programme, but as Robert Askins notes, "We don't want to give



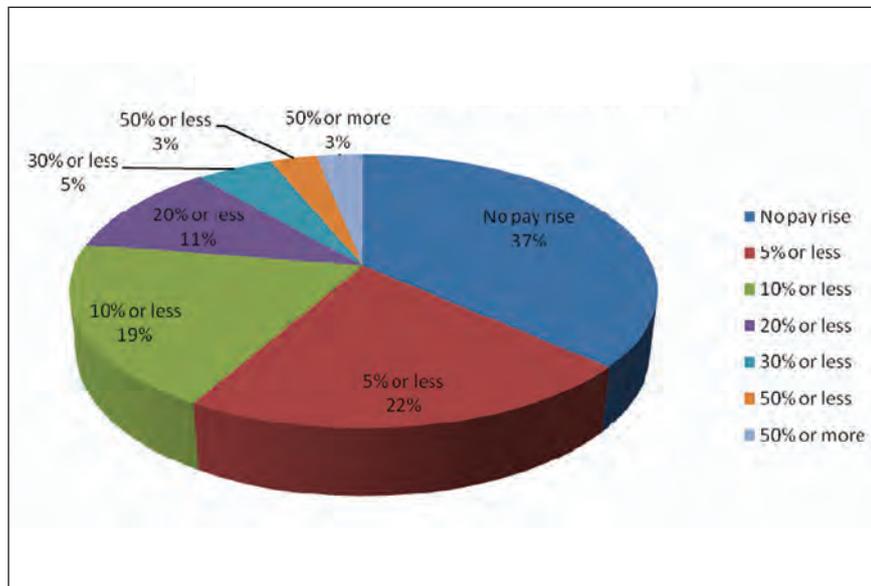
the best graduates the best training only to lose them. Our programme doesn't end after four years and achieving chartered status. Our mentoring system provides ongoing support for graduates with their career development planning and helps them to understand the options that lie ahead. At LR, graduates aren't let loose in the organisation and forgotten about."

Classification societies recognise that they may not be able to compete with consultancies and oil majors when it comes to salaries, but they can offer the opportunity to be at the heart of developments affecting global marine safety and environmental protection.

LR for example is moving its marine headquarters from London to a new Group Technology Centre on Southampton University's Innovation and Technology Campus in 2014. The society believes that will provide a uniquely fertile ground for growing its expertise and attracting the very best marine professionals.

Despite the cuts in defence budgets, the naval architects working in this sector have not been too badly affected. Lots of countries are taking advantage of shipyard capacity and low prices to invest in new ships. UK defence contractor Qinetiq, for example, which has a workforce of around 25 naval architects, says that it has taken on three graduates this year. Like the classification sector, the defence sector cannot compete with the oil and gas industry salaries, but does offer a huge variety of interesting work.

The increasing difficulty of obtaining visas in Europe for non-European passport holders is having an impact on the short-term ability of many companies to fill the gaps in their workforce. Whilst some companies are getting around the problem through inter-office transfers or employing non European Union (EU) naval architect students studying in Europe with previous shipyard or vessel operational experience, the fact remains

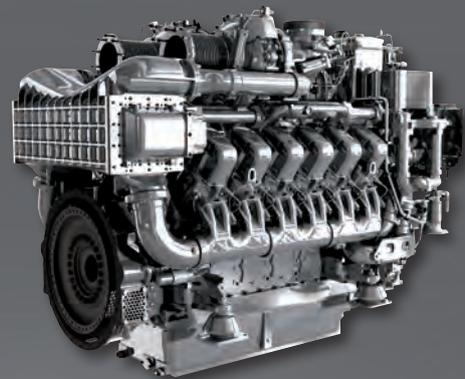


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Image courtesy of Austal, Australia 2011.

Company type	
Consultancy /design house	39%
Class society	18%
Shipping company	18%
Oil major	4%
Manufacturer /product supplier	14%
EPC/subsea installation contractor	6%

that many offices in the UK in particular are suffering as a result. Neil Walker, of independent oil and gas consultancy Global Maritime and employer of around 80 naval architects explains: "Whilst we have found it easier to find staff in the past year globally – oil and gas has been very

Experience	
0-3 years	9%
3-5 years	14%
5-10 years	24%
10-15 years	16%
15 + years	37%

busy at a time when other areas have been quieter – we are particularly interested in people with fabrication experience. With the lack of shipyards in the UK, these are likely to be overseas candidates. However, the visa issue is making this difficult. It means that our overseas offices in places like Abu Dhabi, Stavanger and Houston are growing, but the UK is not."

Faststream's Singapore office is seeing a brisk demand for naval architects across all sectors, particularly for people with five

to 10 years of experience. Whilst ex-pat packages have almost disappeared, salaries continue to be competitive. The rise in local recruitment continues and one major class society recently introduced a graduate scheme for Chinese naval architectural graduates.

However, unless companies make serious efforts to keep their workforce professionally motivated and engaged, they will continue to face the retention challenges. **NA**

UK Based Graduate salaries

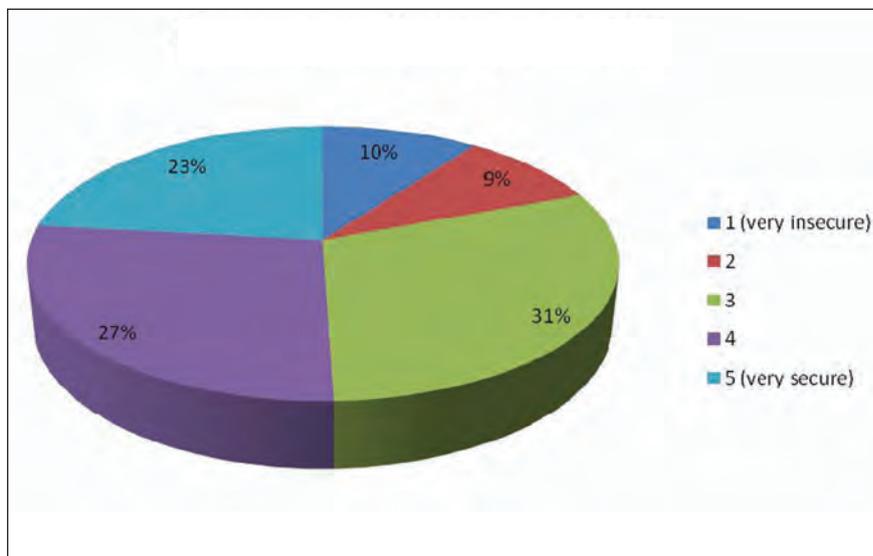
£21,000 – £25,000 for SME companies of up to 50 employees
 £26,000 - £33,000 for larger organisations such oil majors and class societies. A comprehensive benefit scheme is usually also available.

Basic salary for Naval Architects with five years of solid experience

Leisure market (yachts, recreational craft) & shipyards - £35,000
 Offshore consultancy - £45,000
 Marine consultancy - £38,000
 Oil Major - £50,000
 Class society - £35,000
 Oil & Gas EPC contractor - £47,000

Basic salary for Naval Architects with 10 years + experience

Leisure market (yachts, recreational craft) & shipyards - £50,000.
 Many shipyard employees are contracted as consultants at this level, and are paid £40-£50 per hour
 Offshore consultancy - £58,000
 Marine consultancy - £50,000
 Oil Major - £60,000
 Class society - £45,000



How secure do you feel in your current role?

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Class wants EEDI clarity

The energy efficiency design index (EEDI) has received backing from the International Maritime Organization (IMO) as an industry tool for the reduction of CO₂. But outstanding questions remain. The International Association of Classification Societies (IACS) voices its concerns.

The EEDI has been set in place by the IMO to see mandatory measures to reduce emissions of greenhouse gases (GHGs) from international shipping. These changes were adopted by Parties to MARPOL Annex VI represented in the Marine Environment Protection Committee (MEPC).

It is expected that adoption of the EEDI will happen this year and entry into force in 2013, the introduction of the EEDI for all new ships will mean that between an estimated 45 and 50 million tonnes of CO₂ will be removed from the atmosphere annually by 2020. For 2030, the reduction will be between 180 and 240 million tonnes annually from the introduction of the EEDI.

The amendments to MARPOL Annex VI Regulations for the prevention of air pollution from ships, have added a new chapter 4 to Annex VI on Regulations on energy efficiency for ships to make mandatory the EEDI, for new ships, and the Ship Energy Efficiency Management Plan (SEEMP) for all ships.

IACS considers that the biggest challenge faced by the EEDI is the verification of ship speed. "It is well known that the methodologies used for speed estimation in model tests, or speed corrections at sea trials, contain not only semi-empirical but also proprietary elements. These methodologies, developed and refined over a considerable period of time, are trusted by their users, but are not entirely transparent and not easily amendable to verification by a third party. It is expected that standard methodologies may not necessarily find acceptance, let alone adoption in place



Pavel Shikov, Council Chairman, IACS.

$$EEDI = \frac{CO_2 \text{ emission}}{\text{transport work}}$$

More than just a simple equation.

of legacy methodologies. The industry will need to find a solution to this matter before the date of entry-into-force of the regulations", said Pavel.V. Shikov, Council Chairman, IACS.

IACS has stated that the industry is working together to seek a solution and that IACS has initiated a Joint Working Group on EEDI (JWG/EEDI), whose objective is to prepare guidelines to facilitate the consistent application of the EEDI (see MEPC 62/5/21). The JWG held a workshop in July 2011 to further discuss the IMO guidelines on survey and certification of EEDI. While some progress has been made, it is hoped that more agreements can be reached in October when the group meets again. Meanwhile, other proposals have been made, such as that contained in MEPC 62/5/5 and MEPC 62/5/32.

With regards to the EEDI being able

to address all types of vessels, this is still a matter of contention for some, but IACS has pointed that the purpose of the EEDI was to create a mechanism to reduce CO₂ emissions through mandating energy efficiency in new ships.

"While the regulations may not include some ship types, they do include a major proportion of international shipping, and, hence, rightly, address a major proportion of potential CO₂ emissions", said Mr Shikov. To address older vessels the regulation will require a SEEMP onboard and will require them to reduce CO₂ by operational means only.

IACS has highlighted that many proposals were submitted to MEPC 62 seeking further improvements to the regulations and the related guidelines, in particular MEPC agenda item 5 and agenda item 6 papers. What has come out of the meeting? Mr Shikov asked: "Perhaps the key issues that should be addressed are the regulatory text itself and the associated guidelines. For example, for the regulatory text, suggestions were made by China (MEPC 62/6/16) and Greece (MEPC 62/6/19) to modify the reduction rates for EEDI for tankers and bulk carriers, and in the case of Greece, for containerships as well. In the case of the guidelines, the four main ones, namely, EEDI calculation method, EEDI survey and certification, SEEMP preparation, and determination of minimum installed power for safe navigation in severe conditions, have yet to be adopted. These and other issues, as described in MEPC 62/24/Annex 10, are on the table to be resolved in the upcoming intersessional working group in January 2012." **NA**



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Yards succumb to new economic order

Global economic crisis is driving changes to the shipbuilding industry in South Korea with an uncertain future for some smaller yards who are finding it difficult to adapt in the way that their larger competitors appear to have managed.

Systemic failures in global banking have had little effect on the South Korean shipyards according to the Korea Shipbuilders' association (KOSHIPA). That is to say there was a deep impact on the global shipbuilding industry in 2008, but the Korean yards' large orderbooks have helped them to weather the crisis.

In fact the bigger yards have employed a number of strategies that appear to have assisted them in overcoming the worst of the economic crisis, but some of Korea's smaller and medium sized yards are finding the heavy economic weather harder going.

KOSHIPA general manager Kwon Oh-Yoon said that the Korean shipbuilding industry is "more competitive than the Chinese, European and Japanese yards, we think we were well prepared for the crisis and we invested a large amount of money in research and development."

In fact of the five major South Korean yards only Hanjin Heavy Industries has failed to increase its orderbook this year. "Our orderbooks for the KOSHIPA membership

[which includes most Korean yards] shows that Korean yards are the most competitive, they had already surpassed the 2010 totals [8.1 billion grt] by the middle of this year," said Mr Oh-Yoon.

Some 50% of this year's orders are for the offshore sector and the yards expect that with the global economy still weak and many orders yet to be delivered it is unlikely that conventional vessel orders will be able to sustain the industry and so diversification for the larger yards is necessary.

A number of the five major yards have already invested in foreign ventures, most notably STX which has European and Chinese subsidiaries that are allowing the principle Korean companies to maintain their conventional ship business while significantly reducing their labour costs. In fact STX were unable to build a new yard in Korea because the regulations were too stringent, said KOSHIPA, and labour costs were prohibitive compared to the labour costs in China.

Daewoo Shipbuilding and Marine Engineering (DSME) has also ventured out

to China having signed a memorandum of understanding (MoU) earlier this year with China's Rilin Group. DSME said at the time: "With this agreement, DSME is very well placed to promote its new business plans in shipbuilding, energy development, and wind power by securing a business partner in the logistics hub of Northeast Asia."

Both companies, in signing the MoU, pledged to develop the ship construction arm in the Dandong region and to later develop wind, offshore, nuclear and other energy businesses.

Samsung Heavy Industries has been building blocks at Ningbo since the mid-1990s and opened a second Chinese facility at Rongcheng in 2006 which has been producing blocks since 2007.

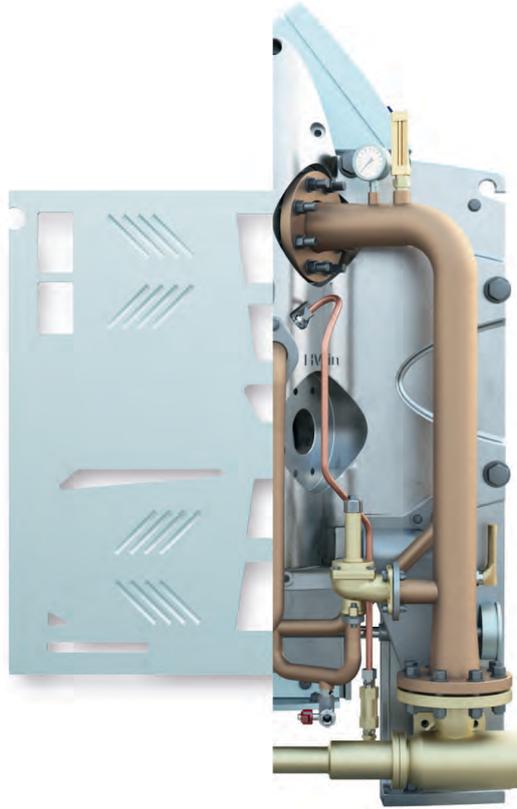
All the Korean companies that have invested in shipbuilding facilities abroad see the main purpose as reducing their labour costs with a view to competing more efficiently with Chinese yards, Korea's major competitor.

It is this fact that has stalled Hanjin's

Sungdong say that "diversification is the name of the game, there is no survival without it."



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recovery as Korean workers were angered at what they saw as their jobs being exported to low wage regions, in Hanjin's case the Philippines. Hanjin's Subic Yard was the beneficiary of work that would have otherwise gone to the company's Korean yard. As a result Hanjin has been beset by industrial action from a disgruntled workforce and it has received no new orders for three years, according to Mr Oh-Yoon.

Hanjin Heavy Industries fired 480 employees in 2010, mainly naval architects and administrative staff as cost saving measures entered into force with some 9000 staff having been laid off in 2010 across the industry and the total employment in the Korean yard sector declining from 150,000 in 2009 to a significantly lower 132,000 12 months later.

Labour costs may be a contentious issue amongst Korean yard workers at the moment, but one advantage that the Koreans have is the supply of engineers which has doubled over a period of 10 years. In 2011 Korean universities will see a further 1200 new naval architecture graduates from some 37 colleges, compared to just 600 in 2005.

"Less than 70% of these graduates are employed by Korean yards and many go to other industries," explained Mr Oh-Yoon.

And while Hanjin was laying off staff one yard, SPP was pleased to accept the experienced naval architects into the fold as the yard looked to offer a wider range of vessels to its customers.

Hojin Lee, managing director at SPP Shipbuilding Co Ltd said that "more than half of the company's 360 ship designers were former Hanjin employees". At SPP designers have been concentrating on developing

new designs which are environmentally less damaging through a 12% increase in fuel efficiency.

The yard has developed its own fuel efficient hull shape and the yard is beginning to diversify its production from mainly product tankers and bulk carriers at its three yards, Gosung, Tongyoung and Sacheon yards all located west of Busan.

The company has now developed a container ship design that it has started to produce at its Gosung and Sacheon facilities. "We were approached by Metrostar, who were a bulk carrier customer and asked if we could build container ships for them," said Mr Lee.

The company can now build vessels from 1700TEU up to 4500TEU and it is building three vessels of 1700TEU each for Metrostar and a further four container ships for East Maritime, each of 3600TEU.

Another smaller yard, Sungdong Shipbuilding has also successfully turned its workforce to building container ships. "We have done many deals in the wake of the market," said Jong-Hwa Lee, also known as Jack, of Sundong's general affairs department.

The company builds three types of container vessel, 3600TEU, 4700TEU and the most recent addition, the 9000TEU ships of which the company has 11 orders. "Sungdong is not exceptional," says Jack, adding, however, that "we have strong back up from the banking system that issues first class refund guarantees [on a par with sovereign debt], so in this context we say we're financially very stable."

In total Sungdong has an orderbook of 31 vessels and, says Mr Lee, "We are developing a fourth type of container ship with a capacity

of 13,000TEU".

According to Mr Lee (Jack) "Diversification is the name of the game; there is no survival without it." Design development is very important, "if you stand still you can't avoid tough competition with the Chinese."

As a result Sungdong is looking to expand its marketing ability and is developing new vessels. Small shuttle tankers are being designed through the modification of larger sizes and the company is looking to develop dual fuel ships using LNG as a fuel and the company is also looking at developing its already substantial conversion business.

If Sungdong is the successful face of a smaller yard managing the global crisis which has hit shipping, its neighbour Shina SB is less fortunate as the yard clings on in the hope of finding new customers.

Formerly known as SLS, Shina SB was restructured as the banks took control in April 2010. The yard is now looking to branch out into small container vessels of around 2500TEU and the company says it has virtually completed two new designs of vessels that will meet new regulations.

However, the yard's director for ship sales, YB Kim, said; "There are no new orders at the moment." One of the major difficulties for all the smaller yards, many of which are under administration of the banks, is that the "present market price [for ships] is below the break even point for the yards."

Shina SB is considering diversifying into ro-ro ships, small bulk carriers and cement carriers in the future.

"We have no special difficulties, if the contract price meets our price we're supported by our backers, it's a typical situation for small

Order books

Year	Korea		Japan		CESA		China		Others		World	
	Thou. CGT	%										
2003	26,623	37.7	9,543	13.5	19,255	27.3	8,613	12.2	6,521	9.2	70,555	100.0
2004	33,968	37.3	13,483	14.8	25,683	28.2	12,302	13.5	5,642	6.2	91,077	100.0
2005	37,595	35.6	16,643	15.8	27,952	26.5	15,924	15.1	7,522	7.1	105,635	100.0
2006	47,994	35.2	28,645	21.0	30,676	22.5	18,129	13.3	10,795	7.9	136,238	100.0
2007	64,575	35.6	53,101	29.3	31,355	17.3	16,753	9.2	15,664	8.6	181,449	100.0
2008	64,357	33.8	62,001	32.6	30,649	16.1	13,743	7.2	19,516	10.2	190,266	100.0
2009	47,576	31.3	54,357	35.8	24,460	16.0	9,214	6.1	16,345	10.8	151,952	100.0
2010	39,145	30.6	19,836	15.5	6,227	4.9	48,922	38.2	13,883	10.8	128,013	100.0

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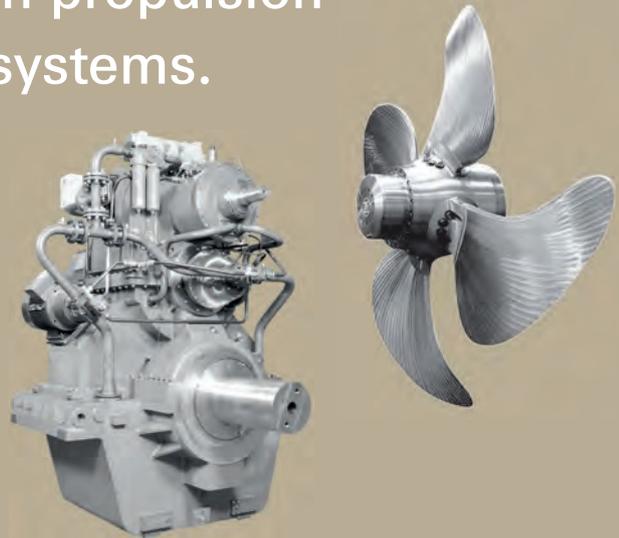
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and medium sized yards,” explained Mr Kim.

Mr Lee at Sungdong pointed out that medium and small yards “theoretically” have lower capital, but “all yards are worried about liquidity problems”.

Korean Register chairman and CEO, Oh Kong-gyun is more upbeat about the future, however. He said several years ago Korean yards struggled to overcome the sharp

decline in new orders brought on by the global financial crisis. Since then, they have been diversifying their business portfolio and carving out niche markets for themselves.

“Consequently, the Korean shipbuilding industry has managed to achieve orders to build high-end products such as LNG carriers, VLCCs and ultra-large container ships. They have also been winning contracts

for new products related to offshore oil and gas exploration and exploitation such as FPSO, FSU and drill ships.

“Korean shipbuilders will continue to maintain their status as the leading shipbuilding power in the future based on technical innovation and market awareness.”

That, like all predictions, remains to be seen. *NA*

KR throws its weight behind carbon taxes

Following the International Maritime Organization’s (IMO) approval of two of the crucial building blocks for improving shipping’s emissions record, the Korean Register backs the creation of an emissions tax and calls for these revenues to be used to support emerging economies, explains chairman and CEO, Oh Kong-gyun.

In July this year the Marine Environment Protection Committee (MEPC) 62 adopted the Energy Efficiency Design Index (EEDI) and the Ship Energy Efficiency Management Plan as additions to the MARPOL Annex VI regulations. In adopting these new rules the IMO set out its plans for reducing emissions from ships through better design and operation.

However, improving ship designs and operating vessels more efficiently will not be enough to reduce emissions from the maritime industry sufficiently to meet its greenhouse gas (GHG) targets.

A GHG reduction target to limit the increase in global average temperature below 2°C above pre-industrial levels was agreed at the 16th Conference of the Parties (COP) of the United Nations Framework Convention on Climate Change (UNFCCC), in Cancun last year.

According to the Second IMO GHG Study 2009, CO₂ emissions from shipping in 2007 were 1.046 billion tonnes which is 3.3% of the global total. Of these, international shipping emitted 870 million tonnes which is 2.7% of world’s total emissions. The forecast growth in world trade suggests this share might grow to 12-18% of global emissions by 2050.

“Technical and operational measures



Korean Register chairman and CEO, Oh Kong-gyun says that an “open (Emissions Trading) system” would leave shipping vulnerable to more competitive land-based industries.

alone would not be sufficient to reduce shipping’s emissions to contribute to

achieving a global stabilisation of the climate to less than 2°C warming,” says Mr Oh.

It is, therefore, necessary to introduce market based measures to further limit the growth of emissions, particularly CO₂, to acceptable levels.

Market based controls “would provide an incentive for the efforts of the maritime industry to improve energy efficiency and provide additional and cost-effective options to achieve emissions reduction by purchasing UN-approved emissions reduction credits such as Clean Development Mechanism (CDM) credits,” said Mr Oh.

Recognising the conflict caused by the contradictory principles applied by the Kyoto Protocol, namely the common but differentiated responsibilities (CBDR) and the IMO’s own no more favourable treatment (NMFT) KR believes that this conflict can be resolved by offering financial support to emerging economies from funds raised through market based measures.

“However, the levels of revenues generated by market based measures are decided by the level of the auctioning rate to allocate emissions allowances in the Emissions Trading System (ETS) or by the level of tax on bunker fuel in Carbon Tax (the so called GHG Fund). This means

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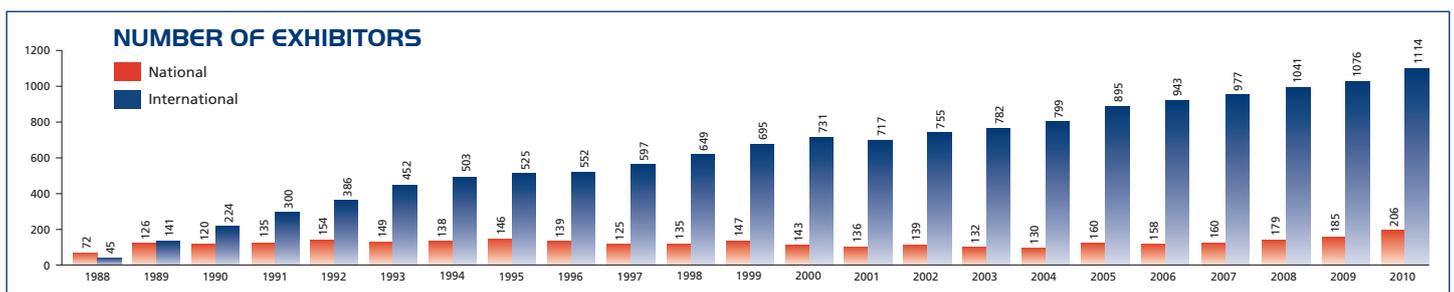
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that if the auctioning rate or tax rate is set at a high level, the level of financial burden that shipping companies have to bear becomes high also. Therefore, an assessment of revenues generated and the burden on shipping companies needs to be made," said Mr Oh.

He went on to point out, however, that the ETS proposed for the maritime sector is an "open system" that will allow land based companies to participate. "KR believes that the competitiveness of the shipping industry is lower than land-based industries because the shipping industry lacks experience and knowledge of the system. There are no CDM projects, which generate emissions reduction in addition to emissions allowances allocated, applicable to the shipping industry," claimed Mr Oh.

In addition the potential to reduce GHG emissions in the shipping industry is far less than for land-based industries simply because the shipping sector is significantly more efficient.

"Consequently, the shipping industry would likely be a buyer in the system resulting in a potential outflow of capital from the shipping sector. In addition, the ETS is an unfavourable scheme for small shipping companies in terms of administrative and technical burden," Mr Oh said.

He, therefore, concluded: "Like many shipping companies and organisations, KR is of the view that a Carbon Tax ensures a level playing field and prevents market distortion. It is also a very simple and transparent system to implement."

When the IMO makes its final choice over market-based measures for reducing emissions the new design and development of technology will still be needed to further reduce emissions from the industry.

"Improvements to vessel design and fuel efficiency must go hand-in-hand with the market-based measures for reducing global emissions from the maritime sector. "Continuous development of new hull forms and energy saving devices, combined with the use of eco-friendly fuels such as LNG and new and renewable energy, will surely help the shipping industry meet its emissions targets for 2050," said KR.

Alternative energy sources must be a long term solution to sustainable shipping in the future one of those technologies is the development of fuel cells for both main engine and auxiliary power. "The US, Japan and European Union (EU) anticipated this paradigm shift a decade ago and since then have been endeavouring to carry out R&D on key technologies related to the use of fuel cells for ships," claimed Mr Oh.

"The potential to reduce GHG emissions in the shipping industry is far less than for land-based industries simply because the shipping sector is significantly more efficient."

In 2009, KR formed its "Eco-friendly Fuel Cell Ship Research Team" comprised of experts from shipping companies, shipbuilders, fuel cell manufacturers, materials & equipment manufacturers and R&D institutes. The team is presently working to develop a fuel cell system for auxiliary power generation onboard and main propulsion.

KR is also carrying out research to develop green ships that emit less greenhouse gas. A part of this project includes the establishment of a "Green Ship TCS (Testing, Certification and Standard) System" to verify the energy efficiency of new ships and those in service.

Perhaps more surprisingly KR is investigating the possibility of developing nuclear powered ships. Unlike their near neighbours, ClassNK in Japan who will not countenance a nuclear power option following the spring Tsunami

and subsequent meltdown at Fukushima Nuclear Plant, KR believes that there is a future for marine nuclear energy.

"For the successful commercialisation of nuclear powered ships, all three key elements - ie, design, operation and infrastructure - need to be addressed. In addition, its safety aspect needs to be properly dealt with to ease the concerns of the public," says Mr Oh.

Safety regulations for nuclear powered ships are stipulated in the IMO MARPOL Convention and the Korean government is working to improve the nuclear power laws and Ship Safety Act to accommodate nuclear powered ships, said KR.

"As the leading shipbuilding nation, Korea is beginning to look at nuclear powered ships as one of the areas that they will excel in. KR for its part is working with the government and the shipbuilders to develop safety standards and rules that the nuclear ships need to comply with," explained Mr Oh.

He did concede, however, that nuclear powered ships still need to resolve some technical issues and negative public perceptions though he said the level of interest from the industry was likely increase in the future.

"Although Korea has a lot of experience and technical competence in the onshore nuclear power generating sector, which enabled the country to export a nuclear reactor system to UAE recently, Korea does lack experience in the offshore nuclear power sector," Mr Oh added.

He also noted that Russia with *Taimyr* in 1989, *Sevmorput* in 1988 and *Vaigach* in 1990; the US with *Savannah* in 1962, *Otto-Hahn* in 1968 and a number of military vessels; and Japan with *Mutsu* in 1991 have already successfully developed nuclear powered ships.

KR believes that the continuous development of new hull forms and energy saving devices, combined with use of eco-friendly fuels such as LNG and new & renewable energy, will surely help the shipping industry meet its emissions targets for 2050.

However, these technological advances can only be fully effective if they are complemented with market based mechanisms that will further limit the growth of GHG emissions. **NA**

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Samsung and GTT in legal wrangle over LNG CCS

South Korean companies are beginning to encroach into the territory previously occupied only by the French company Gaztransport & Technigaz (GTT) with Samsung Heavy Industries (SHI) following in Kogas' footsteps and designing its own LNG cargo containment system.

Advances in the development of membrane containment systems for LNG carrying ships have been few and far between over the last 30 years or so, but as with the proverbial London bus, you wait 30 years for a new cargo containment system (CCS) and then two come along at the same time.

Two new systems, one from South Korea's gas production company Kogas. The KC-1 system was first presented in December 2006; and the other CCS, the Smart Containment –system Advanced (SCA) from SHI launched in September in London, are expected to break the hold that GTT currently enjoys over the market in the membrane type of CCS.

SHI developed its system with the Korean Advanced Institute of Science and Technology (KAIST) and the two organisations began their collaboration in 2007. SHI has extensive experience with the GTT MKIII membrane system which it uses on the gas carriers it builds. However, SHI reportedly pays KRW9-10 billion (US\$ 7.72 – 8.58 million) in royalties to GTT for building its MKIII design.

"In the past, all Korean shipbuilders manufacturing LNG tankers had to pay technology royalties, as a foreign company had the source technology. With the aim of achieving self-reliant cargo hold manufacturing, Samsung Heavy Industries has conducted joint research with KAIST since 2007, with the master design and full design certified by major classification agencies, including LR [Lloyd's Register] and ABS," said SHI.

In saving these royalties the SHI CCS will be far more competitive on price than its competing CCS systems.

Invitations to the London launch of the SCA were sent to GTT, but the company declined to attend, though a representative



CH Park believes that the market is demanding competition between LNG CCS manufacturers.

from major GTT shareholder GDF Suez was reportedly present, said a Samsung representative. However, *The Naval Architect* understands that some expert opinion at the launch suggested the system is comparable to the GTT MKIII.

SHI executive vice president and chief technical officer CH Park said: "GTT has its own system, but they need some competing systems," he conceded that "GTT won't be happy, but they need the competition, the market demands it".

Mr Park said that the SHI system was different from existing CCS's because its boil off rate (BOR) was significantly lower and the SCA has less stringent filling

limitations which are there to limit the damaging effects of sloshing motions of the cargo in the tanks.

GTT President and CEO Philippe Bertorottiere told *The Naval Architect* "We are in frank and direct discussions with Samsung, we have a legal case, though they may consider things differently". "Eventually, at the end of the day we could take legal action," conceded Mr Bertorottiere, adding "If we don't come to an acceptable solution we will go to court." Pressed on what GTT would consider an acceptable solution, he said: "Samsung must stop marketing SCA".

However, Mr Park denied that SHI was discussing the issue with GTT. "We took legal advice and we understand there are no violations of any patents," said Mr Park.

The situation between SHI and GTT is further complicated by the long term and successful business relationship that the two companies have enjoyed. Mr Bertorottiere referred to this long standing association when he said "SHI are signing for plenty of MKIII vessels".

Details of the design of the SCA are a little patchy. According to SHI "the wrinkled part of the membrane of the primary protective wall that is in direct contact with the LNG was improved to reduce sloshing and significantly enhance stability. Sloshing refers to fluctuations during operations, which may give shocks to tanks." It is understood that the primary barrier is made from steel, though the type of steel is unclear.

In addition the company says: "The secondary protective wall surrounding the primary wall was made of metallic materials, replacing the previous material of triplex that is made of glass fibres. The replacement of the material aimed to improve the gas tightness of the hold."

Professor Dai Gill Lee, a director at KAIST, outlined other innovations of the

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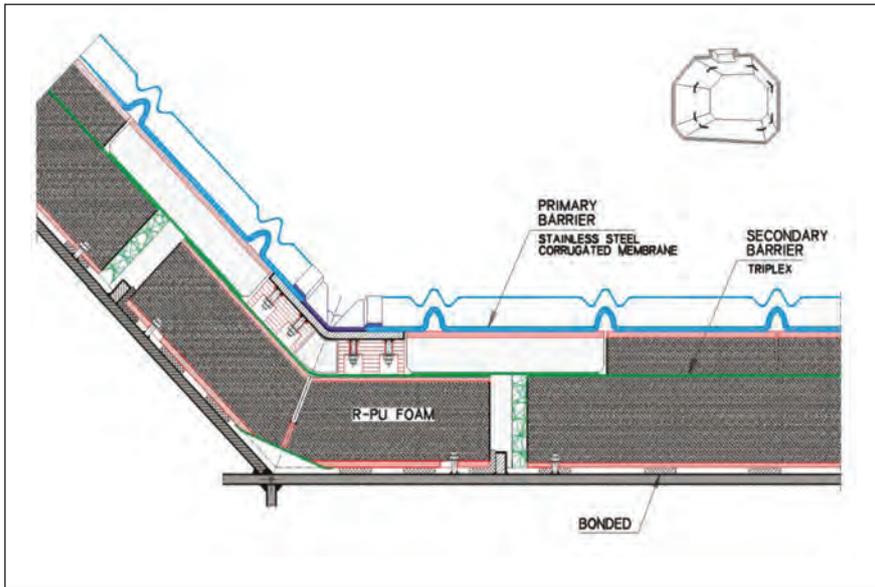
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A cross section of the MKIII CCS.

additional reinforcing system is required”, according to SHI.

Furthermore the SCA has a super-insulating new material applied to the insulation panels, “preventing the evaporation of LNG and improving the efficiency of LNG transportation. In general, evaporative emissions created during the operation of LNG tankers are partially used as fuel, and the remaining emissions are self-propagated or disposed. The new material minimises evaporative emissions of LNG.”

In fact Dr Lee says the insulating board thickness of the SCA is 270mm, similar to the MKIII, but its BOR rate is 0.12%/day compared to the MKIII’s 0.15%/day. “If the thickness of the insulation is increased to 390mm the BOR reduces further to 0.1%/day,” said Dr Lee.

Three mock up models have been built to evaluate the SCA, including the construction process and the integrity of the secondary barrier. In thermal load tests and the integrity of the isolation

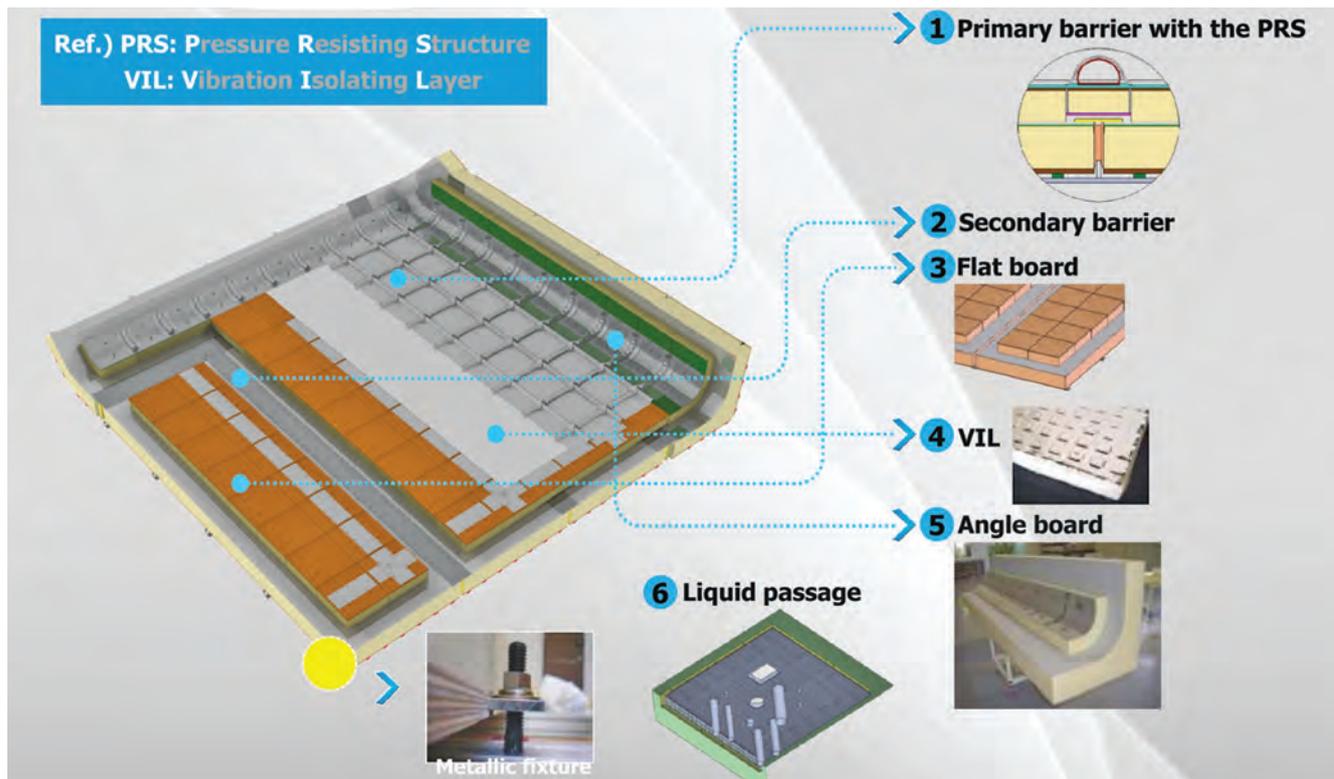
SCA in London, these included the PRS, Pressure Resisting Structure a glass fibre mat that sits between the primary barrier and the insulation, made of reinforced polyurethane foam. Dr Lee said the system had been tested to 62bar and was a massive improvement on existing CCS.

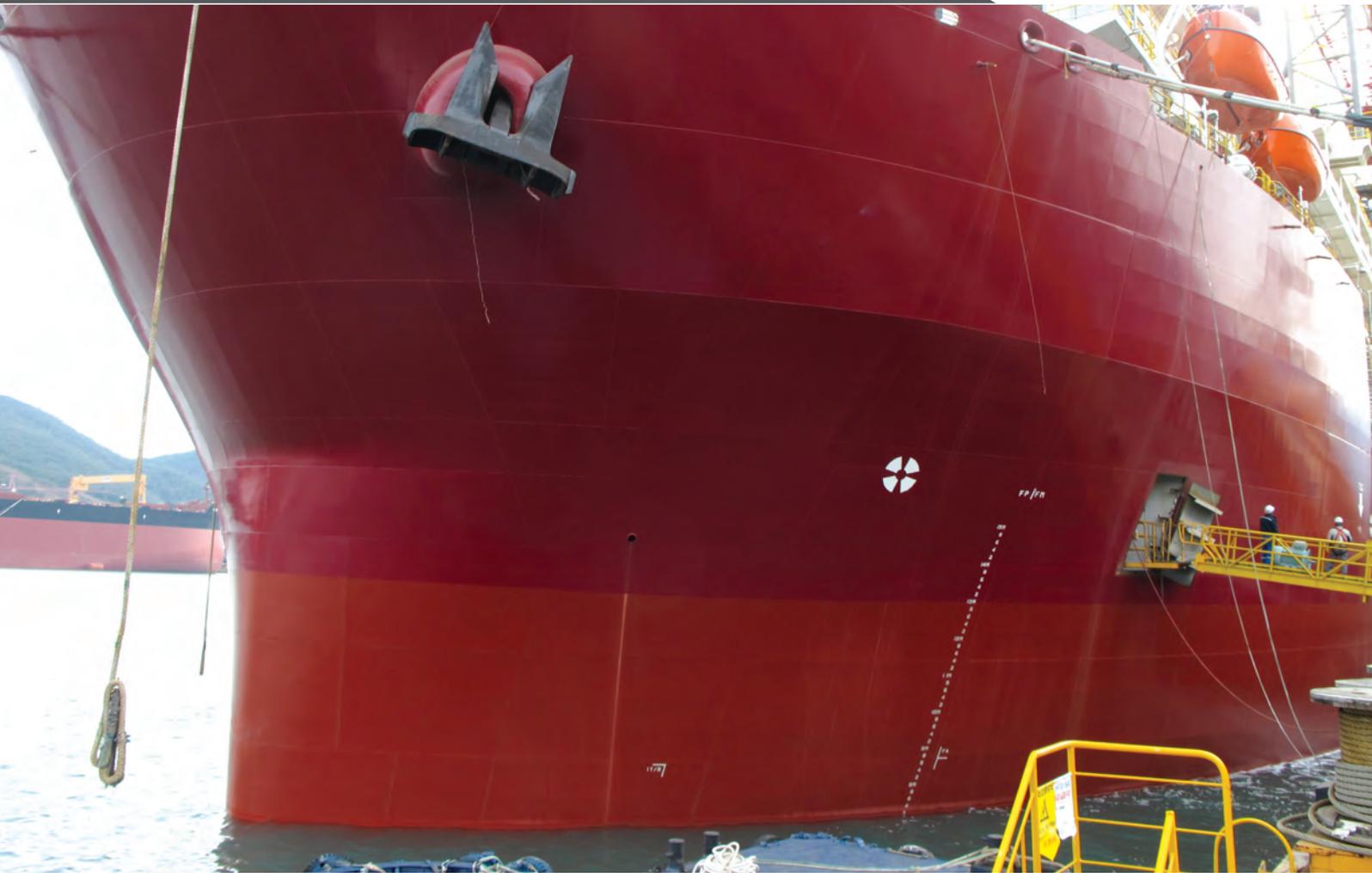
The secondary barrier is constructed from a metal composite laminate (MCL)

consisting of aluminium foil, a glass fibre mat and a second aluminium foil layer making a glass fibre and foil ‘sandwich’ held together with PU glue which is 0.39mm. The foil sandwich forms a part of the secondary barrier keeping the whole system totally gas tight, say SHI.

The secondary barrier is fitted directly onto the hull of the ship, “thus no

Detail of Samsung’s SCA containment system.





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structure and tightness of the secondary barrier there were no reported failures.

Currently the operational filling limits set by class societies ABS and Lloyd's Register are 50% of the tank height, but expectations are that these will be increased when the ABAS Blanket system is fully developed. The ABAS Blanket, or Anti Boil-off gas Anti Slosh Blanket (see *The Naval Architect* May 2011 pages 20-24), is made from a material called Basotect, patented by German chemical company BASF. The blanket is designed to float on top of the LNG cargo, which is stored at around -163°C, and dampen the sloshing motion, thereby protecting the CCS from the heavy loads created by sloshing cargo.

SHI's principle engineer Sangeon Chun has championed the design of the ABAS Blanket and was recently in Qatar in a bid to take the ABAS Blanket on to its next stage of development.

"Qatar Gas is ready to supply a ship that will be fitted with the ABAS Blanket so that it can be tested," said Mr Chun. Final approvals of the ABAS Blanket are expected by the end of this year and the full scale ship tests should start early next year, probably around March, said Mr Chun.

Mr CH Park said that the SCA would sell its first system probably within the next one to two years, by which time the ABAS Blanket should have completed its testing and be preparations to market the system should be in place.

Adaptable to any CCS the ABAS Blanket would also suit Kogas' KC-1 system which is now the subject of discussions between with three Korean shipyards; Hyundai Heavy Industries (HHI), SHI and Daewoo Shipbuilding and Marine Engineering (DSME).

Kogas has now said that it is looking for partners in the shipping and shipbuilding industries to take their system to the next stage of development.

Discussions include, "improvements in the KC-1 system for cost-cutting, development of a moveable scaffolding system for installing PUF [polyurethane foam] insulation panels and membrane panels and a study to mitigate risks expected for building LNG carriers using new technology," said Yang Young-myung,

vice president of the LNG Technical centre R&D division at Kogas.

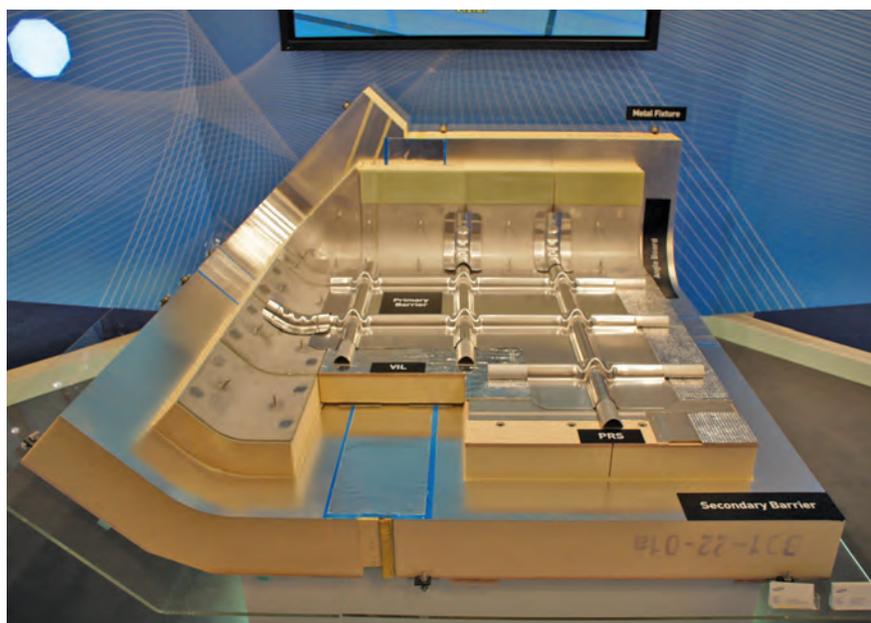
The conventional size for the KC-1 system is 150,000m³, but the system was originally designed for land use and could operate in tanks of up to 200,000m³, said Mr Young-myung. Land-based tanks in Incheon using the KC-1 have been operational since 2008.

Kogas, along with Australian energy company Santos, French oil company Total and Malaysian energy company Petronas, are partners in the Gladstone LNG project which will see coal seam gas turned into LNG at the rate of 7.8 million tonnes/annum initially rising to 10 million tonnes later.

the inner hull and the load bearing mastic is used only for levelling the irregular surfaces of the inner hull for the installation of the insulation panels. The primary and secondary barriers are made of stainless steel 304L membrane," say Kogas.

In addition Kogas say that the KC-1, unlike other systems, has only one layer of insulation, i-grade polyurethane foam (PUF-i) with a density of around 115kg/m³ and Kogas has dispensed with the glass fibre continuous strand mat. Kogas claim the thermal conductivity of their insulation system will be around 10% lower than existing CCS's.

Mr Young-myung said some improvements to the KC-1 system were



A mock-up of the SCA at its London launch show in September.

Kogas will build an initial four ships for this project and "we will then decommission the ships to inspect them before offering the KC-1 system to other owners," Mr Young-myung explained. As a result the KC-1 system is unlikely to be available on the market for a number of years, maybe five or more years.

"The basic concept of the KC-1 system is; (1) to minimize the effect on the insulation system by the hull and primary barrier deformation and (2) to provide liquid and gas tightness at both primary and secondary barriers. For these purposes, the insulation panels are not bonded to

being discussed with major shipyards, HHI, DSME and SHI in an effort to cut the cost of the CCS. In addition discussions were under way on the "development of a moveable scaffolding system for installing PUF insulation panels and membrane panels and a study to mitigate the risks expected for building LNG carriers using new technology."

With the market place for LNG CCS now becoming crowded the jostling for position is moving to a new dimension. When the dust settles the customers should, in theory, have more, better and cheaper products to choose from. **NA**

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Koreans Join BWTS battle

A number of South Korean companies have developed ballast water treatment systems (BWTS) in preparation for the new regulations that are expected to be ratified within the coming year and the signs are that owners are beginning to respond.

In the first eight months of this year one company alone has taken orders for BWTSs for 37 container carriers ranging in size from 3800TEU up to 10,600TEU and eight 205,000dwt bulk carriers.

This flood of orders comes as the expectation mounts that the critical ratification figures, according to the International Maritime Organization (IMO) rules 30 flag states representing at least 35% of the world's tonnage are needed to pass a regulation into law, are expected to be reached very soon. So far some 28 countries representing 25.43% of the world's fleet have reportedly ratified the convention that was approved by the IMO in 2004.

However, the ratification process may have been hindered by the fact that some flag states may have reservations on their ability to verify the efficacy of the BWTS. In a report by the US Environmental Protection Agency, released last July, the agency admitted: "While "zero detectable discharge" might initially seem a desirable standard, it is not statistically verifiable. Further, verification of standards that set very low organism concentrations may require water samples that are too large to be logistically feasible. However, when small sample volumes are used, the probability of detecting an organism is low even when the actual organism concentration is relatively high. These errors depend on the sample volume collected, and the relative errors are much larger for small sample volumes."

Once the ratification process finished it was expected that there would be a rush to fit BWTS and as the years since the IMO adopted the regulation have passed an increasing number of systems have been approved. That rush appears to have already started.

In South Korea at least four companies have entered the fray, the latest being Hyundai Heavy Industries (HHI) which has introduced EcoBallast, an ultra-violet



Hyde Marine a major European competitor for the South Korean BWTS manufacturers says it has received orders for over 100 systems, such as the one above, ranging from 60m³/hr to 5000m³/hr capacity and for Research vessels to Suezmax tankers.

system that does not use any chemicals and HiBallast which uses electrolysis as its disinfectant.

Type approval for EcoBallast was received in March 2011 and Final Approval for HiBallast was received in September. Both systems have received orders, nine ships from two owners have ordered the HiBallast system and three companies have ordered EcoBallast which will be fitted to 11 ships in total.

The HHI BWTS' costs around US\$1 million each to buy and fit, whereas some other producers are charging in the region of US\$1.2 million according to Sungdong Shipyard. But the yard expects this price to fall in the short-term because of the intense competition in the market, even between Korean manufacturers. Costs can differ depending on system and the pump

capacity necessary, so for larger ships with higher capacity ballast tanks the cost is generally higher.

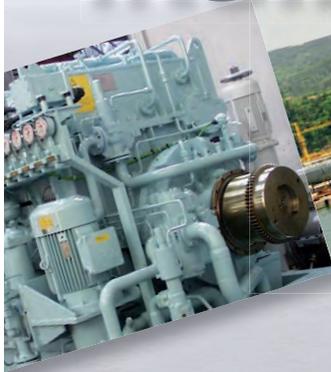
Sungdong says its preferred BWTS is the NK version which uses ozone as its main disinfectant. The yard said that the NK-03 system is easy to fit and the use of ozone means that there is little re-growth of organisms, which means that the ballast water only needs to be treated once whereas some systems need to treat water a second time before de-ballasting.

Ozone itself has been used as a disinfectant for more than 100 years. It is comparatively easy to produce and has an extremely limited half life in seawater particularly, around five minutes, before it reverts to oxygen.

The NK-03 system is easy and cheap to install using readily available components



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Component	Filter Unit UV Unit+UV sensor Rectifier Control Panel Power Distributor	Oxygen Generator Oxygen tanks Ozone Generator Ozone tanks / Cooler Power Distributor TRO Sensor Neutralization	Electro Chamber Rectifier Control Panel Power Distributor TRO Sensor Neutralization	Filter Chlorinator Unit Rectifier Control Panel Power Distributor TRO Sensor Neutralization
Active Substances	UV radiation OH- radical	Ozone	TRO 2 ~ 10ppm	TRO 1000-1500ppm Diluted to 10~15ppm
Pressure Drop	< 1 bar	<0.1 bar	< 0.2 bar ~ < 1 bar	0.5 bar
Power Consump. Per 100m3	8-12KW (Med Pressure) 14.4-24 KW(Low)	8KW	2KW ~ 6KW	7.3KW
Maintenance & Expected Costs	<ul style="list-style-type: none"> Filter maintenance to prevent clogging UV Lamps replacement /1,500~3,000 hours (\$1,000~ €500 / lamp) Titanium exchange per 3,000 hrs (Alfa Laval) 	<ul style="list-style-type: none"> Special care for Oxygen tanks and Ozone tanks Oxygen 	<ul style="list-style-type: none"> Titanium electrode replacement Neutralizer 	<ul style="list-style-type: none"> Titanium electrode replacement Neutralizer
Strength	<ul style="list-style-type: none"> No toxic or nontoxic byproducts No danger of overdosing 	<ul style="list-style-type: none"> Strong Efficacy(?) Short half life time at Seawater 	<ul style="list-style-type: none"> Strong efficacy No re-growth 	<ul style="list-style-type: none"> More suitable for bigger ships by capacity increase
Weakness	<ul style="list-style-type: none"> No disinfection residual Regrowth Not suitable with high levels of TSS, POC Filter Maintenance 2nd Treat at deballast 	<ul style="list-style-type: none"> Toxic and special care for ozone tanks Corrosion issue Less number of maker in BWTS Neutralization 	<ul style="list-style-type: none"> Neutralization required for short voyage Corrosion issue Fresh water issue 	<ul style="list-style-type: none"> Control over dosing Neutralization for short voyage H2 gas removal Corrosion issue Fresh water issue
COMPANY	<ul style="list-style-type: none"> Panasia, HHI, Hyde-Marine, Mahle 	<ul style="list-style-type: none"> NK, Special Pipe 	<ul style="list-style-type: none"> Techcross, Hamworthy, RWO 	<ul style="list-style-type: none"> SHI, Severn Trent, HHI

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and ships need no modifications to their ballast water systems. Neither is it necessary for a vessel to stop operations to install the system which can be fitted any where, in the engine room or on deck and it is easily retro-fitted to existing vessels, it can be installed in two weeks if the preparations are made, with four units to fit.

NK said: "We chose ozone because it was the strongest disinfectant and we developed the system with academics and there are no adverse effects of the ozone on coatings".

Ozone can kill organisms in around eight seconds and the ozone leaves a total residual oxidant (TRO) in the tank for 48 hours which will kill off any residual organisms.

Final approval of the NK-03 system was achieved in 2009 and type Approval followed shortly after from the major classification societies. Techcross's own BWTS also received final approval in 2009 and the company said it had already achieved 90% of its sales target of KRW33.1 billion (US\$28.5 million) for 2011 by the end of June.

Techcross was the first company to install a BWTS on a VLCC, the 317,000dwt *Sifa* and *Fida* were built at HHI and were delivered to the owner the Oman Shipping Company earlier this year. Techcross has now installed its Electro-Cleen™ System (ECS) on 36 vessels in total and has firm orders for 113 systems.

The ECS uses electrolysis to disinfect ballast water, it is an effective system that can be adapted to meet the requirements of any ship. The system can be fitted below deck or on skids on deck if preferred. The system is modular and can, therefore, be easily installed, but the system does not use filters so there is no need to clean a filtration system, simplifying maintenance.

Electrolysis will kill most of the organisms in the water, but the ECS also uses hypochlorite which remains in the tanks and will continue to disinfect the water for seven days after the initial treatment, making re-treatment of ballast water at de-ballasting unnecessary.

The company said that the system uses a maximum of 3.4kW to treat 100m³/hour of 8PSU (Practical Salinity Units) water and 7.3kW to treat 100m³/hour of 30PSU water, the standard salinity for seawater, with such low power requirements the company says an extra generator is not necessary.

"ECS meets California's standard which more strict than the IMO's," said the company, which will allow their customers to operate in US waters.

Practical instalment costs for an ECS are between US\$100,000 and US\$150,000 per ship depending on the yard, said Techcross. The cost of the ECS itself will depend on the vessels and the size of the ballast water tanks. A smaller

"In such a crowded market place the intensity of the competition is extremely high and as the date of enforcement of the IMO regulation comes ever closer that intensity will reach fever pitch"

system handling water at the rate of 300m³/hour will cost US\$230,000, while the mid-range system, 600m³/hour will cost around US\$330,000 and the larger systems, 1000m³/hour cost US\$430,000.

"It is possible to combine units for ships with large ballast tank capacity, for example if the tanks have a capacity of 2600m³ the electro chamber units (ECU) used would be two, 1000 ECU chambers and a 600 ECU chamber," said Techcross.

Like Techcross, Panasia's version of the BWTS produces no toxic gas, is said to be non-corrosive to the ballast tank walls and does not produce explosive gases such as oxygen or hydrogen and is, therefore, safe to use aboard tankers and other vessels carry flammable cargoes.

GloEn-Patrol uses ultra-violet light to neutralise organisms and a filter for the larger organisms, above 50µm. Like many of the other designs GloEn-Patrol does not use any costly or hazardous chemicals.

The system uses a filtration unit that has a fine mesh, but is fully guaranteed by Panasia for 10 years, while the UV lamp will last 4000 hours, or in ballasting days it is expected to last between five and 10 years.

All the components for GloEn-Patrol are manufactured by Panasia and have been extensively tested on its barge in Busan and in "muddy Chinese rivers" and the system was effective said Panasia.

Essentially GloEn-Patrol has two major elements, its filtration system which filters water and takes out the larger organisms, creating a filtration cake on the surface of the filter. Back pressure then automatically starts back-flushing to clean the filter without affecting the through flow of ballast water.

Water is then disinfected by UV light which captures all the smaller organisms. Under IMO regulations BWTS's must be able to show there is no re-growth of organisms within 15 days, however, GloEn-Patrol achieved no re-growth for up to a month in its Busan test tank, said the company.

Installation of GloEn-Patrol can be adapted to suit the vessel. The system can be fitted into the pump or engine room or can be fitted into a container and placed on deck. Operation and maintenance are simple, said the company, no engineers are needed as the system is self-cleaning and crews can easily maintain filters and change UV lamps when necessary. Operating the system is also very simple with a single on/off switch.

Panasia also estimates that the cost of fitting a system with two 500m³ sets will be US\$500,000. According to Sungdong shipyard the cost of BWTS's, including the fitting costs, will decrease as "there are many competitors in this market."

Certainly the competition from the European companies is very strong, Alfa Laval has sold the most systems, said Panasia and in the top ten are also Ocean Saver, RWO, Hyde Marine and Hamworthy. Also vying for a market share are Mahle, Samsung Heavy Industries and Severn Trent. In such a crowded market place the intensity of the competition is extremely high and as the date of enforcement of the IMO regulation comes ever closer that intensity will reach fever pitch. **NA**

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New regulations herald change of emphasis for boxship operators

Orders for container ships have been growing apace during the course of the year, but the emphasis is now on cost savings and environmental friendliness in order to offset the effects of bunker prices and new environmental regulation, writes Sandra Speares.

The advent of emission control areas, which are likely to spread further, plus the International Maritime Organization (IMO's) Energy Efficiency Design Index has meant greater attention being paid to hull design, propellers and propulsion as a means of cutting down on emissions and fuel consumption.

Although the new generation container giants have been grabbing the headlines, so too have feeder vessels with an order from UK-based Graig group for 26 MARLIN 2000 Blue design feeders to be built at the Jin Hai shipyard in China.

Delivery of the first two vessels in the series is due to take place in August and September 2013, with subsequent deliveries of two vessels every two and a half months.

While charters for the vessels will be key to the success of the newbuilding programme, construction of a fleet of feederships is perceived to fulfil a gap resulting from a depressed KG market in Germany.

In announcing the order, Graig chief executive Hugh Williams said that: "This series responds to the industry's needs. There is a gap in the containership market for quality, fuel efficient, competitively-priced and environmentally-friendly feeder ships to service the ultra large containerships now being brought into service by the major lines. This advanced MARLIN family of designs will fill that gap, and we expect this order to be the first of several series of larger capacity future-proof vessels, backed by the strength of the MARLIN consortia."

The MARLIN series was developed by Graig in conjunction with engine manufacturer Wärtsilä, and classification society Det Norsk Veritas. The company claims that the series can deliver "improved capacity and slow steaming potential, better loading flexibility for different container



Graig CEO Hugh Williams believes there is a gap in the market for highly efficient container feederships.

types including a high reefer intake and lower emissions when compared to vessels currently in service".

MARLIN 2000 Blue is a Bangkok-max, direct diesel powered and Graig says it provides 30% fuel savings per day per TEU carried while carrying 20% more boxes. It offers a range of service speeds aim to deliver fuel savings across from 10 knots to about 20knots.

Two other MARLIN designs are the MARLIN 2500 Jade which is slightly larger and diesel powered but equipped with either scrubber or SCR emission reduction technology, while offering similar fuel and efficiency gains. MARLIN 2500 Green is aimed at the market for feeder vessels in emission control areas and provides the option for dual fuel and LNG.

The design has been tank tested to ensure hull lines for least resistance and propulsion power. Specifications include an electronically controlled 2-stroke main

engine, the Wärtsilä6RT-Flex 58T-D, three auxiliary engines of 1400kW and one of 1050kW to provide flexibility, redundancy and ease of maintenance. Manoeuvrability is ensured by a flap rudder and 1114 kW bow thruster to ensure reduced port costs.

Design requirements are flexible and include a crane option or a reefer option. Container cranes can be retrofitted as supporting hull structure is available.

The initial order is for three MARLIN 2000 Blue vessels and three options followed by an understanding for the series to be extended up to twenty further vessels including the other MARLIN designs.

Wärtsilä is also supplying the main engines for the first series of eight Bangkok-max container ships being built at the Guangzhou Wenchong Shipyard in China to serve as feeder vessels in Asian waters.

Eight Wärtsilä RT-flex60C main engines will be built by under licence by Hudong Heavy Machinery in Shanghai. The engine manufacturer says the Wärtsilä RT-flex engine technology offers "excellent fuel consumption, exceptional reliability, and the possibility to incorporate environmental upgrades at a later date. Furthermore, the compact size of the engine is ideal for the narrow engine room that the vessel design calls for".

Four of the ships are being built for Buss Shipping. The other four ships are for Eastern Mediterranean Maritime Limited. The machinery for the first of these 1700 TEU container vessels is scheduled to be delivered in 2012.

Another shipping company that has been on the box ship acquisition trail is Seaspan Corporation who has placed an order for seven 10,000TEU vessels plus 18 options from China's Yangsijiang in a deal that could be worth over US\$2billion if all the options are delivered.

According to Peter Curtis, vice president at Seaspan Shipmanagement, it was a seller's

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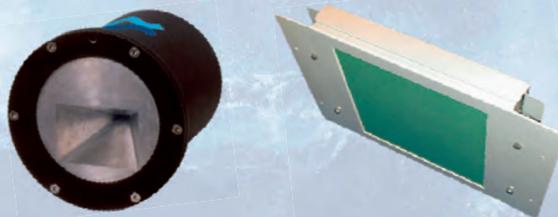
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Eight of Wärtsilä's RT-flex60C main engines will be built by under licence by Hudong Heavy Machinery in Shanghai for the MARLIN ships.

market for the shipyards until the economic crunch of 2008, and if owners wanted anything out of the ordinary the cost was "outrageous". "That kind of market is one that is devoid of innovation as the shipyards are all about 'production, production, production'."

He says that Seaspan nearly signed for a 9200TEU container ship in 2001, which he says was several years ahead of its time, but it was only because of 9/11 that discussions went down to 7000TEU vessels and then up to 8500TEU. Breaking through the 8000TEU barrier was consistent with the company's view of what its clients wanted, according to Mr Curtis. The aim of the company is not to make a short term profit but to earn money over the term of the charterparty, which is typically 10 to 12 years.

"We have a long term interest in the success of the tonnage and we are very cautious not to engage in new tonnage which has the threat of being obsolete within a short period of time." "Against the economic outlook and the fuel price for example, we were looking at providing tonnage that had an advantage over contemporary tonnage of a similar size, or advantages over contemporary tonnage period."

The drive behind the latest newbuilding order was how to maximise the number of TEU carried for one tonne of fuel per day.

With the expansion of the Panama Canal, Mr Curtis says, Seaspan sees the 10,000TEU ship as the optimal size for the Far East/East Coast US trades. Are the ships coming out of shipyards today designed to be the

most economical for their particular size groups? "Our determination was no," Mr Curtis says. "Contemporary vessels are not designed at the sweet point for their actual operating profile." Given Seaspan's belief in the 10,000TEU size, the aim is to "maximise the number of TEUs on a platform".

In going to the yard, Seaspan did not specify a certain length or width of vessel but asked the yard to determine for a 10,000TEU ship, operating in a certain speed range, what was the most efficient length/ beam ration. Seaspan worked closely with DNV, and was part of the Quantum project – a concept containership design with a particular emphasis on hydrodynamics.

In the past, Mr Curtis says, the contract between the yard and the owner would include guarantees that the ship would be able to carry a certain number of containers at a certain maximum speed. Shipyards generally designed ships round that maximum speed although the ship would only be operating at that speed for a very small part of its life. Seaspan changed the concept, asking for ships designed round a more realistic speed range. It specified that it wanted power reserve in order to reach a certain maximum speed which it determined was necessary for passage planning or to meet speed demands from port to port, for example intra-Europe or intra-Asia.

"What we found was the [contemporary] ship's design had a bell curve much further to the right, in other words at a higher speed, and in actual fact the operating profile of the ship is where your average speed is much lower, so the lines of the vessel are not designed for the speeds at which the vessel usually performs."

If the ship was designed for the speed at which it normally operates, it could burn less fuel for 90% of the time that is the case with contemporary vessels because of this gap in the design point, Mr Curtis explains. With the new vessels, Seaspan specified that they be designed around a certain speed so there would be a tremendous saving for 90% of the time. This involved designing the hull shape, propellers, rudder etc and other appendages to be most efficient at the lower speed. This included the shape of the bulbous bow, the fullness of the hull line, and a large and slower propeller, which is more efficient than a smaller faster one. The results of the method give improved efficiency in terms



A MARLIN Blue vessel in port.

of the number of TEU per tonne of fuel per day of the order of over 20% compared to an existing contemporary vessel.

The vessels will be built to DNV class. According to the class society the Seaspan newbuildings represent major improvements in energy efficiency, cargo capacity, operational efficiency and emission reductions. The new features are developed in a collaboration between Seaspan, the Yangzijiang Shipbuilding Group, MARIC, and DNV. The order is the biggest ever container contract in China.

“Compared to current 10,000TEU container vessels in operation or presently being built, the improvements due to new design features are substantial”, says COO Remi Eriksen, who heads DNV’s Asia Pacific & Middle East division. “Cargo capacity is increased by 10%, and fuel consumption reduced by 20%. A new hull design enables the vessels to trade with minimum ballast water in operation. The vessels are designed for a reduction of air emissions of approximately 20%, in order to meet the future regulatory requirement on emissions.”

“The ship hull lines have been optimised for the speed range 18-22knots. In this range the fuel consumption has been reduced by 16-27% compared to contemporary similar size ship series presently operated by the industry. The new design is also capable of reaching 25knots, as the focus on schedule reliability is expected to increase,” Mr Eriksen says.

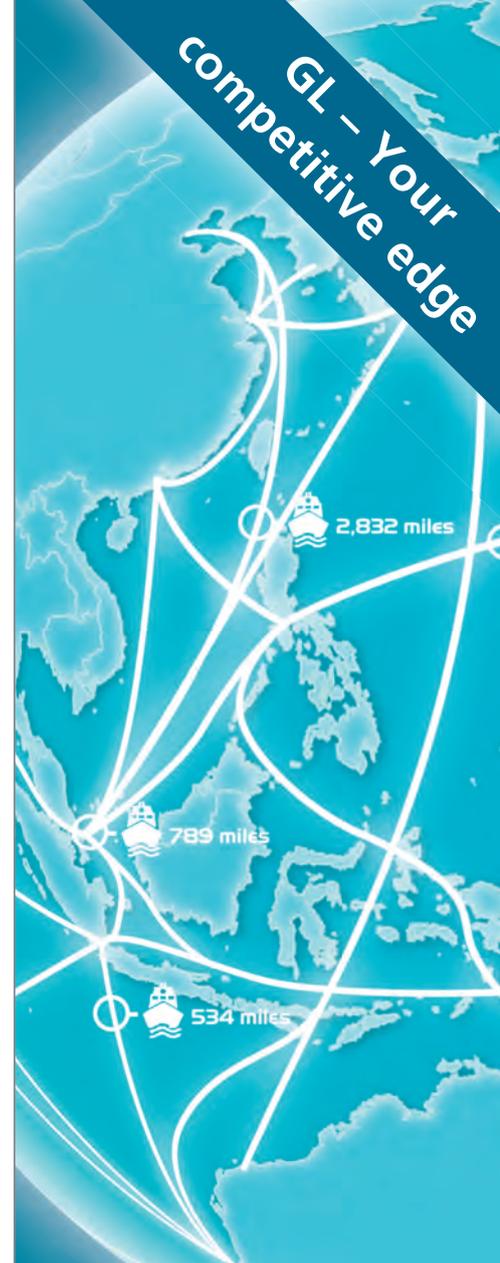
The container vessels will be powered by the new super long-stroke engine type MAN B&W 10S90ME-C9, which will be built by the Chinese engine builder CMD.

Traditionally, MAN Diesel & Turbo K98-type engines have been used for 8000-10,000TEU capacity container vessels, the company explains. However with the drive to greater energy efficiency and with container ships operating at slower speeds MAN has been investigating the possibility of designing larger propellers with a view to using engines with lower speeds for propulsion. Greater efficiencies come from adapting the hull design of ships to accommodate a larger propeller.

MAN estimates the new higher-powered, super long-stroke S90ME-C9 engine can offer an overall efficiency increase of about 7% when using the S90ME-C9, compared with existing main engines, depending on the propeller diameter used.

The engine designer says Seaspan initially considered the MAN B&W K98ME-C engine, “but ultimately settled for the super long-stroke 10S90ME-C9 type on account of its superior fuel savings”. This meant a redesign of the hull aft in order to accommodate the lower engine rpm and larger propeller diameter. The yard and its design partner changed the design accordingly.

The MAN B&W 10S90ME-C9.2 engines to be installed in Seaspan’s newbuildings will in addition feature MANTCA turbochargers built in Augsburg. *NA*



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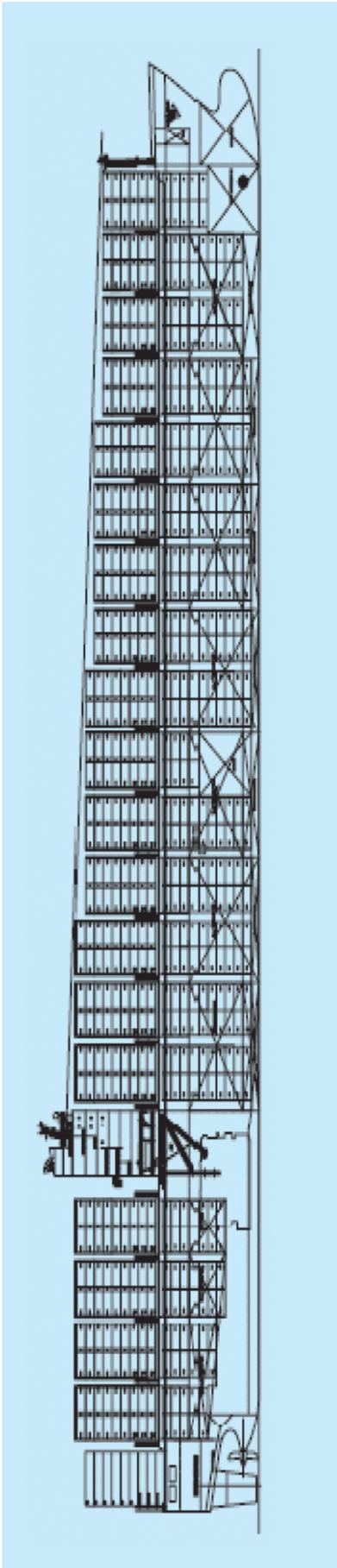
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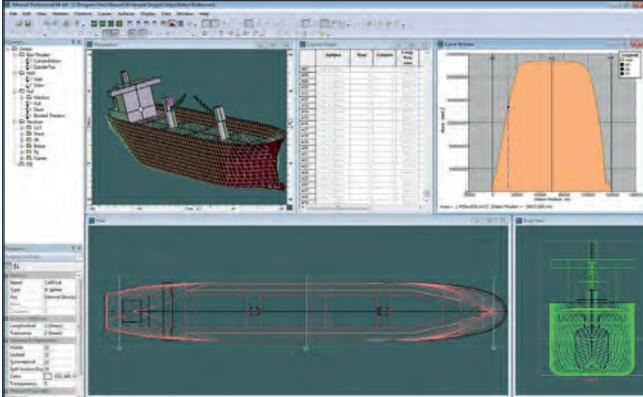
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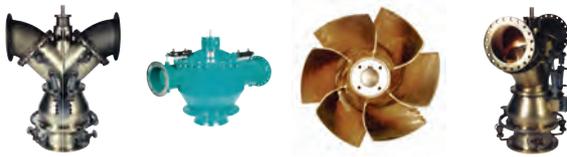
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Distributed engineering for shipbuilding

Stéphane Neuvéglise, head of business management, Marine Systems at AVEVA Solutions explains how distributed engineering can work for the maritime industry.

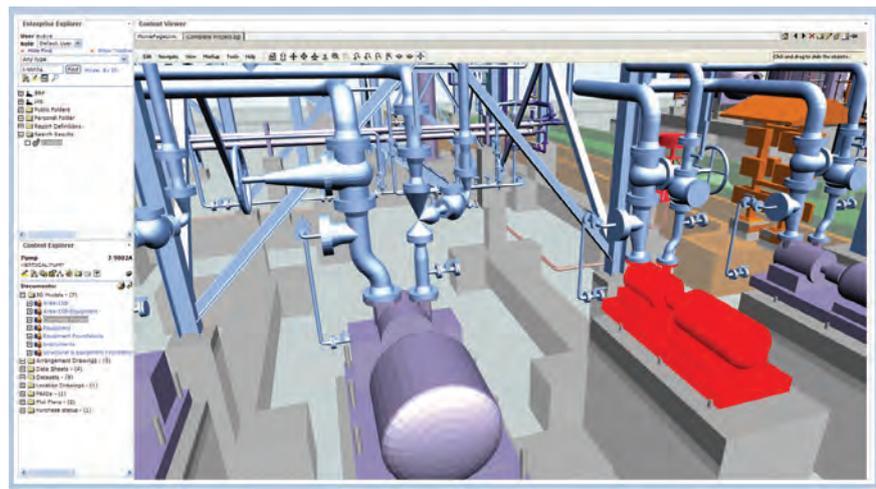
Distributed Engineering is a term that can mean whatever you choose it to mean, first we need to explain how it relates to the practical processes of shipbuilding. “There are three principal aspects to Distributed Engineering in the shipbuilding context: sharing information, working collaboratively, and managing the flow of materials,” highlights Ms Neuvéglise.

Fundamentally, this is nothing new; shipbuilding has always been a highly collaborative, highly concurrent process involving many people from different disciplines and many different suppliers, so it is by nature a distributed process. But with the scale, complexity and compressed timescales of today’s projects, managing the process is highly information-intensive, requiring powerful and sophisticated technologies.

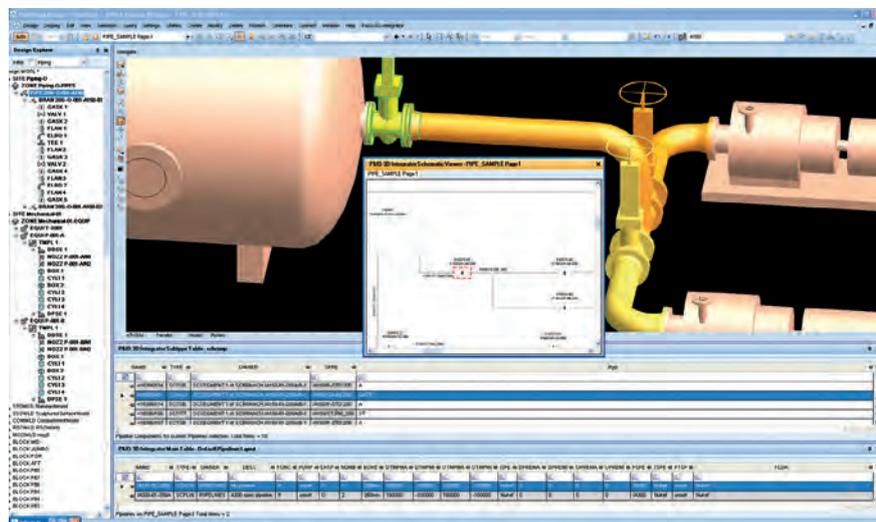
Sharing a common information asset

The information asset might be termed the ‘digital ship’. It consists of all the engineering and design information which together define the vessel. But, this is necessarily a very complex asset; a single item such as an engine has a wide variety of attributes associated with it, including its 3D form, its mass, its thermal characteristics, its electrical and control interfaces, maintenance procedures and so on. Different project disciplines own and use different subsets of this information so, without centralised control, there is considerable scope for duplication and inconsistency, and inefficiencies arising from any inability to access the information in a consistent manner.

Ms Neuvéglise comments: “For efficient shipbuilding, therefore, it is essential that the digital ship be maintained as a single, consistent, validated asset which can support a distributed network of project resources.” In other words, the engineering can be distributed, but the information asset



At the enterprise level, the most powerful solution for managing the entire digital ship is AVEVA NET.



AVEVA Schematic 3D Integrator integrates two quite different views of the same information: the schematic view and its 3D representation.

should not be. A moment’s thought shows just how demanding this requirement is. How can one manage so complex an information asset while providing easy, intuitive but controlled access to it by all the various project participants?

In recent years, a number of solutions have been developed which address this need. One practical example is AVEVA Schematic 3D Integrator which, as its name

suggests, integrates two quite different views of the same information: the schematic view and its 3D representation. Using this technology it can be said that a fuel systems engineer ‘owns’ the schematic definition of the design while an outfitting designer works with the corresponding relationships between the various pumps, pipes, valves and so on as he positions them in the 3D model of the vessel. A single set of data



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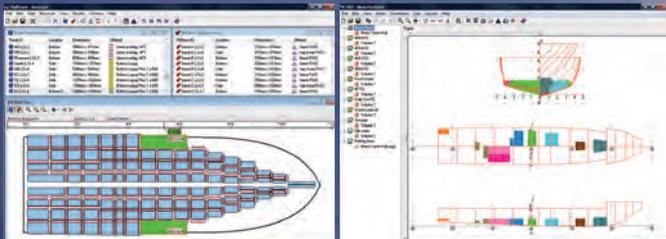
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AVEVA Global provides an efficient, flexible and robust solution by maintaining a single, definitive project model which can be shared by any number of participants in any location.

defines all the attributes of the system, so both schematic and 3D design are views of the same data and remain consistent.

AVEVA Engineering, a new product, is aimed at gathering and integrating the often considerable quantities of engineering data which most companies accumulate. This can come from either across the enterprise or across individual projects and it will exist in a wide variety of different forms, typically dozens of ad-hoc spreadsheets and databases. This is a powerful tool for bringing valuable legacy information under control, validating it by highlighting any inconsistencies, and making it easily available across a project or enterprise. I like to visualise this capability as a 'digital sheepdog', collecting and driving the information forward with a common objective!

At the enterprise level, the most powerful solution for managing the entire digital ship is AVEVA NET. This is increasingly being deployed in both the plant and marine industries to handle the most massively complex, distributed projects. It can make all of a project's engineering information available to its community of stakeholders, in a controlled and consistent way.

Working together

It is rare today for any vessel to be designed by a single team in a single location; much more common are collaborative multi-site projects involving engineering and design teams handling different aspects of the work in different physical locations. An FPSO is one obvious example of such a project.

There are two ways to configure technology to achieve this. The first is to rely on duplicating the entire project database at each location and then working to keep these copies in-step as the design progresses. This is an inefficient, inflexible and vulnerable solution. In contrast, AVEVA Global provides an efficient, flexible and robust solution by maintaining a single, definitive project model which can be shared by any number of participants in any location. For



example, outfitting designers in one location can see and work within the hull being designed by colleagues in another location. Local teams' work is integrated into the project model by transmitting only changes to the design. AVEVA Global automatically maintains the definitive project model and manages data communication so that local teams can continue working offline in the event of a communications disruption. Satellite resources can be added, removed or have their access privileges reconfigured as necessary at any time. Here again we see centralised information enabling distributed engineering, forming an optimum combination. So powerful is this technology that leading companies in the oil & gas industry use it on a large scale to manage multiple, concurrent projects across global networks of contractors. Equally valuable, this technology can be applied across both AVEVA Marine and AVEVA Plant deployments, supporting efficient execution of such complex multi-disciplinary projects as FPSOs or FLNG, and enabling shipyards to extend the scope of their business.

Bringing the parts together

The third important element is integrated control of materials. Without this, participants in a collaborative project have to handle their materials flows independently and can often find themselves competing against each other for materials from the same supplier. Integrating the information which underpins materials management paradoxically increases efficiency by combining project-wide coordination of purchasing and supply with the ability to manage resources effectively at a local level.

Meeting this challenge now forms an important part of AVEVA's strategy for integrated shipbuilding. Just as AVEVA has integrated the most powerful solutions for marine and plant design, it is now doing the same for materials and

resources management, following its recent acquisition of the MARS product suite.

Distributed or Integrated?

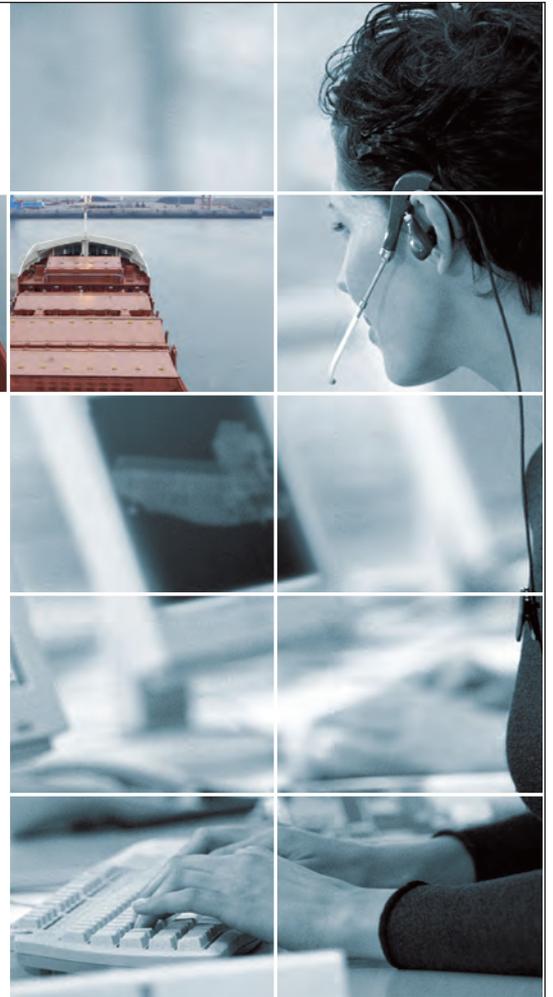
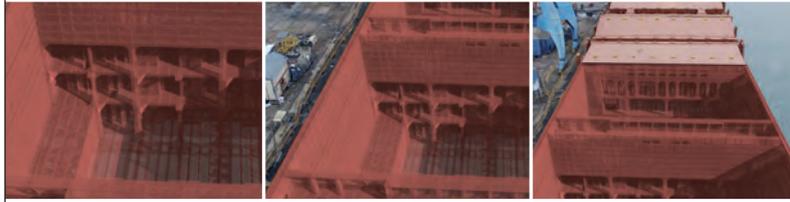
As long as 'distributed' actually means 'disconnected', project efficiency can only reduce as project size increases. In contrast, integrated information provides a scalable foundation for maximising efficiency regardless of project size or complexity. By combining centralised control of an integrated, validated and complete information asset, with robustly managed project-wide access in ways which meet practical needs, it becomes possible to operate multi-site projects efficiently, regardless of size. Integrated information is a prerequisite for Distributed Engineering. "Information integration and management technologies offer today's biggest opportunities for increasing productivity and capability", added Ms Neuvéglise. AVEVA customers in both the shipbuilding and plant industries are already exploiting this.

Achieving the 'virtual shipyard'

"The 'virtual shipyard' concept of seamless collaborative project execution may be the "Holy Grail" of technology visionaries, but it will only be achieved step by step in a cautious industry", commented Ms Neuvéglise. That's why AVEVA provides a range of technologies that not only meet the specialised needs of shipbuilders, but address individual aspects of an overall integrated solution. So a shipyard can achieve a full enterprise solution progressively, as opportunity allows, by adding capabilities which deliver measurable benefits at every stage.

To conclude

In summary therefore, while distributed engineering is really what shipbuilding has always been about, achieving it in today's industry requires integrated information. Technologies for integrating, controlling and exploiting project information exist, have been proven in demanding deployments, are immediately applicable to the specific needs of shipbuilders and deliver real business benefits. They represent today's competitive advantage. **NA**



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28 - 29 February 2012, London, UK



Second Announcement

As the 21st century progresses, extensive global legislation and innovation centres on environmental protection. The focus of the international marine industry has been shifting greatly towards the design and operation of vessels which minimize their environmental impact.

New regulations are coming into effect, regarding the reduction of all forms of emissions and waste from marine vessels. Increasing fuel prices and environmental concerns have again highlighted the benefit that reduced fuel consumption can bring to the ship operator. Groundbreaking designs and innovative technology is being introduced daily, which will eventually lead to zero-impact shipping.

RINA invites papers from designers, regulators, class societies, builders, owners, suppliers and researchers on all related topics including:

- Air pollution reduction (CO₂, SO_x, NO_x)
- Operation in Emission Control Areas (ECA's)
- Alternative Fuel: LNG, hydrogen, biofuel, fuel cells, solar power
- Energy saving methods of propulsion
- Improving Ship Energy Efficiency Index
- Ballast water and waste treatment & management
- Liquid & air waste management and heat recovery
- Minimizing the impact on marine ecosystems
- Design for end of life & recycling
- "Clean" production and maintenance methods
- Unconventional design for environmental efficiency
- Implementation of new and future regulations



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Maxsurf moves on to version 17

Formation Design Systems are taking a closer look at the probabilistic damage regulation in its next version of Maxsurf.

As well as a large number of smaller updates, version 17 will include some key developments to Hydromax, the hydrostatic analysis module and Workshop, the structural arrangement module.

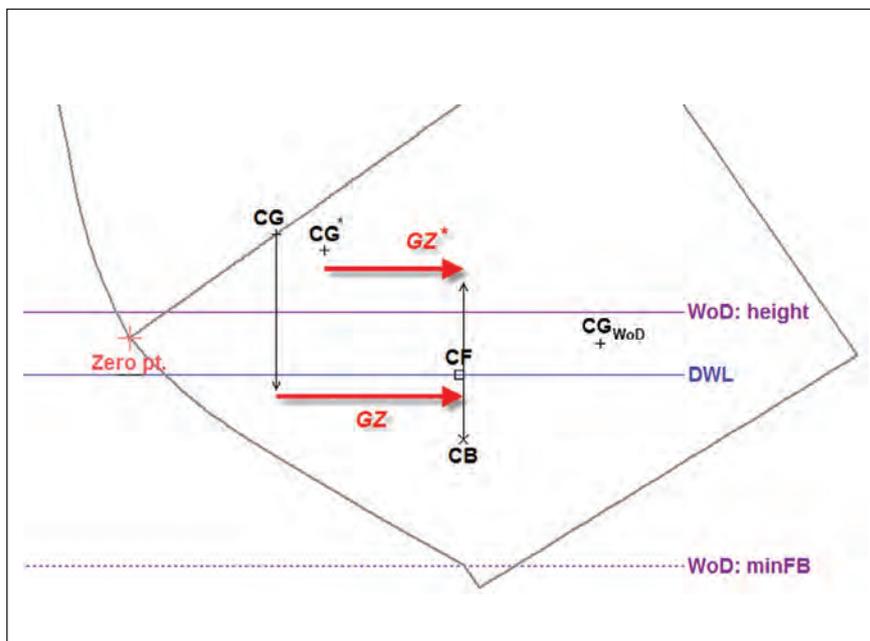
In recent developments a number of key analysis functions have been added to Hydromax, including Probabilistic Damage – MSC.216(82). However, since it seems clear that deterministic damage assessment will be required for some years to come, Water on Deck (WoD) analysis – MCA MSN 1790(M) – has been a focus of development for Hydromax version 17. The following documents as well as direct correspondence with the MCA have been used to develop the WoD analysis capability in Hydromax:

Agreement Concerning Specific Stability Requirements for Ro-Ro Passenger Ships Undertaking Regular Scheduled International or Domestic Voyages between European Ports: MCA MSN 1790(M) – which supersedes MSN1673(M). <http://www.mcga.gov.uk/c4mca/1790.pdf>

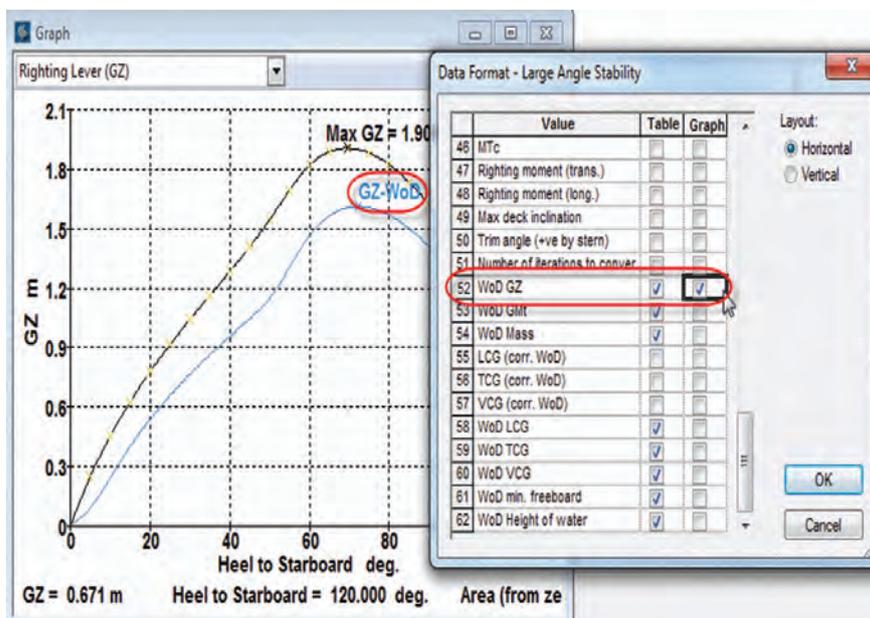
Guidance Notes On The Stockholm Agreement SLF 40/Inf.14 ANNEX 1 http://www.mcga.gov.uk/c4mca/con1_2a_ap3_1-2.pdf

WoD may be applied to the Large Angle Stability (LAS) analysis in Hydromax, which is used to generate the ship's GZ curve and to perform the ship's stability assessment against a range of prescribed stability criteria. The effect of WoD is calculated, in Hydromax, using the procedure outlined below:

1. Balance vessel to specified displacement and CG, including damage, but ignoring mass of WoD. For a range of fixed heel angles, the vessel is balanced (including the possibility to trim freely) to the prescribed displacement



Shift in CG due to WoD and resulting reduction in GZ.

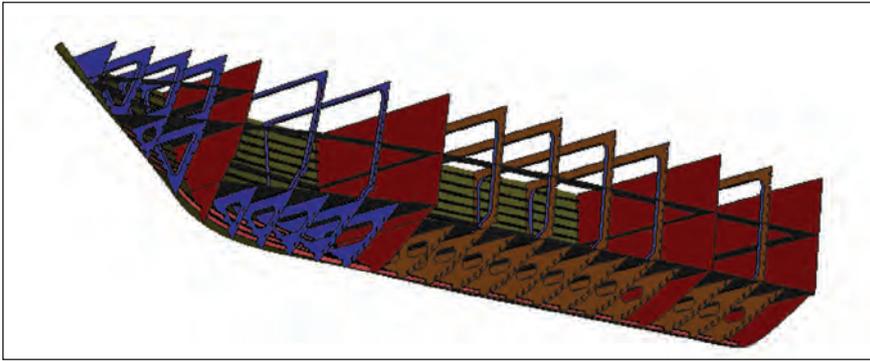


With WoD applied, the GZ graph shows the modified GZ curve in addition to the normal GZ curve.

Any damaged areas of the hull below the waterline are treated as lost buoyancy. These areas also include the areas where

WoD is specified but are below the waterline.

At each heel angle, the vessel is balanced without the effect of



Same model in Workshop (above) and after export in Rhino (below).

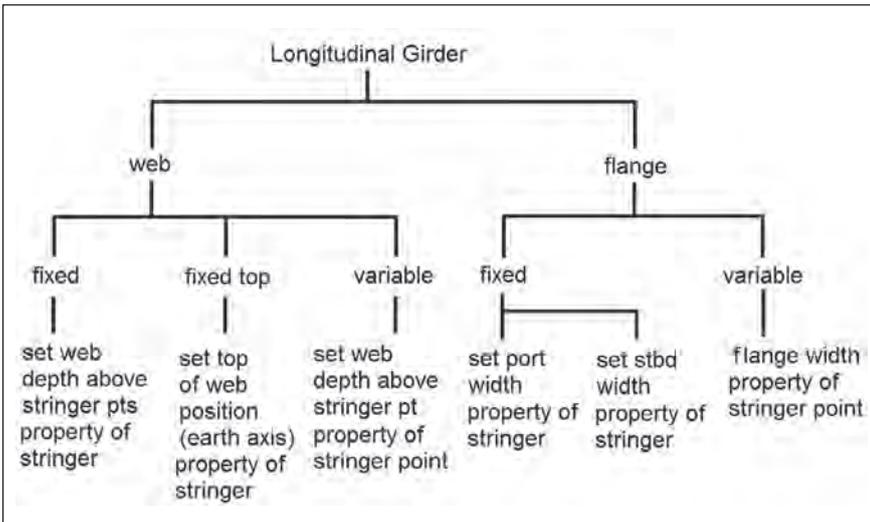
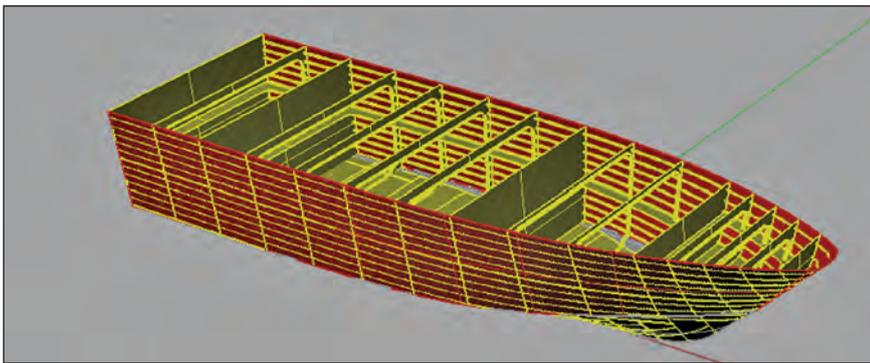
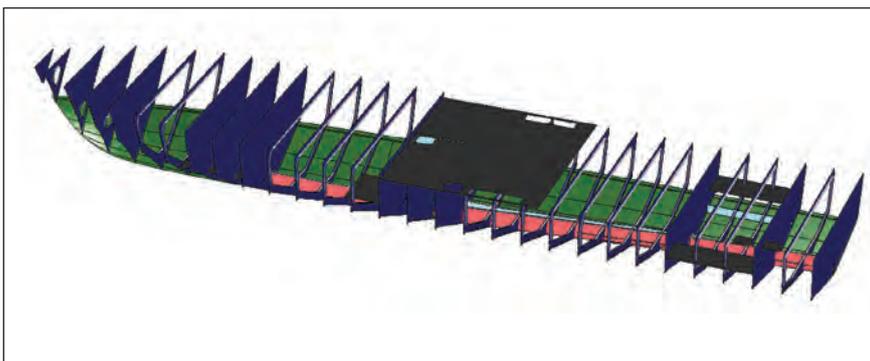


Diagram of longitudinal girder web and flange properties in Workshop.



Model in workshop showing Long Girder.

WoD (i.e. hull mass is balanced against hull buoyancy and the longitudinal positions of the CG and CB are aligned if the user has selected a free-to trim analysis).

2. Minimum freeboard and height of WoD. The minimum freeboard, within the specified damage extent, is then obtained with the vessel in the condition found in step 1 and is used to determine the height of WoD in the areas that the user has specified as accumulating WoD.

3. Mass and location of WoD; adjustment to GZ and GM

The mass and centre of gravity of the WoD is computed. Note that no further balance of hull mass vs hull buoyancy or CGvs CB is performed at this point. The modified vessel centre of gravity, due to the additional mass of WoD is then computed as follows:

$$CG^* = \frac{CG_{WoD} \cdot M_{WoD} + CG \cdot M}{M_{WoD} + M}$$

where: CG_{WoD} is the centre of gravity of the accumulated WoD; CG is the centre of gravity of the vessel without WoD; M_{WoD} is the mass of the accumulated WoD; and M is the mass of the vessel without WoD.

The modified righting arm is computed by adjusting the original righting arm (without WoD) by an amount corresponding to the transverse shift of the centre of gravity:

$$GZ^* = GZ - (CG_y^* - CG_y)$$

and the metacentric height is modified by the vertical shift.

$$GM^* = GM - (CG_z^* - CG_z)$$

Given that y is positive to starboard and z is positive up and the vessel is heeling to starboard.

The GM value is also modified to account for the transverse second moment of area of the WoD free-surface

(using the vessel displacement, without including the mass of WoD). GZ is not modified because the actual centre of gravity of the WoD is calculated at each heel angle (similar to the “Simulate Fluid Movement” option for normal tanks).

Hydromax shows the GZ curves with and without the effect of WoD. Stability criteria may be specified to use either of these GZ curves.

Workshop, the structural arrangement module

For some time now Formation Design Systems have been embracing the use of Rhino as a complementary modelling platform. As part of this development, the parts in a workshop model can be exported directly to native Rhino .3dm file format. Once a design has been developed past the initial parametric design stage (i.e. hull shape is fixed and all major structural components have been developed in Workshop) the parts may be exported to a rhino 3dm file for further detailing. Since Workshop is a parametric modeller (all parts are linked dynamically to an underlying Maxsurf surface) the data exchange is unidirectional (i.e. from Workshop to Rhino) only.

Enhancements have also been made to the longitudinal girders which are modelled in Workshop: longitudinal girders now have fully customisable webs and flanges. The web depth and flange width may be defined either as properties of the complete girder or as properties of the individual girder points allowing them to vary along the length of the girder.

Historical ship sample models

A range of historical ship models has been added to the broad range of sample vessels that are shipped with the Maxsurf suite. The designs are of actual vessels that have been surveyed and modelled in Maxsurf under the Historical Hulls Digital Database program set up by the Tasmanian Maritime Museum. More information on the project and processes used for surveying the vessels can be found at www.sites.google.com/site/tmmhullmeasurementprogram/ NA



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Second Notice

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From the bulk of Naval Architecture literature, it would be easy to assume that it was purely a design discipline. However many RINA members are employed in ship survey, ship owner and ship repair organisations. As offshore oil, commercial and naval sectors seek lower through life costs, the reliability of ship systems and optimising their maintenance become key elements in the cost equation. When the equation is flawed, the additional risk taken can cause spectacular outcomes.

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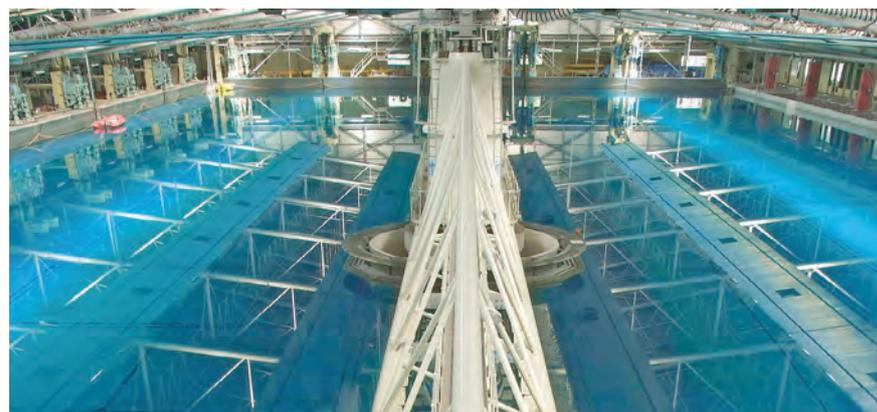
QinetiQ makes waves

Testing for hydrodynamics is a key aspect of ship design. Chris Richardsen, Consultant – Experimental Hydrodynamics, QinetiQ tells us the latest developments from QinetiQ’s towing tank.

QinetiQ has unveiled the results of major investments in its hydrodynamic test facilities at Haslar, Hampshire. As part of a multi-million pound programme to provide continued support to its customers, including the Ministry of Defence under the Maritime Strategic Capabilities Agreement (MSCA), QinetiQ has implemented a series of significant improvements to the largest hydrodynamic tanks in the UK.

“Increasingly, non-defence clients are using the facilities to measure the performance of commercial ship designs at model scale and the tanks have also been used by clients in the renewable energy market, primarily to predict the performance of tidal turbines and wave energy devices”, said Mr Richardsen.

Used primarily for constrained model tests of surface ships and submarines, the Towing Tank (or No.2 Ship Tank as it was named originally) has a rail length of over 270m, a width of 12.2m and a standard operating depth of 5.4m. A wavemaker is



Ocean Basin with Rotating Arm in the foreground. (Copyright QinetiQ).

fitted at one end of the facility, capable of generating regular waves up to a height of 0.37m and irregular waves representative of real sea states.

The Towing Tank’s 35tonne carriage has been the subject of a major upgrade which included the replacement of its three motors, drives and control system. Although the maximum speed of the carriage remains unchanged at 12.25m/s,

the new control system is far more flexible, allowing users to define a smooth transition from acceleration to steady speed and vice versa. Rheostatic braking can be used to decelerate and previous users of the facility will be impressed by the reduction in noise levels achieved with the new motors and cooling fans.

“Looking to the future, QinetiQ is designing new test rigs for the Towing

Qualisys cameras along the edge of the Ocean Basin. (Copyright QinetiQ).





The longest Towing Tank in the UK. (Copyright QinetiQ).

Tank to reduce preparation time and, as a consequence, maximise the amount of time dedicated to the acquisition of test data”, commented Mr Richardsen.

QinetiQ’s Ocean Basin (or Manoeuvring Tank) is the largest of its type in Europe at 122m (L) x 61m (W) x 5.5m (D) and has benefitted hugely in recent years from the installation of a Qualisys motion capture system. An array of nineteen cameras is used to maximise coverage of the 7400m² surface area of the basin and active infra red-emitting markers are used to guard against interference. Images are analysed in real time to capture not only a test model’s location but also its behaviour in/on the water. Use of the system has allowed QinetiQ to reduce the amount of instrumentation and data acquisition equipment required for free-running tests and, as a consequence, model size and cost can be reduced accordingly.

“The latest exciting development is the transmission of real-time Qualisys data to a surface model’s autopilot. This removes the need for models to carry heavy gyroscopes

to measure their heading – instead the heading or, better still, the steering gear demand signal can be transmitted to the model from a shore-side autopilot using the latest wireless technology”, explained Mr Richardsen.

Also in the Ocean Basin, QinetiQ has replaced the control system for its Rotating Arm. A relatively unusual and rare capability, the Rotating Arm is used primarily to measure the forces and moments acting on ships or submarines constrained to follow circular trajectories at different angles of incidence. Although the original maximum rotational speed of 0.6 radians per second (16.5m/s at the tip) has been retained, the Arm’s new control system offers far greater flexibility to the user through the ability to define acceleration/ deceleration and the arc through which steady speed must be maintained during acquisition of test data. The system uses laser technology to communicate between the Arm and its sub-carriage, the latter being used to vary a test model’s radius and angle of incidence.

QinetiQ’s newly upgraded Rotating Arm. (Copyright QinetiQ).



“The next major investment in the Ocean Basin will focus on replacement of the facility’s wavemaking capability. Although many manoeuvring tests make use of calm water, the majority of tests in the basin involve free-running models operating in waves”, said Mr Richardsen.

The existing wavemaker consists of two mutually-perpendicular sets of five wedge-shaped plungers that were installed when the facility was built in the 1950s. QinetiQ intends to remove this wavemaker and install a system capable of generating regular and short/long-crested irregular waves. When combined with the Qualisys motion capture system and the sheer size of the facility, this upgrade will make the Ocean Basin one of the most capable hydrodynamic test facilities in the world.

Although QinetiQ remains committed to physical model testing, it has been at the forefront of developing and applying computational hydrodynamic methods for the past three decades. From the establishment of a ‘numerical towing tank’ in the 1980s, QinetiQ has grown its computational fluid dynamic (CFD) capability to become one of the most powerful hydrodynamic consultancies in the world.

With a cluster comprising over 1000 cores, QinetiQ is able to handle computational grids containing over 50 million cells on a routine basis. Flow fields are predicted for fully-appended and self-propelled surface ship and submarine geometries, often directly at full scale Reynolds numbers, thus removing an element of uncertainty associated with extrapolation of, for example, wake data from model scale. Looking ahead, QinetiQ’s team is actively involved in the development of CFD methods to predict unsteady flow fields, key to understanding flow characteristics and signatures associated with transient events.

QinetiQ is proud of its hydrodynamic heritage, having evolved from the Admiralty Experiment Works established originally by William Froude in Torquay in 1872. With the latest investments in its capabilities at Haslar, QinetiQ is building upon Froude’s legacy to ensure that the UK remains at the forefront of hydrodynamic test, evaluation and prediction, and can continue to serve defence and commercial clients for decades to come. **NA**

ShipConstructor supported by AutoCAD in 2012

The 2012 update of ShipConstructor will not only see a host of new features but will also have the added support of AutoDesk's AutoCAD.

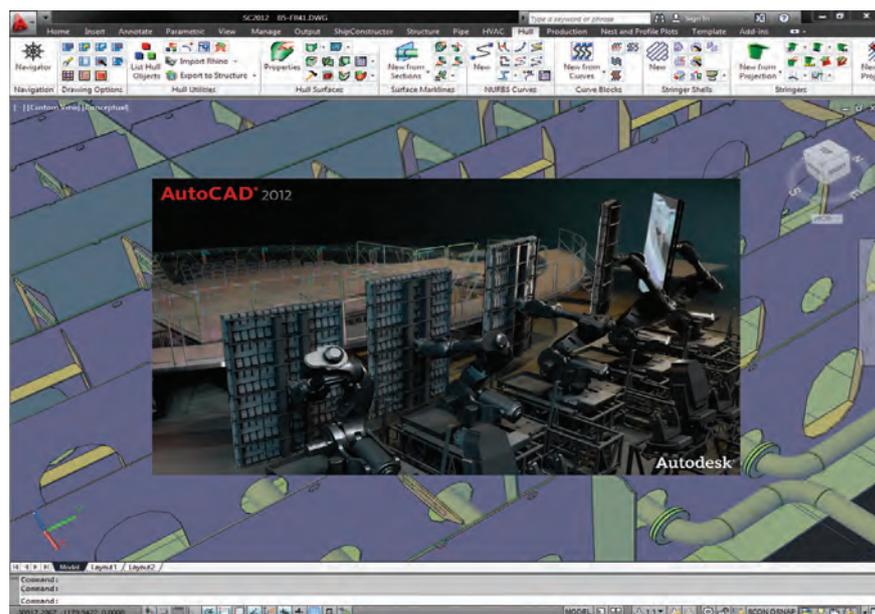
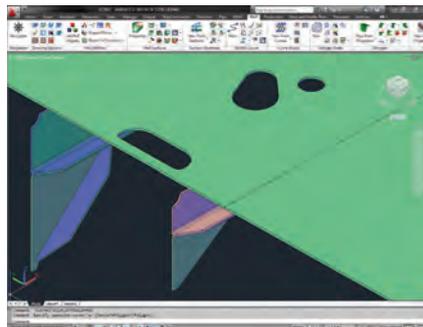
Bringing features and products to the market before competitors gives clients the edge that they want over their own competitors. ShipConstructors update will now be able to do this with the advantage of being supported by AutoCAD.

“The biggest change in this ShipConstructor update is that it now supports AutoCAD 2012, which is tied to AutoCAD. It's like the car industry where you see car designs come out ahead of time, this new feature will now let our clients achieve this”, commented Mark Waldie, PR, ShipConstructor.

Other added features to the software includes enhanced offset construction lines, enhanced endcuts, one step package and deploy project, side-by-side installation and increased software speed.

One of the latest feature's that has been improved by the added AutoCAD support is the enhanced point cloud for laser scanning, which now has improved indexing algorithms. The speed of the software has also been increased saving users even more time. “Loading time

ShipConstructor 2012 reduces the number of endcut definitions required to populate a catalogue with industry standard endcuts. Additional trim application options require fewer unique definitions and simplify the combined application of endcuts and trims.



ShipConstructor 2012 enables users to work in the most advanced CAD environment by adding AutoCAD 2012 compatibility. AutoCAD 2012 offers several new tools and improvements such as enhanced surface modelling, enhanced point cloud support, direct access to AutoCAD WS, and in-application access to AutoDesk Exchange. ShipConstructor 2012 also supports AutoCAD 2011 and AutoCAD 2010.

for a distributed system is now 10% quicker to view and viewing property data is now 50% quicker”, commented Mr Waldie.

The software also has enhanced construction lines that will allow users to change the offset line in a design without it affecting the main feature. With enhanced endcuts ShipConstructor has slimmed down the amount of endcut definitions, making the process quicker. The one-step package and deploy project quickly isolates versions of the entire ShipConstructor project for archiving or transferring.

ShipConstructor has stated that its software is easy to use. “Even if people are using other competing software, it will probably be based on AutoCAD. Our programmes sit on AutoCAD, so

if you know AutoCAD then you know ShipConstructor”, said Mr Waldie. “The software is very similar to use, with the AutoCAD ribbon along the top with ship construction tools added. It is using a tool that you already know how to use. The software is more graphical rather than scripting, making it easier to learn.”

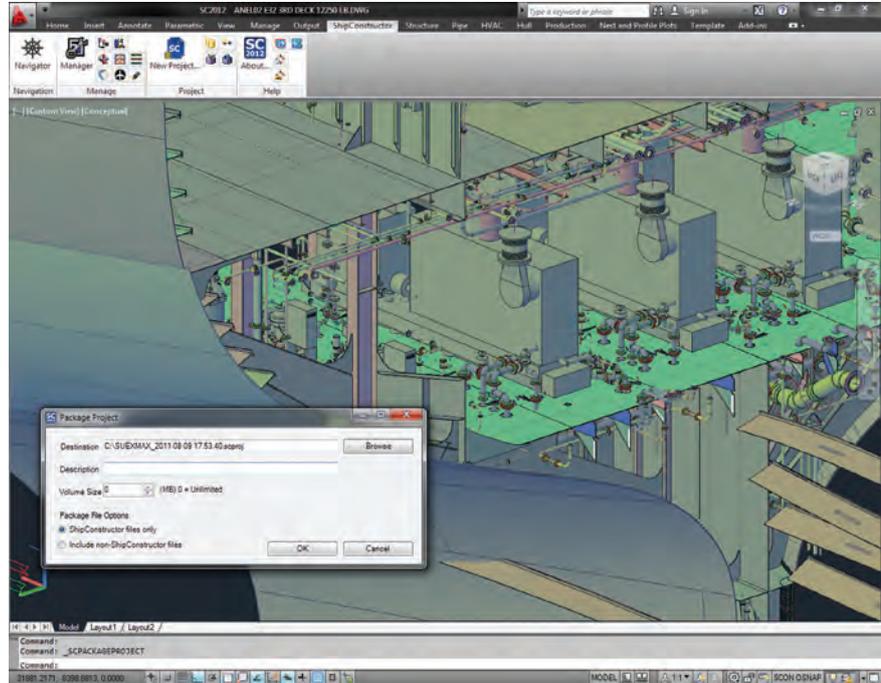
ShipConstructor 2012 makes it easy to test or to execute multiple projects on multiple versions of ShipConstructor. On the same PC, side-by-side installation of ShipConstructor 2012 is supported with ShipConstructor 2008, 2009, and 2011.

Mr Waldie explained the benefits of side by side installation: “A newer version of ShipConstructor will be able to read files created in older versions but

there are “binary breaks” in AutoCAD (and therefore ShipConstructor) after certain versions which make them incompatible. For instance, there is a binary break after 2009 so AutoCAD 2011 can’t read AutoCAD 2009. On the

other hand, AutoCAD 2012 can still read AutoCAD 2011 and 2010 files. (There tends to be a binary break every three years.) *NA*

ShipConstructor 2012 simplifies the process of backing up and transferring a project with new one-step commands: Package Project and Deploy Project. The Package Project command creates a compressed archive that includes all components of a ShipConstructor project, i.e. the database backup, all ShipConstructor drawings, and optionally any additional files that reside in the project folder. The Deploy Project command takes the archive produced by the Package Project command, checks the file for consistency, and then automatically deploys it to a specified server and location while creating a new PRO file so that there are no additional steps required to start working once the deployment is complete.





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Viking goes Polar with latest liferaft

Viking Lifesaving has launched its latest liferaft on the market to fulfil new guidelines and regulations for operation in Polar waters.

The opening of the Northern Sea Route is a growing interest in exotic sea cruises, and the increase in oil and natural gas production in Arctic regions have all made marine safety equipment specially designed for the harsh conditions of polar waters a priority, when designing a new vessel. As a direct result, several ship owners and shipyards have approached Viking requesting liferafts tailor made for Polar conditions.

The idea for a Polar liferaft was originally thought up and designed in 2008 by Viking, since then there has been amendments to the SOLAS regulations. The launch of this latest liferaft is compliant with MSC circ 1056, guidelines for operating in ice-covered waters.

Viking highlights that the SOLAS rules state that liferafts must be tested at temperatures of -30°C, however, in reality temperatures can reach below this and it is critical that the liferaft can still operate in these conditions.



Viking's Arctic liferaft has been designed and tested specifically for sailing in Arctic ice-covered waters.

“Solutions exist for keeping such liferafts protected against the cold and ice, however all are based on either covering or sheltering liferaft containers which impair the liferafts float free function. The main challenge was to keep the liferaft inside the container at normal SOLAS temperatures between -30°C and 65°C regardless of the outside temperature and at the same time prevent ice formation on the container”, said Lone

Aaboe Jessen, marketing manager, Viking Life-Saving Equipment.

Viking's global sales and marketing director Niels Frønde stated that the liferaft can inflate within 20 seconds in temperatures as low as -49°C, which improves significantly upon the SOLAS target of three minutes in -30°C.

“There is a huge difference in cold Polar conditions between three minutes and 20

Viking Polar liferaft system is the first on the market to fulfil new guidelines and regulations for operation in Polar waters.



The Viking Polar liferaft system consists of SOLAS approved liferafts, packed in special GRP containers with built-in heating.

seconds,” Frände remarked. Under such extreme temperatures, getting the liferaft launched quickly is even more essential, as every second in the water reduces the possibility of survival, he said.

“Getting into the liferaft speedily is critical.” Such conditions can have an effect on the person’s ability to use their hands and other limbs as normal, even though they may still be conscious. The Viking system is designed to avoid icing up, which could cause the cradle to fail to launch the container in an emergency. “That means that you have a liferaft that can be operative at any point of time,” Frände pointed out.

Certified and patented system

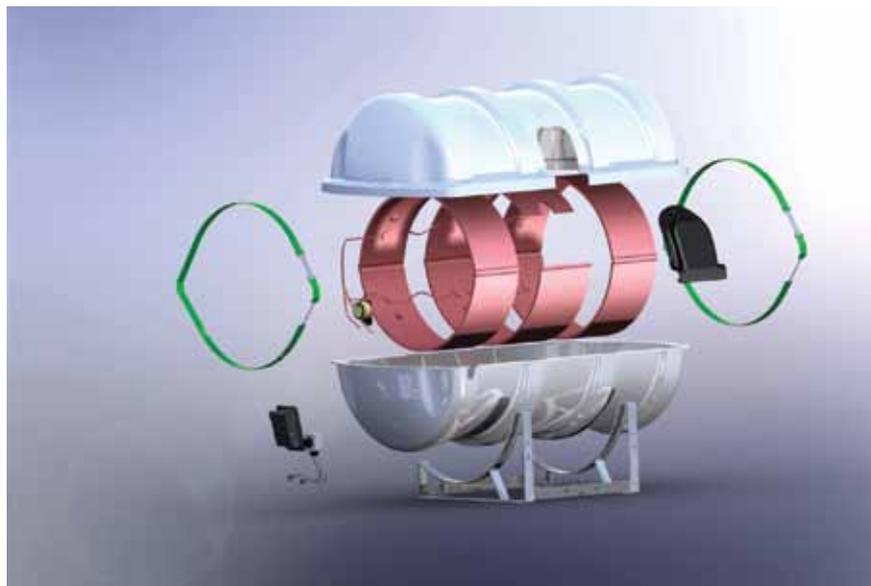
The patented Viking Polar liferaft system is the only approved Polar system on the market. It offers unrestricted flexibility for naval architects and vessel operators alike by being approved to operate even in the harshest conditions. Viking Polar complies with MSC Circ 1056, guidelines for ships operating in ice-coved waters, and Russian Maritime Registry of Shipping (RMRS) Winterization regulation. The system even exceeds SOLAS requirements by having successfully completed extensive tests including cold chamber tests and inflation tests at -50°C and cold endurance tests at -60°C. These tests were witnessed by RS and DNV.

Efficient design

The Viking Polar liferaft system consists of SOLAS approved liferafts packed in special glass fibre reinforced polyester (GRP) containers with built-in heating.

Since the GRP containers can be used with existing Viking cradles and racks, no additional space requirements are made, when designing a vessel with marine safety equipment approved for operation in polar waters.

The control box, which passes any functionality warnings on to the bridge, is small and can be positioned in a number of ways near the liferafts, meaning it



does not have any adverse effect on any drawings.

System components

As mentioned earlier the Viking Polar liferaft system consists of SOLAS approved liferafts packed in special GRP containers with built-in heating.

The latest version of the Viking Polar liferaft is operational at even lower temperatures and fulfills new MSC guidelines and Russian regulations. It comes with an A-Pack with extra food rations, independent alarm system connected to the bridge and a Hammar HRU stored in heated container.

When the Polar liferaft is due for service, the HRU heating box is simply disconnected from the rack and sent to the service station along with the liferaft. When the HRU expires, it will be replaced at the service station.

The liferaft is serviced like all other VIKING liferafts. Shipowner Agreements are possible with fixed price servicing.

Special GRP container

Standard GRP containers equipped with heating mats mounted on the inside of the containers. The heating mats are fitted with safety thermostats and turned off when the temperature reaches 25°C. The heating mats are connected to a thermostat box mounted outside the container using waterproof connectors.

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The heating mats inside the containers are attached to a thermostat protected in a control box. The specially designed thermostat box has a separate RMRS type approval for compliance with Russian regulations.

The box is located near the liferafts and keeps the power supply safe. Each box supports 1-2 Polar liferafts. It is equipped with a temperature controlled relay set to turn off automatically when the outside air temperature reaches above +5°C. All cables, boxes and connectors are waterproof.

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SSE's fire detection device gets approval

Keeping fire safety equipment up to date and relevant for the market has been the key point behind System Sensor Europe (SSE) MED approval.

System Sensor Europe has recently announced that it has gained Marine Equipment Directive (MED) approval for its EC1000 range of conventional fire detectors, enabling them to be used in fire detection systems installed on passenger ships, cargo vessels and tankers.

"The fire detector was launched a while ago but the MED approval started last year. The company opted for MED approval to cater for Marine based applications as the detectors are sold through fire system integrators", said Nigel May from Parkway Communications.

Massimiliano Marrone, product manager, System Sensor Europe added that with the approval it will allow System Sensor Europe to enter a new market and show its clients that the product is qualified against environmental issues.

The ECO1000 range consists of optical, photo thermal, fixed and rate-of-rise thermal detectors, and for shipboard use, dry and wet bases which prevent condensation entering into the contact area, are available as standard. The optical and photo-thermal detectors have automatic drift compensation, a feature usually found only in intelligent sensors,



SSE gets MED approval.

which offsets changes in sensitivity that would otherwise arise from the build up of dust during use. A highly integrated design, along with onboard digital signal processing and a new optical chamber result in an exceptionally stable and sensitive smoke detector. Another innovative feature is laser-activated remote test capability. The detector can be set into alarm from ground level

using a coded laser pointer, saving considerable time during commissioning or maintenance as the device itself does not have to be directly accessed.

Now that SSE has the MED approval it is hoping that its clients will see an uptake of the fire detector, which is suitable for all marine applications. With interest in larger vessels and retrofitting, SSE is awaiting its first order. **NA**

Hanging on for hook clarity

Hook safety on lifeboats is still at the forefront for lifesaving equipment manufacturer Schat-Harding, with the International Maritime Organization (IMO) amendments to the rules, the debate over hook safety continues.

The IMO has a new name for lifeboat hooks and has issued clear guidelines on how they should be designed and operate. Unusually, the IMO has backdated the new rules to cover existing hooks and these will have to be replaced or upgraded if they don't meet the new standards. Unfortunately some parts of the shipping industry are still not happy with the standards so are issuing their

own additional guidelines on Secondary Safety Systems and vibration.

For manufacturers the new standards should bring to a close a long standing debate and allow development of safe lifeboat release and retrieval systems, the new IMO term for on-load release hooks. But there are challenges in the number of existing hooks to be inspected and potentially renewed, and

challenges in meeting two different standards, those set by IMO and those set by industry guidelines.

Ship owners face choices too. They need to get their hooks examined, they need to replace ones that don't meet the new standards and they need to decide which new standards they will opt for. They have some time in which to do this, but if they leave it



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Norsafe as

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too long they risk running out of options if there is a backlog of refits.

David Bradley, vice president operations, Schat-Harding Service, said: “IMO has now issued clear guidelines for lifeboat release and retrieval systems under MSC.1/Circ.1392. They will become mandatory under SOLAS regulations and will apply to new boats from 1 July 2014, and there are also clear tests to be applied to existing hooks, and these will have to be upgraded at the first dry-dock after 1 July 2014 if they do not meet the set standards. IMO’s guidelines do not call for a Secondary Safety System (such as a pin) or a Fall Prevention Device for new boat or upgraded hooks.”

That is clear, but separately the shipping industry will be issuing guidelines which recommend that owners should only fit hooks with Secondary Safety Systems (SSS). These SSS will be an added advisory requirement over and above the international regulations as agreed by IMO.

Mr Bradley said: “As the leading manufacturer we would prefer if the IMO and industry had one set position and we could then produce one hook range to meet that standard. If there are two hooks available of different standards, some owners and builders will opt for the least complex. Perhaps because it will be cheaper, and perhaps because they share our concerns that adding complication to hooks increases the possibility of mechanical or human failure. However, Schat-Harding recognises that with two different standards globally we will have to be ready to meet demand for both. Therefore, we will design an optional SSS (training lock) for our SeaCure LHR hook range, and we will then be able to supply new hooks with or without the SSS, at the request of the owner or yard. We have to supply what regulations demand and what our customers want.”

There is also an interim question often raised about Fall Prevention Devices (FPD). “These are often confused with Secondary Safety Systems,” explained Mr Bradley. “They do the same job but the term has a specific meaning in this context. Fall Prevention Devices are an interim measure to be applied by ship owners under MSC.1/Circ. 1327 until hooks are tested and approved or changed to meet MSC.1/Circ.1392. Unfortunately IMO has not set any design and operational criteria guidelines for FPDs so Schat-Harding is not currently in a position to supply them.”



David Bradley, vice president operations, Schat-Harding Service.



Schat-Harding SeaCure hook fitted as a replacement hook to the existing boat.

Another area of contention is vibration. The possibility that vibration would induce hooks to open was discussed at IMO but no standards were set. The industry may recommend a vibration test, but there is however, no consensus in the industry on what this may be, or what vibration it may cover. “As every ship and installation will be different it will be hard to devise such a test. In the absence of that Schat-Harding will continue to take the pragmatic view it has applied to all its hook designs for a long time,” said Mr Bradley. “We will use FMEA techniques to make sure that the hook cannot fail because it is shaken. We can’t do any more than that and we are confident in the safety of the systems.”

Should shipowners be worrying about the ability of lifeboat and hook system manufacturers to test and replace the hooks in service before the due dates? Mr Bradley insists he cannot answer for the whole industry, only for Schat-Harding. “We face a few issues and it is both a big challenge and a big investment for us,” said Mr Bradley. “We have to test hooks in service by 1 July 2013, and we have to have ready new

systems for new boats, or boats requiring replacement hooks, by July 2014. We then face a window for replacements to older boats and non-compliant systems which depends on dry-dock dates and could run until 2019. So we have an eight year window ahead of us, during which demand for hooks will come in waves. We foresee that some owners will want to get future proof hooks as soon as possible, and we already meet quite a high level of demand for that. Then there will be owners who will leave things until the last minute.”

The challenge for the makers is to have the right hooks tested and compliant, in two versions with or without SSSs and have to have stocks of them strategically located in parts of the world where rehooking will be done. “A big part of this is also having the trained manpower to install these hooks on ships in service,” said Mr Bradley. “That is hard in an uncertain market, and it is a novel situation. It is very rare for an IMO regulation to be made retrospective. So we cannot be sure how this will pan out. However, we are confident we will have the right hooks in the right places with the right people to fit them, when owners need them. It will help the whole process to run smoothly if we can connect with all the owners who have our equipment fitted and plan replacement strategies with them. That way we could map demand and gear up to meet that.”

What about another way forward, replacing hooks with another system all together, something novel? Mr Bradley doesn’t discount that, but does not see it as a solution to the immediate logistics problem facing manufacturers and the shipping industry implementing the new IMO guidelines in time. “At present we believe that the best and safest systems are our on-load release hooks, and crews are familiar with hooks, which improves safety. However, Schat-Harding has an active R&D department and we are always looking at new ways of doing things. Our history as an innovator in lifeboats and davits speaks for itself. If we can devise or adopt a system which is more effective than a hook-based system, and which is acceptable to the market in terms of cost and crew training needs, then we will offer it as an alternative. At present we are looking at new systems, but none looks as if they will displace hook-based systems in the foreseeable future,” he concluded. **NA**

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Putting the standards into practice

Designing a lifeboat for harsh conditions, can be a challenge in itself. However, with two sets of standards to work with as well, Norsafe explains the development of its latest lifeboat concept.

Earlier this year Norwegian-based lifeboat company Norsafe signed a contract with the oil company Statoil for the development for a prototype of a new generation free-fall lifeboat. The company was to design a lifeboat that met with DNV's offshore standard and also Norwegian Oil Industry Association (OLF) GL0437 standard.

"The design is for the Luva area, for most harsh conditions. Development of the lifeboat also included weight restrictions and drop height of the boat", said Mr Mostert, R&D senior engineer, Norsafe.

Norsafe has said that the most challenging part of this project and an issue that has been causing the lifeboat industry some challenges recently is the new standards that lifeboats now have to meet. Between 2005 and 2009 Norsafe worked on the development of the forward motion and slamming effect of a lifeboat, which was brought about by the Norwegian Oil Industry Association for the safety of crew.

DNV then introduced its Offshore Standard DNV-OS-E406 for design of free-fall lifeboats in April 2009. "This was a complete new standard on how to build free fall lifeboats. The standard is written by DNV with input from a lot of companies and authorities from the industry. Norsafe was not involved as much as they would like to



Norsafe latest lifeboat that will handle extreme weather and multi standards.

be in the development of the standard, Not involving the manufacturers of the life boats to a greater extent resulted in quite a few issues when the standard was presented the first time", commented Mr Mostert.

Norsafe has highlighted that DNV's standard for lifeboats is site specific, meaning that when a lifeboat is designed it is designed for a specific field that the offshore facility is located, however, each field has different standards that a lifeboat needs to meet, meaning that one lifeboat designed for a specific field may not be able to be used in another field.

The DNV-OS-E406 standard is currently under review for possible major modifications due to a large number of errors and technical issues. These issues have been identified by customers of free fall lifeboats, oil majors, ship owners, engineering experts and not at least the lifeboat manufacturers.

A common forum consistent of the before mentioned participants supported by the Norwegian Oil Industry Association OLF has jointly made a proposal to DNV in order to change the current version of the standard.

After a meeting held earlier in September DNV has agreed in quite a few of the comments and will come up with a suggestion of change to the standard. The major issue about changing to maximum weather criteria will not be included and the design will still have to be carried out for specific fields.

The concept that Norsafe is currently working on will comply with the DNV's standard and OLF's guidelines. Also, due to the new requirements the lifeboat will be bigger, have more space for each passenger, toilet, stretchers and injury seats

Norsafe has said that it has managed to develop a hull with excellent diving behaviours and much higher forward speed than existing free fall lifeboats. Norsafe is also investigating the possibility of reducing weight for both life boat and launching appliances. This is carried out in special projects and several alternatives will be checked for example extended use of composites.

Norsafe expects to see the first delivery of the product in 2014. At the moment there are no definite orders, but there is a potential of 200 lifeboats to be ordered. **NA**

LSA extends its reach

Liferaft Systems Australia (LSA) has developed its latest 23m marine evacuation system (MES) for the life saving equipment market.

The development of the LSA slide has come as a direct response to both customer demands and new passenger vessel designs. The slide is fully US Coast Guard (USCG) and European Community (EC) Type approved, it is the longest MES slide the company has developed to date.

Peter Rea, European manager, Liferaft Systems Australia describes the developments of this latest slide: "The 23m slide is a simple, stronger, extended version of our very successful 20m slide, of which we have over 50 installations worldwide."

The main benefit to the customer is it enables LSA's unique inclined slide based

MES to be installed higher in the ship. The LSA MES range can now cater for all installation heights between 5m and 13.6m.

"The 23m slide MES has the same footprint as the 17m and 20m MES and is manufactured from nylon coated polyurethane using our tried and proven cold stick adhesive and RF welding techniques.

BC Ferries Northern Expedition fitted with LSA MES slide.

The deck footprint of the new 23m MES is just over 4m² which provides considerable space saving advantages for designers of all types of passenger and personnel carrying vessels. As with all of our products, the 23m evacuation slide technology and design is protected by international patents, added Mr Rea.

Mr Rea also highlighted that the slide is not only suitable for ferries but for other vessels as well, such as military vessels, LSA are still awaiting its first contract for its latest system. LSA has stated that its manufacturing capacity is full right through to 3rd quarter 2012 with further contracts pending for delivery in 2014. Looking ahead Mr Rea has said that LSA's focus will be on keeping on top of the development of liferafts for the market.



“Our plans moving forward are to continue to stay ahead of our competitors through advanced technological manufacturing procedures, consistent management practices and maintaining the highest possible quality culture within the

company. By remaining a specialist MES supplier and not spreading ourselves too thin, we will continue to ‘punch above our weight’ and deliver the world best MES to the global market as we have done for the past 19 years”, Mr Rea concluded. *NA*



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Chuting range

The Marin Ark marine evacuation system being tested at sea.

As the ever increasing sizes of passenger vessels dot our oceans, the need to evacuate 7500 or more souls in the event of an emergency is not an easy business. While algorithms exist and in depth evacuations plans are posted on every vessel in existence, the reality is, there have been no major cruise disasters on the scale of the infamous, but still valid, example of *RMS Titanic* on which to base realistic time scales for evacuating these large vessels.

Evacuation trials can provide some analytic data. The University of Greenwich conducted just such a trial in 2010. The research project involves nine partners from countries that include the UK, France, Norway, Finland, Greece and Canada. The University's Fire Safety Engineering Group exercise was conducted on board the Royal Caribbean Cruise Line vessel, *Jewel of the Seas*, in which more than 2300 passengers took part in a 'live' assembly drill while at sea. The exercise required nine months of planning, utilised one hundred cameras that included, CCTV, fish-eye, digital and analogue camera and cost more than €3 million (US\$4.14 million).

Specially developed, infra-red tracking tags were worn by passengers allowed researchers to locate each person's exact movements and reconstruct the paths people took as they made their way around from the 12 decks of the cruise liner to their designated assembly points on board during the half-hour exercise. While the outcome of the exercise is yet to be published, the undisputed problem of

how to evacuate a large passenger ship in a timely manner remains.

Most passenger ships rely on utilising a combination of tenders that double up as lifeboats. In addition liferafts and Marine Evacuation Systems (MES) make up the numbers in the life saving equipment arsenal. *Allure of the Seas* for example, has 18 lifeboats, each 17m long accommodating 370 people each, along with four MES evacuation chute points, each one offering 450 places. Like most cruise line operators, the MES is assigned to evacuate crew rather than passengers.

Marine Evacuation Systems comprise of a number of connected rafts or modules which are automatically deployed and inflated. Based on gravity, the MES telescopic chutes are fully enclosed to prevent exposure to the elements while the dual spiral path allows for a controlled descent.

RFD boasts their Marin Ark MES can be fully inflated and operational within 90 seconds of deployment. One simple release action deploys the full system, with no bowing of additional liferafts required. This, says the company, reduces the number of crew required to operate the system. In addition, the liferafts are fully reversible, have suspended floor, and multi redundancy chambers.

While the MES has gained popularity with most cruise vessels owners because of its compact stowage and ability to provide rapid evacuation, the system is not without its critics. Highlighted worries include safety concerns as to the suitability of the chute systems for elderly passengers and

for passengers with mobility problems, the potential vulnerability of the system to fire, and the lack of an integrated propulsion system, instead of the reliance upon fast rescue craft or lifeboats to tow the rafts away from danger.

The decent into the chute, with feet and knees together and arms raised above the head has also lead to a one fatality. According to the MCA report published in 2004, an evacuee was found stuck in one of the cells of the chute, in a "piked" position (arms and legs above the head). In spite of the chute being cut in places to allow the evacuee to complete the descent, she subsequently died. Though this accident was deemed very rare, with over 5000 descents cited, a number of recommendations were made and have been implemented. Today, at the hatch of the chute, a sensor indicates when the chute is blocked, so that the evacuation operation can be halted, in order to allow a crew member wearing a safety harness to help release a panicked person stuck inside.

Despite such positives, injuries including sprains, broken ankles and arms are not uncommon when landing into the raft. As one seafarer I talked to termed it, "it's a bit rough."

Since the new SOLAS, Safe Return to Port regulations advocates passenger ships should be designed for improved survivability based on the time-honoured principle that "a ship is its own best lifeboat," in my personal case sliding down an MES chute will be best left until a real emergency. *NA*



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By Stephen M. Payne FRINA

Stephen Payne, Naval Architect of modern day cruise ships, fully describes the Holland America line's flagship, S.S. Rotterdam, designed and built over thirty years ago and discusses her owners in his above mentioned book. Various chapters describe the building of the ship, her construction, her technical features, her passenger accommodation, and the Holland America line transition from Atlantic ferry to cruise ship operators.

Price: UK £10.00 EUR £12.00 OVS £14.00

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By Chris Thomas

HMS Vanguard sank in thick fog in Dublin Bay in September 1875 rammed by her sister ship. No lives were lost (except perhaps that of the Captain's dog) but this one event provides valuable insight into naval history of the late nineteenth century. Chris Thomas examines what happened, setting it in the context of naval life, the social and economic situation of officers and ratings. He describes the furore caused by the unjust verdict of the Court Martial, vividly illustrating the joys and trials of the seagoing life in the Victorian era, and the tragic effect on the life of Captain Richard Dawkins and his family.

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John Lingwood

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I C Clark Ref:

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The Department is an integral part of the University's renowned Faculty of Engineering, which is the largest in Scotland and has a global reputation for producing quality engineers. The Department, which has excellent hydrodynamic testing facilities and expanding marine engine and fuel cell laboratories, is leading the establishment of the Strathclyde Marine Institute which will co-ordinate and promote joint research in all aspects of marine science (both physical and social), technology, business, finance and law across the university.

The Department of Naval Architecture and Marine Engineering is holding its Annual Marine Careers Fair in the Henry Dyer Building, University of Strathclyde on Thursday 20 October from 10:30 - 15:30. This is a great opportunity for companies to speak directly to NAME undergraduate and postgraduate students of all year groups, on a one-to-one basis.

If you would like to come to our Marine Careers Fair please contact
Thelma Will for a booking form.

E-Mail: thelma.will@strath.ac.uk Telephone: **0141 548 4913**

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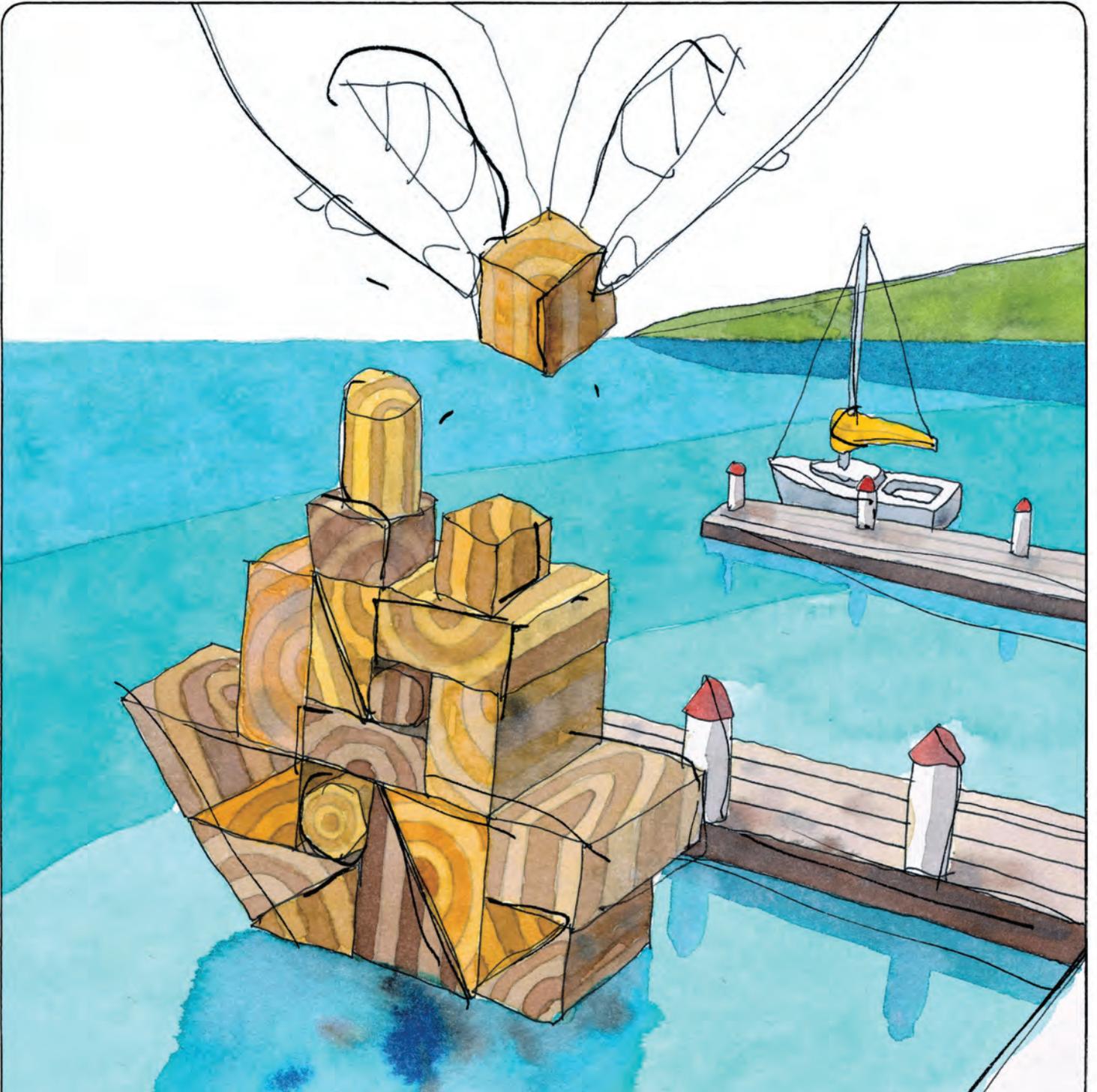
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