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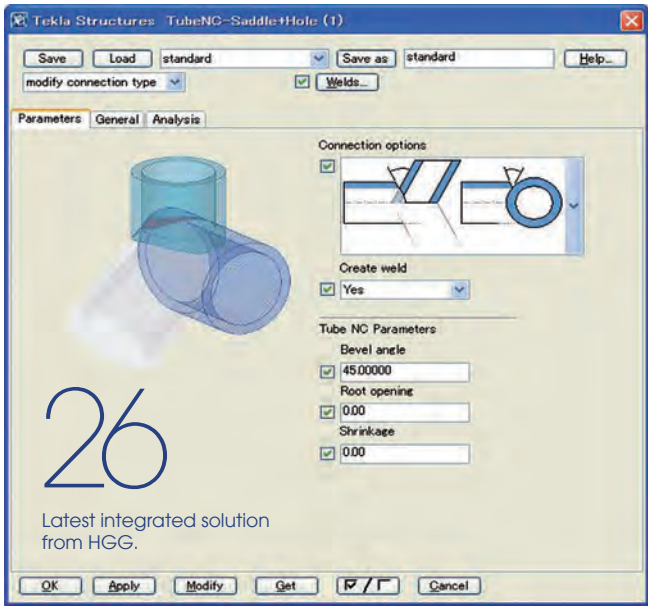
Lloyd's Register

LIFE MATTERS

Sea star and golden sea squirt off Irian Jaya, Indonesia – one of the most biologically diverse coral reef systems in the world.

21-58 Features



On-line Edition

The Royal Institution of Naval Architects is proud to announce that as of January this year, *The Naval Architect* 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/tna 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.

From crisis to opportunity

SHIPPING'S ROLE IN THE FIGHT AGAINST CLIMATE CHANGE

NOR SHIPPING
OSLO JUNE 09-12 | 2009


Sylvia Brustad


Erik Solheim


Elisabeth Grieg


Efthimios Mitropoulos


Richard Fain


Ingar Skaug


Dagfinn Lunde


Dimitri Giotakos


Knud Pontoppidan


Åke Niklasson


Henrik Madsen


Per Brinchmann


Jan Fredrik Meling


Todd Benjamin

MORNING SESSION
TUESDAY JUNE 9 | 9:30 AM

OFFICIAL OPENING

Elisabeth Grieg, President NSA
Brief remarks welcoming delegates to the Opening Conference

Sylvia Brustad, Minister of Trade and Industry, Norway
Welcoming delegates to the Opening Conference and introducing the Heyerdahl Award

Heyerdahl Award

THE WORLD IN PERSPECTIVE

- **From Kyoto to Copenhagen**
  Erik Solheim, Minister of Environment and Development, Norway
- **The financial crisis: How deep and how long?**
  Dagfinn Lunde, Member of the Board of Managing Directors of DVB Bank SE

DEFINING CLIMATE CHALLENGE RESPONSIBILITIES: CARGO OWNERS AND SHIPOWNERS

- **Re-thinking logistics**
  Åke Niklasson, CEO Volvo Logistics
- **The consumer and climate change and the new US administration**
  Richard D. Fain, Chairman & CEO RCCL
- **Round table discussion**
  Todd Benjamin, Former CNN Financial Editor
  - Dagfinn Lunde, Member of the Board of Managing Directors of DVB Bank SE
  - Ingar Skaug, Group CEO Wilh. Wilhelmsen
  - Richard D. Fain, Chairman & CEO RCCL
  - Åke Niklasson, CEO Volvo Logistic

SEEKING COMMON GROUND: REGULATORS AND SHIPOWNERS

- **Closing in on a viable solution**
  Efthimios Mitropoulos, Secretary-General of IMO
- **What is the EU waiting for?**
  Dimitri Giotakos, Member of Commissioner Dimas' Cabinet, The European Comission
- **Round table discussion**
  Todd Benjamin, Former CNN Financial Editor
  - Knud Pontoppidan, Senior Adviser, AP Møller Mærsk AS
  - Efthimios Mitropoulos, Secretary-General of IMO
  - Dimitri Giotakos, Member of Commissioner Dimas' Cabinet, The European Comission
  - Elisabeth Grieg, President NSA

AFTERNOON SESSION
TUESDAY JUNE 9 | 1 PM

PRACTICAL SOLUTIONS FOR ENERGY EFFICIENT OPERATIONS

- **Clean Shipping awards ceremony**
- **Energy solutions are needed now during difficult times for the global economy**
  Henrik Madsen, CEO DNV
- **How regulations can promote practical, environmentally friendly solutions with Norwegian LNG applications as the example**
- **Energy Management creates a win-win situation**
- **The Fellowship project – fuel cells technology can be applied now**
  Jan Fredrik Meling, CEO Eidesvik
- **Outcome of Wilhelmsen's Orcelle Project**
  Per Brinchmann, Wilh. Wilhelmsen
- **Round table discussion with the above speakers**

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Flag raises exploratory questions

Explorer's master mistakenly interpreted the nature of the ice he was entering.

An investigation by the Liberian Registry into the November 2007 sinking of the passenger-ship *Explorer* off the South Shetland Islands, while on an Antarctic cruise, has concluded that the primary reason for the casualty was a mistaken interpretation by the vessel's master of the nature of the ice he was entering.

After the ship was abandoned, all 54 crew and 100 passengers were rescued by the Norwegian vessel *Nordnorge*.

On the evening before the sinking, the vessel had entered an ice field described by the master as 'first-year ice'. At around midnight the ship hit a 'wall of ice', sustaining damage to a section of her hull, which led to rapid flooding. Despite the best efforts of the crew, it was not possible to contain the flooding in the compartment which had sustained the initial damage, and the vessel sank.

Highlighting the heroic efforts which resulted in the survival and rescue of all passengers and the entire crew, the report states: "The master and crew should be recognised for the actions taken to ensure the survival of the passengers under the difficult conditions and circumstances that they had to deal with. The master's decision to have the passengers abandon the vessel, as well as the engine crew's efforts to restore and maintain power so that the passengers could be successfully put into lifeboats, in all likelihood saved lives."

However, the Liberian Registry investigation also concluded that the master was "under the mistaken impression that he was encountering first-year ice when in fact …it was much harder land ice." The master should have altered course to open water and not have entered the ice field during darkness, the report said.

> "Liberia will use its influence at IMO to recommend the establishment of competency training requirements for ice navigation"

The master was very experienced in Baltic waters but he was unfamiliar with the type of ice he encountered in Antarctic waters. The report said that, after he had entered the ice field under this impression, the master failed to reduce speed as he approached and then made contact with the wall of ice.

The Liberian Administration said it would review whether it thought some IMO guidelines, circulars and resolutions – such as those relating to vessels operating in Antarctic and Arctic waters, minimum safe manning, float-free or quick-release VDR installation – should be made mandatory.

The report also said that administrative action should be taken against the certificate of competency issued to the master of *Explorer* in view of the lack of knowledge which contributed to the casualty. Liberia would use its influence at IMO to recommend the establishment of competency training requirements for ice navigation pursuant to STCW 1978 as amended.

The report recommended that the Liberian Administration informed DNV, the vessel's classification society, that its procedures should be revised so that vessels' gauging records were maintained and available throughout its life, and that minimum requirements for deck and shell plating thickness for all ice-class vessels should be revised for the consideration of updating current standards.

The Liberian Administration should also inform DNV that it should review its survey procedures, focusing on the lessons learned from the investigation, so that surveyors review flooding boundaries to determine if vessel systems and components such as the sewage system and down-flooding ducts can compromise the vessel's watertight boundary in the event of damage and flooding.

Finally, the report recommends that the Liberian Administration inform G.A.P Shipping Co Ltd, the operator of *Explorer*, that it should review its procedures for review of, among other things, abandonship and crowd control procedures, and drilling and training in connection with lifeboat engines. *NA*

Design

GL suggests tanker changes

Germanischer Lloyd presented what it termed "a novel holistic tanker design procedure" during its Hellenic Technical Committee meeting, held in April.

In a joint presentation, Dr Pierre Sames, GL senior vice president strategic research and development, and Professor Apostolos Papanikolaou, director ship design laboratory of the National Technical University of Athens (NTUA), outlined a formal safety assessment study carried out for a tanker design whose main objective had been to enhance cargo transport efficiency and environmental safety characteristics.

The study focused on optimising the main cargo area of an Aframax class tanker.

"The resultant Pareto-optimal designs are evaluated in terms of oil outflow consequences, structural weight and cargo capacity, design feasibility, ship maintainability and ballast water capacity", Dr Sames said.

The study concluded that an optimised design would feature an increased double bottom height and a reduced cargo tank size in the fore section, "in direct response to damage statistics", said Professor Apostolos Papanikolaou. The idea is that the capacity of cargo tanks of a ship's aft section would be increased to compensate. Another proposal considered was simply increasing the number of tanks altogether, with the ship's structure being optimised so that overall deadweight remained constant.

The research presented started within the four year, EU-funded project SAFEDOR.

Under the new chairman of the Hellenic Technical Committee, Dimitrios S. Korkodilos, 45 representatives of the Greek maritime community met at Germanischer Lloyd's Hellenic Technical Committee.

Fast ferries

Austal bags order at high speed

Austal received its second large vehicle ferry order within a week in April, after being selected by Maltese operator Virtu Ferries to design and build a 107m long vehicle-passenger catamaran.

The order followed hard on the heels of a contract with Denmark's Nordic Ferry Services to build Austal's largest ever catamaran (see *The Naval Architect*, April 2009, pp51-53).

The Virtu Ferries vessel is scheduled for delivery by mid 2010.

New fast ferry envisaged for Virtu Ferries, to be built by Austal.

Intended for operation between Malta and Italy, the vessel will join Virtu Ferries' existing 68m long vehicle ferry *Maria Dolores*, which was delivered by Austal in 2006.

Virtu Fast Ferries Ltd managing director Francis Portelli said the Austal Auto Express 107 would facilitate the increased heavy cargo traffic between Malta and Sicily. "Following a long and rigorous selection process, we found the Austal 107 to be the best vessel for the route due to her versatility, speed and all round efficiency, as well as being tailor-made for the route's requirements," Mr Portelli said.

Designed to carry 800 passengers and 230 cars at a speed of approximately 39knots, the vessel will be Austal's twenty-fourth commercial delivery to operators in the Mediterranean region.

Powering the vessel will be four MTU 20V 8000 M71L diesel engines at 9100kW; each driving Rolls-Royce Kamewa waterjets.

The vehicle deck will have the capacity to carry up to 230 cars or 45 cars and 342 truck lane metres. Vehicle loading and unloading will utilise ramps installed on both the stern and port-side.

Seating for the ferry's 800 passengers will be spread over two decks, each offering a seating density of 2-3 seats per row, as well as a dedicated upper deck lounge area overlooking the vessel's bow. Outdoor seating will

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also be available for more than 110 passengers.

The vessel will be built in accordance with the requirements and under the survey of Det Norske Veritas, conforming to International Maritime Organization HSC Codes and Malta Flag State and Italian Port State Regulations. Registration will be under the Malta Flag.

Shipbuilding

Lenac dock cut up

Dutch salvage specialists Multraship Salvage and Mammoet Salvage have completed the removal of the wreck of a floating dock which sank in June 2007 at the Viktor Lenac shipyard, Rijeka, Croatia.

The 165m Dock No. 7 weighed 7000tonnes and sank in 22m of water after an electrical power supply failure. Two previous refloating attempts had failed and after a thorough survey and testing of tanks it was decided that refloating of the dock was not feasible. As the sunken dock was impeding access to the yard's other dock, the yard placed a wreck removal contract with Multraship and Mammoet. They worked together to cut the wreck into twenty-four main pieces, each weighing up to 440tonnes. Multraship's floating sheerlegs *Cormorant* was used to lift the sections out. In all, divers performed over 5km of underwater cutting.

CAD/CAM

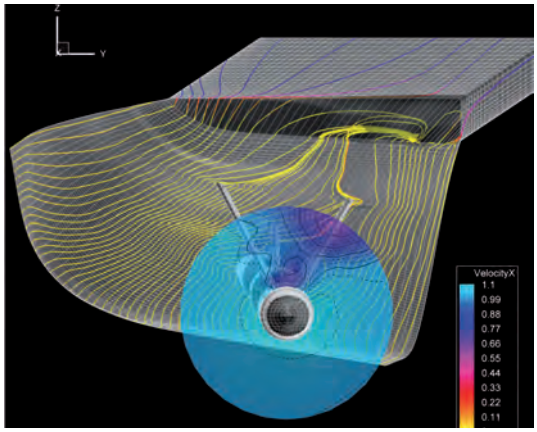
New kind of Friendship

Software company Friendship Systems has released an upgrade of its simulation-driven Friendship-Framework. Release 2.0 of the Computer Aided Engineering (CAE) design software system, featuring enhanced functionality and operational refinement for time-saving and better engineering of energy-efficient ship hulls, propellers, turbines, pumps and other units.

Improvements have been made in tool integration, feature modelling and visualisation technology. Coupling external programs and in-house codes are facilitated through XML, generic and COM interfaces. The developments in feature technology comprise the automated generation of feature definitions from the base model, their nesting into feature assemblies and the application of curve engines and meta surfaces.

The Friendship-Framework 2.0 package includes a skybox with scalable wave patterns for photo realistic visualisation of the designed geometry, clipping cubes and dimensioning modes. Additional assets available with the new release are a library of components, i.e., base models of frequently employed surfaces, curvature visualisation for the hands-on quality assessment of curves and surfaces, GUI features, automated PDF diagram creation from design results, comprehensive integrated documentation and improved project management.

Computed wake field and stream lines of fast mono hull.



Classification

LR appoints Boardley

Tom Boardley has been appointed as the new marine director at Lloyd's Register, succeeding Alan Gavin.

Mr Boardley has worked in the shipping industry since graduation from university in 1978 when he joined P&O. Working in liner management and agency operations, he represented P&O in the UK, Taiwan, South Korea, Japan and Australia. In 2004 he became head of NYK Line's European Container activities based in London. Most recently he was responsible for CMA CGM's UK based operations, involving liner, agency and technical management responsibilities.

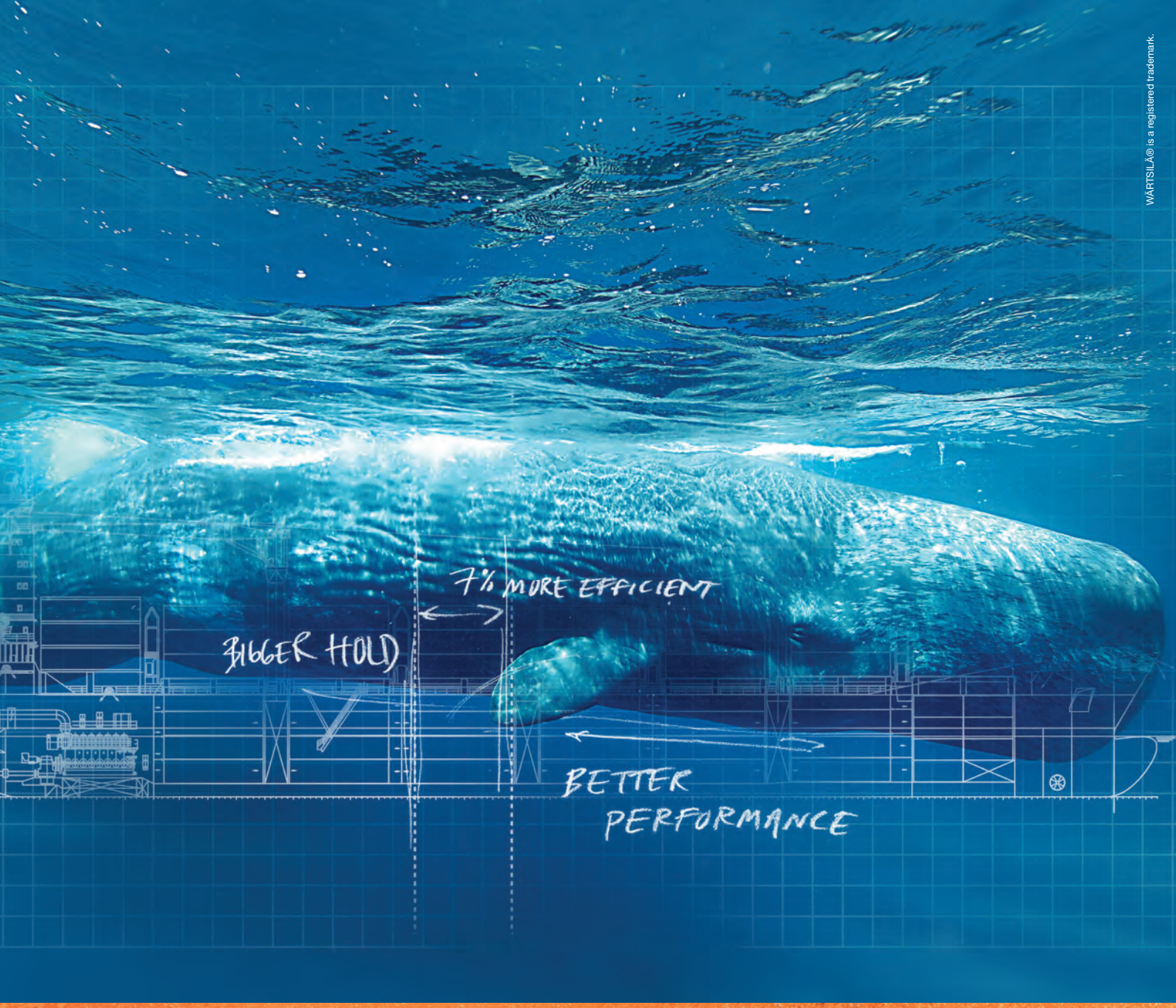
Offshore

FPDSO for Deltamarin

Brazilian oil major Petrobras has awarded Finnish engineering company Deltamarin Ltd the concept study work contract for its FPDSO (floating production, drilling storage and offloading vessel) development.

"Deltamarin won this contract because we have a very recent reference in this field namely FPDSO *Dynamic Producer* for Petroserv, which is now under construction in Singapore at Sembawang Shipyard, said Timo Granberg, Deltamarin sales director offshore. "Petroserv has a service agreement with Petrobras for *Dynamic Producer*. Our focus in offshore engineering is in FPSO/FPDSO design and engineering.

Deltamarin said that the latest concept for an FPDSO would be developed as a DP EWT/EPS (extended well testing/early production systems) vessel for the Brazilian Ultra Deepwater Offshore Oilfields.



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Ancillary equipment

MOTech applies for patent

Mitsui O.S.K. Techno-Trade, Ltd. has applied for an additional patent for the Propeller Boss Cap Fin (PBCF) jointly developed by MOTech, Akishima Laboratries (Mitsui Zosen) Inc. and Mitsui O.S.K. Lines Ltd. The patent covers new innovations that make the PBCF more effective in saving fuel and protecting the environment.

The PBCF is an energy-saving system for propeller-driven ships that, in its original form, has already been adopted on 1700 vessels around the world. Installed at the rear of the propeller, it breaks up the hub vortex forms behind the rotating propeller and reduces torque, at the same time boosting fuel efficiency by 3% to 5%.

Improvements to the PBCF stem from the redesigned length and shape of the device. Compared to the previous model, these changes will allow more reliable control of the hub vortex, boost propeller thrust, and reduce torque further. The original PBCF patent application was filed in Japan in July 1987. Since then, the PBCF has been patented in Japan and 11 other countries.

MOTech plans to install the enhanced PBCF system onboard an MOL-operated vessel that will be completed at the end of 2009 and conduct performance tests. At the same time, the company will conduct research on final design and manufacturing, aiming to bring the enhanced PBCF to market in 2010.

Contact Mitsui O.S.K. Techno-Trade, Ltd. PBCF Div., 2-3-4, Uchikanda, Chiyoda-Ku, Tokyo, 101-0047 Japan.
Tel +81 3 3258 7180
Fax +81 3 3258 7337
E-mail pbcf@motech.co.jp
www.pbcf.motech.co.jp

Propulsion

DMU learns from MAN

Dalian Maritime University (DMU) has chosen a MAN B&W 5S35ME-B9 engine for its maritime laboratory, to strengthen the practical tuition of its student body. The university will establish a fully functional, shore-based engineroom at its Dalian campus. DMU's maritime science faculty consists of a training dock and over 40 laboratories for teaching, training and research.

The university's array of equipment includes a full mission ship-handling simulator and an engineroom simulator. DMU also owns and operates a 10,000dwt ocean-going training vessel that is powered by a MAN B&W 7S35MC engine and equipped with a MAN Diesel Alpha CP propeller.

An eight-cylinder S35ME-B engine, similar to that ordered by Dalian Maritime University, pictured leaving MAN Diesel's Frederikshavn, Denmark production facility in September 2008.

The new training engine will be built in South Korea by MAN Diesel licensee STX Engine Co. Ltd. Logistical and capacity issues in the Chinese market meant that a domestic builder could not be sourced.

MAN Diesel will offer support to the new venture with both technical and commercial backing.

Contact MAN Diesel Group, Teglholmsgade 41 2450, Copenhagen SV, Denmark.
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Fax. +45 33 85 10 30
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Ancillary equipment

MacGregor lift

Cargotec subsidiary MacGregor has won significant crane orders from Daewoo Shipbuilding & Marine Engineering Co Ltd (DSME).

MacGregor has received an order for 28 hose handling and provision cranes from the South Korean shipyard. The cranes will be installed on five VLCCs and two 147,000dwt LNG carriers ordered by Greek and Brunei-based shipowners, which will be delivered during 2010 to 2012.

Each of the VLCCs will be fitted with two 20tonne capacity hose-handling cranes, as well as one 12.5tonne capacity and one 3tonne capacity provisions crane. The two hose-handling and two provisions cranes for the LNG tankers will each have a lifting capacity of 5tonnes.

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Ancillary equipment

Humphree trims costs

Swedish technology company Humphree says that its latest Automatic Trim Optimisation System could shave 10%-15% off fuel consumption on any planing or semi planing hull, from 45ft up to 300ft and beyond.

The company's new package includes an advanced optional active ride control, while the new the new ATOS ensures that a vessel can run at optimal running trim at all speeds, leaving the master to concentrate on navigation.

Humphree says that, if included, the new active ride control option means that yachts, pilot boats or fast ferries would not need to fit the type of fin stabilisers that may keep vessels stable, but also mean excessive drag. .

Humphree interceptors or "super tabs" replace traditional trim tabs and provide improved fuel consumption, cut CO_2 and NOx emissions, increase speed and improve acceleration, as well as onboard comfort. The Humphree interceptors can be adapted to fit any hull shape, even hulls with propeller tunnels. The systems are also used to reduce wave making and wash for vessels operating in sensitive areas. The wake or wave height is reduced by up to 20%, the company says.

Contact Humphree, Sjöporten 4, SE-417 64 Gothenburg, Sweden.
Tel +46 31 744 3577
Fax +46 31 744 3573
E-mail humphree@humphree.com
www.humphree.com

Ancillary equipment

Nexan rolls out Iceflex

Nexans has launched Iceflex, a full range of marine and offshore cable qualified for extremely low temperatures, such as those experienced in the Arctic. Intended for use in a wide variety of shipboard and offshore/onshore applications, Iceflex will keep its flexibility in temperatures as low as –50°C, while ensuring advanced fire performance.

Iceflex also adheres to all current environmental and safety standards. It operates reliably in icy and snowy conditions under a variety of technical applications, and can survive in exposed conditions onboard, topside or in frozen ground or permafrost. The cable will also adapt to abrupt temperature variations.

Iceflex is available in two varieties - Halogen-Free Flame & Fire Retardant (HFFR) and halogenated versions. The cables do not propagate smoke, fire, or generate toxic gases and maintain power supplies for vital safety equipment, such as emergency lighting, fire pumps, or communications circuits.

Iceflex is fully certified by Lloyds Register, and is said to be also mechanically tough, which makes it resistant to atmospheric agents (ozone, UV, heat, etc.), and deterioration from oil, chemicals, heat and extreme weather.

Iceflex also has a high impact-resistance, which means it will not crack or break when subjected to sustained or violent physical shocks, such as vibration or operational stress, according to Nexans.

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Move to IMPROVE LNG carrier design

A new forward-looking design for a 220,000m^3 capacity liquefied natural gas carrier has emerged as part of the EU-funded IMPROVE project, following a study by STX Europe.

Supported by the European Commission, the three year 'IMPROVE' ship design research project is in its last year in its bid to deliver a rationale for making decisions pertaining to the design, production and operation of three new ship generations.

Coordinated by ANAST, University of Liege, IMPROVE involves 17 partners including shipyards such as Saint-Nazaire's, the French shipyard of STX Europe, and Uljanik shipyard of Croatia, owners Exmar, Grimaldi and Tankerska Plovidba Zadar, the classification society Bureau Veritas, two other universities, two ship design companies, two engineering companies and two software companies, as well as WEGEMT (European Association of Universities in Marine Technology and Related Sciences).

IMPROVE aims to use advanced synthesis and analysis techniques at the earliest stage of the design process, considering structure, production, operational performance, and safety criteria on their current basis. The ship types are new generations of chemical tankers and ro-pax vessels and, as the focus of this article, an innovative concept for a large liquefied natural gas carrier (LNGC).

Over recent years, the Saint-Nazaire shipyard (formerly Chantiers de l'Atlantique), the French part of STX Europe, has designed and built several LNG carriers for different shipowners implementing innovative ideas such as the first diesel-electric dual-fuel LNG carrier. Continuing a long tradition of innovation, the French shipyard proposes once more a new design concept for liquefied natural gas carriers.

The Saint-Nazaire shipyard's designers propose a solution to reduce the need for ballasting in order to prevent biological invasions of marine organisms transported in ballast water and sediment transfer. Moreover, energy and thus money will be saved by decreasing the huge amounts of sea water transported, almost unnecessarily.

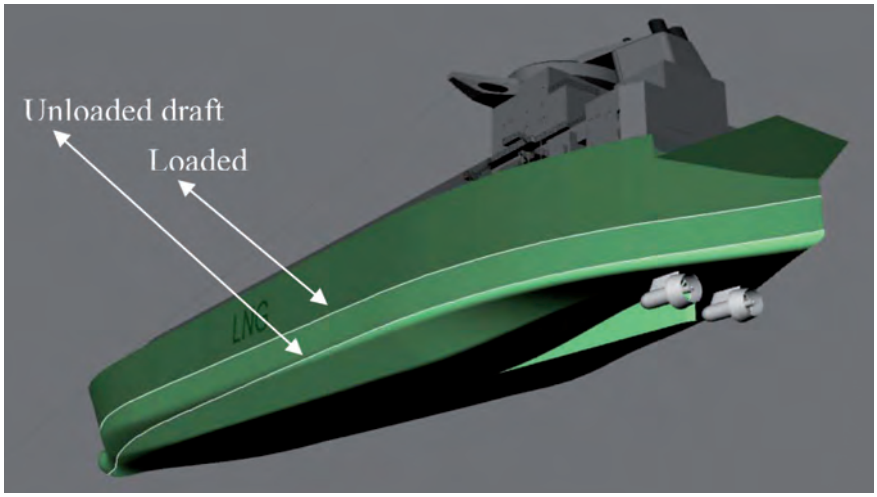
As part of the IMPROVE project, STX Europe has been meticulous in addressing a host of vessel attributes that add up to a state of the art ship design for LNG transportation.

These range from ensuring the large cargo carrying capacity within minimum dimensions, the observance of best practice in shipbuilding, high levels of safety, economic feasibility, low maintenance, high crew comfort, and security in terms of environmental protection.

The standard LNGC features, such as a complete double-hull, worldwide trade, speed of 19.5knots or the accommodation quarters in the aft part are maintained. The ship will also feature five membrane cargo tanks, with suitable cofferdams.

The innovative part is a change of the hull shape in combination with an adapted type of propulsion unit. The solution is based on a V-shape hull and pod type propulsion technology to make the need for ballast water unnecessary in good sea way conditions. The special hull form allows a sufficient draught in most loading conditions with a reduced volume of ballast water.

The STX Europe concept suggests a 'two-draught' vessel, using minimal or even no ballast water in the unloaded condition.



Ballast difference

A conventional design for such a LNGC size requires more than 65,000tonnes of ballast water. There are sea water ballast tanks (SWBTs) arranged in the double-hull tanks, forward and aft.

In the STX design, in the unloaded condition, the ship will be able to sail with a minimum volume of sea water, or even with none at all. The use of these SWBTs is in stark contrast to ballast tanks onboard a conventional LNG carrier, where the vessel is either full of LNG with empty SWBTs ("loaded") or empty of LNG with full SWBTs ("unloaded").

The SWBTs may be called upon in two particular situations only:

- Situation 1: during the loading/unloading operations of LNG, to reach a draught to be within the range of the loading arms.
- Situation 2: if the vessel meets bad weather conditions during a voyage and the master wishes to achieve a safer sailing condition from his point of view.

TECHNICAL PARTICULARS

STX Europe LNG carrier design

- Length over all .....about 319.20m
- Length between perpendiculars..... 309.90m
- Breadth moulded 50.00m
- Depth at main deck 27.40m
- Depth at trunk deck 36.00m
- Design draught (moulded) 13.05m
- Scantling draft 14.10m
- Light ballast draught .....about 7.00m
- Fully ballasted draught .....about 9.80m
- Air draft, from B.L. .....about 59.00m

Total deadweight at design draught ..... about 105,400tonnes

- Cargo total volume (at 100% full and at - 163°C)..... about 220,340m^3
- Ballast capacity (total volume) ..... about 64,000m^3

- INOVELIS pods .....two
- INOVELIS pods propeller diameter.....about 4.50m

- Total output of the four diesel engines (100% MCR).....51,300kW

- Classification.....Bureau Veritas

Classification, Rules & Regulations
Bureau Veritas I, ✠HULL, ✠MACH, Liquefied Gas Carrier LNG, Unrestricted Navigation, ✠VeriSTAR-HULL, ✠AUT-UMS, SYS-NEQ1, MONSHAFT, CARGOCONTROL, CLEAN SEA, CLEAN AIR, MANOVR, SDS

Concept for a new LNG carrier from STX Europe.

Whatever the particular situation, the design means that the ship will not have to renew or clean the sea water within the SWBTs when the ship is sailing. In short, this can be envisaged as;

- In the situation 1: used sea water is discharged before departure or in a zone close to the terminal at the beginning of the sailing.
- In the situation 2: the sea water used to reach a safer situation is considered as clean.

Thus the International Maritime Organization (IMO) recommendation to treat the ballast water is fulfilled or respectively not needed.

Machinery

A diesel-electric power station is proposed using engines of four-stroke dual-fuel type (running on boil off gas or marine diesel oil) at 514revs/min. At the start of the project, this thinking was based on the dual fuel engines supplied by Wärtsilä although, since the study began, other dual fuel main engines options have surfaced from MAN Diesel.

For the propulsion itself, two electric engines within two INOVELIS pods developed by CONVERTEAM may be used. Other types of propellers may also be considered, subject to further studies, according to STX Europe.

Cargo containment

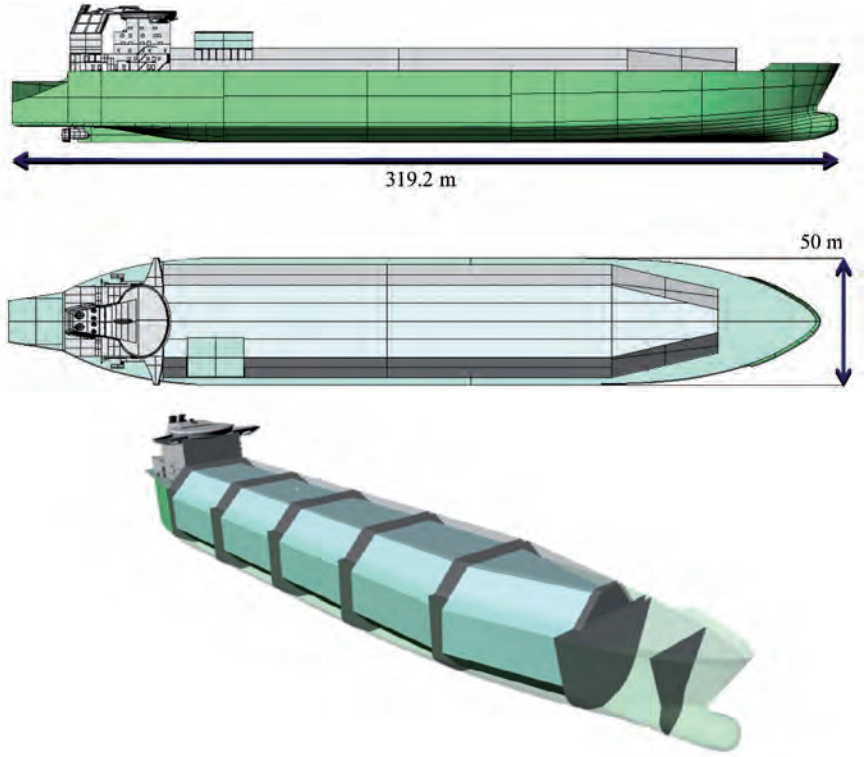
The proposed containment system is of the membrane type, five (5) tanks based on Gaz Transport and Technigaz (GTT) technology. Sloshing problems will be avoided by following the GTT and classification society requirements.

The insulation of the cargo tanks has been designed to give a natural boil-off-rate (BOR) to about 0.135 % (per day) of the loaded cargo volume.

Other containment solutions with independant tanks such as Aluminium Double Barrier Tank (ADBT) are possible and adaptable to the ship design with further studies.

The hull form is designed with more than 80% of developable surfaces, and minimises the cost of production of the hull.

For a conventional LNGC the exploitation conditions are 50% of the



time in a loaded condition and 50% of the time in an unloaded condition. For the STX Europe design, the partition of the exploitation conditions are the same but, within the unloaded condition, 80% of the time only a minimum volume of sea water is required, which may be nil, and the remaining time is considered with full SWBT.

Under such assumptions, around 8.6tonnes of LNG used as fuel can be saved per day. This is equivalent to a 9% saving when compared to a diesel electric dual fuel LNG carrier with about the same size and conventional features.

STX Europe is currently designing other LNGC sizes such as a "medmax" LNGC with the same principle. *NA*

The ship is envisaged with five cargo tanks, offering a large capacity of 220,000m^3, with length limited to 319m.

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Conoship zeros in on single hold bulker

New single hold 8500dwt bulk carrier design provides initial focus for the new international partnership involving Dutch yard group Conoship.

The developing relationship between Conoship International BV, of Groningen, The Netherlands, and Algoship Brokers Ltd and its sister company Smart Engineering and Design Solutions Ltd (both of Nassau, Bahamas, and both headed by Antony Prince), is homing in on two ship types where the partners believe opportunities persist, even in today's uncertain shipbuilding market.

The companies unveiled their new partnership in the third quarter of 2008, with an initial view of cultivating orders from Indian yards.

Leo van Ingen, Conoship International managing director, said that, alongside the Indian strategy, the partners were now developing links with shipbuilders elsewhere in Asia, specifically in China, Singapore, Bangladesh, Vietnam and Indonesia.

With Conoship bringing long-held ship design and building experience, and Algoships playing a brokerage role, the 200-staff strong SEDS (Smart Engineering and Design Solutions) organisation has wide experience of subcontracting engineering functions at a local level throughout Asia, stretching across areas such as steelwork, engineroom installations, fatigue analysis, and pipework.

Mr van Ingen said that the partners were now most actively pursuing business for smaller tonnage, of below 3000dwt, but also a new and specialised niche design for a single hold 8500dwt bulk carrier, developed to be in line with new stability rules.

"It is very difficult to make market predictions at the moment," said Mr van Ingen, "but, relatively speaking, the opportunities are better to build smaller vessels. That is why we have developed what we consider to be a forerunner single hold 8500dwt bulk carrier. The latest stability requirements have a major impact on the watertight integrity of ships of this size."

Mr van Ingen was referring to the new IMO damage stability requirements that entered into force on 1 January 2009, which demand a higher 'survivability index'.

"For new designs, this brings us to watertight integrity particulars, which have to be brought to a higher level compared with previous situations.

> "The trick is to increase the required damage stability index while minimising the extension of number of compartments/ tanks"

"To meet these requirements quickly, one solution would be simply to add a bulkhead, dividing the ship into two holds. However, not everyone is fond of this solution, especially those involved in project cargoes. For example, there is a clear tendency for those supplying the windmill industry to prefabricate as much as possible before installation on the seabed, in order to avoid welding on-site. That means that there is an imperative to maintain the single hold configuration.

"The trick is to increase the required damage stability index while minimising the extension of number of compartments/ tanks, and also to minimise the vessel's main dimensions, such as depth in view of steelweight, GT etc.

"Besides stability, global strength is challenging as well. Due to heavy crane capacity, a relatively long open cargo hold and the demand from the owners to be able to perform heavylift operations with a completely open hatchway, strength calculations mainly concentrate on transverse strength. Use is made of Finite Element Analysis to obtain the optimum construction configuration."

Mr van Ingen said that, in order to meet new stability rules, it was also necessary to make adjustments to the position of ballast tanks.

"We have to have a close relationship with class societies to achieve these goals," he said. As part of the arrangements between the three partners, Germanischer Lloyd has been nominated as a key participant their collaborative endeavours.

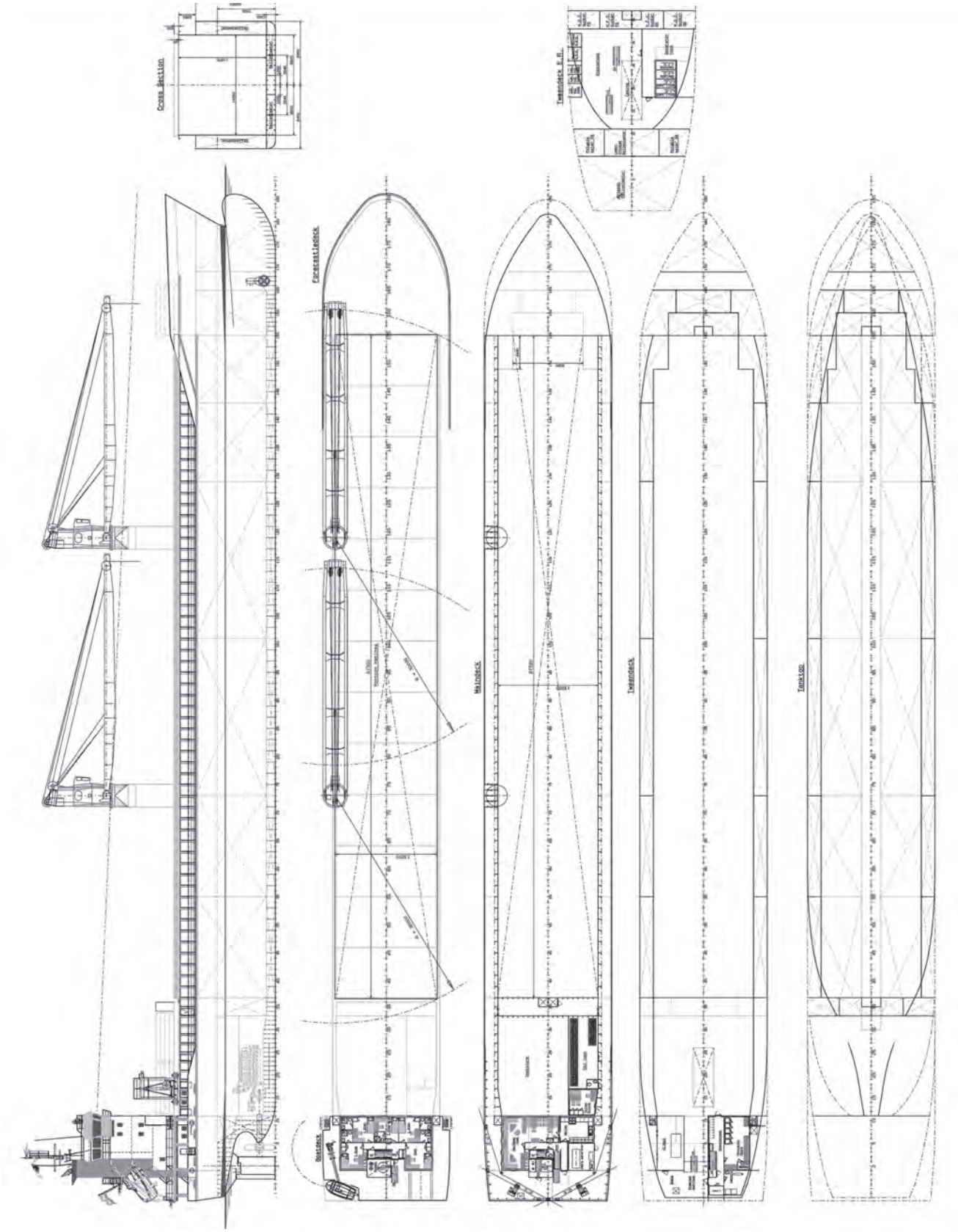
"It is remarkable that Germanischer Lloyd is playing an active role at the pre-contract stage," said Mr van Ingen. "GL experts support us with their knowledge, strength analysis and advice - not only Conoship/SEDS, but also subcontractors.

"Normally, the detailed design will be something offered by the yard, and the start of the project will involve a discussion over the outsourcing of engineering. By the time the project comes around to the build stage, it can be discovered that the project was based on a different steel weight than was first thought of, meaning that the whole project becomes unprofitable. Our new approach involves designers sitting down with GL at the outset."

Algoship Designers Ltd has series-built some 45 vessels and has over 71 on order for a number of well-known shipowners. Designs include *Fantasy* (1996), *Valiant* (2003) and *Trader* (2003), all of which have were selected by the Royal Institution of Naval Architect's *Significant Ships* publication.

Ultimately, Conoship, Algoship and SEDS intend to act as partners in the design, marketing and construction of any size of multi-purpose vessel, including bulk carriers, chemical tankers, dredgers or engineering vessels. *NA*

GA for a new 8500dwt bulk carrier with single hold identified as a clear market opportunity by the new Conoship/Algoship partnership.



Uplifting Emotion for converted cat

Elevator pre-installed in rigid frame by Dutch supplier for *Incat 050* conversion saves time.

The transformation of the *Incat 50* catamaran from a naval vessel to the passenger vessel *Manannan* by UK company Burgess Marine at Portsmouth's naval dockyard for Isle of Man Steam Packet represents the largest aluminium fast ferry conversion ever undertaken, but a slice of Dutch ingenuity was also required to ensure the project will come in on schedule.

Burgess Marine called upon specialised elevator company Lift Emotion, of Meppel, to abide by the extremely short conversion schedule demanded, with the lift specialist devising its first elevator pre-installed in a rigid frame, complete with Solas A60 elevator doors, to be lowered into the waiting ship. The complete elevator was installed within one day, with a further 1-2 days required to set the lift tom work.

Lift Emotion was responsible for delivering two marine elevators for the ship, one for the aft section and one for the forebody, but it was the unit aft that required innovative thinking. Here, because Tier 2 was separated from Tier 1 by means of resilient mounts, a normal lift construction was not possible. Therefore, Lift Emotion designed and constructed a lift including trunk construction, to be connected only at the Tier 1 part of the ship. Even the landing door for Tier 2 was fixed to this trunk construction.

Lift Emotion's prefabricated elevator slots in at short order onboard *Incat 050* as part of the conversion project.

Built to EN81-70 standards, the 1.15m wide, by 1.4m deep, by 2.05m high lift offers a payload capacity of 650kg and travels at a speed of 0.58m/sec.

Lift Emotion said that the time benefit of pre-installation had been clear to see, and that the same approach had already been selected for a high grade glass elevator installation for a yacht builder in Makkum, in a project due completion in April. Another project, for Dutch yacht builder Delta Marine, is due to come to fruition in the coming months, although in this case Lift Emotion said the four-stop glass elevator would be hoisted into place in two sections. .

Manannan, which is due redelivery in May, is replacing the existing monohull fast craft *Viking* and will principally serve the seasonal Liverpool – Douglas route. The 96m long wave piercing catamaran will be the largest vessel of its type in the Irish Sea and will enhance the service the shipowner can offer due to its faster cruising speed, greater vehicle and passenger capacity, freight backup capacity and increased levels of passenger comfort. As well as additional structural work, including a new vehicle ramp, she will have an entirely new and extended internal passenger layout. The ship is due to be incorporated into Steam Packet's existing fleet for the beginning of the summer 2009 season.

Incat 050 was built in Tasmania in 1998 and after a short period of commercial service in Australia and New Zealand, was chartered to the US Military for evaluation purposes in 2001. Because of her most recent use, she has significantly fewer hours of service than a vessel of comparable age. *NA*

The wave piercer *Incat 050* is being renamed *Manannan*.

Pipelay giant from Sea of Solutions

Ulstein Sea of Solutions develops new derrick pipelay vessel for NPCC.

Abu Dhabi-based National Petroleum Construction Company Ltd. (NPCC) has awarded Dutch design office Ulstein Sea of Solutions the basic design contract for its new large derrick pipelay vessel, designated the DLS-4200.

The new vessel will be the largest ever pipelay vessel designed by Ulstein Sea of solutions and will be one of the biggest vessels of its kind ever to enter service, combining S-lay double joint pipelay operations with a lifting capacity of 3800tonnes.

The design of the vessel is a modified version of the SOC 3000 design from Ulstein Sea of Solutions - a dynamically positioned crane/pipelay vessel design featuring a centre firing line to optimise pipelaying operations that are not hampered by vertical motions due to roll.

The DLS-4200 will be equipped with an Amclyde Model 80 crane. It will be 196.9m long (191.7m between perpendiculars), feature a beam of 43.4m (moulded) and a depth of 19.6m will initially be equipped with a mooring system to operate in the Middle East Gulf and India, but a future DP2 upgrade is envisaged in the design, with provision made for the inclusion of additional thrusters later on, should the ship be called upon to operate worldwide.

"We are pleased to be awarded this basic design contract by NPCC as it is the result of a careful evaluation by NPCC to renew and expand their fleet to operate outside their traditional market", says Bob Rietveldt, managing director at Ulstein Sea of Solutions.

Proposed DLS-4200 design from Ulstein Sea of Solutions for NPCC.

The vessel will feature a diesel electric propulsion solution, with four gensets driving thrusters and propellers. It will benefit from two fixed pitch shaft driven main propellers, drawing 5500kW each, which will mean it can operate at speeds of up to 12-13knots. For the future DP upgrade five retractable azimuthing thrusters of 3500kW each will be required.

The Amclyde main crane will be capable of lifting 3800tonnes at a 125ft radius over the stern in tie-back mode and the same weight at 95ft without tie-back. In full revolving mode the crane will be able to lift 2680tonnes at an outreach of 135ft. *NA*

All quiet on the Qatar front

Further details are not forthcoming regarding the memorandum of understanding signed last month by Qatar's Gas Transport Company Ltd. (Nakilat) and Damen Shipyards Group, of The Netherlands, to form a joint venture to manage a new shipyard, in the Port of Ras Laffan.

The partners said that the new shipyard would focus on high value vessels: commercial vessels (e.g. tugs, offshore supply vessels, coastal tankers, ferries); naval and coastguard vessels (e.g. corvettes, patrol boats, fast attack craft, of up to 100m in length); and luxury yachts (custom and semi-custom steel/aluminium vessels).

The yard is expected to be operational in early 2010, after which it is expected to roll out roughly 15 vessels a year.

Nakilat has invoked its stock exchange listing to bind Damen to a confidentiality agreement which prevents the Dutch shipbuilder from going into further detail.

As part of the official announcement, Qatar's Deputy Premier and Minister of Energy and Industry, H E Abdullah bin Hamad Al Attiyah said that ships built would be intended for local as well as for other customers in the Middle East and beyond. "It is an option for any customer, either from Qatar or elsewhere. We are not building this for a specific project," he said.

HGG offers missing tubular link

Dutch partner HGG in new integrated solution to export tubular steel structure CAD programs to cutting machines.

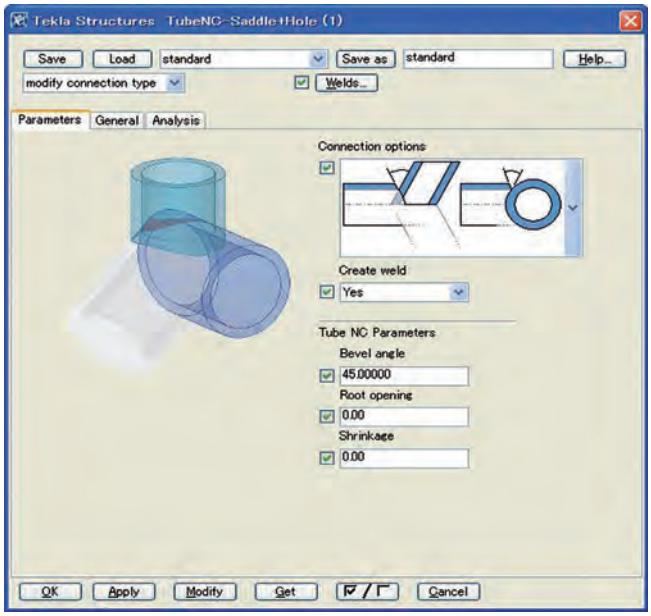
In an industry first, 3D modelling specialist Tekla and 3D profiling company HGG Profiling Equipment BV have come together to develop an integrated solution to export CAD programs to cutting machines used in manufacturing tubular steel structures.

Although exporting CAD programs to machining applications is, by now, commonplace in the offshore and shipbuilding sectors, the partners say that this is the first time that the technique has been applied to tubework.

The new software solution covers all 3D tubular profiles from design and detailing to automatic fabrication. The partners say that, until today, this functionality has not been an integral part of any main design program, but required separate manual data input and editing before actual fabrication could take place.

HGG said that the intention was to establish an industry standard for automated CAD export to tube cutting machines which could be freely adopted by other suppliers of cutting machines and 3D modelling developers at a later date.

HGG, of The Netherlands, offers the Management Information System (MIS) ProCAM suite, which delivers capability such as rotation, integral production management, and project planning.



New integrated solution to export CAD programs to cutting machines used in manufacturing tubular steel structures, from Dutch company HGG, and Tekla.

Finnish-headquartered Tekla offers the Building Information Modelling (BIM) concept, aimed at developers of tubular steel construction projects, and has been developed so that all information included can be extracted from one source. No manual input or editing of manufacturing data is needed. The concept now also includes automatic handling of all 3D tubular connections.

The new solution covers tubular profiles, and is available with Tekla Structures 15.0, which is being released to the market in spring 2009.

The joint offering includes:

- A full range of components in Tekla Structures software to cover the needs for modelling tubular structures; the new component types are offshore saddle (AWS) and offshore chamfer, saddle and hole, mitre and hole, chamfer and slotted hole
- An integrated export of complete manufacturing information from the model directly to 3D tube profiling production
- An XML format-based industry standard for transferring data that is open for any tube profiling machine company or design software supplier
- A visualisation module for 3D representations of cutting shapes on tubular structures.

HGG said that the new approach had already been adopted by McDermott in the United Arab Emirates, and by Saipem's Italian yard, Intermare Sarda. In terms of pipework onboard ships, an HGG spokesman said that the new approach should confer a 10% increase in productivity, where cutting was complex, and at low volumes. He emphasised that the main advantage of automation in this context lay in quality control and the traceability of materials. In an offshore construction context, where volume was more of an issue, the new approach promised a 30%-40% improvement in productivity.

In reiterating its aim to work with other developers to offer similar capability to fit with other software packages and process engineering concerns, and to establish an industry-wide standard, HGG's spokesman went so far as to make explicit mention of the company's desire to develop ties with marine and offshore process engineering market leader Aveva. *NA*

Automatic for Uljanik

Uljanik Shipyard, Croatia, recently installed an SPC800 pipe cutting machine, designed by HGG in close cooperation with Uljanik. In combination with the SPC800, the shipyard requested a semi automatic in feed and out feed system. HGG reports that, during pre-acceptance tests held at HGG headquarters, the complete Uljanik machine was approved to full satisfaction of the shipbuilder.

New thrust from Veth

The largest ever thrusters to come from Veth sees the Dutch supplier 'taking on the big boys'.

Don Amado, the first in a new series of three 105m long, DP Class 2, diving support vessels from Dutch shipbuilder De Hoop, is now in service with Oceanográfia in the Gulf of Mexico, and its delivery represents a milestone for Veth Motoren, whose participation in the building project saw the supply of the company's largest ever thrusters.

The latest electrically-driven Veth-Z-Drives, type VZ-1800 feature propeller diameters of 2400mm. Two of these thrusters are installed aft onboard *Don Amato*, operating at up to 1500kW, although the equipment supplier says that the VZ-1800 can offer power of up to 2000kW, at 1800revs/min. The ship is also equipped with three Veth tunnel bow thrusters, of the VT-800 type, offering 900kW at 900revs/min.

According to Veth, De Hoop Lobith has let it be known that it has high expectations for the VZ-1800 unit, as the yard has been getting more and more requests for thrusters of this size and power. It is understood that De Hoop has already placed orders for a further 10 x VZ-1800 units.

With a beam of 24m, a draught of 7m, and equipped with a Liebherr Offshore crane capable of handling 300tonnes at an outreach of 20m, *Don Amado* is capable of working in shallow and deep waters, worldwide, and offers accommodation for up to 200 personnel. Her high block coefficient hull has been refined for station-keeping in particular. Featuring a bulbous bow and a U-shaped fore-section, designed to limit friction, the ship's aft moonpool also includes a spoiler to minimise drag. *Don Amato* is powered by four 3516B generators, each rated at 1825kW at 1800revs/min. *NA*

Don Amado, now in service with Oceanográfia in the Gulf of Mexico.

The largest ever aft thruster from Veth – the VZ-1800.

Step change for VSTEP

Upgraded simulation package based on high quality graphics and low cost is finding favour with customers, even before its official release.

Officially slated for commercial release later this month, the latest full mission bridge simulator software from VSTEP, the Professional v2.0 suite, is already being used by a "renowned Naval Academy", supporting the training of some 500-plus students, according to its developer.

VSTEP has remained coy over exactly which organisations are specifying its latest simulator package, but the company is nonetheless bullish that its latest product will find a ready audience. According to a spokesman: "What I can tell you is that, even without any publicity, we have a lot of pre-orders from maritime institutes and maritime professionals worldwide. It seems that our low-cost/high quality solution is something the professional maritime world has a real interest in."

High quality graphics at low cost.

Ship Simulator Professional v2.0 includes a database of 30 detailed vessels, ranging from a large container vessel and an oil tanker, to a pushboat, a navy frigate, and an ocean tug, as well as a database of accurately recreated environments including the Solent, Hamburg, Rotterdam, New York, Marseille and others. It also features advanced ship dynamics and what the company claims are "the best 3D visuals in the current professional simulator market". The package can be used on Windows XP & Windows Vista desktop PCs, with up to three screens (more screens and up to 360degs full surround view is possible with additional user licenses). It integrates with external chart devices, AIS monitors, and other navigation instruments and hardware. Up to eight serial connections or Ethernet can be used to configure different National Marine Equipment Association sentences separately, such as different update frequencies, baud rates, etc. 23 NMEA output sentences and nine input sentences, are supported.

As well as a berthing trainer option, Ship Simulator Professional Software includes a Ship Dynamics Editor that allows the user to change notional displacement, engine type and thrust, rudder placement, dimensions and steering forces, dynamic vessel response to waves, and manoeuvring characterisitics. It also includes an advanced version of the basic weather editor, allowing for further adjustment and creation of realistic weather, and dynamic wave and current effects.

In September, VSTEP is due to launch the Ship Simulator Professional Instructor Station - a suite designed for maritime instructors that want full flexibility to create specialised training scenarios for students. It includes all the advanced features of Ship Simulator Professional v2.0 as well as specialised high end creation tools to cater for all your specific training needs. *NA*

Radio Holland brings integration inland

New generation of multi-functional consoles, from Radio Holland.

Designed specifically for the compact inland shipping bridge environment, Falcon offers operators of specialised inland tonnage the same type of networking capability at different bridge locations as has already been exploited in sea-going vessels. Using Falcon, the supplier says the ship's master obtains easy access to required information or functionality at his place of choice on the bridge, whereby multi-functional control panels provide flexibility in showing relevant navigation data. The concept "each instrument an individual layout" has become a thing of the past, according to Radio Holland.

Key to Falcon's functionality are its MultiHUB sensors, which are attached to the intelligent distribution system, distributing all information over the ethernet network around the ship. The control panels are hooked up to the same network, which gives the master direct access to all the data on the network. The MultiHUB compiles National Marine Electronics Association data technology, making it possible to connect to radar systems directly. An extra advantage is that installation requires a minimum amount of cables, according to Radio Holland. *NA*

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We're always Hamworthy

Waiting for ballast approval

The Ballast Water Management (BWM) Convention was adopted by the International Maritime Organization (IMO) in 2004 to address the scourge of invasive species. While ratification remains out of sight, technology is rising to the challenge.

Although agreed in 2004, the International Maritime Organization's Ballast Water Management Convention, requiring all ships to implement a ballast water and sediments management plan, will not enter into enter into force until 2010 at the earliest. Current expectations are that new ships constructed from 2009 will not be required to have the new equipment fitted until their second annual survey or end 2011, whichever is the sooner.

This position was arrived at after shipping industry lobbying, where implementation was initially pushed back towards the end of 2007, after it was acknowledged that the type of water treatment technologies able to handle the volumes of water ballasted by commercial shipping were not sufficiently ready. In the meantime, it was agreed that ballast water exchange in defined locations would remain acceptable.

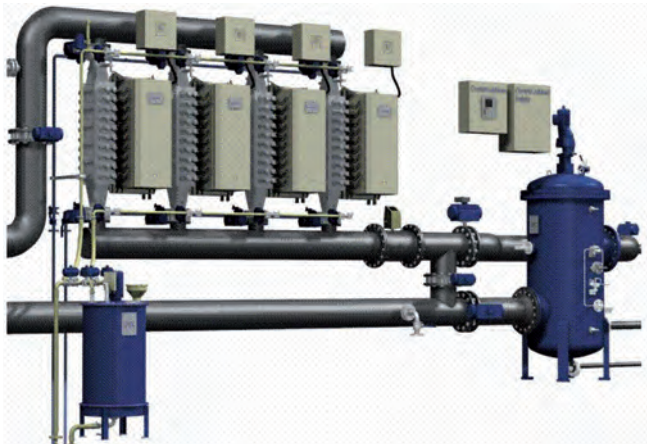
To date the Convention has been ratified by 18 states, representing 15.35% of world shipping tonnage, while it is only due entry into force 12 months after ratification by 30 state members, representing 35% of the world's merchant shipping tonnage.

As was the case with the earlier ban on the use of tributyl tin in anti-fouling coatings, the BWM Convention thus hangs in suspended animation.

Certainly, however, the IMO's Marine Environment Protection Committee is doing its utmost to facilitate entry into force. It is continuously monitoring progress on the technical side through a review group established at MEPC53 to determine whether equipment presented achieves the standard required under 'regulation D-2' of the Convention.

Technology answers

Significant progress has, in fact, been made in technological development that will facilitate the Convention's eventual adoption.



Alfa Laval's 'chemical free' ballast water system.

Among the latest meeting the technology challenge has been RWO GmbH, which is offering CleanBallast - a system designed to work in high sediment conditions.

The company has 40 orders for its ballast water treatment system. With eight units having been supplied to shipyards in 2008, the remaining units will be delivered in 2009 and 2010.

Orders for the CleanBallast system have been received from Germany – based Beluga Shipping and via China's Hudong Shipyard. Beluga Shipping is to fit 20 of its heavylift cargo ships with the CleanBallast system. They will have ballast water treatment capacities ranging between 350m^3/hr - 500m^3/hr.

RWO's CleanBallast system uses a two stage approach whose first stage involves mechanical separation (DiskFiltration) to remove suspended solids, sediments and a large number of organisms. The second stage is an electrolysis-based disinfection, termed 'Ectosys', which kills off remaining microorganisms.

RWO says that its ballast water DiskFilter has been specially designed to achieve a high flow rate. The filter units backwash one by one while the other disks are in full operation and produce filtrate and backwash water at the same time. The advantage of the in-depth filtration of the disk's design enables a greater particle removal with filter fineness below 50microns, RWO says.

The filtrate leaving the DiskFilters is treated by the inline Ectosys disinfection system, which is installed in the main ballast water pipe. The technique involves treating water electrochemically through use of electrodes with a high-oxygen over potential. The special electrode type makes it possible to electrolyze the water so that different short-lived highly reactive disinfectants, such as hydroxyl radicals, are produced, which inactivate micro-organisms and bacteria. No chemicals are added to the water prior to treatment.

The Ectosys disinfection system can work in any kind of water; including sea-, brackish, rivers and fresh water.

The Ectosys disinfection system offers low power consumption, a footprint of just 1m^2 for every 500m^3/hr unit, and can be adapted for various ship types, covering all ballast water capacities and qualities.

Testing of CleanBallast was repeated in 2008 at the request of MEPC57 with new documentation for the application of Final Approval of its Active Substance submitted to the IMO in November 2008.

RWO has said that it expects to receive Final Approval of the system's Active Substance during MEPC59, which will be held in July 2009, with shipboard testing of

CleanBallast due to be completed during the later part of 2009. Once Final Approval of Active Substance is granted by MEPC and the shipboard test is completed RWO will be submitting all relevant documentation to the German authorities for Type Approval of CleanBallast. RWO said that it expects that it will receive Type Certification in the later part of 2009, in line with the current timetable for IMO Convention to come in to force.

Already well advanced in the process is the PureBallast system from Alfa Laval, which is reckoned to have been the first 'chemical free' ballast water treatment system to enter the market. Having received full ballast water type approval from Det Norske Veritas (DNV) as long ago as June 2007, PureBallast has also received Final Approval from the IMO.

The Clean-in-place (CIP) unit uses a combination of UV lamps and 'Advanced Oxidation Technology'. The AOT units generate radicals to neutralise microorganisms and larger organic matter, with flow rates for an individual units being 250m^3/hr, and a modular approach currently envisaged for installations of up to 2500m^3/hr capacity.

Per Wang, PureBallast business manager, Alfa Laval said: "The CIP unit contains 250litres of CIP solution, which contains 12litres of CIP fluid and 238litres of water. The CIP fluid is based on fruit acid that is 100% biodegradable and can be discharged overboard when used."

To date Alfa Laval has received orders for its PureBallast system, ranging in size and capacity of 250m^3/h to 1000m^3/h. The system can be fitted between existing pipes and utilise the ballast pumps that are already installed. Vessels that have larger requirements can be fitted with duplicate systems.

Ectosys disinfects ballast water after disk filtration.

Also in the thick of ballast water technology development is OceanSaver, which recently announced that it, too, had received full type approval certification from DNV.

The Type Approval certificate has been issued on behalf of the Norwegian Maritime Administration and confirms OceanSaver's compliance with IMO's International Convention for the Control and Management of Ship's Ballast Water and Sediments.

"The Type Approval certification completes one of the strictest and most complex compliance procedures by the IMO and national approval Authorities," said OceanSaver, managing director, Stein Foss. "The certification proves the biological efficacy of OceanSaver's unique system and unique ballast water management technology".

OceanSaver emphasises that its ballast water solution does not contain or use any substance that poses a risk to the marine environment.

In essence, after filtration, a small portion of ballast water, less than 0.5% of the specified system flow rate, is exposed to an electrodialytic process before being re-injected into the flow together with nitrogen (N2), to kill off remaining microorganisms.

"OceanSaver is a robust and suitable ballast water management system for shipboard environments and occupies a minimal onboard footprint," said Mr Foss. "We offer the market a ballast water management system in compliance with all applicable regulations now and into the future. It is an optimal solution for marine applications."

OceanSaver received an order from

CleanBallast RWO ballast water treatment solution.

Höegh Fleet Services for its first 10 systems, for installation on the shipowner's managed fleet of car and gas carriers. The first four systems were delivered in 2008 – with two installed on Höegh's Horizon-class car carrier newbuildings under construction in Vietnam (Nam Trieu shipyard), and two retrofitted to two other car carriers.

The OceanSaver ballast water treatment is suitable for larger vessels or complex tonnage. "OceanSaver has shown itself to be extremely suitable for oil tankers, gas carriers, and chemical carriers," said Mr Foss." OceanSaver's solution is preferred by a growing number of ship owners and yards due its scalability and performance.

"DNV's analysis has been extremely thorough. All aspects associated to installing ballast water systems, including that of potentially unexpected installation costs, have been analysed," said Mr Foss.

"This has contributed greatly to the shipowners' decision-making process when examining and comparing ballast water management systems and has assisted technical departments in their early-stage design and specification process."

Also fast emerging from the pack has been Dutch company Greenship, which recently received two more orders for its SEDINOX ballast water management systems, which will be installed onboard two vessels owned by Chemgas Shipping BV.

The orders were placed in December last year is to replace two Sedimentor systems that were installed onboard two newbuilds vessels. Delivery of the systems will take place in early 2009.

SEDINOX can be installed onboard ships with ballast flow rates from 100m^3/hr up to 5000 m^3/hr. The System is always installed in a by-pass situation and consists of three major components, including a multi hydrocyclone and an electrolytical technique that feature no moving parts whatsoever.

The Greenship SEDINOX ballast water management system is only used during ballasting sessions and by-passed during discharges. The system uses no active substances. Easily installed in an engineroom, it operates at low power consumption of 2kW per 100m^3.

It meets the requirements as set out by the IMO and was granted basic approval from the IMO in October 2008 and is expected to receive final approval of the unit at MEPC59 in July this year. Last month, in a move that spoke volumes of the readiness for market of SEDINOX, Greenship was taken over by Hamworthy. *NA*

Hamann thinks bigger

Germany-based Hamann AG, the developer of the SEDNA ballast water treatment solution, has set its sights on handling larger ballast water capacities.

The SEDNA system received type approval back in June 2008, with the system offering a maximum capacity of 2,000m³/h.

Hamann is expecting to receive confirmation of orders to install onboard eight newbuild vessels and 32 retrofits, with deliveries to be made by the autumn of this year.

Hamann's SEDNA ballast capacity looks to get bigger.

Mathias Voigt, executive sales manager, Hamann AG said: "As the IMO D2 regulation addresses smaller ballast water pump capacities/types of ships, at first we've adopted our systems capacities accordingly. Hence the next step will be to deal with the requests of bigger amounts of ballast water/bigger ships. This will be our next step."

Research is currently underway for a larger unit, but no schedule has been set in place as yet.

Alfa Laval throws down bilge water challenge

Alfa Laval has launched PureBilge, a bilge water treatment system that uses a laminar flow inlet device for efficient separation.

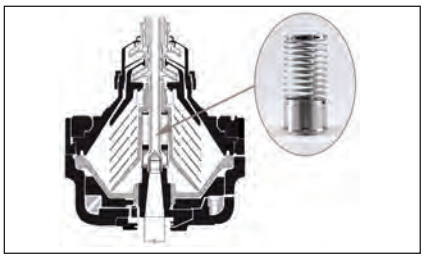
Alfa Laval's launch of PureBilge has come about, the company says, after it concluded that the marine industry was in dire need of a more effective bilge water treatment solution. While certain unspecified systems perform admirably in tests, Alfa Laval says they do not live up to their billing once onboard a ship.

Current legislation specifies that all vessels must have bilge water treatment systems onboard that can deliver bilge water with no more than 15ppm as particles or less, tested and typed approved according to MEPC 107(49).

Bilge water treatment systems go through a programme of shore based testing, with one chemical and, in order to receive certification, the test need only run for 150minutes. Alfa Laval has said that this is not sufficient to replicate the type of environment that will be encountered in real.

Pauli Kujala, business manager waste oils, Alfa Laval says: "If traditional static systems were to be tested with a realistic bilge water 'cocktail' under conditions simulating a rough sea state 24/7 for 20 days, they would immediately be eliminated."

The problem with dealing with bilge water today is that the bilge does not only contain oily water, but also a mixture of other chemical ingredients that can clog up a separator over a short period of time.



At the centre of PureBilge is the XLrator.

Efficient handling and testing of this noxious cocktail is important if it is to be treated correctly. The Alfa Laval PureBilge solution achieves this end through its separation process and through its newly developed XLrator laminar flow inlet device, or 'magic screw' as Alfa Laval has named it. The XLrator is designed to slowly accelerate agitation of the bilge water that sits in the separation bowl. Gentle agitation of the bilge water improves separation by preventing splitting of oil drops and the formation of further emulsions.

Testing of the PureBilge BWPX 307 system was carried out onboard the Teekay vessel *Falster Spirit*. The system was put through a more demanding process than current testing procedures for bilge water systems demand. The process involved using a mixture of chemicals comprised of 1m³ of sea water, 1litre of compressor oil, 10litres diesel oil, 10litres of heavy fuel oil (HFO), 1litre of hydraulic oil, 1litre of corrosion inhibitor, 1litre of carbon remover, 1litre of solvent based oil cleaner, 20litres of mud, 5litres of rust, 50litres of main engine air cooler condensate and 5litres of soot. The test was carried out over a period of four hours and at sea rather than on shore.

PureBilge the latest separator to add to the 'Pure' range.

The system comes in capacities of 2.5m³/h and 5m³/h with separation to 15ppm achieved; it can also be configured to achieve 5ppm particle levels in both capacities. *NA*

Genoil in bilge roll-out

Bilge water separation specialist Genoil Inc, of Calgary, has signed an exclusive licensing agreement with South Korea's DongHwa Entec Co Ltd.

Under the terms of a new agreement, DongHwa will license Genoil's bilge water separation technology for all ships, industrial fields and offshore rigs manufactured or retrofitted in South Korea, China and Japan, for the next five years.

Additionally, DongHwa will also build the Genoil Bilge Water Separator units for sale by Genoil.

DongHwa is one of the industry's leading manufacturers of heat exchangers and related multi-stage water generators.

David Lifschultz, Genoil chief executive, said: "We are very pleased to be working with DongHwa as our marketing and manufacturing partner. DongHwa accounts for the majority of all marine heat exchangers used in ships. For example, in both Korea and China they account for 70% of the shipping industry's heat exchangers and in Japan that rate is 60%. This bodes well for us as DongHwa is positioned to use its leverage to book bilge cleaner sales.

"In addition, we believe this is the beginning of higher worldwide demand… The DongHwa agreement is an important milestone in the evolution of Genoil, as we are working hard to transform Genoil into a profitable company focused on increasing shareholders' value.

"Based on the continual sales activity for both the GHU Upgrader and Crystal Sea Separator products, we are now at a point in organising manufacturing facilities for regional locations to reduce transportation costs and expedite deliveries by shorter shipping distances.

Gemoil's Crystal oily water separator.

"We are in the process of determining other low-cost manufacturing centres to serve (1) the Caspian Sea area, (2) Europe, and (3) other major markets"

"With DongHwa covering the Pacific Rim, we are in the process of determining other low-cost manufacturing centres to serve (1) the Caspian Sea area, (2) Europe, and (3) other major markets. As a result, this will allow Genoil to efficiently manufacture and ship at competitive prices."

Genoil's Crystal oily water separators for marine use have been certified by the US Coast Guard in accordance with the International Maritime Organization Resolution MEPC 107 (49). Subsequently, its bilge oily water separators have been certified by ABS.

Genoil Crystal oily water separators utilise a patented process for multi-stage separation of immiscible phases with different densities such as mineral or vegetable oils and water. The process combines gravitational and centrifugal forces with surface tension and vortex effect prior to the polishing stage.

The automation system ensures unattended operation and features PLC units, self-cleaning oil sensors and fail-safe components.

Crystal oily water separators typically achieve effluent purities of less than 5 mg/l for 0%-100% oil in water mixtures and relative oil densities of up to 0.985. A specially designed oil dome is also available to reduce the oil content to 5 mg/l at angles of inclination of up to 22.5degs in stormy conditions. *NA*

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Second Announcement

With conflicts increasingly taking place far away from land based air support, the role of naval based air power and the need to deploy a comprehensive range of naval based aircraft has become ever greater. RINA's 2009 conference in its highly successful Warships series will focus on Airpower at Sea.

Aircraft have developed rapidly in recent years and each generation of planes and helicopters present a new set of requirements and challenges to be met by the vessels carrying them. This is especially true of the latest trend towards Unmanned Air Vehicles (UAVs). These are now common for reconnaissance and surveillance and are on the brink of moving into a direct combat role. The vessels that carry these aircraft have long service lives and must be designed to take account of future developments with both minimal time spent out of service and cost due to updates.

RINA invites papers on all aspects of naval airpower from, designers, builders, equipment manufacturers and operators on the following topics:

- Design: new aircraft-ready vessels and retro-fit
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- Future aircraft requirements and their strategic context
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Sep-Line steps forward

DMA-Sorption is applying the principle of fluorescence to bilge water separation.

After two years in development, Danish company DMA-Sorption has launched a new high performance bilge water separator system.

The Sep-Line system has been developed after mathematical modelling and fluorescence input from Copenhagen University Foundation, while electronic consultancy was contributed by Lyngsø (SAM).

Available in capacity ranges of 0.5m^3/hr – 5.5m^3/hr, DMA-Sorption says that the Sep-Line approach is superior to other technologies because using fluorescence as the foundation for filtering means that the system is not tripped by other residues.

"Our filter containers represent the latest state of the art design in stainless steel 316 L with small footprint and low weight as well as an easy lid opening without the use of tools," the company says.

While IMO107 (49) standards set the limit for bilge discharge quality at 15ppm limits, Sep-Line achieves effluent oil concentration below 5ppm. The system features no moving parts and is based on a free oil separation unit, a particle and emulsion breaker unit and finally a large capacity absorption membrane filter unit including a patented polypropylene/polyethylene filter.

The system consists of an oily matrix separator unit for gravity separation of free oil, a particle and emulsion breaker unit and an absorption membrane filter unit – including a patented polypropylene.

"Our technology measures the actual oil concentration in water and not particles, as opposed to monitors based on light diffusion," says DMA-Sorption.

Monitoring is incorporated in the system, which is delivered as a 'plug and play' technology, ready assembled and tested with filter cartridges installed inside and variable DIN flanges for easy connection to onboard piping. It can interface with shipboard computer systems and GPS. This makes it possible for users to track the discharging history for periods of up to 30 days.

The DMA Sep-Line separator system is delivered mounted with helical rotary pump and oil discharge monitor and control box. *NA*

The new Sep-Line bilge water separator from DMA-Sorption.

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New views from Fincantieri

Refined thinking from the world's market leading builder of cruiseships.

Fincantieri's pedigree in cruiseship design has allowed it to build up an enviable reputation for securing contracts from repeat and new customers. And though its technical department is adept at working with new designs, the series approach of cruise companies has allowed the builder consistently to refine its products every time a new order is placed.

"We really have vessels in two categories; those that are the evolution of prototypes developed by Fincantieri five, six or eight years ago, and a second family which are prototypes at this moment," says head of technical department and innovation Luigi Matarazzo.

Less than obvious perhaps is that its highest profile recent order, for the new *Queen Elizabeth* is itself an evolution of the Vista class of ships built from 2000 onwards for Holland America Line at Marghera. The fourth of these vessels became P&O's *Arcadia* and Fincantieri then took its main characteristics, lengthened it by 11.7m while keeping it Panama-capable, completely redesigned the public rooms and proposed it to Cunard as *Queen Victoria*. Mr Matarazzo describes *Queen Elizabeth* as the *Victoria* design 'with some improvements'.

In this case, knowing the ship's characteristics in terms of manoeuvrability, speed and stability allows the designer to use part of the margin in order to allow an increase in passenger numbers or bring new flexibility to public rooms.

Current projects *Costa Luminosa* and *Costa Deliziosa* also evolved from the Vista class despite the Italian vessels having different floor plans and facilities. In this case, Fincantieri took the general arrangement of a much larger Carnival ship and squeezed it into Panamax dimensions, calling for a total re-arrangement of public spaces and restaurants, galley and food logistics. The result is a pair of 92,600gt ships that are 294m long overall, 32.25m across the beam, and feature a scantling draught of 8.1m. Powered by four 12,000kW MaK 12V43C main engines, operating at 514revs/min, these ships will be able to achieve a top speed of 23.6knots

Similarly, newbuilding *Carnival Dream* has origins in the *Destiny* project albeit with increased length and breadth. The ability to derive a fleet of vessels across different brands from a prototype is clearly cost effective for owners but Mr Matarazzo says customers would not notice the resemblance inside despite the hull forms being in many cases practically the same.

Being able to optimise the payload

Fincantieri head of technical department and innovation, merchant ship unit, Luigi Matarazzo.

Costa Luminosa - the latest ship to be delivered by Fincantieri's Marghera yard.

and hotel facilities according to market need is subject to the evolution of IMO regulations and the technical programme is regularly reviewed in light of new rules to decide on the feasibility of maintaining the design of accommodation, propulsion and machinery or developing a new concept.

In the case of *Carnival Dream*, it allowed a further evolution of cabin space compared to the previous delivery, *Carnival Splendour*. Differences include some changes to cabin layout but particularly the addition of a lower promenade deck. Fincantieri worked with Lloyd's Register on the feasibility of adding balconies to the cabins on deck 2, just below the public rooms. Creating an opening in the hull meant being able to guarantee water tightness equivalent to 1.5tonnes of water pressure m^2 with a galvanised stainless steel balcony.

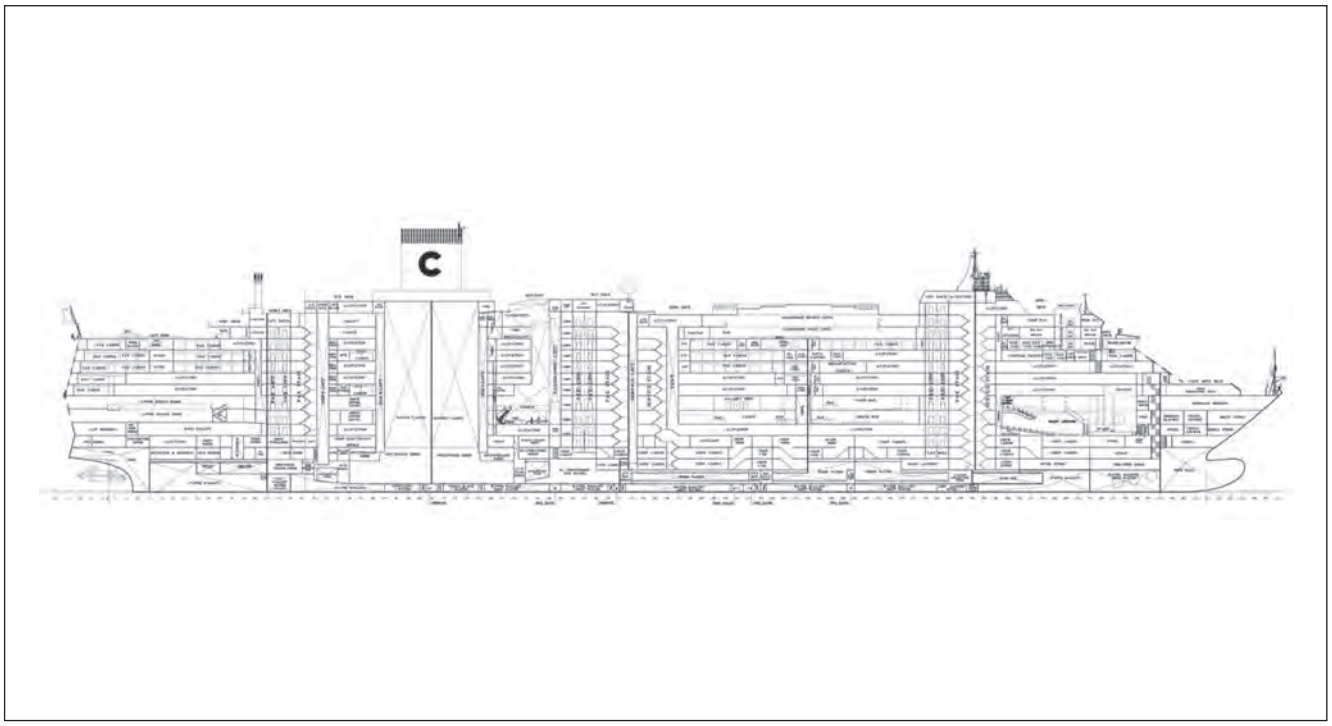
This desire to increase earning power – particularly when yields per cabin are under pressure - has meant an increase in similar work to existing ships. Having completed the retrofit of *Prince Albert II* (ex-*World Discoverer*) for Silversea at the Arsenale San Marco in 2008, this April *Oosterdam* was due to arrive in Palermo for a retrofit that will include 35 new cabins, an extension of the aft swimming pool and an increase of the lido deck.

The technical department is designing a similar retrofit for the 1997-built *Rotterdam*, which will see the aft-end modified to include 35 new cabins, a pool extension and a new profile for the upper level of the restaurant. Another new feature will see some cabins opened to the lower promenade, allowing them to be also sold as outside cabins with balconies. This increases the potential revenue per cabin but the possibility to service the additional capacity without increasing crew numbers effectively delivers something close to 'free of charge' payload to the owner.

Not all of the company's work involves thinking at the largest scale possible, even when earning power is at a premium. Its contract to build two megayacht/small cruiseships for Compagnie des Iles du Ponant at Ancona will present a similar set of challenges in a different environment.

The specifications for the 11,000gt, 400-person CIP ships demand that onboard vibration and noise is as close as possible to zero and the positioning of the restaurant above the main engine calls for engineering finesse far beyond any rules. In addition to insulation, efforts to decrease noise and vibration have included model tests on hull shape and propeller simulations in order to reduce noise as far as possible.

The ships' operational range, including passage in restricted waters, calls for a total dynamic positioning system and sonar for upriver excursions. Pressure on engineroom space has also resulted in a first for Fincantieri, the application of asynchronous electric propulsion. More commonly found on land than afloat, the system's integration of how the power is used and subdivided between main propulsion and side thrusters presents another stage of cruiseship design evolution according to Mr Matarazzo. "It's a first for a small ship and very complex but there is the potential to scale this up for future cruiseships. It's technology that is promising for a larger scale." *NA*



Profile of the 15-deck Costa Luminosa.

Smoke and mirrors

Technical departments in shipbuilders across the world are grappling with the demands of revisions to Marpol and Solas on their designs, but they also have to think ahead of the regulatory curve.

As Fincantieri's Alessandro Maccari puts it, participation in the debate at the International Maritime Organization and the ability to bring the builder's experience actively to bear in the discussions is the best way to ensure that the result is compatible with the design of the ship and effective for environmental protection. "We have to start thinking about how the rules will affect our projects in two years' time, so it's important to think about new concepts," he said.

As well as participating at IMO and in European research programmes, Fincantieri maintains a close relationship with the Cruise Lines Industry Association, the Community of European Shipyards Associations and the US Coast Guard. "This is not just for deliveries and generally on safety aspects but for discussions about new systems," said Mr Maccari. "Some of these discussions have resulted in international rules, such as the safety centre located close to the wheelhouse, now part of Solas, which is an interpretation of a concept developed between Fincantieri and the US Coast Guard."

Environmental issues facing the cruise sector run the gamut and put pressure on the design and innovation team to make and save more space onboard ship for equipment to manage and monitor air and water discharges. Mr Maccari believes the revisions to Marpol Annex VI and the next phase of air pollution regulations on CO_2 will have a major influence on the selection of the propulsion system and the installed power.

"We are discussing the design index for CO_2 now and there is a certain threshold defined but this will be tighter and tighter. In future, it is very that likely ships will have less power onboard and therefore a reduction of speed is possible. That could have an important effect on routes and trades and the ability to keep to the route and the schedule," he said.

If the ship is the primary destination this might be less of a problem but for those with a high number of port calls he predicts changes to the cruise concept. "Of course, we hope it means an increased number of ships."

In the meantime, discussions with CLIA and Interferry are centred on the concept of including not the total installed power in the design index but the balanced load, effectively measuring how much power is actually used. The increasing importance of redundancy in passenger and other ships

Carnival Glory, built by Fincantieri. Last year, prompted by the record fuel price, the shipbuilder proposed energy savings equivalent to $13million to the Carnival group for its existing fleet.

means that not all the installed power will be used, a point Mr Maccari said will be made at the next session of the Marine Environment Protection Committee.

To meet the criteria of the revised Annex VI, Mr Maccari pointed out that, for new ships, meeting the NOx reduction is largely a function of manufacturers designing systems that are compliant by the imposed deadlines. For meeting SOx emission limits, he preferred clean fuel to abatement, describing the scrubbers as "huge, costing a lot and having a strong impact on onboard space and casing weight in upper part superstructure" - little surprise perhaps, that they have yet to draw enquiries from owners.

Instead, to meet the green rules of the future means more research; into energy management onboard and alternative power generation. Solar panels and fuel cells will come to play their part in the latter but for the former, long-standing issues like reducing waste heat and producing only the power required rather than a surplus, has spurred an entire branch of investigation and cooperation with owners, with the aim of applying innovations that will save fuel costs to environmental protection too.

Last year, prompted by the record fuel price, Fincantieri proposed energy savings equivalent to $13million to the Carnival group for its existing fleet. Head of design and innovation Luigi Matarazzo said these ranged from the efficiency of the hull to the use of key cards, with work to identify the possibilities for energy savings on each vessel. "We made in some cases 100 ideas for each ship. The ships under construction will have new energy saving ideas. The big one is lighting but there is always a compromise to be made between technical constraints and architectural design."

Similarly emerging ballast water treatment technologies are being evaluated, not only for their efficacy but for their impact on space requirements. Mr Maccari suggested the ideal solution would be for zero ballast exchange, using a configuration of tanks to allow internal transfer with no discharge provided stability can be maintained but that with more treatment systems achieving IMO approval, these will see increasing adoption. *NA*

Cool savings from Imtech

Imtech secures latest order for energy-saving HVAC technology onboard new Celebrity cruiseship.

Imtech has received an order from Meyer Werft for an energy-saving climate technology onboard a Solstice-class cruiseship, through its German business unit, Imtech Schiffbau-/Dockbautechnik. The ship will be delivered to Celebrity Cruises in the autumn of 2012.

The order marks the fifth Solstice-class cruiseship that Imtech has been involved with. Ships of this class have an average length of about 315m, a width of about 37m, and a passenger capacity of around 2850 people.

The HVAC system will include intelligent process control, decentralised energy supplies, and high-tech cooling, induction and cabin units, as well as special energy-saving connection systems, all of which will add up to a 25% reduction in energy consumption when compared to a conventional system installed on an equivalent ship.

As the second largest energy consumer on the ship, after propulsion, the HVAC system has considerable energy-saving potential, and thus the air-handling units on *Celebrity Solstice*, for instance, feature enthalpy energy recovery, as well as modified cabin fan coils, independent cabin monitoring and control systems and a new fan coil system for public areas.

The latest system selected is similar to the HVAC technology already installed onboard the 122.000gt cruiseship *Celebrity Solstice*, where Imtech supplied 85 air handling units, 1600 cabin fan coil units, 110 public and 70 technical fan coil units, a special cabin area with air induction units and a separate cabin control and monitoring system.

In the case of *Celebrity Solstice*, the package consisted of technical calculation and design for the entire accommodation area, the layout for all deck areas, coordination for AC rooms and trunks, delivery of main components and duct material, including the chilled and heating water system within the AC rooms.

Here, Imtech developed a new generation of vertical and horizontal fan coil units for standard passenger cabins. These are compact and decentralised air treatment units mounted behind the sanitary block and thus accessible for maintenance from the passageway. Access to cabins is hence no longer necessary, which distinguishes this system from all other known cabin supply unit types on the market.

Elsewhere, special air induction units were used in a selected cabin area. Unlike the fan coil units, these components are equipped with an induction nozzle system for distributing air through a cabin cooling coil without an additional fan. This means lower electrical installation costs for the yard and less maintenance for the ships' crew.

A separate cabin control and monitoring system for all passenger cabins and some officer cabins was designed specially for *Celebrity Solstice* to permit direct monitoring of all functions of the fan coil unit. Each fan coil can be individually controlled by the assigned room temperature controller. The fan coils and control valves are connected to the room temperature controller and monitored by a central computer system onboard. From there the room temperature, temperature setpoint and alarms can be retrieved, giving a good overview and helping to meet passenger requirements immediately, as well as optimising energy consumption.

In public areas, horizontal fan coil units are installed within the false ceiling just above the room area that is to be serviced. This permits a tailor-made supply of cooled air appropriate for the individual requirements of each public room. An inspection hatch ensures accessibility for maintenance. The use of these public fan coils has significantly reduced the space required for A/C rooms, Imtech says. *NA*

Diesel electric tightens its grip

The latest newbuilding under construction for Holland America line, *Nieuw Amsterdam*, will become the latest cruiseship to be fitted with diesel electric propulsion technology.

Six MaK M 43 C engines from Caterpillar Marine Power Systems (CMPS) with a combined output of 64,000kW are being installed onboard the latest cruiseship for Holland America Line – *Nieuw Amsterdam*.

In March 2006, Italian shipyard Fincantieri ordered its first 4 x MaK 12 M 43 C and 2 x MaK 8 M 43 C marine engines to power the new 'Signature Class' cruiseship being built for Holland America Line. The vessel was delivered in 2008 as *Eurodam* and has already logged thousands of miles at sea. Following the initial order, Fincantieri clinched contracts for another four vessels with the same engine configuration.

In opting once more for a diesel electric powering option, owner HAL has again selected 4 x MaK 12 M 43 C and 2 x MaK8 M 43 C engines. When she is delivered in 2010, the 86,000gt *Nieuw Amsterdam* will join sistership *Eurodam* in service.

The last of the MaK engines for this latest newbuild underwent final customer acceptance tests at the Caterpillar Motoren facility in Rostock, Germany during March. Experts from both Caterpillar and Lloyd's Register checked engine performance under extreme conditions, which the ship will almost certainly never have to experience in real life.

Shipment of all six engines to Fincantieri's Marghera shipyard in Italy took place at the end of March.

Nieuw Amsterdam will join sistership *Eurodam* in operations after delivery in 2010.

TECHNICAL PARTICULARS	
Nieuw Amsterdam	
Ship's Registry	The Netherlands
Passenger capacity	2104
Crew members	800
Gross tonnage	86,000gt
Length	285.3m
Beam	32.3m
Maximum speed	23.9knots

Each MaK M 43 C engine is fitted with Flexible Camshaft Technology (FCT) to guarantee invisible smoke at all loads and NOx emissions below current IMO (International Maritime Organization) regulations. Utilising FCT, the engines will meet both the extended expectations of passengers on the sun deck and the more stringent legislative rules in some areas of the world, for example the Alaska Marine Vessel Visible Emission Standards. In addition, all M 43 C series engines can be easily converted to IMO II-compliant MaK Low Emission Engine (LEE) standard at any time if the operator desires.

Among the latest innovations in onboard propulsion technology is the MaK DICARE engine monitoring and maintenance system. By tracking both current engine status and long-term trends, the system enables optimum utilisation of scheduled maintenance, service personnel and spare parts, cutting operating costs and extending service life. DICARE spots malfunctions at a glance, assessing data, plausibility and the built-in expertise of decades of MaK diesel engine design.

The first *Nieuw Amsterdam* was launched in 1906 and used both a full set of sails and steam engines. She was 17,149 tonnes and carried 2886 passengers, 2200 of them in third class. She sailed in regular service through World War I and then through to 1932.

Nieuw Amsterdam II joined the fleet in 1938 as the company's flagship.

Nieuw Amsterdam III was launched in 1983. The 33,900gt ship sailed in Alaska in the summers and in the Caribbean in the winters. ***NA***

Cosnav looks longer term

Designers are faced by challenges in today's shipbuilding market.

The collapse into administration of the de Poli shipyard is, for Trieste-based naval architect Cosnav, a demonstration of the challenges of building and realising projects at independent yards in Italy. Cosnav's Costantino Cosmidis takes no pleasure in pointing out that its designs could be among the last ships built in the Venice yard unless a rescue package is forthcoming.

During 2008, Cosnav was involved in the construction at de Poli of the 7800m^3 IMO II chemical/oil tanker *Leale* for Elbana di Navigazione, launched at the year's end.

The scope of Cosnav's work included the basic design, structural and strength calculations, loading and stability requirements, as well as designing the piping arrangements for the cargo and systems on the main deck.

Tank tests were carried out at the Krylov Shipbuilding Research Institute in St Petersburg with positive results confirmed during the sea trials. In particular, the design of the hull form allows the vessel to exceed 14knots with a shaft power of 2800kW, delivering optimal manoeuvrability and seaworthiness in operations.

Leale was built for Piombino-based Elbana di Navigazione under the supervision of RINa and Bureau Veritas with class notations of AUT-UMS, AUT-PORT, VCS, Mon-Shaft, Manovr, Unrestricted Navigation, In Water Survey, AVM-APS-NS,VCS, IGS, CARGOCONTROL, CleanSea and CleanAir.

With a length between perpendiculars of about 104m and a beam of 16.80m

The new chemical tanker *Leale*, built at the de Poli yard to a Cosnav design.

Leale features 10 Avesta 2205 stainless steel cargo tanks and two sloped tanks, with a deadweight of 7300 drawing a draught of about 7.4m. The cargo pumps were supplied by Marflex for use in combination with a stern discharge system. The main engine is a MAN B&W 8L32/40 rated at 4000kW at 750revs/min driving a four blade controllable pitch propeller. Power is supplied by a shaft generator of 800kW and three Volvo Penta D25A generators of 480kW each.

Work experience

Despite the difficult trading conditions for its clients, Cosnav is occupied with design work that builds on its long term relationship with Turkish builders of specialist tonnage.

Underway are two 9400m^3 chemical/oil tankers, to be built to IMO II/III and ice class 1A with stainless steel cargo tanks, for shipowner Finbeta of Savona. The sisters are being built at the TVK Shipyard at Izmit under the supervision of RINa.

Cosnav has also designed a new 15,500dwt self-loading/unloading bulk carrier for Naftotrade, currently under construction at the Selah Shipyard in Tuzla. Two years ago it completed what were at the time the largest cement carriers built in Europe for the same owner. Naftotrade has since continued its fleet replacement programme, selling older, conventional tonnage to build bigger ships that will comply with more stringent dust controls.

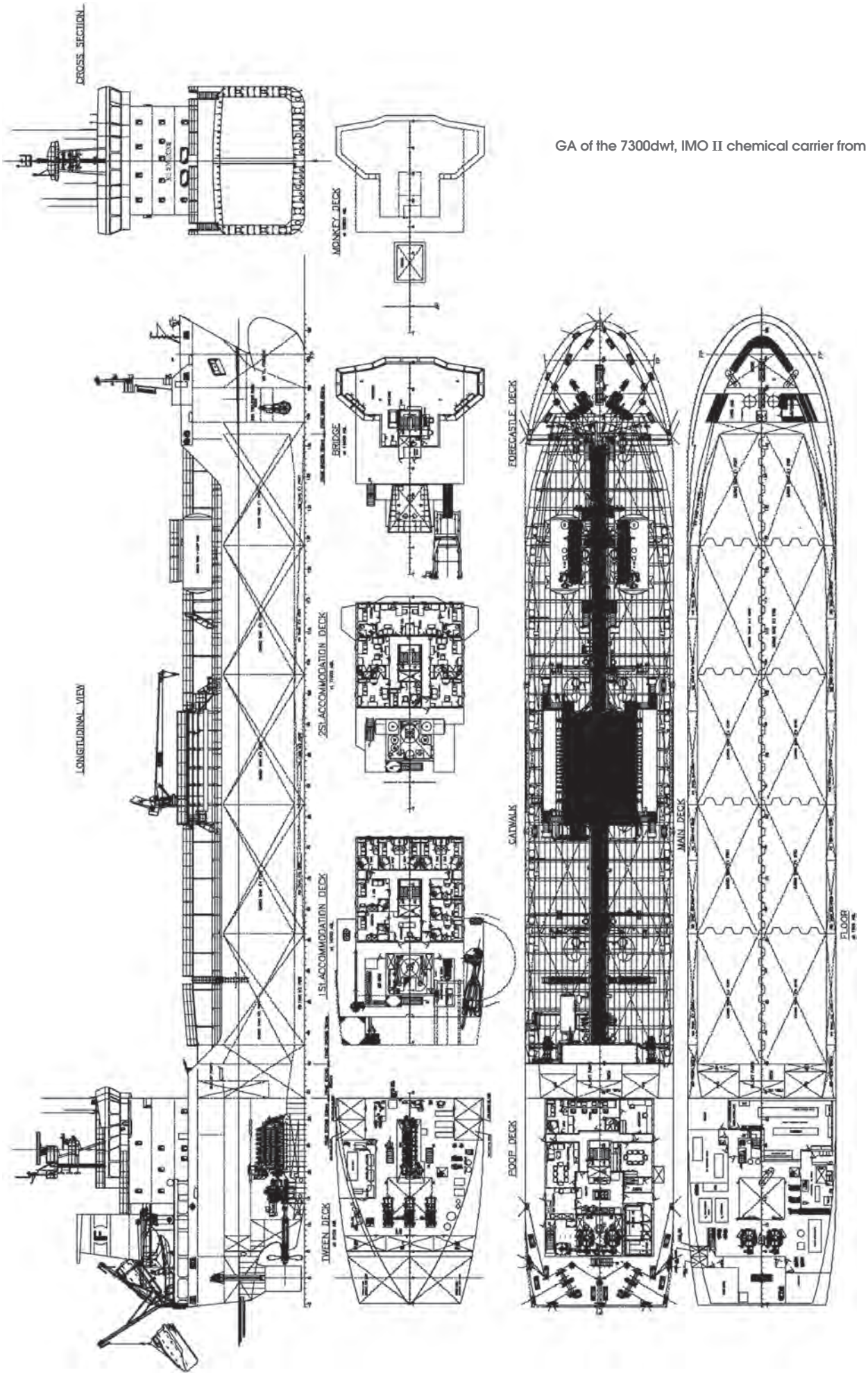
This latest contract included the development of the loading/unloading system by Cosnav, which worked with RINa and industrial partners but was given a free hand by the owner. The resulting vessel is designed to be as flexible as possible, operating with a low environmental impact, enabling mechanical or pneumatic cargo operations depending on weather conditions and available port facilities.

It is a good example, Mr Cosmidis says, of working with owners whose ideas for new designs are drawn from working experience which can combine a "theoretical solution with a good economic compromise" over the working life of the ship. "Experience is important, not just in design but during the life of ship in reality, providing statistics and feedback on how it performs day to day." ***NA***

TECHNICAL PARTICULARS

Chemical/Oil Tanker Leale - IMO II

Loa:	abt 112m
Lbp:	abt 104m
Breadth:	16.80m
DWT at abt 7.4m:	abt 7300
Main engine:	MAN B&W 8L32 /40, 4,000kW
Shaft generator:	1 x 800kW
Genset:	VOLVO PENTA D25A, 3 x 480kW



GA of the 7300dwt, IMO II chemical carrier from Cosnav.

Fincantieri works on as market stalls

While currently sustained by its strong forward orderbook, Fincantieri must wait on the cruiseship market to pick up before it can fully assess its future prospects.

Not even giants can escape the bad times. As the giant of southern European shipbuilding Fincantieri might be judged both vulnerable and resilient in current conditions; the former because of its high exposure to the cruise market, the latter because of the cushion provided by its forward orderbook.

The contrast was obvious from the state-owned firm's annual results. Revenues grew 8% in 2008 thanks to the high order intake of previous years but the effects of the economic crisis were felt in high raw materials prices, rising labour costs and falling order levels, sending earnings for the year to just €10million compared to €36million in 2007.

Securing just two new orders last year worth €2.5billion compared poorly with the €4.2billion booked in 2007. The brightest spot in the results was the news that the Italian government was ready to approve a capital increase of €300million, some compensation for the fact that privatisation will not take place for the foreseeable future.

This downbeat news is somewhat at odds with the level of activity at the company's production office, which continues to work on fulfilling orders that take it through to 2012. It is a point not lost on head of technical department and innovation Luigi Matarazzo. "As you can imagine, it is not an easy period and the global situation is touching us, but we are lucky to have a certain number of orders to keep the shipyards busy," he said.

"Of course, we are working in order to be ready when the cruise market starts again. For this, we are developing a certain number of projects accommodating new rules. What we try to do is to anticipate and develop a complete project, to find the best compromise in terms of the commercial aspect and the environmental point of view."

The Trieste-based production office employs 300 people working from basic design concept to management of the ship's lifecycle, producing all the specifications required for the purchase department. The merchant shipping division works with six shipyards; Monfalcone, Marghera, Ancona, Palermo, Castelamare de Stabia and Sestre. In addition, the Arsenale San Marco facility in Trieste is used for drydocking during sea trials as well as dedicated retrofitting and conversions.

In each of the construction yards, a workshop department produces detailed drawings under the supervision of head office. The organisation not only puts technical staff close to the production process but centralised management means that work is organised not just by task, such as basic design, but also with key staff providing support and knowledge all along the production chain.

Of current projects, the Marghera yard has been dedicated to two ships for Costa Crociere, *Costa Luminosa* due for delivery at

Rendering of *Carnival Dream*. The130,000gt ship is taking shape at Monfalcone, and is due delivery in September 2009.

the end April and sistership *Costa Deliziosa* due for delivery in 2010. These ships will be followed by one for Holland America Line, derived from the Vista class project. Another two large vessels will follow for Costa. Specifications for the last two have not been defined but the ships will be around 110,000gt-115,000gt, the last of which will deliver in 2012.

Under construction at Sestre is *Costa Pacifica,* due for delivery at the end of May, followed by two prototype vessels for Oceania, scheduled for delivery in 2010 and 2011.

Visitors to Trieste by train can hardly fail to notice the 130,000gt *Carnival Dream* taking shape at Monfalcone, which will be the biggest vessel the yard has delivered when it is handed over in September. That contract is followed by a ship for P&O Cruises for delivery at the start of 2010. Then come more behemoths, *Queen Elizabeth*, said to offer an improved design, based on *Queen Victoria*, and a sister for *Carnival Dream*, both to be delivered in 2011.

Its Ancona yard, normally dedicated to ferry construction has since its last delivery for Tallink last year, also been given over to cruiseship building. Most recently launched is the first of two ships of a prototype design for Silversea Cruises, the 36,000gt, 540-passenger *Silver Spirit*, while negotiations continue over exercising the option for a second ship – perhaps at a reduced price. At Ancona, steel cutting has begun for two new small luxury cruise vessels for Compagnie des Iles du Ponant.

At the Neapolitan Stabia yard, one vessel for Grimaldi-owned Minoan Lines has recently been completed and another is under construction for delivery next year. Palermo, which is often used for conversion and modification work, is currently occupied with a more unusual project, constructing the Scarabello 8 drilling rig for Saipem for delivery in 2010.

In February Fincantieri Palermo completed a unique heavylift operation, raising the completed drilling tower weighing 2400tonnes some 90m from the quay and onto the upper deck of the floating platform, a process which also required moving 9000tonnes of ballast water.

In addition to its core vessel design and construction services, Fincantieri together with its in-house consultancy Cetena, develops value-added products in a bid to draw on practical experience. Among the most recent of these is the Safe Navigation System, a patented decision support tool which uses wave radar to predict sea state at a certain distance from the ship.

From the wave height, period and main direction data collected, a mathematical ship model forecasts the ship's dynamic behaviour under wave impact on the hull and the consequent hull girder vibrations. The SNS has been installed on *Queen Victoria* and is available as a retrofit to any vessel, offering not just safety applications but potential energy savings and emissions reductions if used as a weather routeing system, according to the shipbuilder. *NA*

MES builds on speciality

Creative thinking is the order of the day at Marine Engineering Services, which continues to extend its geographic reach.

The way a new order unfolded for four liquefied petroleum gas carriers to be built at Besiktas Gemi Insaa Sanayi for €60million, to a design from Trieste-based Marine Engineering Services, is typical of the environment facing the industry in general and the designers of specialised tonnage in particular.

Livorno-based Gas and Heat, the cargo containment arm of MES had originally placed the order for the 3360m^3 capacity quartet at Berk Shipyard, on behalf of Greece's Vafias Group. When delays prompted Vafias to cancel the order, Gas and Heat took them on and successfully transferred the deal to Besiktas Group, which operates nine tankers and manages another two.

Besiktas' own yard in Yalova has taken over the project, including completion of one vessel started at Berk and the construction of the remaining three. The first ship is due delivery in November, with the second to follow in February 2010 and the remaining two in May 2010.

Such creative thinking will be a feature of business in 2009, according to Giorgio La Valle, who runs MES with his son Marco. Expansion of business meant a move to new offices as the market turned and Mr La Valle accepts that the coming year will be one when the industry has to survive on lower margins. He notes a substantial reduction of orders in 2008, but also the remaining good forward, multi-year orderbook.

MES' recent work has been to concentrate on its speciality for designing chemical carriers and parcel tankers from 'white paper' through the ship's lifecycle as well as completing conversions and modifications. While its core skills remain in basic and extended design, previous projects have included a single to double-hull conversion for Mediterranea di Navigazione, increasing the deadweight and upgrading propulsion.

The formula for the Besiktas ships will follow that of previous deliveries, with Gas and Heat building and supplying cargo tanks and plans to a part-completed hull. After shipping from Livorno and fitting, the canopy deck will be added along with the cargo handling system.

MES-designed newbuilding 33 (left), the 15,900dwt chemical carrier *Ardenza*, under construction for D'Alesio Group, at Tuzla Gemi Shipyard. Next to her is newbuilding 34, the sistership *Divina*, whose sea trials were carried out in March.

Among original design projects underway are a 6700m^3 capacity liquefied natural gas carrier featuring a dual fuel propulsion system. MES said orders for these ships were very close to fruition, for construction in an Asian yard for a Danish owner. MES is also designing a bitumen carrier with what Mr La Vale described as "a different philosophy" for its cargo containment system, employing a special arrangement that reduces heat loss.

MES continues to favour twin skeg designs for their improved hydrodynamic performance and redundancy, a concept recently applied to an 18,000dwt ice class chemical carrier built to RINa class and capable of working in temperatures as low as -35 °C in the White Sea. The design called for heating of outside spaces during cargo operations with covering to fore and aft mooring positions. In addition to a special arrangement of sea chests, the hull was shaped for astern movement in ice-covered waters. Improvements to the hull form achieved a service speed of 15knots despite a reduction in installed power.

Having built its twin skegs to RINa's Green Star notation, the next ship will be designed to the new Green Plus standard and MES says future designs will increasingly draw on alternative propulsion systems including more dual fuel solutions using LNG while alongside.

A truly international company with European roots, the MES orderbook includes two 9000m^3 ethylene carriers under construction in Poland, four 4500m^3 ethylene carriers in Vietnam, the four 3300m^3 LPG ships at Besiktas and the last of six 4000m^3 LPG carriers at Pesaro. Tanker projects include six 8400dwt units and the last of two 16,000dwt tankers under construction in Turkey, as well as two 6800dwt chemical tankers with stainless tanks in Indonesia. *NA*

Mariotti enters another league

T. Mariotti has grown from roots in shiprepair to become a builder of luxury cruiseships.

Genoese shipyard T. Mariotti is putting the finishing touches to the first of three ultra-luxury small cruiseships for Carnival brand Seabourn, expecting to deliver *Seabourn Odyssey* in June 2009.

Seabourn's decision to exercise options for two sisters well in advance of expiration is an indication of the owner's "satisfaction with the progress of the work thus far and with its relationship with T.Mariotti" according to a yard spokesperson. The total cost for the three ships will be €550million, with the second and third ships scheduled for delivery in 2010 and 2011.

The 32,000gt design calls for hulls of 198m, a beam of 25.6m and a draught of 6.4m. Powered by diesel-electric plants, they will operate with twin screw propellers at a service speed of 19knots. Redundancy is provided by two fully independent propulsion systems.

Architects Yran & Storbraaten have designed the series to provide accommodation in 225 luxury suites, 90% of which will offer private verandas, with one of the highest space-per guest ratios in the industry. As well as complying with revisions to Solas for damage stability, all three will be built to the RINa Green Star class notation, employing advanced wastewater treatment technology.

The hull of *Seabourn Odyssey* was built in the CI.MAR yard in San Giorgio di Nogaro, with the fore and aft sections constructed separately. Both were then loaded onto a submersible barge and taken about 100nm to a floating dock in Rijeka, Croatia. The two hull sections, the forepart about 3000tonnes and aftpart 4000tonnes, including their lifting cradles, required as many as 168 four-wheel axles and eight hydraulic heavylift trolleys to position and align them for welding into a single floating hull, which was towed to Genoa for fitting out.

Seabourn Odyssey, under construction at T. Mariotti.

Finishing touches being put to *Seabourn Odyssey*.

Describing shiprepair and conversion as "the roots on which T.Mariotti was born and steadily grew up", during 2008 Mariotti signed an agreement with shiprepairer San Giorgio del Porto to create Genova Industrie Navali, establishing a holding company in which Mariotti holds a 75.25% stake. GNI's role is to coordinate the business of the two companies at the strategic level and in relation to the investments, which will allow the companies to chase international and domestic business while also controlling costs.

Genoa Industrie Navali employs around 300 people and covers an area of about 53,000m^2, including 15,000m^2 of indoor space and 1,500m^2 of quay inside the port of Genoa. It also provides marketing for the CI.MAR facility.

In 2008, Mariotti continued to draw on its relationships with main customers Moby Lines and Costa Crociere, though the yard stresses its contacts with non-Italian customers including V.Ships and Peter Gast Shipping.

Early in the year, Mariotti replaced diesel generators on the 1976-built ro-pax *Moby Otta* and completed main engine and diesel generator overhaul as well as boiler replacement on the 1975-built *Moby Drea*. It followed this with structural reinforcements in the main garage and other drydock works including starboard tailshaft withdrawal to the 2002-built ro-pax *Moby Tommy*. Work for Costa saw new steel work and the fitting of new bow thrusters to the 1969-built cruiseship *Costa Marina*. **NA**

RINa moves up the class

A year of change for the Italian class body, with a new focus on Asia paying off, and the continuing need to participate fully in regulatory debate.

For class society RINa, 2008 was a year of change in a number of ways. It marked impressive growth in its classed fleet and orderbook alike and confirmed itself as a contender for both larger conventional tonnage and the specialised ships with which it made its name closer to home.

Finishing last year with a classed fleet of 23.6 million gt meant an increase over three years of 25% and an increase of 9% compared to 2007. Its orderbook of 10.5 million gt is equivalent to 710 ships, with a record intake of 300 units equivalent to 4 million gt added in the course of the year. The order influx will reduce the average fleet age as well as bringing bigger ships including very large ore carriers and very large crude carriers which have not been present until now.

For deputy director of the marine division, technical and international affairs, Roberto Cazzulo, the unprecedented boom also means that currently harder times are being felt more keenly but he says the class society has yet to see any major impact from the present market conditions in terms of its classed fleet or its newbuilding orderbook.

"The overall situation of our clients is OK and going ahead in a stable way. In terms of cancellations, absolutely not for 2009 and beyond the current year; it's possible for some slippage but nothing which will affect the current orderbook." He accepts that 2009 will be "a year of consolidation" with little or no likely increase in the order intake while there is so much tonnage available second-hand.

The growth in RINa's activities in recent years has had an obvious Asian flavour, with a new plan approval centre in Shanghai supported by six survey stations across China. Offices have also been opened in Indonesia and Vietnam. By the year-end, 35 newbuildings were on order in China to RINa class for Asian owners with a further 35 on order in Indonesia for Asian owners. Mr Cazzulo says staff have relocated from Italy and South Korea to support Chinese nationals in RINa's local office with about 100 in total now working across the country. The society sees the potential to provide more shipping services alongside classification and benefit from market liberalisation in the value-added ro-ro and ferry sectors where it made its name.

RINa deputy director of the marine division, technical and international affairs, Roberto Cazzulo,

> "one of the roles is to dispel the rumour that you can achieve the number you like from a risk assessment"

Though China has been a source of new business for RINa, the society has not been above questioning the speed with which the country has embraced mass-market shipbuilding. Chief executive Ugo Salerno raised eyebrows last year when he suggested that lack of experience born of an inability to secure high-quality managers and labour meant that some yards were falling short of its standards.

The problem, Mr Cazzulo says in RINa's experience was limited to a handful of general cargo vessels from second and third level shipyards which would have drawn attention when trading outside China, but its own response has been robust. "We took steps in two directions, first to work only with highly reliable shipyards, not just the state-owned but those with a good design office and their own resources, not greenfield yards."

As well as being more selective, RINa increased its local presence – in part through its Shanghai centre - but also by establishing a Chinese advisory committee to hold regular meetings and seminars. "This is additional work for us but it has had a positive effect in increasing confidence on both sides," he says.

Describing the four VLCCs and one VLOC under construction at yards in Korea and China as "in some respects, exceptional cases" Mr Cazzulo says RINa's approach is based on same criteria that it follows with other complex cruise or ro-pax vessels. The increased size demands a greater commitment of human resources but he says RINa is "enjoying the possibility to do something that is not our most traditional field. The VLOC order is at the request of a specific client. We also class specialised vessels for this client and we will continue to work at the small and specialised area of the market".

He also defends the Common Structural Rules to which such bulker and tanker newbuildings are constructed as "a valuable document developed at industry request". The requirements have been positive so far, less in terms of specific technical elements but more in defining common structure for the future, he suggests. "In terms of transparency, the comments in the IACS knowledge centre show there is a strong interest. Like any rules, the first edition is not perfect and some elements still require consideration," he says, adding that the quieter market for ship classification might allow more time to finalise more of the requirements enabling

the project to take another step forward.

Equally important is wider industry involvement and the opportunity to collect feedback from non-IACS class societies, to which end the knowledge centre resources are being made available to such societies considering bringing the requirements into their own rules. He thinks this wider constituency might mean a broadening of the rules themselves, from standards for large international ship types to application for smaller, coastal and short-sea tonnage.

As regulations evolve and change over time, Mr Cazzulo sees a growing importance for tools such as the Formal Safety Assessment, of which RINa was one of the original prime movers. The intention in developing 'rules for rules' might have been to make regulations less prescriptive and more performance-based but he agrees more work needs to be done to make FSAs equivalent to their prescriptive counterparts.

"We have to go with the research projects such as Safedor and others. It is promising but it requires a lot of work to make equivalence to the rules for damage stability, safe return to port in practice." Involved in the IMO working group, he says one of the roles is to dispel the "rumour that you can achieve the number you like from a risk assessment" while encouraging further studies for baseline development. Both are "long and demanding and IMO cannot complete this work without the full support of industry. We have seen some results but we shouldn't believe these techniques will replace prescriptive regulations for some years to come".

> "By the year-end, 35 newbuildings were on order in China to RINa class for Asian owners with a further 35 on order in Indonesia for Asian owners"

One area of regulation the society will continue to oppose is the concept of mutual recognition of marine equipment certificates, proposed by the European Commission last year, despite a tacit acceptance of the regulation's inevitability by IACS. Whatever the political messages, Mr Cazzulo says that since class is a concept not related to individual components but to total vessel compliance, a society can never in reality trace the construction and performance of individual components certified by others.

Under transfer of class, responsibility is assumed after a survey which will identify improvements necessary for compliance so the mutual recognition occurring here is not something it can refuse, but the society will make its own judgment. "There is an assumption of responsibility in transfer of class based on a technical assessment. If it is just based on a rubber stamp or a certificate, I'm not sure a class society could assume the same level of responsibility." *NA*

A greener RINa

Classification society RINa has introduced two new class notations, building on protection of the environment and seafarer safety.

RINa has developed the voluntary goal-based class notation, Green Plus from its preceding Green Star notation. This voluntary standard will be based on an environmental performance index covering all aspects of the vessel's impact on the environment, including energy efficiency and carbon emissions. Green Star's anticipation of the requirements of Marpol and other relevant legislation is taken further by the new notation which will be granted only to new vessels which make a significant investment in design, equipment, and operational procedures which contribute to an improvement in environmental performance beyond the minimum levels.

Design solutions and onboard equipment include any items which reduce the risk of pollution or which lower fuel consumption and air emissions, such as innovative engine design, use of alternative fuels, high-efficiency propellers, optimal hull design and bio-degradable oils. No operational ships have yet been awarded the Green Plus notation, though some are being designed in Italy with it in mind. RINa has granted the Green Star notation to about 40 passengerships to date.

> "No operational ships have yet been awarded the Green Plus notation, though some are being designed in Italy with it in mind"

RINa has also introduced the class notation ILODESIGN, which is designed to provide compliance with the new ILO Maritime Labour Convention 2006, expected to enter force in 2012. RINa plan approval will assess the ship's drawings in order to ascertain that they are in compliance with the Convention regarding general arrangements and dimensions of cabins and other accommodation spaces, heating, ventilation, sanitary facilities, lighting and hospital accommodation. In the event of a ship conversion, ILODESIGN will be withdrawn and a new plan approval and inspection will be carried out in order to issue the new additional class notation. *NA*

The Royal Institution of Naval Architects

DESIGN AND OPERATION OF BULK CARRIERS

26 - 27 October 2009, Athens, Greece

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

Designers, classification societies and owners have faced the challenges posed by the introduction of the Common Structural Rules. Goal Based Standards have been developed further at IMO with the final elements expected to be finalised this year. Also at IMO, new schedules have been added to the IMSBC Code (formally BC Code) which will become mandatory in January 2011 and the BLU Code is currently under review to include grain and consider issues associated with high loading rates.

Environmental regulation is also moving forward with the revision to MARPOL Annex VI placing further restrictions on emissions of NOx and SOx. The development of the IMO Energy Efficiency Design Index is aimed at stimulating technical innovation in propulsive efficiency as the industry strives to reduce its CO_2 emissions.

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

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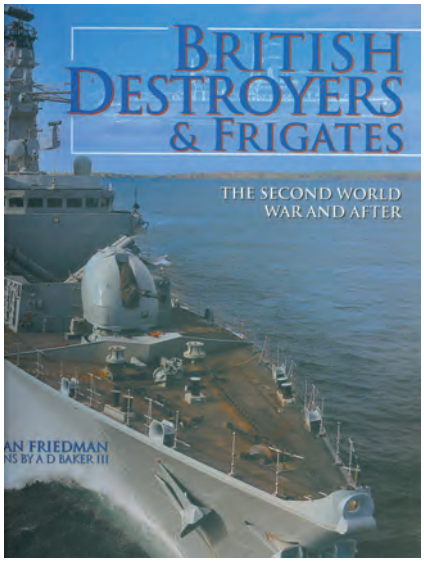
British Destroyers & Frigates

Review by E. C. Tupper

British Destroyers & Frigates
The Second World War and After
By Norman Friedman, published by Seaforth Publishing as a hardback, 2006, 352 pp.
ISBN 978 1 84832 015 4, £45.



The author is a well known, and respected, American naval analyst. He has researched his subject in depth and has the advantage of being able to compare British designs and procedures with those adopted by the US Navy. The book contains a wealth of well referenced data, much not published before, and is very well illustrated with over 200 photographs and more than 120 line drawings. Ship plans are by A. D. Baker III with additional drawings by Alan Raven. These illustrations bring to life the descriptions of the ships, and their equipment, given in the text. The book begins with the armaments build-up of the 1930s and progresses up to the present day. The hulls, machinery, weapons, sensors, control systems and accommodation are all covered. The book also brings out the differing views held by the different authorities involved in deciding upon the requirements for individual ships and the constraints within which they, and the designers, had to work. Apart from the obvious constraint of money, the number of potential builders, the skills of the workforce, changes in the threats experienced in war and peace, shortages of equipment and the risks associated with new technology had all to be included in the decision making process. The desire for more hulls on a limited budget led, particularly in the post WWII years, to a range of specialised ships – anti-submarine, air protection, air direction and anti-surface. There were also desires to keep down complements and improve ship availability. The Falklands War showed how valuable naval flexibility can be. The author says that the losses the Royal Navy sustained in that war were not because ships cannot be designed to survive anti-ship missile attack but, rather, were the consequence of cost cutting gambles over two decades. The new Type 45 is what is needed to beat such attacks, but this can only be achieved at the expense of sophistication.

Inevitably, perhaps, the book touches upon the "short fat ship" controversy. The author likens it to the situation of the failed ironclad, *Captain*. In both cases "innovation was backed enthusiastically by those with only limited technical knowledge". Of the short fat ship proposal itself he says: "A cynic might suggest that the real problem was that the decision makers had little or no exposure to technology or science, hence did not realise just how outrageous the Giles-Thornycroft claims could be". The Government did not accept the opinions of their own experts.

In the Introduction the author reviews the changes which have taken place in the balance between the Admiralty, later the Ministry of Defence, and industry over the period under review. He outlines the advantages and disadvantages of the different ways of working as well as the problems arising from the very low number of ships designed and built in recent years. It is difficult to maintain an adequate force of experienced staff for both design and build. The trend has been to put more of the design work out to industry, but with MOD leadership and partnership. The author points out that many of those in industry now designing the Type 45 and the new carrier are RCNC trained. Thus for a while the old legacy of the Director of Naval Construction survives, but for how long will this relatively satisfactory situation continue?

The coverage is so extensive that it is not possible to discuss individual designs. Ships from the USA, supplied to the RN, commonwealth ships and exports are amongst those discussed. The enthusiast will find the book fascinating in terms of the technological changes and the number and variety of designs, of both ships and equipment, considered (many rejected or not developed) against a changing operational scenario. The changes made during conception, the reasons for them and their consequences for the final ship are discussed. The ordinary reader may find the detailed descriptions lengthy (because of the detail which makes the book so valuable for the enthusiast), but will nevertheless find the general trends very interesting.

At the back of the book are extensive tables listing the characteristics of the ships discussed in the main text. There is also a list of classes of ship in order of ordering date and then, within each class, individual ships by name (with pennant number) in alphabetical order. This listing includes the shipbuilder with laying down, launch and disposal dates. War losses are indicated.

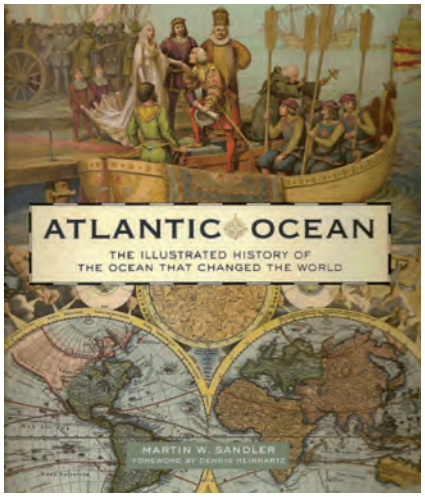
From the last chapter, in which the author looks to the future, it is clear that the Royal Navy is still faced with the age old problem of not having enough money for the ships they would like. They must still decide whether a few high quality ships or a mix of high and low capability ships is better.

Those who have been, or are, associated with the design, build and operation of these ships will enjoy the insights given by this book. *NA*

Atlantic Ocean

Review by E C Tupper

Atlantic Ocean
The illustrated history of the ocean that changed the world
By Martin W. Sandler, published by Sterling Publishing as a hardback, 2008, 480 pp. ISBN 978-1-4027-4724-3, £20.



The author has written more than 50 books and has received two Pulitzer Prize nominations. He has taught American history and American studies at the University of Massachusetts and South Carolina.

The term Atlantic derives from the Greek god Atlas and the ocean is bordered by four continents. The book says that the Atlantic has a greater shoreline than the Pacific and Indian Oceans combined. Also, the continental areas drained by rivers emptying into the Atlantic are twice as great as for those other two oceans. Thus the Atlantic has always been important in the transfer of people, ideas, and cultures as well as in communications generally. Early explorers were driven by a desire to fine another route to the riches of India and China or a wish to escape persecution and poverty in Europe.

The book covers a lot of ground and has a fascinating tale to tell. It begins with the early myths and legends which, coupled with very crude maps and navigation equipment, meant that those who first ventured out from Europe were very brave people. It progresses to the first landings of Europeans on the other side of the Atlantic, reconnection, discovery and exploration leading to colonisation of both of what are now North and South America. It outlines the struggles that ensued, the prevalence and role of slavery, the War of Independence and then the American Civil war. The book then describes the industrial revolution in Britain, followed later by a similar surge in industrialisation in the USA and Germany. The two great World Wars of the twentieth century are dealt with mainly in terms of the war in the Atlantic and the dreaded scourge of the submarine which came so close to severing the links between the Old World and the New. It explores in some detail the historical, socioeconomic, political, scientific and cultural changes that occurred in the Atlantic region to lead to the modern world.

> "The economic success of these liners depended upon the lowly passengers in steerage"

Because it covers so many themes none can be dealt with in any great detail. Thus a specialist in one area is unlikely to learn anything new about his or her speciality but will come to see it within a wider context.

In a chapter devoted to shipping developments as they affected Atlantic trade, the author takes as his starting point the emergence of the Packet – a ship providing regular sailings on the main routes. He then describes the Clippers which were speedy and profitable (and proved useful to many in the Californian Gold Rush), the whalers, the search for the North West passage, yachting, the advent of steam and iron which spelt the end of the wooden sailing ship as the main vehicle for trade. The book describes the arrival on 23 April 1828 of the British steam vessel *Sirius* in New York harbour, the first vessel solely powered by steam to cross the Atlantic which it did in nineteen days. It was followed an hour later by the *Great Western*, a much larger ship which had crossed in fifteen days. It describes the role of Brunel's *Great Eastern* in laying the Atlantic Cable. It outlines the battle between the two ironclads *CSS Virginia* and *USS Monitor* in 1862 which some regard as the beginning of modern naval warfare.

The author goes on to describe how ships played a major role in the great immigration of people from Europe to the United States, although the conditions on board were pitiful. The conditions in the great liners crossing the Atlantic both before the First World War (including Titanic) and between the two wars (including the *Normandie* and the *Queen Mary*) were quite different. Luxury was the theme for the wealthy passengers with great emphasis on décor and service. However, the economic success of these liners depended upon the lowly passengers in steerage. Most of these great liners were destined to be used as troopships or hospital ships in the two wars.

The later chapters deal with the vast increase in size of modern ships and the growing importance of protecting the environment in the ocean, besides exploring its depths with submersibles.

All in all the book makes a most interesting read. It is extremely well illustrated with antique maps, period paintings and engravings, documents, political cartoons and photographs. It is very good value at a modest price. *NA*

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Second Announcement

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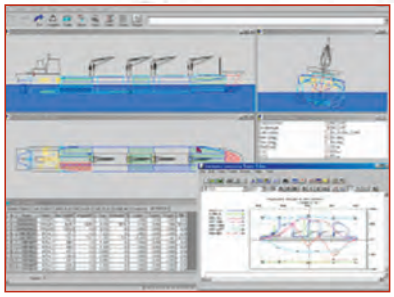

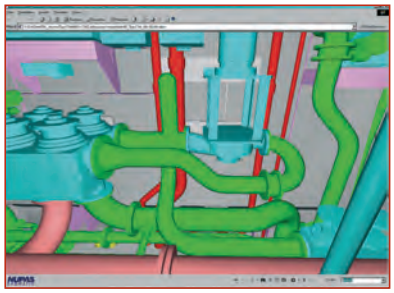

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