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Holland's marine industries / Cruiseship update

Italian marine industries / Shipboard water treatment / **May 2008**

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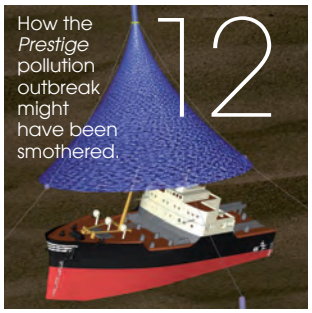

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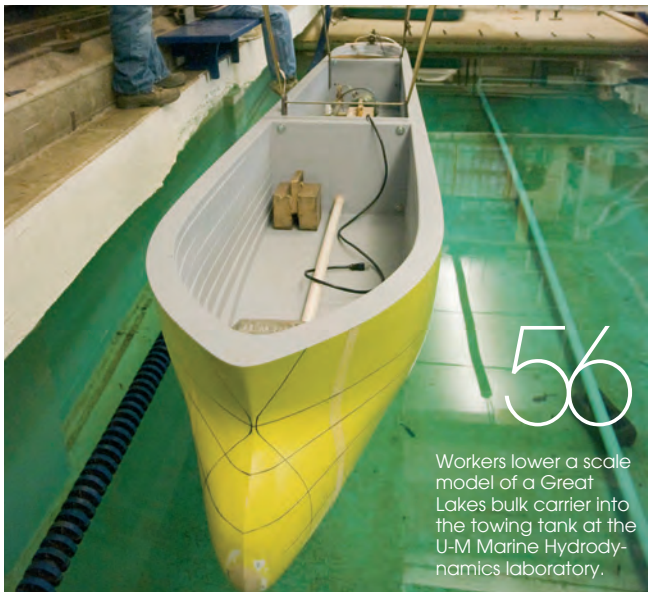
A stroll in the park beckons for *Genesis* cruisers.



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Workers lower a scale model of a Great Lakes bulk carrier into the towing tank at the U-M Marine Hydrodynamics laboratory.

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.

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Emissions consensus takes IMO critics by surprise

Coming amendments to MARPOL Annex VI will prove extremely beneficial to the environment, according to the IMO.

Agreement was reached at the International Maritime Organization's Marine Environment Protection Committee (MEPC) last month to amend MARPOL Annex VI regulations and reduce harmful emissions from ships.

The significant changes, agreed by consensus after some had preferred to imagine intractable controversy, will see a progressive reduction in sulphur oxide (SOx) emissions from ships, with the global sulphur cap reduced initially to 3.5% (from the current 4.5%), effective from 1 January 2012; then progressively to 0.5%, effective from 1 January 2020, subject to a feasibility review to be completed no later than 2018.

The limits applicable in Sulphur Emission Control Areas (SECAs) will be reduced to 1%, beginning on 1 March 2010 (from the current 1.5%); being further reduced to 0.1%, effective from 1 January 2015.

Progressive reductions in nitrogen oxide (NOx) emissions from marine engines were also agreed, with the most stringent controls on so-called 'Tier III' engines. For Tier III, NOx emission levels for a diesel engine which is installed on a ship constructed on or after 1 January 2016 would be reduced to 3.4 g/kWh, when the ship is operating in a designated Emission Control Area.

The IMO said that the revised Annex VI would allow for an Emission Control Area to be designated for SOx and particulate matter, or NOx, or all three types of emissions from ships, subject to a proposal from a Party or Parties to the Annex which would be considered for adoption by the Organization, if supported by a demonstrated need to prevent, reduce, and control one or all three of those emissions from ships.

In the current Annex VI, there are two SECAs designated, namely, the Baltic Sea and the North Sea area, which also includes the English Channel.

Speaking at the close of MEPC, IMO Secretary-General Mr Efthimios E Mitropoulos said: 'The fact that representatives of some 100 Governments were able to reach decisions by consensus on complicated issues of great importance to the environment not only bears testimony to the responsible manner with which the Members address environmental matters nowadays but also to the great results that can be achieved when States, with the same concerns and determination to produce meaningful solutions to global problems, work together under the auspices of IMO.

'I am confident that, once adopted as amendments to MARPOL Annex VI, in the coming October, the new measures will prove extremely beneficial to the environment,' he said. 'It will certainly be one of IMO's finest hours when this happens six months from now.' This current timetable sees a revised Annex VI entering into force in 2010.

The MEPC also agreed, with a view to adoption by an MEPC resolution, the draft revised Guidelines for Exhaust Gas Cleaning Systems. It was agreed to forward the interim washwater discharge criteria, to be included in the Guidelines, to the Joint Group of Experts on Scientific Aspects of Marine Environmental Protection (GESAMP) for its review and comment. The interim washwater discharge criteria will be revised in the future as more data becomes available on the contents of the discharged washwater and its potential effects on the marine environment.

Industry bodies welcomed the package wholeheartedly. Intertanko 'expressed satisfaction that the goals set by Intertanko's Council have been fully achieved - namely that the revisions should: ensure a solid platform of requirements; be realistic and feasible; seek a global, long-term, and positive reduction of air emissions from ships; contribute to a long-term and predictable global regulatory regime.'

> "There are clear winners from this outcome. At the end of the day, these are the environment, the many people affected by air pollution from ships, and thousands of seafarers."

'There are clear winners from this outcome,' said Intertanko managing director Dr Peter Swift. 'At the end of the day, these are the environment, the many people affected by air pollution from ships, and thousands of seafarers worldwide.' *NA*

Shipbuilding

Hyundai makes tandem leap

Hyundai Heavy Industries (HHI) has developed and obtained an international patent for a new inundation method used in the tandem shipbuilding process.

Traditional methods saw a vessel that was under construction floated on the water whenever the drydock was flooded to launch a completed ship. The new method holds the incomplete ship in place, allowing the company to continue work on the ship whether the drydock is flooded or dry, reducing construction time.

The method does not require any additional investments to facilities and has eliminated additional work. HHI assembles the main engine and propeller shaft, attaches the hatch cover, and lashes down the bridge to make the ship heavier before the drydock is filled with water.

HHI said it had already launched seven vessels using this method, including a 10,000TEU containership. The company plans to expand use of the inundation method to all drydocks.

HHI was granted a domestic patent in January 2008, and applied for an international patent application, under the Patent Cooperation Treaty, in November of last year. The company will also register its patent separately in other countries including Japan, China, and India.

Hyundai Heavy Industries' new inundation shipbuilding method.

The tandem shipbuilding process involves building more than one ship in a drydock simultaneously. When one ship is launched, all ships within the drydock float up.

Classification

New class effort on LNG

ABS and the Russian Maritime Register of Shipping (RS) are jointly to develop new classification rules for Arctic liquefied natural gas carriers.

This is the first pairing of the International Association of Class Societies to create rules for the LNG market sector.

The joint effort involves a new approach to combining ice class rules with direct calculations for the design of Arctic LNG vessel propulsion.

The Class bodies said that ice class research on non-linear finite element analysis of side structures subject to ice loads, which led to the issuance of guidance notes on ice class, provided a methodology for studying the impact of ice loads on LNG containment systems.

At the recent Gastech 2008 conference, in Bangkok, the organisations' said experience in ensuring high safety standards in severe climate had enabled RS to proceed with investigations into the permissible service conditions for operation in heavy ice. Simulation of the potentially dangerous ice-through sailing pattern, as summarised from the integrated practical experience of operation in the Russian Arctic, is normally applied to ships of high ice class utilising ice damage statistics analysis, ice load assessment, and advanced ultimate capacity assessment.

Development of the joint rules for Arctic LNG carriers had allowed ABS and RS to share experiences gained in Russian, Canadian, and US Arctic waters.

Environment

Wärtsilä exec heads EMEC

The European Marine Equipment Council (EMEC) has appointed Jaakko Eskola as its new president, replacing Pim van Gulpen who has come to the end of his term.

Jaakko Eskola is the group vice president of Wärtsilä Corp and head of Wärtsilä Ship Power. He intends to lobby EMEC's interests to the European Union and the IMO and support the development of the European Union's transport and industry policies. He said his presidency would focus on promoting policy choices favouring safety at sea and environmental protection.

'Prime movers have improved in efficiency and emissions levels, but further improvements are needed. I expect that there will be stronger equipment integration development that will secure higher

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Jaakko Eskola, EMEC's new president.

overall efficiency, innovations related to different fuel strategies, and secondary methods to meet future demands. Improved environmental performance will be the focus for R&D and new equipment,' he said.

Ro-ro

Steel cut on largest ro-pax

Aker Yards Germany says it has started the production of the world's largest combined freight and passenger ferries. The first steel plate for Stena's 11,600dwt new ro-pax ships was cut at its site in Warnemünde on Thursday, 10 April.

Design of Aker ro-pax 55 by Aker Yards.

Yard number 159 is the first of two vessels of the type Aker RoPax 55 ordered by Stena Rederi AB in Gothenburg, Sweden. The contract has a total value of approximately €400 million. Delivery of the vessels is scheduled in the first and third quarter 2010 respectively.

Production will be carried out in a split method between the two Aker Yards German sites in Warnemünde and Wismar.

The new Stena ships will be 63,600gt – 35% higher than vessels of this type in service. The ferries were developed and designed together with Aker Yards Rauma in Finland and Stena RoRo in Sweden. The 240m long ships will be 32m wide, and offer lane length of 5500m for trailers and 728m for cars. They will have capacity for 1200 passengers. Their engine is given as a stroke main engine, offering 2 x 9600kW and 2 x 7200kW, allowing a service speed of around 22knots.

Classification

NK goes for naval arch

The new president of Class NK is a naval architect, as well as being a 39-year veteran of the Class Society. Noboru Ueda was at University of Tokyo, achieving a Bachelor's degree in 1967 and a Master's degree in 1969, both in naval architecture.

After joining NK right after graduation from university, Mr Ueda served in a number of assignments in Japan, starting with the hull department, followed by the ClassNK Okayama and Imabari branch offices. He later returned to the head office where he worked in the development department, which is responsible for the development of the technical rules of the Society.

In 1980, Mr Ueda was tapped to establish the Seattle Office in the USA, where he served as the general manager until 1985. It should be noted that it was a rare feat to become a general manager of such a key location outside Japan at such a young age.

After his five-year stint in the USA, Mr Ueda returned to the hull department, where he served as a manager before being promoted to general manager of the department in 1997. He subsequently became a managing director in 2002 and executive vice president in 2006. He was then elected as chairman and president of the Society on 1 March 2008.

New Class NK chairman, Noboru Ueda.

Some of the other key accomplishments of Mr Ueda over the years include his decade of service as a member of the Working Group of the Tanker Forum. He was also a member of the team that formulated the Japanese National Regulations for Ships Carrying Nuclear Waste and Liquid Dangerous Goods. *NA*

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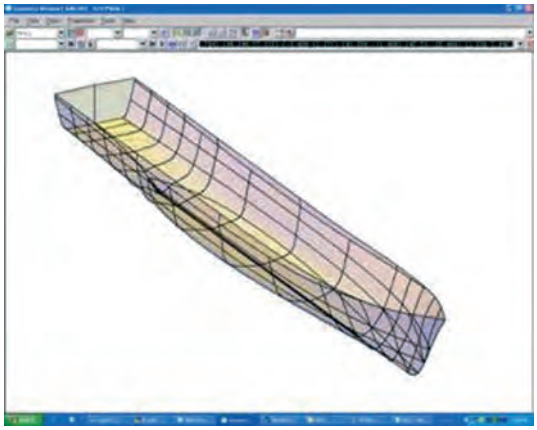
Software

New Napa annexes

Marine software company Napa has established a subsidiary in Galati, Romania, entitled Napa Romania SRL. Its purpose is to build a centre of expertise to serve the firm's own development needs, as well as its customers'.

The Romanian arm is basically an extension of the Napa Technology Unit and its functions will focus mainly on software development for new projects. By the end of spring 2008, the subsidiary is due to employ a team of skilled software developers.

Another branch has been initiated in India, Napa Software Services India Ltd. The Bangalore office is intended to increase the strength of product development in the Indian market, as well as offering local services.



Larsen & Toubro hullform in NAPA.

Napa's client base in India is also expanding as Larsen & Toubro Ltd chose the NAPA program for naval ship design, because it believes the software is the most cost effective solution.

Contact Napa Ltd, Tammasaarenkatu 3, Helsinki FI-00180, Finland
Tel +358 9 22 813 1
Fax +358 9 22 813 800
www.napa.fi

Software

FORAN's Chinese commercial

AKRON (China) Group has decided to use Sener's FORAN as its main ship design system following a two year selection process. This makes AKRON the first commercial user of FORAN in China.

The software was chosen due to its advanced technology and capabilities, as well as the fact that Sener's Chinese partner, UFC, can also provide a leading product lifecycle management system and digital shipbuilding solution.

FORAN has now been installed in AKRON's design department in Shanghai and the personnel have received the necessary training.

Contact Sener Ingeniería y Sistemas SA, Severo Ochoa, 4, Parque Tecnológico de Madrid, 28760 TRES CANTOS, Madrid, Spain
Tel +34 918 077 000
Fax +34 918 077 201
www.sener.es

Research

Rolls-Royce goes to the poles

Rolls-Royce has been selected to design a vessel which will carry out significant environmental research at both the North and South Poles. It will be outfitted to cover a wide range of marine research operations such as monitoring fishing stocks, meteorological studies, sea floor sampling, and mapping.

The NVC 395 POLAR ship will be designed for operations in waters covered by ice up to 1m thick and is classified to Polar 10 ice class. The contract is with the Norwegian Institute of Marine Research, but all Norwegian research institutes involved in polar research will be involved in both development and use of the vessel.

Contact Rolls-Royce International Ltd, 65 Buckingham Gate, London SW1E 6AT, UK
Tel +44 20 7222 9020
Fax +44 20 7227 9170
www.rolls-royce.com

Propulsion

Wärtsilä broadens low-speed options

Following the recent contract with RSHI in China, Wärtsilä has signed a further low-speed engine licence agreement with Zhenjiang CME Co Ltd. CME can now manufacture and sell RT-flex marine diesel engines from its new factory in Zhenjiang.

The Chinese concern will focus on engines of 50cm cylinder bore and smaller, as well as featuring common-rail technology incorporating full electronic

control of engine processes.

The new manufacturing capacity of CME is reckoned to result in more efficient delivery of Wärtsilä low-speed marine engines to the rapidly growing shipbuilding industry in China.

Contact Wärtsilä Corp, John Stenbergin ranta 2, PO Box 196, FI-00531, Helsinki, Finland
Tel +358 10 709 0000
Fax +358 10 709 5700
www.wartsila.com

Maintenance

Alfa Laval's dual identity

Alfa Laval has introduced the Gunclean Toftejorg i65 D, a dual-nozzle tank cleaning machine that is built on the same platform as its single-nozzle predecessor. The dual-nozzle model is intended for use aboard smaller chemical and product tankers.

The machine operates in a 'criss-cross' pattern, producing a shorter cleaning cycle that consumes a minimum of cleaning fluid. This version is reckoned to be advantageous due to striking two points simultaneously to create the faster, more efficient cleaning cycle.

For ships that use heated media in their cleaning applications, the two impact points and the distributed cleaning pattern also mean more even heating of the tank surfaces. The Gunclean Toftejorg i65 D contains a patented hysterisis clutch, which eliminates the need for a shaft penetration between the turbine and the gearbox, and crews can use it to alter the speed of the machine by changing the distance between the magnets and the hysterisis plate.

No programming is necessary to optimise the cleaning pattern and the machine's speed can also be adjusted topside without interrupting the cleaning cycle.

Contact Alfa Laval Tumba AB, Gustav de Lavals väg, SE-630 09 Eskilstuna, Sweden
Tel +46 8 530 650 00
Fax +46 8 530 658 72
www.alfalaval.com

Cranes

New name for Palfinger

Palfinger HTC Systems GmbH, a manufacturer of marine cranes and working platforms for shiprepair/maintenance is changing its name to Palfinger Systems GmbH as of 1 May 2008. This change is due to the company's growth and is intended to implement brand recognition.

Palfinger is a privately-owned company, developed from the amalgamation of Crane Power GmbH and HTC Systems GmbH & Co KG. Crane Power originated from the former marine department of Palfinger AG, and HTC Systems was previously incorporated within the research and development area of Palfinger, becoming independent in 2004.

Contact Palfinger Systems GmbH, Vogelweiderstrasse 40a, 5020 Salzburg, Austria
Tel +43 662 88 00 33 0
Fax +43 662 88 00 33 2770
E-mail sales@palfingersystems.com
www.palfingersystems.com

Power

Cat's Merwede approval

Caterpillar Marine Asia Pacific and WesTrac China Ltd have established a preferred supplier status in powering China-built IHC Merwede dredgers. The new IHC 7025MP cutter suction dredger design is borne out of this already longstanding partnership, and features a 70cm suction diameter, at up to 25m of dredging depth, and mono pontoon execution.

Side winches enable dredging in currents, plus the spud carrier, the cutter drive, and all winches are diesel-hydraulically driven. Cat 3561B diesels drive both the underwater pump and the booster pump, while a Cat 3512B diesel drives the hydraulic pump. Meanwhile, Chinese dredging contractors have ordered another 15 IHC 7025MP dredgers from Xinhe and Wenchong shipyards, with Cat engines being supplied by WesTrac China and Pon Power.

IHC also developed the more powerful 8527MP cutter suction dredger. This design is based on a suction diameter of 85cm and can cope with dredging depths up to 27m. The IHC 8527MP utilises two Cat C280-12 engines for the booster pump and three Cat 3516B auxiliary engines to provide electric power. WesTrac has already signed repeat contracts to power six additional IHC 8527MP dredgers.

Furthermore, WesTrac and Pon Power have also provided Cat power for an IHC-designed 1600kW dredger, comprising one Cat 3412C and a pair of Cat 3508B engines.

Contact Caterpillar Marine Power Systems, PO Box 610, Mossville, IL 61552-0610, USA
Tel +1 309 578 6298
www.mak-global.com

Deepwater intervention for pollution prevention

A second series of model tests was recently completed as part of an EC-funded project looking to develop a new method of intervention in the case of shipwreck.

DIFIS (Double Inverted Funnel for the Intervention on Shipwrecks) is a study looking to design and validate an EU reference method for the prompt and cost-effective intervention on shipwrecks.

According to project coordinator MARIN, the 2002 sinking of *Prestige*, which settled on the seabed 4000m below the surface before causing environmental havoc, was a prime demonstration of the lack of existing tools, systems, and methodologies for the timely intervention on shipwrecks to confine the pollution and eliminate the source of the pollution threat.

The €3.2 million, 36 month DIFIS project (with €1.8 million coming from the EC) is due completion in September 2008 and other participants include SENER (Spain), Ifremer (France), CEA-List (France), Cybernetix (France), Sirehna (France), ISI (Greece), and Consultrans (Spain).

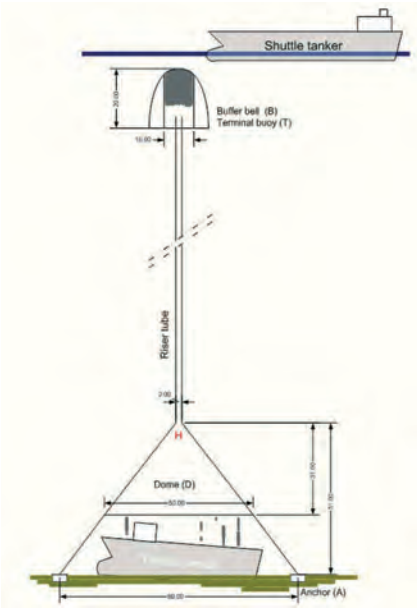
How the *Prestige* pollution outbreak might have been smothered.

DIFIS looks to develop a system able to deal with oil leaking from wrecks even at very large water depths.

The proposed solution is a light and quickly deployable flexible structure looking to envelop the wreck in the first instance, that should stay in place until all the tanks are emptied and the pollution threat is eliminated.

Conceived by Dr Fivos Andritsos of the EC's Joint Research Centre, the main items in the DIFIS system are its dome, riser tube, and buffer bell. It relies on gravitational forces to channel the flux of spilt fuel towards the surface.

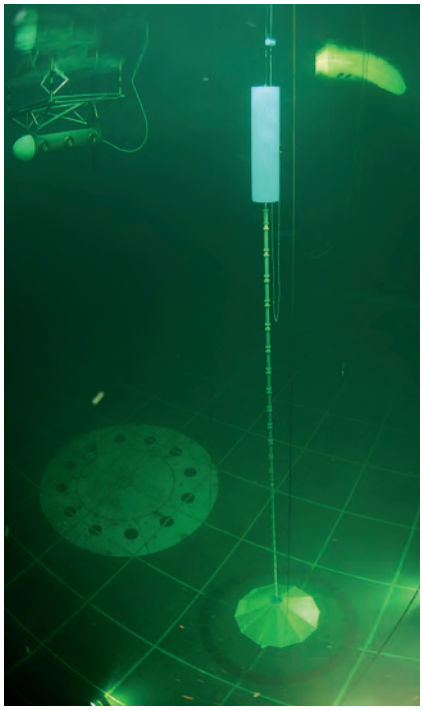
The leaking fuel is collected by the fabric dome, or inverted funnel, which has been solidly anchored around and covers the wreck completely. The collected fuel is channelled, along with sea water, through a flexible riser tube (typical diameter: 1.5m – 2m) into a second inverted funnel, or buffer bell, closer to the sea's surface, at a depth of around 30m-50m, where it is not affected by rough weather.



Schematical representation of the DIFIS system.

The dome is composed of a conic cover made of pre-tensioned membrane, reinforced with 12 Vectran/Dyneema lines. In order to fulfill the functional requirements, the early design has been carried out with a base diameter of the conic cover of 210m. However, current technology does not allow manufacturing, folding, and deploying of a dome of such dimensions. Realistic dimensions have been limited to a base diameter of the conic cover of 100m, for a height of 50m.

The second inverted funnel is made of steel, like a bell, having a capacity of several hundred tonnes (typically 1000tonnes or more). Fuel occupies the upper part of the bell while heavier sea water is forced out from the open bottom. In acting like a separator and buffer reservoir, it has the function of a terminal buoy T, which keeps the whole riser line in tension and provides for a rapid periodical unloading to a shuttle tanker. The buffer bell is



DIFIS model test set-up in MARIN's offshore basin.

provided with standard offshore loading equipment.

The conceptual design of the buffer bell consists of a steel sphere and a collecting cylinder made of geo-textile (length 20m) reinforced by rigid rings and an adaptor component made of steel, with a capacity of 2000m^3 in the conceptual design, which will be increased to 6000m^3 in the definitive design.

The electronics contained within the buffer bell are to include a transponder revealing its position, a digital acquisition and storage system for storing and monitoring system data, an interface either to the shuttle tanker or a transmitter, transmitting data from the monitoring system to an administrative operator, a level sensor for the oil recovered, and a power source to transmit data revealing the mooring lines' condition and support the electronics overall. Furthermore, the buffer bell must be designed in such a way that at the point of maximum horizontal deflection, no sloshing will occur.

With the DIFIS system, spreading of pollutants in the sea would be prevented and neither would pollutants reach the sea surface, where their recovery could be affected by the weather conditions.

Researchers believe that the full scale development of the system will have important ramifications for existing or new EU or IMO regulations on how to handle potential catastrophes, such as *Erika* and *Prestige*.

In a first series of model tests, carried out in March 2007, the performance of the DIFIS system was tested in operational conditions and during offloading operations.

Subsequent model tests, carried out in January 2008, focused on several aspects related to the deployment of the DIFIS system. First of all, the lowering of the dome and the riser tube from an installation vessel was tested, considering various environments of waves and current. Secondly, the actual unfolding of the dome over the shipwreck on the bottom of the offshore basin was tested.

The results of both sets of model tests will now be used to finalise the design of the DIFIS system. *NA*

Design by remote control

Dutch shipbuilding group Conoship begins to see its relationship with India's Chowgule bearing fruit.

As many as 20 general cargo ships have now been ordered through Indian group Chowgule's Goa–based shipbuilding division, to a design licensed from Dutch builder Conoship International. At time of writing, the third vessel in the series of identical 4450dwt ships, *Vechtdijk*, was due delivery at the end of April.

Twelve of the 20 ships have been ordered through Navigia, the Dutch affiliate company of German shipowner R Schoning, either for private investors or for operation by Hamburg owner Apollo Shipping. A further four are for Union Transport in the UK, while the remaining four are for unspecified separate German and Dutch interests.

The ship type offers capacity for 204,825ft^3 of cargo, and its primary function will be to carry dry bulk cargoes, principally for inter-

Damsterdijk, the first in the series of 4450dwt ships delivered by Chowgule to a Conoship International design.

European trades, but it also has container carrying capacity.

The first 89.95m long, 14.4m wide by 7.85m deep single box-like cargo hold vessels were initially ordered in February 2005 by Navigia, largely on the promise of speedy delivery, as more easterly Asian yards had booked slots well in advance, and cost factors meant it no longer made sense to build such ships in Europe. While the first ship, *Damsterdijk*, was not delivered until September 2007, a Navigia spokesman said that the delay had not been unusual for a builder new to a ship type, and that subsequent build schedules had been 'tightening up'.

Equipped with moveable bulkheads to yield cargo carrying flexibility, these ships are powered by 1980kW MaK 6M25 main engines, and feature Rolls-Royce Kamewa controlled pitch propellers, and Rolls-Royce Tenfjord rotary vane steering gear. They are capable of 11.7knots. Navigation equipment has come from Furuno Electric, while autopilots are coming from Tokimec, and the ships are coated with Jotun paints. *NA*

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Damen in demand

Despite sliding freight rates, Gorinchem-based group Damen Shipyards remains confident in the shipbuilding sector, as it unfolds a growing portfolio of specialised smaller tonnage for the cargo-carrying market.

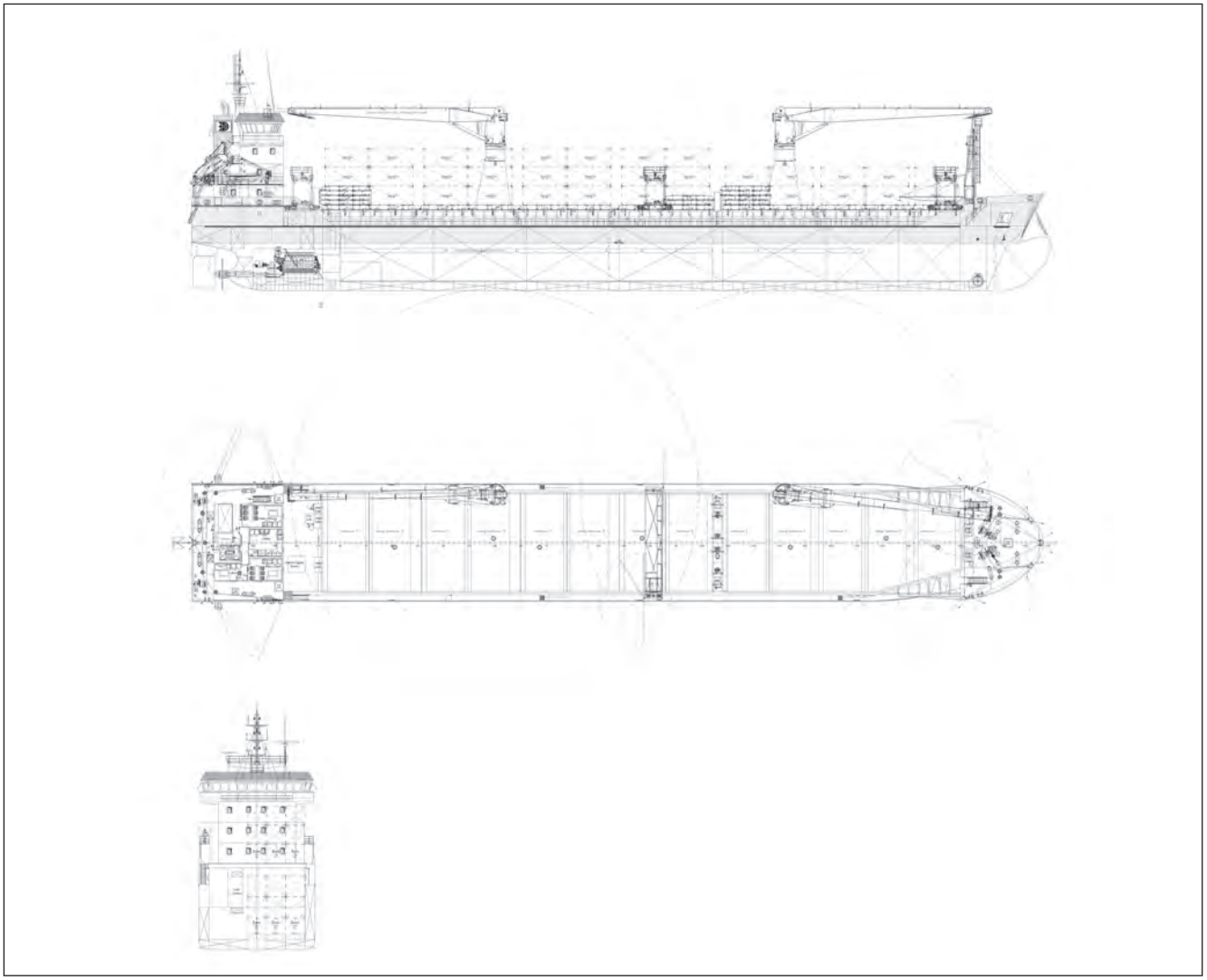
Damen Shipyards Gorinchem sales manager Europe, Roel van Eijle, said that interest in new vessels remained high over the whole range of the production programme of the group, including tugs and workboats, high-speed vessels, ferries, and supply vessels, as well as cargo vessels.

With current cargo vessel building interests concentrated on Damen Shipyards Bergum, The Netherlands, Damen Shipyards Galatz, Romania, and Damen Shipyards Yichang, China, the group has secured orders into 2011, with 27 ships outstanding. Twelve of these ships will be completed in The Netherlands, with six due out of Galatz (the Romanian yard is also very active in turning out Damen-designed tugs, patrol boats, and supply vessels), and nine due delivery from Yichang.

Orders are split between five basic ship types (see Table 1), with four 'Combi Freighters' ranging in length from 88m to 142.95m augmented by the 140.64m long 'Container Feeder 800'.

The latest ship to be introduced has been the Combi Freighter 7200, which has been designed to 'fill up the gap' between Damen's 3850dwt coastal vessel (CF3850) and its 11,000dwt multi-purpose vessel. The first four examples of this ship type are being constructed at the Bergum yard for Dutch owner Unisea Shipping, with deliveries running from June 2008 to March 2009.

Damen Combi Freighter 7200 – characterised by its flexibility. The first four of this ship type are now on order.



At 117.15m long overall (115.70bpp), the Combi Freighter 7200 features a beam of 15.90m, depth of 8.80m, and a maximum draught of 6.54m. Powered by a 2640kW main engine working at 750rev/min (MaK 8 25-C), the vessel will achieve 13.7knots at maximum draught. An option exists for installation of the more powerful MaK 8 M32-C engine, which generates 4000kW, to achieve 14.5knots. Either way, the shaft connects to a controllable pitch propeller, while the vessel is manoeuvred by electrically-driven 300kW fixed pitch bow thrusters.

The new ship is characterised by its flexibility, offering hold capacity of 10,510m^3, or enough for 171TEU in the container loading mode, with an additional 165TEU capacity on deck. Classed by Lloyd's Register, the Combi Freighter 7200 is an Ice Class 1A ship, and is also strengthened for heavy cargoes up to 17tonnes/m^2, and equipped for dangerous goods according to SOLAS regulations.

The ship features two cargo handling cranes offering 40tonne lift capacity at an outreach of 24.80m, 13 pontoon-type cargo hold hatches, one hatch cover gantry crane, with two divisible grain bulkheads, offering 10 positions, which are also used as a tweendeck.

But this is by no means the end of the story, according to Mr Van Eijle. 'We are also working on some other new designs and upgrades,' he said. 'First we are working on a design of a simple multi-purpose vessel of approximately 5000dwt, because we see that there is still a need for such a size. Secondly, we have upgraded the Combi Freighter 12,000 to a deadweight of 13,500tonnes by giving the vessel a bit more length and beam. With this there is also an option for deck cranes with a larger hoisting capacity up to 250tonnes and more space is created in the engineroom for all kinds of additional equipment, such as a ballast water treatment plant, dual fuel systems, scrubbers etc - all items which make the vessels more environmentally friendly. Thirdly, we are working on a larger sized container vessel in the range of 1100TEU to 1400TEU, but that is still in a very early stage.'

Type	Length oa (m)	Beam (m)	Depth (m)	Draught (m)	Deadweight (tonnes)
Combi Freighter 3850	88.00	12.50	7.00	5.42	3800
Combi Freighter 7200G Ice Class IA	118.00	15.90	8.80	6.54	7120
Freighter 11000 Ice Class IA	145.63	18.25	10.30	7.50	11,200
Combi Freighter 12000 Ice Class IA	142.95	18.90	10.95	7.90	12,000
Container Feeder 800 Ice Class E3	140.64	21.80	9.50	7.32	9300

Table 1: Damen cargo ships, 2008.

Damen is also looking to boost capacity, according to Mr Van Eijle. 'We are in negotiations with the shipping group which owns Yichang Shipyard about an expansion of the capacity of the yard and a closer cooperation for the outfitting as well as the hull building. Our intentions are to build at Damen Shipyards Yichang our Combi Freighter 11000 and 12000 and the successor to the CF12000 - the CF13500. These vessels have also approximately the maximum dimensions for this location, in terms of length and weight.' *NA*

Vosta sinks its teeth in

Dredging specialist Vosta LMG and Combi Wear Parts have developed a new wear-resistant tooth in their T-system to be used on Vosta's T-Cutter heads. The work has been done in cooperation with AB Sandvik Hard Materials.

The new teeth are called 'Duracore' and are said to offer an increased wear life compared to standard products, due to a cemented carbide core in the centre of the tooth point. The point shape has been optimised to balance strength, penetration, and to support the cemented carbide core.

After several years in development, the products have benefited from almost one year of field testing to optimise their final design. All the tests have been carried out in rock applications, in soil conditions varying from 5Mpa to 50Mpa, and with cutter powers ranging from 1200hp to 8000hp, according to Vosta LMG.

The results from the field tests are said to have proven that Duracore teeth last several times longer than standard teeth. 'The tooth stays sharp during the whole lifetime due to the cemented carbide core...' said the company. 'This will also result in higher and extended excavating production for rock cutter dredgers.'

Vosta LMG, Combi Wear Parts AB, and AB Sandvik Hard Materials have applied for several worldwide patents and registered the trademark Duracore. The teeth are available in sizes T4, T6, and T8.

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Vuyk gets heavy

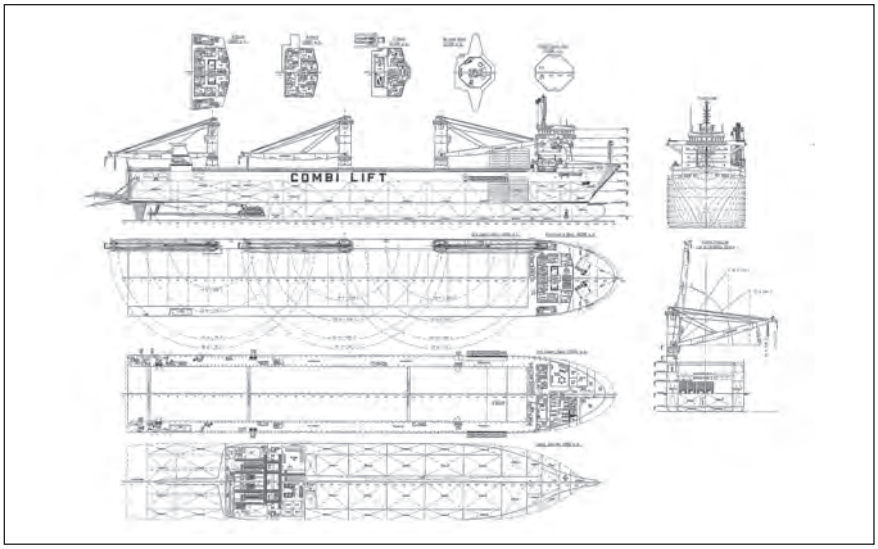
The first 'Combi Dock' heavylift ship, *Combi Dock 1*, entered service at the turn of the year, in time for the announcement that a fourth ship had been commissioned by the owners of this most flexible of vessel types.

Built at Lloyd Werft, the basic design of the innovative Combi Dock newbuilding came from H B Hunte, but the vessel's evolution into an 11,000dwt multi-task ship has been the preserve of Vuyk Engineering Groningen.

Combi Dock1, the first ship, comes under the ownership of Dockship 1 ApS, a subsidiary of Combi Dock, which is in turn a German-Danish joint venture between Bremen shipowner Harren & Partner and J Poulsen Shipping, of Korsoer. The same partners will be behind the following ships in the series.

The hull of the second ship recently arrived at the German yard from Polish builders, and delivery is due to follow in July 2008. Steel cutting has already commenced on a third ship in the series, while in January, a fourth ship was commissioned.

These semisubmersible heavylifters operate at a draught of 6.6m in their heavylift mode, and are distinguished by their ability to multi-task. While they have been built with outsize heavy loads in mind, they will also load bulk, ro-ro, or container cargoes, offering a high deadweight to ballast ratio.



General arrangement plan of Combi Dock vessel.

Distinguishing features also include a lack of transverse bulkheads, ensuring that the upper deck is completely flat for cargo loads over almost the full length of the hold. The single floodable hold measures 132m by 18m, and is sealed by a stern ramp, reinforced to take ro-ro loads up to 700tonnes.

The ships will also offer crane lift capacity of up to 700tonnes, featuring, as they do, two Liebherr cranes of 350tonnes capacity, plus a further unit offering 250tonnes capacity. They also feature a ramp which, depending on the size of the individual cargo piece, allows them to load single pieces of cargo of up to 7600tonnes. A tweendeck pontoon cover can also be deployed to subdivide the hold vertically into two compartments.

Combi Dock 1.

The first task for *Combi Dock 1* involved a call at Marina di Carrara, Italy, where the vessel loaded two reactors, each weighing about 1000tonnes, which were rolled onboard. Her next call involved a voyage to Aden, where the ship loaded two split barges, each weighing 400tonnes, with her own cranes, as well as a dredger weighing 1200tonnes, the latter floated onboard. In this case, all of the cargo was destined for Durban.

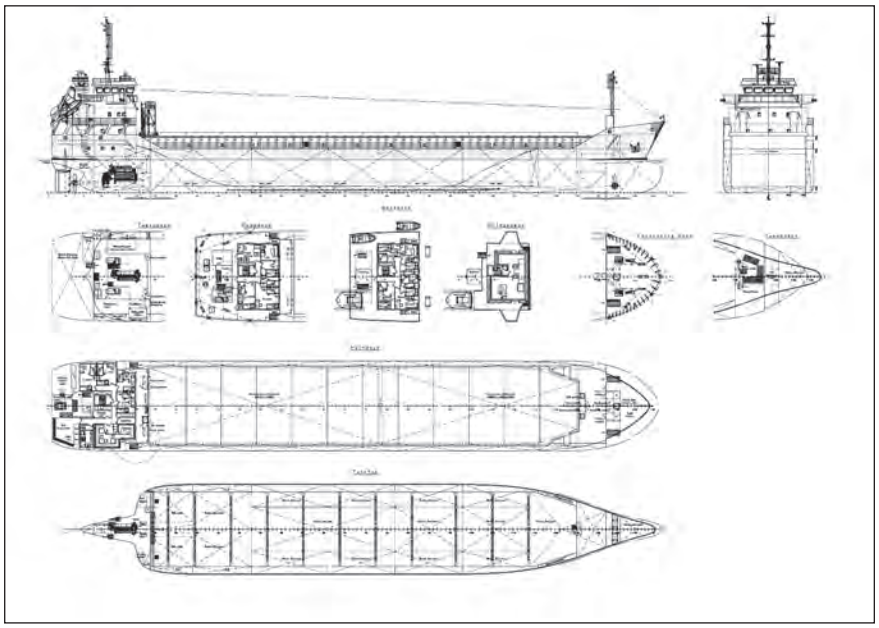
Meanwhile, it is understood that work initiated on the second ship in the series will see her equipped for operations offshore Mexico, with an accommodation block factored in, as well as a helideck, and additional bow thrusters. While Vuyk has been principally involved in the structural work on these vessels, this part of the project devolves to Lloyd Werft. Subsequent vessels in the series will be repeats of the first.

In line with its broad portfolio of interests, Vuyk Engineering Gronigen has also been heavily involved in developing basic and detailed design for the Icon62 motor yacht, under development by Icon Yachts (see article p21-22). Vuyk Engineering Groningen deputy director, Maarten Sickler said that start-up yacht builder Icon was

TECHNICAL PARTICULARS

Combi Dock 1

Length, oa	162.30m
Length, bp	147.60m
Breadth	25.40m
Depth to 2nd deck	13.00m
Depth to main deck	6.00m
Design draught, ro-ro service	5.60m
Design draught, heavylift service	6.60m
Docking draught	11.00m
Speed at 5.60m and 7500kW on the propellers	16.40knots
Cruising range at full draught	10,000nm
Gross tonnage	17,220
Deadweight at draught of 6.60m	11,000
Hold capacity (without tweendeck)	22,800m^3
Class	Germanischer Lloyd



Genaral arrangement plan of 5500dwt Vuyk-designed general cargo ship to be built by Ananda Shipyard, Bangladesh.

aiming to build vessels of up to 70m based on the existing platform, but also harboured plans to develop a larger platform for yachts of up to 85m in length, and another to develop 100m plus long yachts. The philosophy for all of these vessels would remain the same, he said, with common attributes below the waterline, but the ability for individual owners to develop a 'unique' vessel by stamping their mark on accommodation and public spaces would also be available.

The rest of the Vuyk Engineering Groningen orderbook remains focused on general cargo ships of between 2900dwt and 5500dwt, with orders in train in Turkey, Spain, and Bangladesh. In the last case, Vuyk has come up with a design for four single hold, 5500dwt general cargo ships (plus two options) for north-western German owner Wessels Reederei, under Germanischer Lloyd class, to be built by Ananda Shipyard, as the Dhaka-based yard turns its attention to the international market, where slots remain at a premium.

Mr Sickler said that Vuyk was also involved in a new project to develop a 3800dwt combined project cargo and bulk carrier, the distinguishing feature of which would be that its accommodation block would be located forward, with the engine positioned aft, in the style of a large platform support vessel. He said that the configuration, for an undisclosed shipowner, would afford shippers of heavylift cargoes a longer loading deck per se by around 15m, compared to conventional tonnage, with the potential also existing for project cargo to extend over the rear of the vessel without compromising seaworthiness. The ships would also feature superior weight distribution and require less ballast water. With the accommodation block forward, bow waves would be prevented from entering the open hold. *NA*

Vuyk is behind a design for an initial four 5500dwt general cargo ships to be built in Bangladesh for German owner Wessels Reederei. Signing the class contract that, with other owners taken into account, represents orders for 12 ships (from left to right): Dr Volkmar Wasmansdorff, GL's head of division Asia/Pacific; Afruja Bari, managing director – Ananda Group; and GL executive board member Dr Hermann J Klein, at last year's Marintec, Shanghai.

Tale of two Vuyks

Former sister companies Vuyk Engineering Rotterdam and Vuyk Engineering Groningen are sisters no more, after holding company Central Industry Group sold all of its shares in Vuyk Engineering Rotterdam BV to IHC Merwede BV, with effect from 1 January 2008. Vuyk Engineering Groningen (VEG) was not part of the deal.

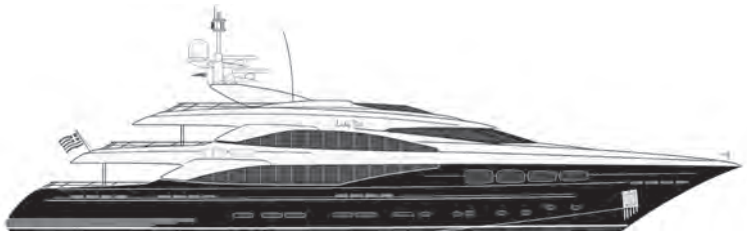
Vuyk Engineering Rotterdam said that aligning itself with its new parent offered considerable synergies, given its expertise in the dredging and offshore markets that provide mainstay work for IHC Merwede.

A staff of 50 transfer across with the transaction. However, Vuyk Engineering Rotterdam emphasised that there would be little change in its relationship with clients. 'As agreed with IHC Merwede we will keep our independent position towards the dredging and offshore market, and all our other clients. The name of our company will remain the same,' Vuyk Engineering Rotterdam said. The company remains focused on work vessels for the dredging and offshore industries and heavylift shipping.

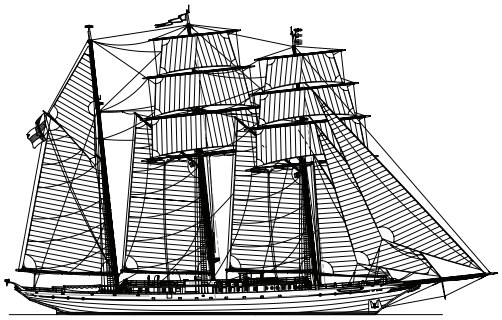
For its part, Vuyk Engineering Groningen also emphasised that the severing of formal ties with its sister company would have little bearing on its operations, where the Groningen-based company (also 50 staff strong) has focused on tankers, general cargo ships, and yacht design. The two companies would continue to be able to work together, a company spokesman said.

Olivier F. van Meer

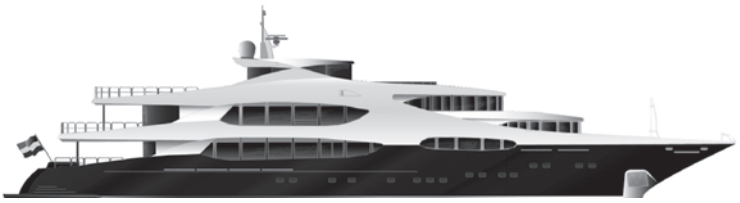
Designs for the Master Mariner ®



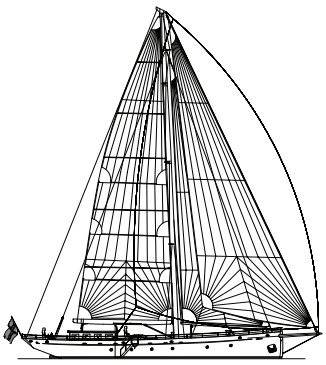
Cor D. Rover 47m



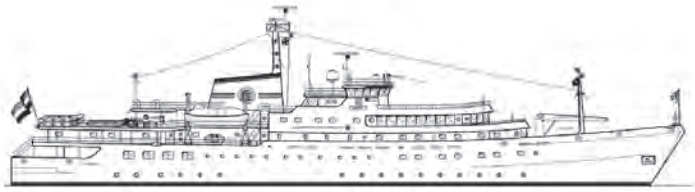
65m SPV



56m motor yacht



26m sailing yacht



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Room at the top for a new Icon

A new Dutch force is emerging in the luxury yacht-building sector, with plans to build vessels of up to 150m in length.

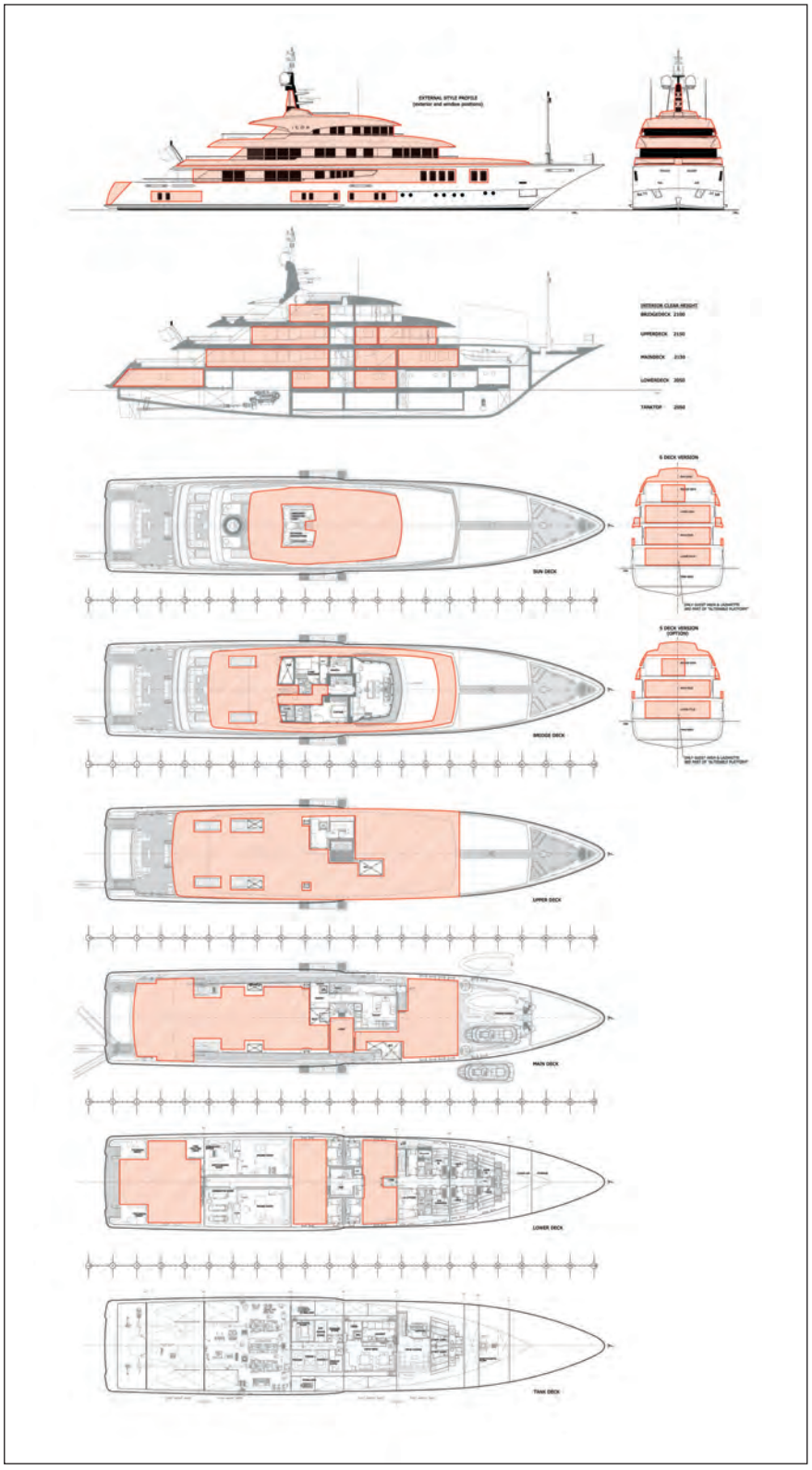
In 2005, experienced yacht builder Wim Koersvelt came together with a like-minded group of individuals to explore plans to satisfy the increasing demand for large motor yachts, in light of limited capacity among high quality builders in North-western Europe in general, and in The Netherlands in particular.

While the availability of yard facilities was being investigated, Koersvelt Yacht Projects BV was commissioned to develop the technical specification for what has now become the Icon 62m concept yacht. Available in five and six deck versions, the concept envisages a vessel constructed around 70% 'as standard' - a standard steel hull, standardised technical systems and spaces, standard crew and service areas - with a view to saving both costs and build time. The upper two or three decks are aluminium. Also standard will be the propulsion package layout, with power to come from MTU's 12V 4000 M71 main engines.

However, in the yacht's upper exterior and interior designs, the Icon 62 offers a free hand for the remaining 30% of the build, allowing 'each client to realise his own unique yacht', according to the builder.

The opportunity to turn this proposal into reality arrived when Volharding Shipyards announced that it planned to wind down its vessel outfitting yard at Harlingen, in a move indicative of the way Dutch commercial shipbuilders have increasingly shifted production overseas.

For Mr Koersvelt and his partners, the timing was impeccable, with the 20-year old yard bought out by the merged interests of Icon Yachts BV and Koersvelt



GA, Icon 62. The red shaded areas are those where a client can customise the yacht. Each Icon will have its own unique interior style and outside profile to match the owner's wishes.

Yacht Projects BV. Icon Yachts BV set itself up as the contracting partner for clients, with Koersvelt Yacht Projects continuing 'in the background', so that Icon Yachts could benefit from its expertise in luxury yacht construction management and ISO-9001-2000 certified quality control procedures.

Facilities, including a covered drydock with space for yachts up 150m long and a 4500tonne synchrolift, were now available to build vessels almost immediately, and a trained workforce was ready and waiting to move on to a new employer.

The Harlingen facilities have subsequently been renovated and made suitable for yacht building and, together with the trade unions and educational institutes, a programme was initiated to instruct and familiarise the workforce with Icon yacht production and construction systems.

Fast forward to January 2008, and production was underway on the first three six-deck yachts to the new 62m long design, with the first two hulls supplied by German builders for completion at the Harlingen site. The first Icon 62 is due delivery in mid-2009 to real-estate tycoon Ton van Dam from Bosch en Duin, and the second is for Russian Canadian billionaire Alex Shnaider.

Work on the third yacht, this time for unspecified private interests, was initiated last October, when owner's representative Paul Fairlamb of Burgess Yachts Ltd activated the automated marking and cutting machinery for hull construction at Harlingen itself.

To get an idea of Icon's different approach to luxury yacht building, it is worth noting the 'base' naval architectural role played in the Icon 62 platform's development, from Vuyk Engineering.

'Before metal is cut, the whole yacht, all systems, profiles, piping, and engineroom related equipment is fully engineered,' said Icon Yachts sales manager Paul Manting. 'By the time the hull arrives at the finishing shed there is no more hot work to be done and tradesmen can start building in all systems, interior, and finishing details.

'This offers major savings on re-working in the earlier stage of the production period and therefore the yacht can be delivered within a shorter timeframe than a conventional build will allow.'

To complete the design to the taste of individual owners, different design houses can be used, so that each yacht can have its own unique interior styling and exterior profile. In the case of the first two vessels, final superstructural and interior layouts for the luxury areas came from UK-based Redman Whiteley Dixon, which styled its designs as 'modern contemporary', while the third Icon 62 has an exterior styled by Tim Heywood.

Now, plans embrace building yachts of up to a maximum of 90m, based on the same platform, with a view to developing a larger platform for vessels of above 100m in length. Currently employing 90 staff, Icon intends to expand the workforce to around 150 within six months. *NA*

Shipbuilding made simple

At 151 metres and carrying over 1000 containers, the new container vessel Anne Sibum shows the value of team work and thorough preparation. The shipyard successfully constructed this first vessel in a very short conception to delivery time.

By tuning the total engineering process, and in close co-operation with the shipyard and ship owner, a new benchmark in the 1000 teu feeder segment has been set. The Anne Sibum becomes the first in a long series of sister vessels.

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Tydeman to return

A former hydrographic vessel is being rebuilt as a luxury expedition ship for the growing Arctic and Antarctic cruise markets.

Work is progressing at the Scheepswerf Reimerswaal shipyard in Hansweert, in the south-west of The Netherlands, on an interesting conversion project that will see the emergence of what, to all intents and purposes, will be a new ship capable of offering exploration cruises for those wishing to visit polar regions.

Oceanwide Marine Services engaged naval architect Olivier F van Meer Design to undertake the complete reconfiguration of the former Royal Netherlands Navy hydrographic survey vessel MPS *Tydeman*, built in 1975, into a luxury expedition ship, in a project that has seen the complete stripping out of the ship's interior and all hydrographic equipment, and installation of a new bridge system, including a praxis alarm and monitoring system. The project will see *Tydeman* reborn as a seven deck ice class passenger ship with capacity for 100 passengers and 40 crew by the time work is completed, before the end of 2008. Cabins will range from 12m^2 to 21m^2 in size.

Olivier F van Meer, naval architect.

According to OMS, the ship, which was originally built by Merwede, should now be viewed as a completely new vessel, whose keel-laying date is given as August 2007.

Artist's impression of *Tydeman* on her completion (copyright Oceanwide Marine Service).

With a length of 90.19m, a beam of 14.44m, and a draught of 7.5m, the 2977gt *Tydeman* is being classed by Lloyd's Register to Ice Class 1D and will fly the Dutch flag. She will feature two gravity davits, offering capacity for 60 persons, and four davit-launched liferafts, with capacity for 25 persons each.

For naval architect Olivier F van Meer Design, the scope of work has been wide ranging. As well as negotiating to purchase the vessel from the Dutch Navy in the first place, work involved overall design and engineering, liaising with Class and preparing Class drawings, and stability calculations.

With new accommodation areas fore and aft, Mr van Meer's scope of work has also included conceiving the interior design, including completely new dining and observation areas, with fitting out coming from Hoogendoorn Maritieme Interieurbouw in Werkendam. Also under Mr van Meer's responsibilities have been the lay outs for electric systems from Werkina, of Werkendam, and Retec, of Romania, fresh water and sewage piping from Breman Shipping Installations, Genemuiden, air conditioning from Windex Engeneering, of Hardinxveld-Giessendam, as well as the activities of numerous smaller subcontractors.

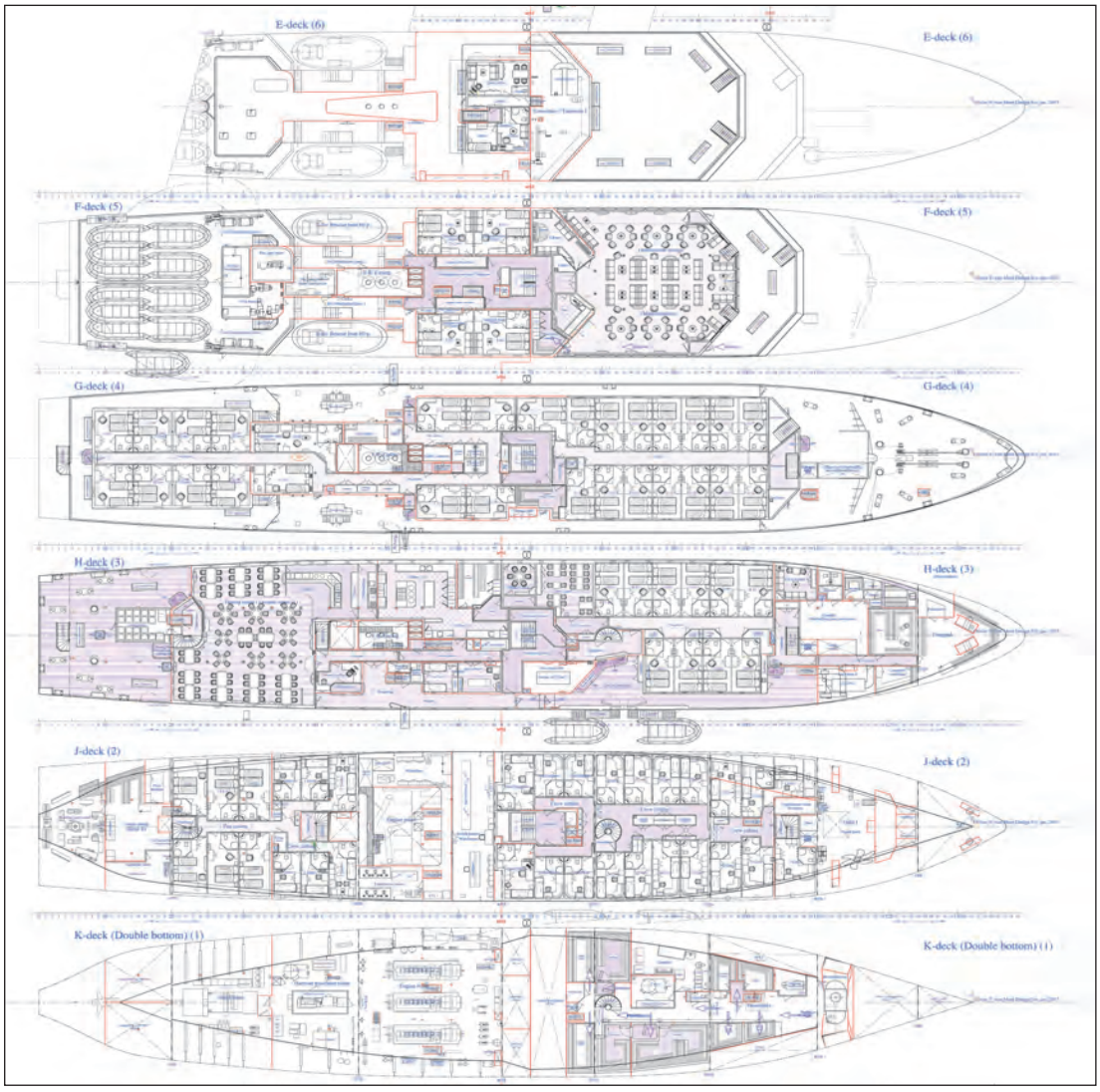
Owner OMS is the main contractor, and its project team is comprised of Hans Heuvel, who spent over 20 years working for the Netherlands Shipping Inspectorate, and Mark van der Hulst, who has worked on a similar project in the past, in the shape of the MY *Sherakhan* conversion.

Not everything about *Tydeman* will be new on her completion. The existing main engine, for example, is being overhauled, together with the diesel-electric equipment. The diesel-electric propulsion

system comprises three Stork Werkspoor FDHC240 units, driving AEG generators. One Pielstick harbour generator is also onboard, which may also be used to sail in 'silent-mode'.

OMS is currently busy developing plans for three newbuild ships for expedition cruising, all of which will be of 90m and to a design created by Robert McFarlane. Planned for delivery at the end of 2009 or early in 2010, these ships will be built to Ice Class 1A standard and will have capacity for 120 cruisers and 54 crew. With drawings due to be submitted to Lloyd's Register at time of writing, naval architect Robert McFarlane said that the new ships would feature a high degree of redundancy, including two engines and three generators, as well as other duplicated and simplified systems designed to sustain the ships over an extended range. *NA*

Tydeman, alongside before conversion work started (picture Olivier F van Meer).



General arrangement plan of of the expedition cruiseship *Tydeman* (supplied by Olivier van Meer).

Fuel cell boat moves towards reality

The project that will deliver the largest commercially-operational boat to be driven by a fuel cell is reaching the end of its engineering phase.

For some, the idea of the fuel cell displacing the diesel engine as the favoured propulsion solution for commercial tonnage may seem far off, but a Dutch project looking to do just that is coming to fruition.

The largest commercially-used vessel to date to run on hydrogen, with a capacity for 100 passengers, will enter service for canal cruises at the beginning of 2009, ferrying Shell employees across the River Ij between Amsterdam Central station and the oil major's new technology centre. The shipowner behind the project is inland transportation specialist Karel Lovers.

The project has attracted a €1 million subsidy from the Dutch government, equivalent to 35% of the design and build price of the initial vessel.

The fuel cell powering the vessel will be free from carbon dioxide, oxides of nitrogen, oxides of sulphur, and other pollutant emissions.

The build team for the Fuel Cell Boat Construction (FCBC) consortium comprises Bodewes yard Scheepswerf De Kaap, Marine Service Noord BV (production and fitting engineroom installations), and Alewijnse Marine Systems. The steel-hulled vessel, with part composite superstructure, is already under construction.

Alewijnse is supplying the electrical power distribution equipment and the automation system, as well as cabling, and overseeing installation. Its scope of work includes load balance, the battery management system, the power management system, the conning desk, propulsion, 3D modelling, the bi-directional grid converter, and human machine interface.

The 'Lovers project', to build a commercial vessel driven by a fuel cell, moves towards reality.

Alewinjse managing director, B Moritz Krijgsman, said that the project's main challenges had not revolved around fuel cell technology itself. Fuel cells had already gained acceptance under the EU's CUTE project, deploying fuel cell-driven buses in European cities, including Amsterdam. 'The challenge was where could we locate a hydrogen-dispensing facility for a vessel,' he said. A solution has been found by Shell, which will offer a hydrogen-dispensing service from its Amsterdam research and development laboratory.

A second challenge has comprised the number of government departments involved in approving the fuel cell-driven vessel, with seven regulatory authorities having a say in clearing the 'Lovers project'. In the event, the vessel is being built to the new, so-called 'Rhine ROS' notation, involving the need for a ship to remain afloat even when a single compartment is flooded, under Germanischer Lloyd Class.

The all-electric propulsion is also innovative, with a podded 'hub-less' propeller offering 70% open water efficiency. Mr Krijgsman said the vessel would be powered by a 60kW fuel cell, although plans were afoot to offer units working in a 4 x 70kW configuration, with inquiries having come in from operators of tugs, workboats, and ferries, and a fuel cell solution under discussion for auxiliary power for an unspecified 5000dwt shortsea vessel. *NA*

TECHNICAL PARTICULARS

Lovers project fuel cell vessel

Length	21.95m
Width	4.25m
Depth	1.62m
Draught, hull CWL	1.00m
Draught, total approx	1.20m
Air draught unloaded	1.90m
Passengers	100 (86 seats)
Power	DC electric, 60kW

Imtech integrates new luxury offering

As the market for larger luxury yachts goes from strength to strength, system integrator Imtech steps up its activities in the specialised sector.

In a drive to reinforce its position in the luxury yacht market, systems integrator Imtech has acquired Van Berge Henegouwen Installations, based in Roelofarendsveen, for an undisclosed amount of cash.

VBH specialises in maritime technology for luxury yachts, such as high-tech entertainment (multi-media, audio, and video), communication, security, and operational systems, navigation and computer networks. Its workload generally consists of six or seven luxury motor and sailing yacht installations (> 50m) per year. The company employs about 35 people, while revenue has been increasing by an average of 30% in recent years, reflecting high demand in the luxury yacht sector, and reaching about €12 million in 2007.

Imtech said that growing demand for integrated networks in which the electrical systems onboard make use of the same basic (IP) infrastructure had become a discernible trend in the market. Imtech and VBH had been cooperating more and more often. The acquisition would allow Imtech to integrate high-tech multi-media technology in the total scope of activities in the areas of automation, electrical systems, propulsion, communication, navigation, IT, and security. The expectation was that Imtech's maritime companies (Imtech Marine & Offshore, Radio Holland Group, and Hagenuk Schiffstechnik (HST)) would be able 'to offer clients added value by expanding their range of maritime (total) solutions with the high-tech multi-media technology of Van Berge Henegouwen.'

In a separate statement, Imtech said it currently held orders for €96 million for technology on luxury yachts and cruiseships, through shipowners and shipyards in The Netherlands, Germany, Russia, the USA, and the United Arab Emirates, with orders covering the company's full range of integrated and automated ship bridges, propulsion and drive, alarm and monitoring, navigation and communication, onboard IT networks, electrical engineering, air conditioning and climate control systems, fire safety, and integral security.

Orders have recently been received for luxury megayachts between 30m and 85m long from the Dutch Feadship Shipyard in Aalsmeer and Makkum, the German Nobiskrug Shipyard in Rendsburg, the Russian Moscow Shipyard, and the Delta Marine Shipyard in Seattle, USA. An exceptional order was also received for the luxury gigayacht, *Swift 141*. This is the former *Hr Ms Piet Heyn,* a Dutch 130m S-class frigate that was sold to the navy of the United Arab Emirates by the Dutch navy in the period 1997-1998 and was re-christened *F02 Al Emerat*. It was recently decided that this ship would be converted to an extremely luxurious gigayacht of 141m, with Imtech being responsible for the entire automation, the energy-efficient drives, the navigation and communication onboard, and the complete range of electrical solutions. *NA*

Coup for IHC's new Engineering Business

A major contract to provide a fully integrated pipelay system for Technip's newbuild 194m pipelay vessel (NPV) has been awarded to IHC Merwede's latest acquisition, the UK's Engineering Business (EB).

New IHC Merwede acquisition Engineering Business has already brought home the bacon, following a 'multi-million' pound contract to provide Technip with a concept for an innovative pipelay system which, married with other vessel characteristics, both supplier and customer believe will give Technip a competitive advantage, on its delivery in 2010.

'This… is a huge boost for the EB team and our supply chain in North East England,' said EB managing director, Dr Tony Trapp. 'From design, incorporation of Technip equipment, through build, installation on the NPV, commissioning, and sea trials we are providing an integrated solution.

'In recent years we have built a number of large component pieces of equipment for pipelay vessels; now, bringing all our expertise together for this integrated solution marks the next stage in EB development. We are working very closely with the engineering team from Technip on this bespoke system and this is exactly the sort of stimulating customer relationship on which we thrive.'

The vessel will be built by STX Heavy Industries (Korea) and will transit to Tyneside, England to be fitted with the specialist pipelay equipment. She will be designed to carry 5600tonnes of reeled pipe and to lay it in 3000m water depth, with 450tonnes top tension.

IHC said EB, acquired in March, had an orderbook worth over £60 million to be delivered over the course of the next three years and in 2007 was recognised as the fastest growing company in the UK's North East. It currently employs 150 people (predominantly professional engineers) and this contract will drive continued expansion.

EB is based in Riding Mill, Northumberland, and was founded in April 1997, initially by a four-man team of engineers led by Dr Trapp. *NA*

Tidal turbine has maritime application

IHC Lagersmit has fully tested a special prototype design of its Supreme shaftseal for a tidal turbine in a Norwegian fjord, whose attributes are transferable to a commercial maritime setting.

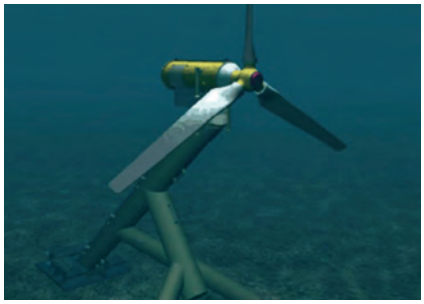
After four years under testing, IHC Lagersmit's latest prototype Supreme turbine shaftseal has been extracted from the Kval Sound Fjord, near Hammerfest, and the developer's evaluation indicates what it terms 'overwhelming and confirming results' for the new design.

The tidal turbine generator faces the same heat challenges as would an electric propulsion podded propulsor, according to IHC Lagersmit, which says that its tests demonstrate that its lipseals and liners would perform 'very well' in the commercial marine context.

Test results indicate that the tidal turbine exhibited:

- No exceeding of temperature of the lipseals
- No water ingress
- No signs of corrosion on the liner

The main goal of the tests was to prove that the sealing system could operate maintenance-free for at least three years.



The latest Supreme shaftseal, whose development for a tidal application should not disguise the fact that it is equally appropriate for commercial marine opportunities.

During the four years of operation, with electricity supplied to the Norwegian town of Hammerfest - the Supreme grease-lubricated shaftseal performed beyond expectations, IHC Lagersmit said.

The special version of the Supreme unit features a six lip grease-lubricated seal, and has demonstrated that no water ingress would appear. The grease system was equipped with two pumps (one as backup) and with level and temperature sensors to signal if something went wrong. According to the manufacturer, no defects were detected.

IHC Lagersmit said that, in the last quarter of 2009, another specially-designed Supreme turbine would go in the water, in this case a 1MW unit for installation along the Scottish coast, in cooperation with Scottish Power.

'When all goes well, concrete plans are ready for several units for the Scottish coast,' said an IHC Lagersmit spokesman. *NA*

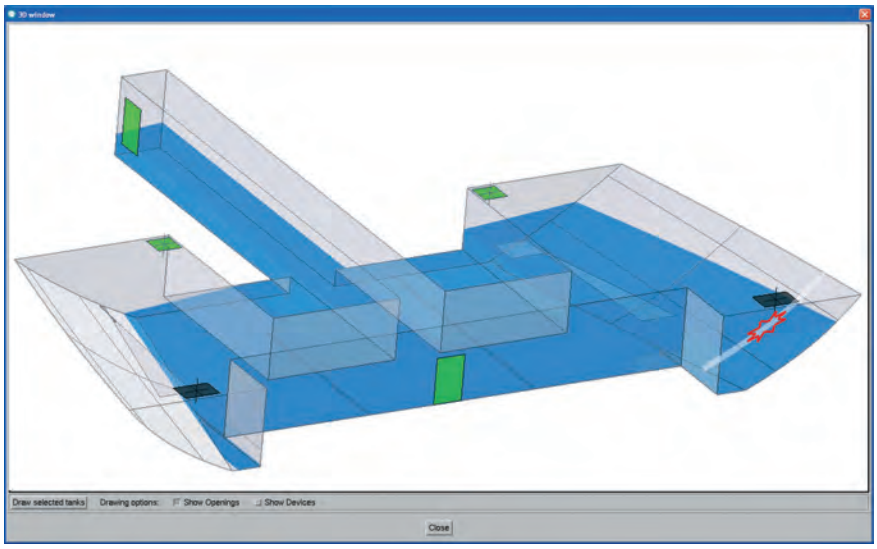
Decision Support for Flooding Control

Napa has been developing a tool to predict the progress of, and thus combat, flooding on ocean-going vessels.

Napa's DFC concept (Decision Support for Flooding Control)[1] is a continuously developing tool for seafarers to fight flooding onboard commercial or naval vessels. Currently it is mainly used on cruise vessels.

DFC combines flooding simulation and counter actions with onboard level sensors in order to assist the ship's crew in decision-making. All spaces are continuously monitored through automated systems and, if flooding is detected at any time, the system wakes up and alerts the user to start the calculation based on the detected flooding rates.

The concept's major advantage is that the prediction is based on the real situation onboard the damaged ship, not on pre-calculated damage cases or probabilities.



3D view showing flooded compartment with breach, and doors with appropriate status.

Safety from knowledge

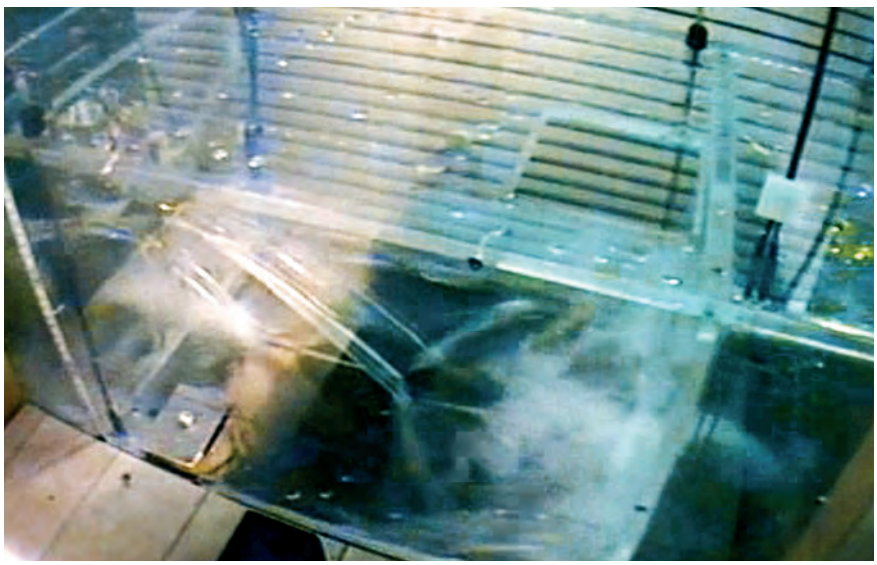
At the current stage DFC is best suited as a powerful training device. In a case of flooding the ship's crew is instructed to prevent its progression through predefined counter actions called Advisory Cards. The counter actions usually consist of closing any open watertight doors, opening possible cross flooding devices, and taking precaution over systems malfunctions, like loss of cooling for main engines or loss of manoeuvrability. Advisory Cards can also contain additional information like evacuation plans or piping information in an easy, accessible form.

After the immediate actions are taken the system proceeds to calculate the effects of flooding for the following hour. The highlights of the results are displayed for the user as the simulation is being calculated. The average calculation time for one hour simulation is between 30 seconds to one minute, depending mainly on the extent of the damage.

Within minutes after the collision or grounding, the ship's master has a good prediction of the process and outcome of the flooding available, and he or she is able to draw the conclusions based upon facts. The decision whether to lower lifeboats and evacuate the ship can be evaluated against the results from flooding simulation. The same tools can also be used from shore at the same time and the captain can get the support he needs.

The accuracy of any flooding simulation depends mainly on the level of detail of the ship model, the collapsing of non watertight structures and doors during flooding, and of course on the modelling of the actual breach detection from level sensor data. The sensor requirements are studied from the flooding simulation standpoint: what is required for an accurate prediction; how many sensors are required and where they should be placed; what is the overall error caused by the limited accuracy in level measurement?

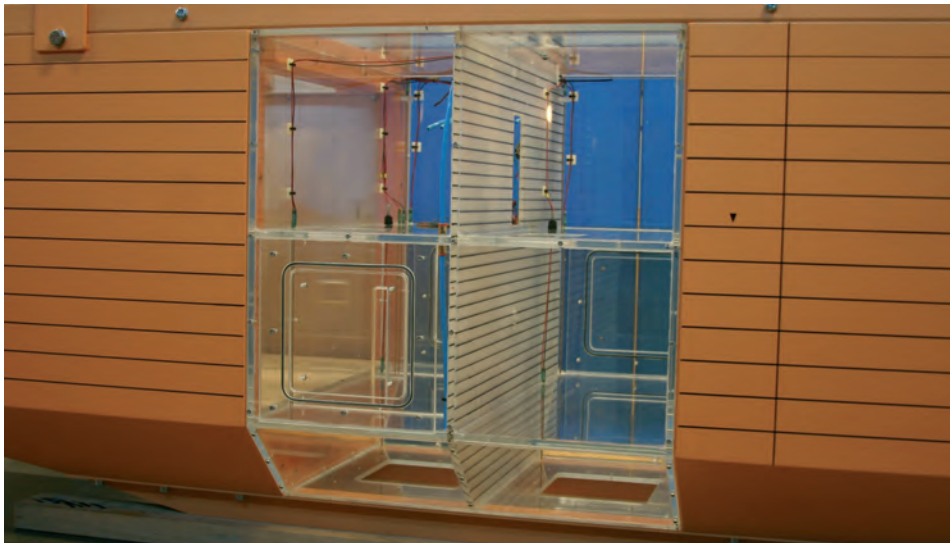
Defining the breach as realistically



Video capture from validation experiments.

as possible is the first step to accurate predictions. During the coming years, other issues will also be studied in detail. The aim is to achieve such accuracy that the DFC concept may rise from its status as a training tool to a real life damage control standard.

Users of the DFC system may also simulate possible counter actions such as filling or emptying some ballast water tanks or the effect of closing or opening specific doors at a specific times. This provides a chance for seafarers to put their intuitions about suitable counter actions to the test. Practicing counter actions beforehand can save a lot time in a real situation.



Model used in validation experiments.

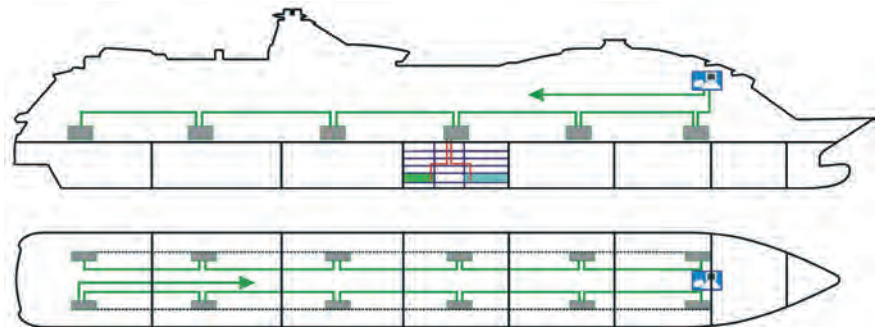


Diagram of automation link for flood detection.

The simulation method

The simulation method solves the progress of flooding in time-domain. Physically, the flooding is governed by conservation of mass and momentum. The flows between the modelled rooms are calculated by using Bernoulli's equation with semi empirical discharge coefficients.

The sea is assumed to be calm and all water levels are taken as horizontal planes. This is considered to be reasonable, especially for passenger ships, which feature dense internal subdivisions. The simulation is started a short while after the creation of the breach and thus the possible transient heeling, caused by the rapid inflow of water and the impact of collision, has already been passed. Consequently, the phase of progressive flooding can be assumed as a quasi-stationary process, at least in moderate sea states. The previous research work supports this assumption. However, more extensive studies are planned in order to increase the understanding of flooding of a damaged passenger ship in waves.

The details of the applied simulation method have been published in scientific journals[2,3] and the method has been validated against experimental data from dedicated model tests[3], performed at Helsinki University of Technology in Finland.

The results confirm that simulation predicts the flooding accurately if all relevant parameters are known. In reality, there are always many inaccuracies in the modelling of internal layout. However, sufficient engineering accuracy is expected to be good enough in order to provide reliable estimations for the progress of flooding. Furthermore, the predictions can be improved as the flooding continues and there is more sensor data available.

The flow of flood water through non watertight structures plays a crucial role. This is also why the door status is received from automation and used in the flooding simulation. The collapsing of non watertight structures like fire doors can have a major influence on the intermediate stages of flooding. Currently, the pressure losses in the openings and the critical pressure heads for leaking and collapsing of closed doors are based on rough estimations[4]. However, it is hoped that in the near future more experimental data will be available for improving the accuracy of the simulations.

Future development

The development of onboard DFC tools still continues. In the near future, research at Napa Group will concentrate on improving the analysis of the extent of damage and its location on the basis of available sensor data. Furthermore, integration of simulation and sensor data will be improved. As the flooding progresses the data from level sensors will be constantly compared to the simulation results. Should the real flooding start to take a new course, the simulation results can be updated very quickly. *NA*

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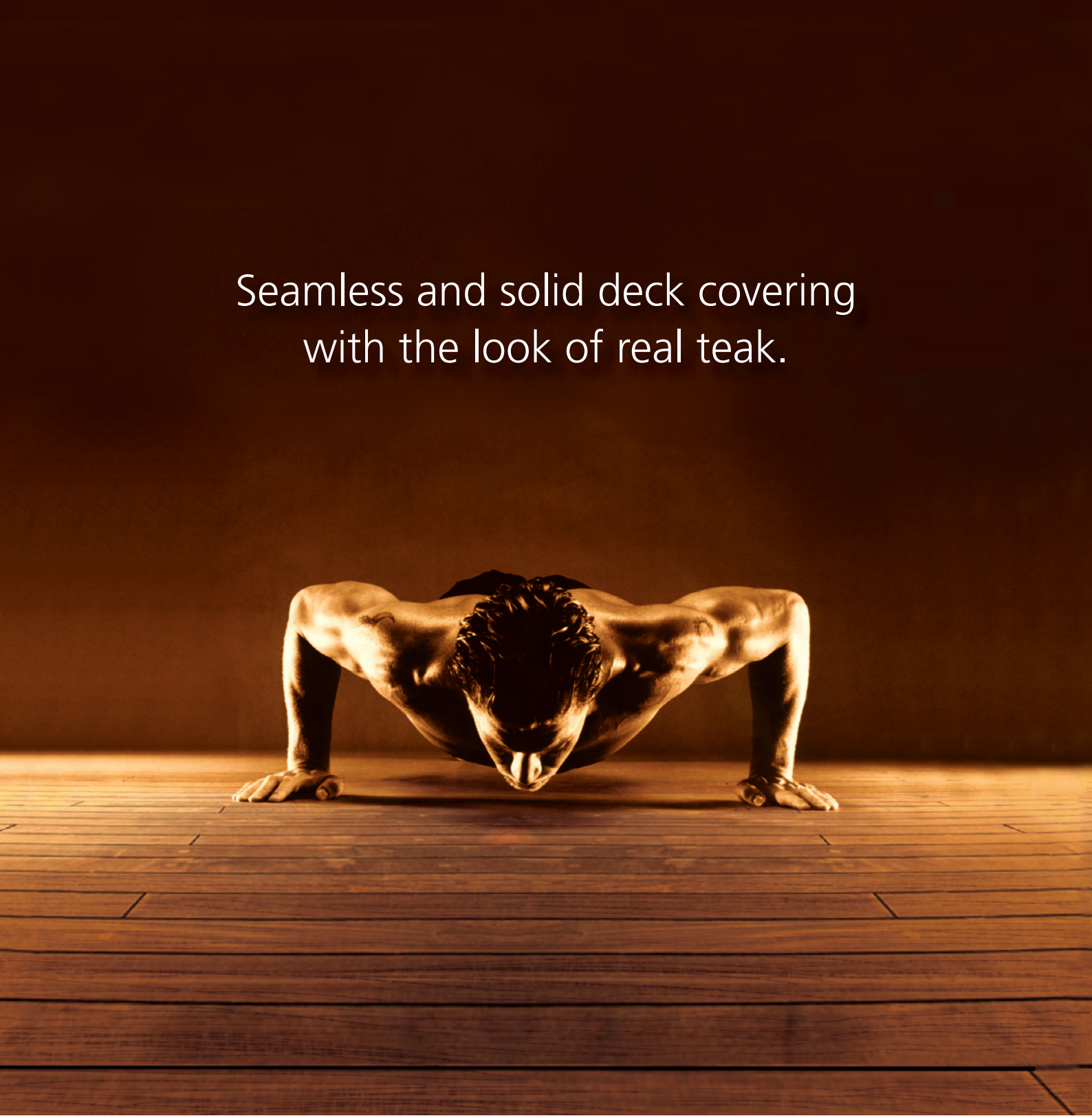
3 Ruponen, P, Sundell, T, Larmela, M. (2007) Validation of a simulation method for progressive flooding, International Shipbuilding Progress, Vol 54, pp 305-321

4 IMO SLF47/INF.6 (2004) Survivability investigation of large passenger ships



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Central Park at sea

Another glimpse has been given of the design solutions preferred to deliver the 220,000gt Project Genesis, which will be the world's largest cruiseship on its launch next year.

In developing the 5400 passenger capacity *Genesis*, Royal Caribbean's designers accepted early on that they would not be able to produce a 16-deck ship with all-external cabins. The solution has been found in the 'Central Park' concept, in which the centre of the ship opens to the sky and features what are termed 'lush, tropical grounds spanning the length of a football field'.

Central Park's central piazza is being presented as the ship's 'town square', transforming 'from a tranquil and peaceful atmosphere during the day to a gathering space for alfresco dining and entertainment in the evening'. It will be lined with balcony staterooms rising six decks high with views of the park below and the sky above. Surrounding this social space will be an array of restaurants, while several bars will be scattered throughout the park, including the Canopy Bar, located at one of two glass-domed canopies, designed to provide sunlight in the ship's inner public spaces. Also within the park is the unique Rising Tide bar - the first moving bar at sea - which will span three decks and allow cruisers to enjoy a cocktail as they slowly ascend into Central Park and then descend back into the public spaces below.

A stroll in the park beckons for *Genesis* cruisers.

Central Park is located on Deck 8 of the ship, and is 19m wide by 100m long. It will be overlooked by 334 staterooms, 254 of which will feature balconies. It will be landscaped with tropical foliage, including seasonal flowers, shrubs, and trees. *NA*

Diesel fills the space

By November, the project to augment all eight Royal Caribbean and Celebrity cruiseships originally built with twin gas turbines with diesel generating plant will be complete.

Brilliance of the Seas is currently in at German yard Blom + Voss, while sister ship *Radiance of the Seas* is at Grand Bahama Shipyard, where work continues to supplement main LM2500 gas turbine engines with 11.6MW diesel generating plant, powered by Wärtsilä 16V38B diesel engines.

Space has been made for the 200tonne diesel engines in a room in the starboard sides of the ships. *Brilliance of the Seas* is due redelivery on 18 May. She will be followed into the yard by *Infinity*, the last ship in the eight ship project.

Celebrity and Azamara Cruises vice president, marine operations, John Krousouloudis, said that the size of the diesel plant had been determined by the space available.

'The whole project was about reducing fuel consumption and costs overall. We started in 2004, trying to figure out how to do this. The goal was to add the diesel generator, and the challenge was that the engineroom was very small.'

Heat exchangers, processing, and other equipment were relocated within the engineroom to create space for diesel plant. 'This was the biggest engine we could fit in that space,' said Mr Krousouloudis. Work has also entailed installation of a new exhaust system and a new auxiliary boiler.

The engine type's 11.6MW output comes down to 9.7MW-10MW, once efficiency losses are taken into account. 'This covers the hotel load, or the full load in port and, at sea, drives the ship at up to 7.5knots to 8knots, depending on the air conditioning load,' said Mr Krousouloudis. 'To go faster means having to run the gas turbine. With one diesel and one gas turbine, we can get up to around 20.5knots.'

Cost per ship for the work has been given as US$15 million to US$18 million. Annual fuel savings per ship are expected to amount to US$7 million at today's fuel prices. The diesel plant runs on IFO380 and its operation also confers some environmental benefits, in terms of CO_2 emissions. *NA*

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Reblading cuts fuel and vibration

Replacing old propeller blades with modern, more efficient versions improves fuel consumption and reduces propeller-induced noise.

Propeller design continues to advance and, when a vessel has been in service for years, it can pay the shipowner to invest in a set of new propeller blades. Because of developments in hydrodynamic analysis and blade manufacture, the new blades will be more efficient than the original ones, and it is also likely that wear and tear and repolishing will have altered for the worse critical areas of the blade profile on the existing units.

Rolls-Royce has carried out numerous reblading jobs, which have resulted in very substantial reductions in fuel consumption and a short payback time, according to the company. An added bonus is usually a reduction in propeller-induced noise and vibration because of smaller pressure pulses and improved cavitation margin.

After Stena refitted several of its vessels successfully with new Rolls-Royce propeller blades, a reduction in fuel consumption of 10% and above was recorded, and the good news travelled fast.

Royal Caribbean International replaced the propeller blades on its cruise vessel *Empress of the Seas* during drydocking in November 2006. Careful records have been kept, allowing performance before and after reblading to be compared, and any differences in operating profile that might affect the results to be identified and compensated for. *Empress of the Seas* is a medium-size vessel of about 48,500gt, with facilities for 1588 to 2020 passengers depending on the cruise. It was originally built in 1990 and was extensively refitted in 2004.

Two vessels that cut fuel consumption and achieved discernable reductions in vibrations after new propeller blades were fitted: *Stena Nordica* (left) and *Empress of the Seas*. (Images courtesy of Royal Caribbean Cruise Lines and Stena Lines).

Speed before and after the new blades were installed is unchanged. In low pitch manoeuvring, slightly more throttle is needed for the same thrust but this is as predicted and has no adverse effects.

Based on data from the first nine months after conversion, the reduction in fuel consumption is about 13%, on a like-for like basis for the vessel's Caribbean cruises ranging from three days to 11 days. So far the direct fuel saving amounts to well over 600tonnes, which also represents a substantial reduction in exhaust emissions.

A side benefit is reduced engine running hours. Because the new propellers enable the ship to run at the same speed with less power, the number of engines on line can be cut, and to date the saving in running hours is about 11%.

Geir Lund, Royal Caribbean's senior superintendent, said: 'The vessel performs according to expectations after the re-propellering and we are very satisfied with the results. One important requirement was that there should be no negative impact on guests. The dining room is located aft, and it was vital that the level of vibration should not increase.

'It is a pleasure to report that vibrations have been greatly reduced, and no increase in noise level observed.' *NA*

Keeping tabs on travellers

MSC *Poesia* embarks on inaugural cruise aided by the very latest in Fidelio Cruise software systems.

'Passengers will not realise the sophistication of the systems in constant operation behind the scenes,' said Fidelio Cruise president Tony Heuer, 'but these have been designed and built specifically to meet that aim.'

He was speaking after the delivery of MSC *Poesia*, the latest cruiseship to join the MSC fleet, after completion by Aker's St Nazaire yard.

MSC Cruises now has nine luxury cruiseships in operation. The fleet will increase to 12 ships by 2010.

MSC *Poesia* was launched on 5 April 2008. At 89,600tonnes and accommodating 2550 guests (double occupancy), with more external balconies than ever before, this is a sister ship to MSC *Orchestra* and MSC *Musica* (launched in 2007 and 2006 respectively).

The reality of 2008 cruise operations includes tomorrow's bottom line and, accordingly, the notion of generating repeat business is high on the agenda. Fidelio believes that its advanced IT offerings will hold sway with the committed cruiser.

General manager, MSC cruises technical department, Emilio La Scala, said: 'The systems we have installed onboard MSC *Poesia* are designed to improve the handling of passengers, visitors, and crew by enabling faster and more effective processing without risk of breakdown. Although cruise guests may not realise it, the quality of their stay onboard will have been significantly enhanced by the added functionality built in to the latest systems. We have been pleased with the Fidelio Cruise systems onboard sister vessels MSC *Musica* and MSC *Orchestra*, but installations onboard MSC *Poesia* offer even more functionality and will enable us to raise service levels even further.'

The check-in procedure is fully SOLAS/ISPS-compliant, with each guest's photograph taken and stored centrally, together with details including name, gender, nationality, birthday, and cabin number. A specially-encoded unique passenger card, designed to meet increasingly strict security requirements at the gangway, is then created and issued to each person. This enables them to embark and disembark during the cruise and to make the most of goods and services available onboard in the ship's cashless environment.

MSC *Poesia* launch night, Dover, 5 April - Andrea Bocelli and Sophia Loren. This is the first time MSC Cruises has launched a ship outside Italy.

For operators, the cards provide a means of monitoring the location of all passengers, visitors, and crew, both ashore and afloat. The passenger manifest can be automatically generated from the ship's central database, while a permanent and completely accurate record of all personnel, onboard or ashore, fully complies with SOLAS regulations. And managers can rely on a real-time track of Souls on Board.

MSC *Poesia* will also benefit from the latest refinements to Fidelio Cruise's Check-in Module which guarantees that fast and efficient passenger handling can continue during embarkation even if the computer connection between ship and shore is lost. This new off-line functionality enables check-in personnel to continue the embarkation process uninterrupted and without having to resort to time-consuming manual procedures risking the possible loss of data.

The Ship's Property Management System (SPMS) facilitates passenger and crew invoicing, with features including recognition of multiple credit cards per passenger or crew member, group invoicing, and automatic handling of discounts and gratuities. Financial transactions are managed centrally and real-time monitoring of all charges allows guests to access and review their spending at any time, either at the Front Desk or from their cabins, through the interactive TV system.

The SPMS, together with other key systems such as the Fleet Management System (FMS), provide MSC fleet managers with complete knowledge of operations onboard. FMS also enables sophisticated analysis of cruise passenger demographics, consumer trends, and onboard revenue streams, offering managers a powerful new tool to assist in comparisons between ships in a fleet, and different cruises and itineraries. *NA*

Fred. Olsen marshals in a new e-mail era

When faced with growing amounts of spam e-mails flooding the IT systems onboard its cruiseships, Fred. Olsen decided to invest in a new filter system. Clare Nicholls reports on the solution.

With a fleet of five cruiseships receiving an estimated total of 30,000 e-mails per day, Fred. Olsen is very keen to keep junk e-mails (also known as spam) at a minimum. In 2007, around 60% of e-mails received were spam messages and the task of keeping volumes under control weighed heavily on the shoulders of the shipowner's IT department.

On average, it took IT staff two hours a day simply to sort through quarantined e-mails manually, to ensure that they were not 'false positives' – e-mails wrongly identified as spam. For two years Fred. Olsen had been using Clearswift's MAILsweeper system to filter out junk mail, but when assessing the considerable time it was taking to deal with the amount flowing in, as well as the strain it was putting on the bandwidth of the satellite connections onboard the vessels, the company felt the system was underperforming and elected to upgrade.

The satellite connections onboard *Balmoral*, *Black Prince*, *Black Watch*, *Braemar*, and *Boudicca* are provided by Vizada and range between 192Kbps and 512Kbps. According to Andrew Ericsson, network operations and IT manager at Fred. Olsen: 'This line is used for all communications to and from the ships. Global satellite bandwidth of this type is expensive, so best use must be made of the narrow pipe to ensure it is available for all ship-to-shore communications, such as voice, data, and our cruise customers accessing the Internet. Special technology is in place to compress data and allocate the limited resources appropriately, but spam is not part of the service we want to include.'

Early in 2007 Fred. Olsen approached five major security vendors for hardware-based solutions: Websense/Blackspider, McAfee, SurfControl, Marshal, and it also re-approached Clearswift to see if it could come up with a better package than the one it had originally supplied. Over a period of four to five months Fred. Olsen whittled the candidates down until it chose Marshal's MailMarshal e1000 appliance, as the company's IT team felt it was more user-friendly than any of the other systems on offer.

Mr Ericsson explained: 'Our supplier, Virgil Software, arranged for us to evaluate the new security appliance, which combined the rich functionality and features of content security software with the ease of use of a hardware appliance.' A trial installation was undertaken during the space of one day, and then the live installation took two days to set up. However, the switchover itself was smooth, only incurring around five to 10 minutes of downtime.

The MailMarshal e10000 is accommodated by two servers, compared to four with the old system, and this provides redundancy should either server cease to function. Mr Ericsson reports that installations of this type can often cost some £40,000 to £50,000, but that this system was only around a third of that price.

The rest of IT team is happy with the system as well, as it has reduced the workload. The staff now spend no more than 20 minutes a day sorting through 'false positive' e-mails, which only make up 2% to 3% of traffic, and no problems have been reported with the system so far. The system is maintained at Fred. Olsen's headquarters in Ipswich, UK, and a rollout at a second site may take place, due to a proposed office move.

The servers basically run autonomously, and therefore the maintenance cost has also been reduced. Built-in add-ons to the MailMarshal package include a virus scanner and users are also able to check quarantined e-mails themselves.

Links to business critical systems aboard each ship are reported to be much quicker since the installation. For instance, the cruise booking facility onboard is now consistently functional, whereas previously the connection was quite erratic.

Mr Ericsson believes that the monetary savings gained with this contract are ample: 'I anticipate seeing a full 100% return on investment from the MailMarshal e10000 appliances within as little as six months to a year, and that even includes the hardware costs.' *NA*

***Balmoral*, one of the Fred. Olsen cruiseships which has had her spam e-mail filters updated.**

New Star rises for Navitas

An additional contract has been signed between Navitas and Star Cruises for the supply of mobile GSM networks onboard cruiseship *SuperStar Libra*.

Navitas Telecom, which provides GSM connectivity onboard large vessels, has signed a contract with Star Cruises that will make it a major GSM supplier in the Asian region. The new contract was signed in February, and adds *SuperStar Libra* to the range of vessels that Navitas supplies communications to, enabling the sending and receiving of mobile phone calls and text messages at sea.

The partnership between Navitas and Star Cruises was first established in 2005, when a GSM network was installed aboard *SuperStar Virgo*. Star Cruises has been satisfied with the service provided, therefore it took the decision to extend the contract to other cruiseships in its fleet.

Navitas has also installed its network aboard *SuperStar Gemini* from September 2006, and *SuperStar Pisces* from July 2007, with Star Cruises transporting around 12 million passengers on its cruiseships every year. The service facilitates passengers and crew in making and receiving calls and SMS messages using their own mobile phone and telephone numbers via roaming.

Star Cruises said: 'We look forward to offering all our customers a convenient way of keeping in touch with family, friends, and business associates whilst onboard our ships'. *NA*

Cruise passengers and crew will now be able to use their mobile phones aboard *SuperStar Libra*.

SuperStar Libra is the latest ship in Star Cruises' fleet to be supplied with a GSM network from Navitas.

Davits out of harm's way

Stroll down the promenade deck of cruiseships under construction today, and something may appear to be missing.

When something is not there in the first place, it is often hard to put a value on its absence, and passengers onboard the new P&O Cruises ship *Ventura* will doubtless overlook the fact that their stroll along the promenade deck will not see them having to negotiate intrusive davits.

The davit installation onboard this ship provides a latest reference for Navalimpianti, in the shape of its stored 'power telescopic davit system for life- and tender boats, and rescue boats' system.

Ventura, delivered by Fincantieri's Monfalcone yard, arrived in the UK for her maiden voyage in April. She carries 18 stored power davits for lifeboats, six stored power davits for tenders, and two stored power davits for rescue-boats.

Marine equipment specialist Navalimpianti said that it had paid particular attention to the design of the davits, in order 'to have the promenade deck completely free as well as the emergency inboard areas; this solution is particularly useful when the deck is used as passenger walking area and also during the embarkation operations.'

The same solution has been preferred for the series of ships under construction for Carnival's AIDA brand. Here, the equipment supplied per ship has consisted of 10 sets of semi-gravity side-hinged davits for lifeboats complete with pivoting arms, winch, and supporting beam, six sets of semi-gravity side-hinged davits for tender boats plus pivoting arms, winch, supporting beam, and the tender hydraulic automatic service bowsing including all necessary parts, and two davits for rescue-boats. The height between the deck and the boats keel (and related boat fittings) is approximately 2100mm and the davits are of semi-gravity type designed for semi-enclosed lifeboats and life-tender boats of 150 people. These davits are suitable to hoist the boats fully equipped and with 10 crew members (light conditions) in all ship operating conditions, and to lower the boats fully equipped and fully manned (full load conditions) in all abandon ship conditions (as stated by SOLAS 74 as amended).

The same type of davit installation was preferred for ships operating under other Carnival brands, including *Carnival Splendor* and *Eurodam*.

In the case of *Ventura*, the hydraulic power necessary to recharge accumulators and move davits for 24 lifeboats and two rescue boats is produced by four hydraulic power packs, which are arranged in four separated rooms, two to port and two starboard. These are longitudinally interconnected. The hydraulic power is stored inside one accumulator with a suitable number of nitrogen bottles for each davit.

'Consequently the necessary power to abandon ship is always available and it permits the davit extension so that the boats, fully loaded, can be totally controlled for lowering at sea in all trim and list conditions', Navalimpianti said. The hydraulic stored power system is independent of any other power supply of the ship and, in case of black-out, the davits can still be hydraulically extended and the boats lowered. ***NA***

Free deck onboard *AIDAbella*.

Happy returns from Germanischer Lloyd

Germanischer Lloyd has launched a new 'Safe Return to Port' service, designed to assist designers, builders, and owners alike at an early stage of design in complying with coming SOLAS requirements.

Class body GL says its new 'Safe Return to Port' service, which will be of particular interest to the cruiseship sector as ships press ever onwards to more remote destinations, presents a new tool 'to systematically verify and document the functionality of essential systems in case of a casualty'.

New SOLAS requirements represent the first example of the International Maritime Organization (IMO) defining performance requirements for the functionality of essential systems on passenger ships under predefined casualty scenarios.

The coming SOLAS requirements for 'Safe Return to Port' demand that the occurrence of defined flooding, as well as fire casualties, demonstrate the application of different and more risk-based methods compared to the prescriptive requirements of today.

The relevant amendments to SOLAS refer to both Chapter II-1(new regulation 8-1) and Chapter II-2 (regulations 21-22) and will be applicable to passenger ships constructed on or after 1 July 2010, having a length of 120m or more or having three or more main vertical zones.

'The new regulations include a change for designers, shipbuilders, classification societies, and national administrations,' said Andreas Ullrich, GL ship type manager, passenger ships. 'Germanischer Lloyd supports passenger vessel design with the new "Safe Return to Port" service and helps ship designers, shipyards, and shipowners to fulfill the new SOLAS requirements.'

At March's Seatrade Cruise Shipping Convention, GL also presented AENEAS, a new tool designed to simulate diverse evacuation scenarios and to integrate the findings into the general arrangement plan of the ship. AENEAS is a software tool for yards, operators, and authorities tailored to perform evacuation analyses. Virtual scenarios can be simulated for ro-pax and cruiseships with up to 5000 passengers. GL said AENEAS was 'a valuable tool in optimising the escape routes, both during the design stage and as a training instrument onboard' for all newbuildings. *NA*

Third of the largest cruiseships

The third in the series of the world´s largest cruise vessels for Royal Caribbean was delivered on 16 April by Aker Yards, Turku.

Independence of the Seas is a sister ship of *Freedom of the Seas* and *Liberty of the Seas* and becomes the third in the 'Freedom' series of the largest cruiseships currently afloat.

Aker said that, in addition to innovative comfort amenities, there were lots of technical improvements onboard the ship - for example its advanced water purification: 'The AWP-plant purifies all of the ship's grey and black waters into a degree of being virtually pure drinking water,' the shipbuilder said. 'The separated sludge will be consequently dried and incinerated with other combustible waste. All other waste material generated onboard will be landed in ports and nothing - except for that fully purified drain water - will be released into the sea.'

Independence of the Seas – now delivered.

The vessel is 339m long, 38.6m wide, and takes 4375 passengers and 1365 crew. It is equipped with diesel-electric propulsion. In order to ensure a best possible fuel economy and subsequently environmentally-friendly operation, a series of different hydrodynamic improvements including a new ducktail design were carefully studied and taken into use.

The signed contracts of Aker Yard´s business area Cruise & Ferries are today worth approximately €5.9 billion, including seven cruise vessels for three out of the four leading multi-brand cruise companies: three for Royal Caribbean, three for MSC, and two for NCL. The 10 ferries in the orderbook are two 'superferries' for Stena, a fast day ferry for Color Line, two cruise ferries for Tallink, a fast ferry for Viking, a passenger ferry for Brittany Ferries, and three LNG ferries for Tide Sjo. *NA*

Siship for sister ships

Latest order for electric propulsion and hotel services energy package.

Siemens has received another order to equip AIDA ships for its Siship PAX platform.

The Siemens Industry Solutions (IS) Division has won an order to equip two further cruiseships under construction for AIDA Cruises at Meyer Werft with electrical and automation systems based on the Siship PAX platform.

The order, placed by the Papenburg-based shipbuilder, includes the electric propulsion system, the power generation and distribution systems, and the automation system. The supplier said the order's value was 'in the medium two-digit million euro range'. The two new ships will be put into service in spring 2011 and 2012 respectively.

The latest deal brings to six the number of AIDA ships that will be equipped by Siemens.

Each of the two new passengers ships has a gross tonnage of 71,000 with 1087 cabins. For the diesel-electric propulsion system of each ship, Siemens is supplying two 12MW electric motors from the Siship Drive MV series. For the generation of electrical energy onboard, four diesel generators with a total output of 48 MVA will be used.

Power distribution will take place with the help of 11kV medium-voltage 'Siship Power MV' equipment. The 'Siship Imac' ship automation system will perform monitoring, alarm, and control functions relating to all onboard technical installations. This will involve the collection and processing of around 13,000 signals. All technical equipment can be controlled by one person from a central engine control room with the help of user-friendly plant mimics. *NA*

Bilge gets the biomechnical treatment

Two stage oily water separator system gets a clean bill of health from cruise newcomer.

Azamara Cruises has completed installation of an EnSolve PetroLiminator 630M oily water separator (OWS) system on the cruiseship *Azamara Quest*, the second ship to sail under the Azamara Cruises brand established by Celebrity Cruises in 2007.

Azamara purchased the PetroLiminator system for *Azamara Quest* after successful sea trials of a unit fitted on sister ship, *Azamara Journey*, last year.

Nikolaos Doulis, fleet director for Azamara Cruises, said: 'The PetroLiminator system uses unique green technology, which has proven to be an effective and reliable tool for complying with the most stringent international clean-water standards.'

'The PetroLiminator system on *Azamara Journey* is consistently achieving effluent levels well below Azamara's internal threshold of five parts per million for overboard discharge,' said Dr Jason Caplan, president of EnSolve Biosystems. 'Compared to the old mechanical OWS, data gathered aboard *Azamara Journey* indicates efficiency levels that translate to a significant annual savings per ship in operational costs related to maintenance, labour, hazmat disposal, and shoreside pump-out of waste tanks.'

Ensolve's PetroLiminator oily water separator – as preferred by Azamara Cruises.

The system on *Azamara Quest* replaced the ship's existing OWS, and was installed and commissioned by EnSolve's distributor, Hyde Marine, during operation of the vessel. 'Commissioning trials on *Azamara Quest* revealed effluent levels of less than one part per million,' said Mr Caplan.

EnSolve's patented PetroLiminator system is claimed to be the first and only marine OWS that uses a combination of physical and biological means to treat oily bilge water. It treats both pure and emulsified oil, as well as detergents, degreasers, and other chemicals in the water. The system is said to generate minimal hazardous materials and to produce no harmful by-products. No flocculant or coagulant chemicals are used, substantially reducing sludge accumulation.

The plant works unattended 24 hours a day, with a built-in fail-safe oil content monitor ensuring that no accidental discharge can occur.

The PetroLiminator 630M system is type-approved by ABS and has been certified to meet International Maritime Organization (IMO) MEPC.107(49) clean-water standards for overboard discharge.

Azamara Journey and *Azamara Quest* are two 180m, 694-guest vessels and were originally built in the late 1990s as Renaissance Cruises R-Class vessels. They had been sailing as part of the Spanish Pullmantur fleet, which was purchased last year by Celebrity's parent company, Royal Caribbean Cruises. *NA*

MES looks to pastures new

Trieste-based Marine Engineering Services continues to push the envelope in terms of the variety of ship designs it offers and the forging of new partnerships with overseas shipbuilders.

Perhaps the highlight of 2007 for Italian design and survey company MES came with the delivery of *Saracena*, the 18,000dwt (at design draught) or 20,000dwt (at scantling draught) chemical carrier delivered by Turkey's Celik Tekne Shipyard. This twin screw ship, which featured in *Significant Ships of 2007* (pp100-101), was built to Ice Class 1A, was the first ship to obtain the new RINa winterisation class for an average temperature of -35°C, and features heated piping trunks and a sheltered mooring area.

Also delivered last year to MES designs were three 4000m^3 LPG carriers (built by the Pesaro Shipyard - Italy), two 3300m^3 LPG carriers (built by the Madenci Shipyard – Turkey), and *Alessandro D*, a 17000dwt chemical carrier (built by De Poli Shipyard - Italy).

2008 has seen a marked surge in business, with no fewer than 30 ships now under construction to MES designs. These include 12 x 9000dwt chemical carriers (from the Celik Tekne Shipyard – Turkey), four 3300m^3 LPG carriers (at the Berk Shipyard – Turkey), two 15000dwt chemical carriers (under construction at TGE Gemak Shipyard – Turkey), two 4000m^3 LPG carriers (from the Pesaro Shipyard - Italy), and four 9000m^3 LPG carriers (built in a collaboration between Pesaro Shipyard and Polish builders).

But this year's stand-out projects involve MES designs now under construction in Indonesia and Vietnam. Two 6200dwt chemical carriers are being built at the PT Pal yard in Indonesia, for example. These IMO2 type ships will be the first vessels to be built using stainless steel duplex 2205 in Indonesia.

In Vietnam, meanwhile, MES has been called in to provide the design for four 4500m^3 capacity ethylene carriers, to be built by the Bach Dang Vinashin Shipyard. In a sign of the willingness of Vietnamese builders to offer increasingly complex vessel types, these ships are specified as high performing in their cargo handling systems, with ethylene cooling capacity down to -104°C, in accord with demands laid down by the oil and gas majors.

Saracena – one of the highlights for MES in 2007.

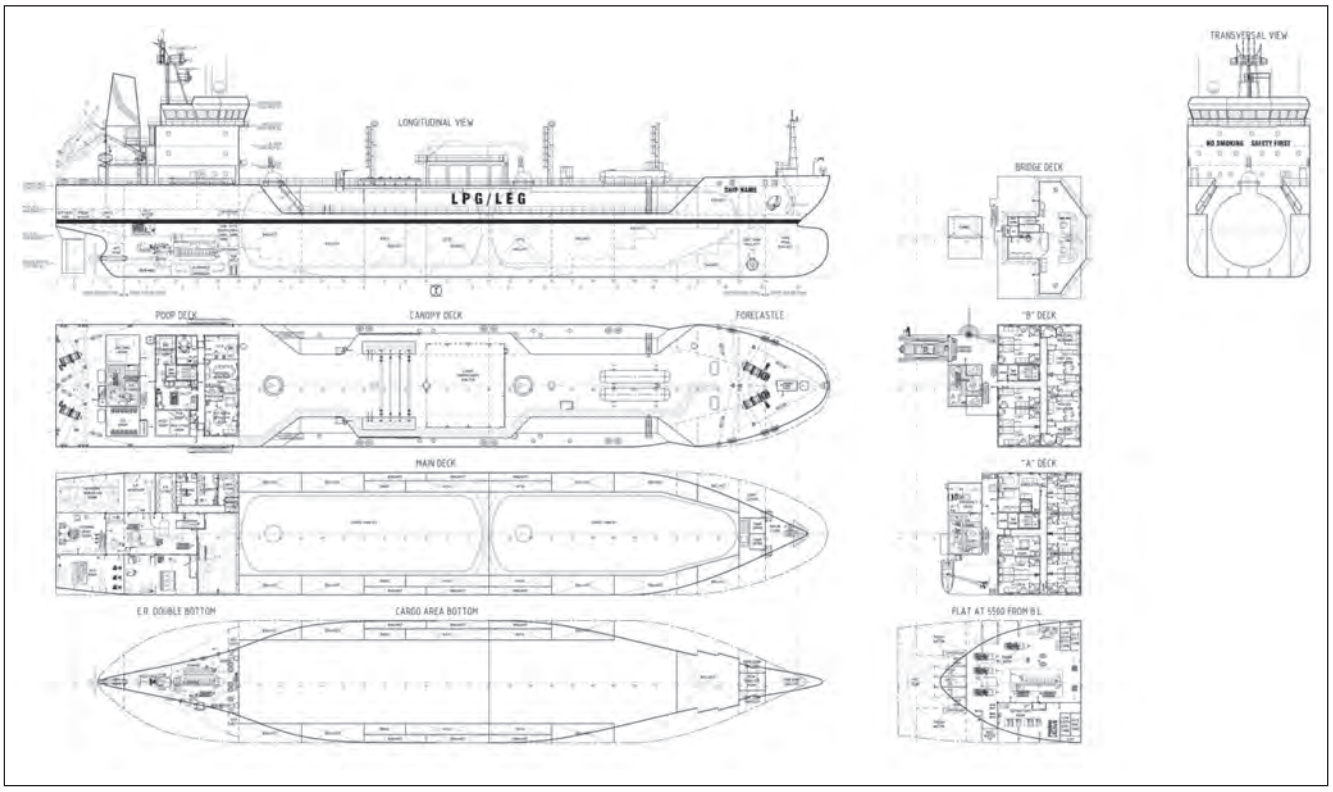
Continuous development

And MES is keen to keep up the pace of development. It is continuously developing new designs, with the current crop including a 40,000dwt chemical carrier, a 6500m^3 ethylene carrier, a 40m yacht design, and a 7000dwt bitumen carrier distinguished by twin skegs/twin screws and the ability to carry a wide variety of products (bitumen/coal-tar/molten sulphur, etc).

As a designer, MES also continues to draw on the expertise available through associated company Gas & Heat, which specialises in supplying cargo handling systems. Sometimes G&H will supply cargo systems built on a canopy deck in its own facilities, and towed to its loading point onboard ship for delivery to the shipyard. On other occasions, G&H will transfer its know-how to the shipyard, with the cargo handling system built under supervision.

The latest development of the combined offering through MES and G&T sees the pairing establishing GH Shipping, with a view to covering all aspects of newbuilding projects, including the financial side.

MES offered a 'successful example of this scheme' as the 3300m^3 LPG carrier *Pleiadi Project* for owner Pianura Armatori. The Italian company has had a long cooperation with MES. ***NA***



General arrangement of the 4500m^3 ethylene carrier from MES. Four such ships are to be built by the Bach Dang Vinashin Shipyard.

Fincantieri gets a second bite at HAL

While Fincantieri continues to churn through its bumper cruiseship orderbook, it is perhaps worth pausing to consider its continuing second bite at three ships it built earlier.

Long after delivery, management at Carnival brand Holland America Line decided that three of the 'Vista' cruiseships delivered from Fincantieri between 2002 and 2004 would benefit from extra cabins – 34 extra cabins to be precise, most of which were to be external and feature balconies – and a few extra suites.

Work on the first 81,769gt ship, the 2004-delivered, 1848-passenger capacity *Westerdam*, was completed last year. *Zuiderdam*, which entered service in December 2002, is due completion next month, while *Oosterdam*, delivered in 2003, is due to undergo the same process by April 2009.

The project involves the modification of the aft areas of the ships (decks 6, 7, 8, 9, and 10) and, although the ship shape does not change very much, the inclination of aft part increases due to the lengthening of the decks. An 80tonne section of each ship is removed to facilitate the upgrade, to be replaced by a new 200tonne module in a single lift. Plant also has to be modified to match the new cabins (additional HVAC machine, increased capacity sewage pumps, etc).

An open area of existing real teak deck has been maintained, with further areas of teak deck added. No new public spaces are being added.

No further details of the project were available at time of writing, among the welter of orders which the Italian market leader is working through.

Two 86,000gt cruiseships remain on order from Fincantieri's Marghera yard for HAL, with one apiece set for delivery in the summers of 2008 (*Eurodam*) and 2010.

Meanwhile, five ships, two of 114,500gt, two of 92,700gt, and one of 112,000gt, are on order for the Costa brand. Princess Cruises has a single 113,000gt ship on order, for delivery this autumn, in the shape of *Ruby Princess*, while Carnival Cruise Lines will take delivery of the 112,000gt *Carnival Splendour* over this summer, followed by the 130,000gt *Carnival Dream* in the autumn of 2009, and by sister ship *Carnival Magic* in the spring of 2011. Fincantieri also has seven other cruiseships on order, ranging in size from 10,500gt (two ships for Compagnie des Iles du Ponant), to a 116,000gt ship for P&O Cruises, and also taking in the 89,000gt *Queen Elizabeth* for Cunard. It holds options for two more ships, one with Silversea (36,000gt) and one with Oceania Cruises (65,000gt). *NA*

Garbarino gets pumped up

Orders have been flooding for Pompe Garbarino over the last 12 months.

Pompe Garbarino can count Fincantieri-built ships for Carnival Cruise Lines, Costa Crociere, Oceania Cruises, P&O, and Holland America Line among its references over the last 12 months, as well as those built for MSC Crociere at Aker France.

'Over the year there have been the launches of *Carnival Freedom*, *Emerald Princess*, *Costa Serena,* and *Queen Victoria* and recently of P&O's *Ventura*: all these cruise vessels have been supplied by Pompe Garbarino,' said Pompe Garbarino co-owner Paolo Garbarino.

The last 12 months have also seen the company win a record order, with a run of 42 bulk carriers to be constructed at China's Jiangsu Yangzijiang Shipbuilding yard to be equipped with its equipment. Also of note has been an order for the largest pipelaying vessel ever built (at Yantai Raffles Shipyard), eight car carriers in Vietnam (Vinashin Shipyard), three offshore patrol vessels in India (Goa Shipyard for the Indian Coast Guard), and three tankers in Russia (Okskaya Shipyard).

With orders surging, Pompe Garbarino has not taken its eyes off the need for continuous product development. Mr Garbarino said that the company had launched a new main engine lube oil pump (VL 150-400) offering lower maintenance costs than conventional screw pumps.

'Moreover we have added a new model (MU 450-450 LDS) to the double suction pumps family for several services onboard the last cruise vessels reaching a capacity of 3500m^3/h with a 20m head. We also have the new portable diesel pump for emergency service, fire-fighting, and drainage in the marine and naval field.

'Another new product is the MU 250-400 LK, submersible hydraulic pump for ballast service on FPSOs and other offshore vessels.'

Mr Garbarino said his company had paid particular attention to solving erosion problems caused by turbulent flows inside pumps, in cases of improper operating conditions and/or improper installation onboard. 'Pompe Garbarino has solved definitely and successfully these problems using a special material: duplex and super-duplex. This special steel avoids completely the erosion of the impeller because of cavitation and/or recirculation. This solution has been really appreciated by several cruise owners.' *NA*

Floating terminal within reach

A novel self-propelled floating terminal offers a promising handling solution for owners of larger ships restricted to in-stream handling. Michael King reports.

Italy's Logmarin Advisors expects to see 'at least one' of its new self-propelled floating terminals in operation within a year, most probably off the coast of India.

'We have two self-propelled units conceived to handle containers as primary cargo at the design stage,' said bulk transhipment veteran Mario Terenzio, formerly of CoeClerici Logistics, who heads up Genoa-based Logmarin.

According to Mr Terenzio, the 'OFC Bulktainer' should be viewed as a 're-locatable floating terminal' rather than a standard floating crane. The 79m long vessel design incorporates two 550kW stern-fitted electric-motor driven azimuthing thrusters providing the flexibility to serve containerships up to 5000TEU capacity in harbour or on the open sea.

Combined anti-rolling damping systems limit pontoon pitching, making the design less susceptible to adverse weather than standard floating cranes. High capacity ballast tanks are included to aid stability and longitudinal trim while, to maximise transhipment speeds, tailored wing tanks and high power pumps are deployed to keep the pontoon and the crane within acceptable heeling operational limits.

'The behaviour of the floating terminal pontoon at sea had to be duly considered at the design stage,' said Mr Terenzio.

'It has been estimated that the floating unit can move as many as 10,000 times a day, thus causing fatigue to the mechanical components of the crane, the mooring lines, disruption of operation, and discomfort to the crew. Therefore it was vital to adopt some movement dumping devices and to design the cargo handling facility with a suitable dynamic factor to bear such stress and fatigue, reduce downtime, and extend the lifetime of equipment.'

New transhipment capability promised in-stream by 'floating terminal'.

Mr Terenzio claimed the big advantage of his self-propelled system versus traditional floating crane options was the incorporation of buffer storage onboard. Capacity for some 162TEU would be available with containers stacked three high, thereby providing higher capacity than most feeder barges.

'This minimises the waiting time because of the discontinuity in the availability of barges alongside,' he explained. 'The buffer storage requires the construction of a larger pontoon which, together with the anti-rolling damping device, guarantees greater platform stability so that the crane is less sensitive to the adverse weather conditions as compared with standard floating cranes.'

The self-propelled nature of the OFC design would also allow the terminal itself to transport cargo during idle periods, he said.

'Some of the containers are stowed athwartships and are balanced fore and aft, thus optimising both the crane cycle time, by minimising the spreader slewing motion for container positioning, and the deck cargo capacity. A suitable number of reefer plugs can also be provided.'

Handling rates using barge slewing LBS500 Litronic cranes supplied by Austria-based Liebherr are forecast to top out at

Main dimensions and characteristics of Logmarin's OFC Bulktainer

Length, overall	Abt	79.00m
Length, between perpendiculars	Abt	79.00m
Breadth, moulded	Abt	24.20m
Depth, moulded	Abt	6.0m
Scantling draught	Abt	4.65m
Summer draught	Abt	4.59m
Deadweight at summer draught	Abt	5300tonnes
GRT	Abt	3600tonnes
Propulsion		
(two (2) Azimuth Thrusters)	2 x	550kW
Capacity		162TEU

The Royal Institution of Naval Architects

DESIGN AND OPERATION OF CONTAINER SHIPS

Lloyd's Register

3 – 4 July 2008, London, UK.

Second notice

The trend towards increased size of Container Ships presents unique challenges for Owners, Designers, Operators and Classification Societies. The high speeds and unconventional structural arrangement of Container Ships can increase the risks associated with innovation. The expansion plans for the Panama Canal are also set to create a new breed of Panamax vessels.

Questions of structural strength, severe weather loads and stability must be addressed. Thought is also being given to deck cargo arrangements; problems with securing the containers to resist green water and potential problems with the safety and speed of loading and unloading are beginning to be addressed.

To meet demands for the new generation of Container Ship, Naval Architects and Operators are constantly striving for innovation. This conference will explore the very latest in Container Ship thinking.

Paper's will cover all aspects of the design and operation of container ships, including;

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around 24 containers per hour.

The LBS500 weighs in at 332tonnes without pedestal and offers electronic-controlled acceleration and deceleration to avoid shocks to the crane. Slewing, luffing, and hoisting can be operated simultaneously at maximum speed. Boom length will reach 52.8m.

The basic floating terminal design can also be further tuned to meet the specific requirements of the client, for example with a sheltered area for steel products storage, a ro-ro ramp, western-style accommodation, or even a helipad.

The design is also being marketed to the dry bulk sector for transhipment operations on vessels up to 170,000dwt. In this configuration buffer storage for coal, iron ore, aggregates, and suitable steel products such as coils and billets would amount to approximately 5000tonnes. Side bulkheads are envisaged on deck for dry bulk containment.

The OFC will be provided with side bulkheads for the containment of cargo in bulk as well. *NA*

Container market

Mario Terenzio, executive director of Logmarin Advisors, believes the container market is now ready for a new generation of floating cranes. He argues that the existing floating crane fleet, many of which are restricted to draughts of less than 10m, are obsolete for handling modern vessels.

Mr Terenzio said that his OFC design married the traditional advantages of floating cranes – flexibility, low upfront investment, fast implementation times, low environmental impact, limited permitting etc – with the ability to handle modern ships at open sea, creating new opportunities for ports limited by land availability or draught.

The OFC could also be deployed by terminals requiring an interim handling solution.

He identified deep-sea ports with inland waterway transport connections such as the leading players in Asia (Hong Kong, Shanghai) and Europe's high throughput 'Northern Range' ports as potential customers.

Logmarin's floating terminal concept could be deployed to 'double bank' by berthing alongside the ship being unloaded to boost terminal productivity, cut congestion, or to tranship direct to feeder barges, said Mr Terenzio.

In ports affected by restrictions on draught, lock, beam, or LOA, the floating crane could be deployed for mid-stream transhipment operations between larger container vessels and feeders. 'The floating terminal concept allows operators to become more competitive and profitable by enabling them to break into larger shipment size markets to which they have no access to as of now,' he added.

The Royal Institution of Naval Architects

INTERNATIONAL CONFERENCE ON SHIP & OFFSHORE TECHNOLOGY 2008 - VESSELS FOR DEEP & ULTRA DEEPWATER OPERATIONS

ABS

16 - 17 October 2008, Busan, Korea.

First Notice & Call for Papers

Shallow water oil and gas production is in long term decline. Much of the undiscovered, economically recoverable oil and gas reserves are believed to lie in the deepwater ocean basins of the Gulf of Mexico, offshore West Africa, Brazil, Northern Europe, Western Australia and Southeast. There has been a significant boom in the entire deepwater exploration and drilling industry over the last few years. Studies indicate that deepwater fields now account for more than 25% of Operator investment in offshore facilities and this may increase to over 40% by the end of the decade.

The development of deepwater fields presents significant technical and commercial challenges. They are often in remote locations far from existing infrastructures and in inhospitable environments. The exploration and development of these field needs a whole range of vessels (survey, drilling units, supply ships, anchor handling vessels, floating production units, etc) with greater durability, reliability, large storage and greater handling and lifting capabilities.

RINA invites papers on all aspects of the design and operation of vessels associated with deep and ultra deepwater oil and gas exploration and field development, including the following topics:

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RINa open for Greek plan approval

Italy-based classification-society RINa has opened a plan approval centre in Greece to provide Greek shipowners with faster response times when contracting newbuildings and conversions.

Greek shipowners now make up 15% of the overall fleet classed by RINa and, rising to the challenge, the Italian class body has just opened a new plan approval centre in Greece.

Antonio Pingiori, head of RINa's marine division, says: 'We have seen demand for RINa class growing strongly in Greece, for newbuildings and conversions in Europe and Asia. This new Plan Approval Centre will bring expertise closer to the owners. One of the benefits of working with RINa which the owners most appreciate is our ability to be nimble in a fast-moving market. This significant commitment of experienced personnel to Greece shows how we intend to enhance our speed of reaction further.'

Spyridon Zolotas, head of RINa Piraeus says: 'Our new Plan Approval Centre will help owners to make sound decisions quickly. It will provide local consultancy in the design stages of new construction or conversion of any type of vessel and support to designers on the application of newly adopted international rules and specific flag requirements. We will also be able to provide FEM analysis of tankers and bulkers in service and we have special expertise in ro-ro cargo and ro-pax conversions, re-fitting, and upgrading. That includes definition of the applicable rules and identification and resolution of the key aspects of the project, in particular regarding fire protection, ventilation, means of escape, stability, and structural aspects.'

Antonio Pingiori, head of RINa's marine division.

RINa currently classes 155 vessels totalling 3.4 million gt on behalf of 62 Greek owners. Vessels classed cover all types of ship, including three cruiseships, 26 passenger ferries, and 42 bulk carriers. RINa's global orderbook for newbuildings grew to 575 ships totalling 8.85 million gt in 2007.

The announcement of the latest expansion coincided with the posting of a strong set of results by the Italian class body. Turnover for the 2007 year was €156 million, up 20% on 2006, and EBITDA was €25.2 million, on a net return growth of 25% compared to the 2006 financial year.

At the end of 2007 RINa's classed fleet reached 3360 vessels totalling 21.5m gt, representing an increase of 8% in 2006. Much of the growth came from newbuildings, which lowered the average age of the fleet. But there were also significant transfers in good modern tonnage.

Over the year the orderbook grew at a faster rate than ever before, and now it has reached about 50% of the present classed fleet. Much of this increased orderbook came from shipowners new to RINa in Greece, China, Turkey, Germany, and Indonesia.

Last year, new marine offices were opened in Croatia, Indonesia, Romania, Sweden, and the Ukraine. At the same time, plan approval centres in Korea and China were substantially strengthened, and a marine equipment office was opened in Germany. *NA*

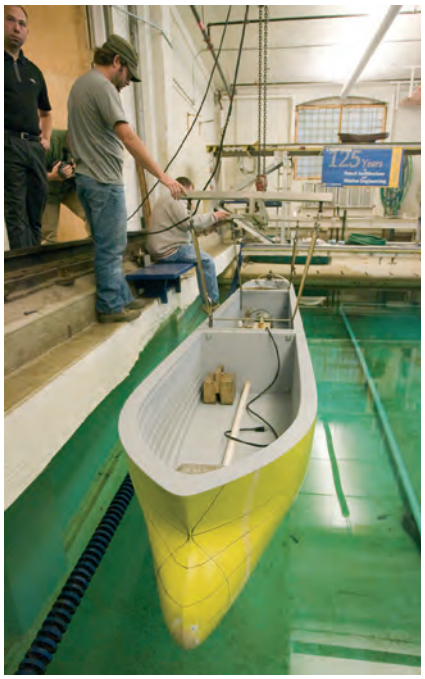
Ballast free at last?

Results from the University of Michigan's ballast-free ship concept programme have shown significant cost savings, re-igniting the possibility of the elimination of ballast tanks.

The concept of a ballast-free ship has been discussed for a number of years, with both the University of Michigan (U-M) and Japan's National Maritime Research Institute initiating projects to develop ships that dispense with the need for ballast water altogether. The U-M concept was conceived in 2001 and patented in 2004, and work is currently underway at the towing tank in the university's Hydrodynamics Laboratory, testing a recently-built 4.8m US$25,000 wooden scale model of an ocean-going bulk carrier.

Funding for the project has been provided by the Great Lakes Maritime Research Institute, and the concept offers a promising alternative that could block hitchhiking organisms while eliminating the need for expensive sterilisation equipment. According to Michael Parsons, professor of naval architecture and marine engineering and co-leader of the project: 'There is no silver bullet. But the ballast-free ship has the potential to be an economic winner while addressing the ballast problem in a serious way.

'Ships take on ballast water for stability when they're not carrying cargo. They discharge ballast when they load freight, expelling tons of water and anything else – from pathogenic microbes to molluscs and fish – that's in it. Instead of hauling potentially contaminated water across the ocean, a ballast-free ship would create a constant flow of local sea water through a network of large pipes, called trunks, which run from the bow to the stern, below the waterline.



Workers lower a scale model of a Great Lakes bulk carrier into the towing tank at the U-M Marine Hydrodynamics laboratory.

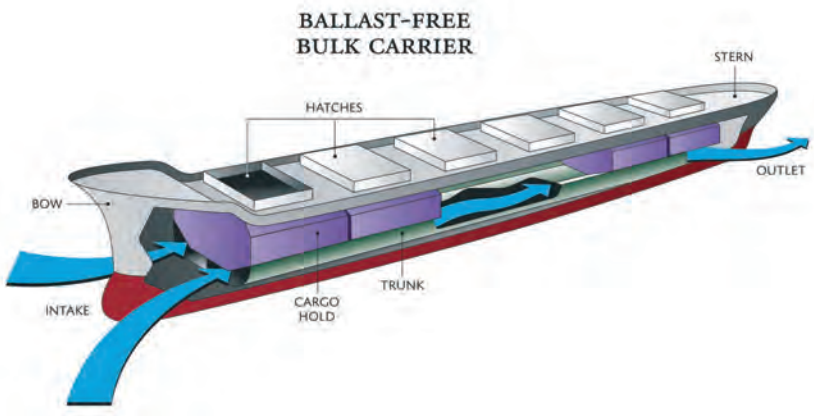
'In some ways, it's more like a submarine than a surface ship,' Parsons said. 'We're opening part of the hull to the sea, creating a very slow flow through the trunks from bow to stern. You're continuously sweeping water through the ship and out, so you're always filled with local sea water, not hauling water from one part of the world to the other.'

In addition to helping fine tune the design, results from the latest round of tank tests and computer simulations suggest the ballast-free ship will deliver an unforeseen benefit. The design appears to provide significant savings, possibly as much as 7.3%, in the power needed to propel the ship.

For a 198m long bulk carrier hauling 32,000tonnes of cargo from the Great Lakes to Europe and back, that translates into a round trip fuel saving worth US$150,000, a considerable amount, especially taking into account seemingly exponentially rising fuel prices.

In upcoming towing tests, tentatively set for late June, the naval engineers will try to confirm and explain the unexpected power savings. Most of the improvement may be attributed to the fact that water expelled from the stern end of the trunks 'smoothes out the flow' into the propeller, allowing it to operate more efficiently, according to Michael Parsons.

Building an ocean-going bulk carrier can cost in the range of US$70 million. The added



Design of the U-M's ballast-free ship concept.

design would result in a net capital-cost savings of about US$540,000 per ship. Combined with expected fuel savings, total cargo transport costs would be cut by US$2.55 per tonne.

These updated results from the project may be very timely, as the USA Saint Lawrence Seaway Development Corp implemented new rules in March, designed to reduce invasive species in the Great Lakes. The requirements mean that ships will be required to flush ballast tanks with salt water before entering the Seaway, a practice corporation officials describe as an interim measure, not a final solution.

To combat the transfer of non-native creatures, it seems that the ballast-free concept may be a viable and cost-effective alternative to the sometimes expensive ballast water treatment systems already on the market. *NA*

BC Ferries cleans up with Hydroxyl

Three BC Ferries vessels have been supplied with Hydroxyl CleanSea Oxidation systems.

Two Canadian marine companies have linked up to enable wastewater purification onboard three vessels operating along the coast of British Columbia. Hydroxyl Systems Inc was due to deliver its CleanSea Oxidation advanced wastewater purification systems to BC Ferries by mid-March 2008.

The units will treat black and grey water onboard the 2100-passenger *Spirit of British Columbia*, 1340-passenger *Queen of New Westminster*, and the 600 passenger capacity *Northern Adventure*. Implementation of the technology is claimed to reduce the environmental impact of effluent discharge.

The announcement continues BC Ferries' commitment to environmentally responsible operations. This new contract follows in the wake of several other CleanSea Oxidation wastewater systems already in operation in the BC Ferries fleet. Other Hydroxyl clients include Royal Caribbean Cruise Lines and Aker Yards. *NA*

PureBallast orders roll in

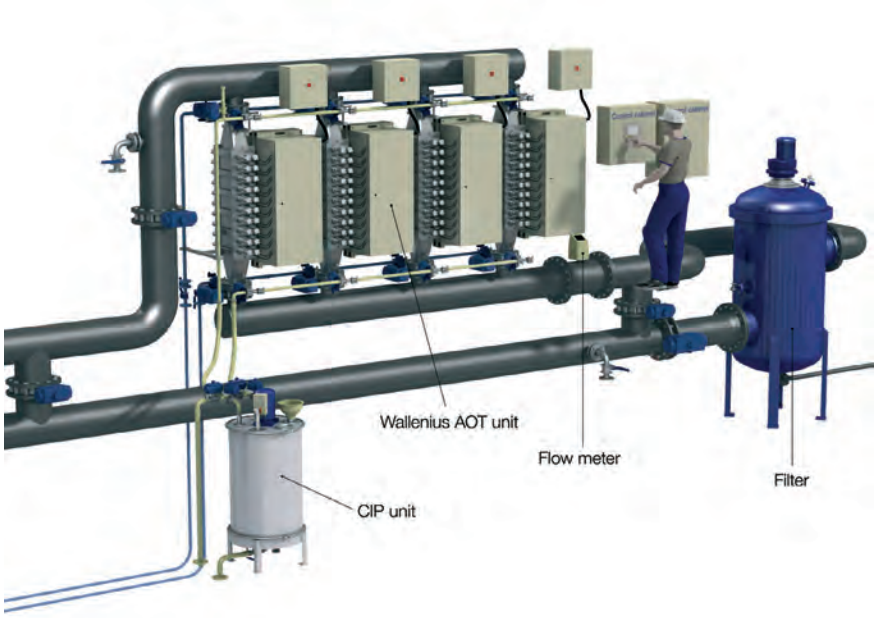
Alfa Laval has recently signed a number of contracts for its ballast water treatment system.

In the past few months, Alfa Laval has taken a number of orders for its PureBallast ballast water treatment system, including multiple sales to Wallenius Wilhelmsen Logistics. According to Lena Blomqvist, vice president, environment at Wallenius: 'Our forthcoming newbuildings in 2008 and 2009 will be so designed to accept the PureBallast system. During 2008, a PureBallast system will be retrofitted to an existing ship.' Two systems are currently being installed aboard Wallenius newbuilds, and it is reported that up to seven retrofits may be completed by the end of this year.

Alfa Laval claims that the Wallenius contracts are part of larger order surge. Niclas Dahl, sales manager PureBallast explained: 'In total, Alfa Laval has sold eighteen systems to five different ship operators. So it's clear that the shipping industry sees PureBallast as an effective and viable long term solution.' These vessels include container, cement carrier, and ro-ro vessels owned by E R Schiffahrt, S&D Shipmanagement, and Naviera.

It may be that these orders signify that reservations regarding a hefty price tag for the system have been overcome in the face of the upcoming entry into force of the International Convention for the Control and Management of Ships' Ballast Water and Sediments. This will require all ships without an approved ballast water treatment system to perform ballast water exchange as of 2009. Ballast water exchange involves flushing the tanks at sea, which, in theory, reduces the chances of organisms surviving in the ballast tanks.

In November 2007, IMO made a decision to delay enforcement for ships constructed in 2009 and these vessels must complete installations by December 2011 at the latest. However, no temporary reprieves have been granted for vessels built in or after 2010.



The compact layout of a PureBallast treatment system.

System development

PureBallast is a chemical-free system for ballast water treatment which has been developed in cooperation with Wallenius Water, utilising patented Wallenius advanced oxidation technology (AOT). The AOT unit uses photo catalysis to create radicals which quickly break down microorganisms and bacteria by damaging their cell membranes.

This process eliminates the need for chemicals. The system is fully automatic and minimises the need for user intervention. It requires no special service or maintenance skills, again said to improve operational efficiency.

Monitoring of alarms, as well as the option of either local or remote operation, can be built into the process, and the system is started and stopped with the push of a button. The treatment involves no preparation or waste streams, and to ensure the performance of the AOT unit is not affected by scaling from seawater contaminants, an automatic cleaning unit has been integrated into the system.

According to Alfa Laval, it is the only system which has received final approval from IMO. The ballast water treatment is said to have nearly completed the Ballast Water Type Approval process, and it was released two years ahead of the enforcement of IMO's regulations to prevent the transport of potentially invasive species.

To be approved by IMO, a treatment system must reduce the number of viable organisms contained in ballast water to a maximum number per unit of volume. Organisms larger than 50microns, for example, must be reduced by more than 99.99%, which represents a decrease from at least 100,000 organisms to less than 10 organisms/m^3.

PureBallast's land-based tests for biological efficiency were conducted by the Norwegian Institute for Water Research (NIVA) and began in autumn 2006. They were completed with positive results in April 2007 and conducted under the supervision of Det Norske Veritas.

The first at-sea prototype system has been in operation aboard the Wallenius vessel M/V *Don Quijote* since September 2003. A second system was installed on M/V *Aida* in April 2006. The units are integrated with the ship's ordinary ballast water systems and users perform all ballast and deballast operations normally. ***NA***

Approval lifts NEI

The Venturi Oxygen Stripping (VOS) ballast water treatment system from NEI Treatment Systems has been issued with a type approval certificate after years of testing.

NEI has now joined the number of companies which produce ballast water treatment systems that qualify for a type approval certificate. The certification was issued by the Liberian Register towards the end of last year, with a technical review undertaken by ABS.

Testing on the VOS system was conducted over a number of years, with land-based biological testing being carried out by the Chesapeake Biological Laboratory (CBL) of the University of Maryland Centre for Environmental Science. Shipboard trials were undertaken by a team of scientists from CBL and the Marine Invasions Research Laboratory at the Smithsonian Environmental Research Centre, a US government facility. The testing was funded by the US National Oceanic and Atmospheric Administration as part of the US Ballast Water Technology Demonstration Programme.

Some of the at-sea trials took place aboard M/V *Pat Cantrell*, a 40,000dwt bulk carrier operated by TECO Ocean Shipping, based in the USA. This particular unit operates at 1000m^3/hour and has produced the intended ballast water conditions of dissolved oxygen of below 1.0mg/l and a pH of approximately six, on three consecutive test voyages.

Following a fine-tuning process, this prototype installation now operates optimally onboard *Pat Cantrell* and all mechanical evaluations to date have signified that it does not impact normal vessel operations.

The VOS ballast water treatment system from NEI.

VOS is a deoxygenation technology that removes up to a claimed 95% of dissolved oxygen from ballast water. This is accomplished as ballast is drawn into the vessel by mixing very low oxygen gas through large diameter venture injectors in the ballast piping. Aquatic organisms cannot survive in these conditions.

In addition, due to oxygen removal, the corrosion of ballast tank steel and degradation of coatings is significantly reduced. Since most structural steel of a ship is located in the ballast tanks, this corrosion prevention element of the VOS system could reduce the cost of ballast tank repair and maintenance. Extensive testing of this effect has been conducted by BMT Fleet Technology Ltd at its Ottowa corrosion testing laboratory.

Upon discharge of ballast water the VOS process reverses itself, due to the water rapidly re-aerating. The system does not require pre-filtration, has few moving parts, and is easily integrated into a vessel's existing ballast control system.

No hazardous chemicals are required to be carried onboard, and there are no toxic by-products in the discharged ballast water. The system has no upper limit to flow rate capacity, making it useful for a wide variety of vessel types.

NEI has received several orders for installations aboard ships during 2008. *NA*

MEPC gives SEDNA final approval

A lengthy span of testing Hamann's SEDNA ballast water treatment plant has resulted in final IMO approval for the product, writes Clare Nicholls.

At the 57th Marine Environmental Protection Committee (MEPC) meeting in London on 2 April 2008, the IMO's senior technical body approved the Safe Effective Deactivation of Non-Indigenous Aliens (SEDNA) system by German company Hamann.

According to the Hollenstedt-based manufacturer, it is the only applicant that can claim final compliance with the requirements of the IMO certification process for ballast water systems.

After passing all of the land and sea tests, the final approval was granted at the MEPC meeting, rewarding Hamann's five years of research and development in the product. SEDNA can now be described as a fully developed system, after having been tested continuously over the last three years at the harbour in Hamburg.

The MEPC agreed to grant basic approval to four systems, but only SEDNA was accorded final approval status, after consideration of the report of the fourth and fifth meetings of the Joint Group of Experts on Scientific Aspects of Marine Environmental Protection (GESAMP) Ballast Water Working Group, which met in November 2007 and January 2008.

The system testing has been conducted at different locations and with two full-scale plants, with capacities of 200m^3/hour and 500m^3 respectively. In total, these plants have been running without any problems for more than 3000 operating hours over the past three years.

Both the mechanical performance and the biological efficacy were tested with a variety of different ballasting scenarios such as varying flow rates, and different pressure and back pressure scenarios, simulating different levels of tank fillings. The biological efficacy was evaluated using the Artemia Testing System, recording the natural occurring plankton organisms and the surrogate species.

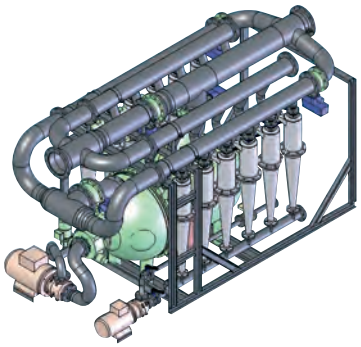
SEDNA treats ballast water in several stages as it is taken to the tanks of a ship. Initially, so-called hydrocyclones are used to filter out solids using centrifugal forces. These help to separate out the large species and largely prevent sediment, which tends to have living creatures mixed within it, from getting into the tanks. The number of hydrocyclones required depends on the flow rate of the ballast pump, though each hydrocyclone has a flow rate of between 35m^3/hour and 42m^3/hour.

Hamann employees toast the final approval news from IMO on 2 April 2008.

Secondly, a further filter removes all the remaining particles that are greater than 50micrometres in size. This also increases the stress imposed on the organisms, as well as increased sensitivity towards disinfection.

After the physical steps, the ballast water is then treated with 150ppm Peraclean Ocean, a chlorine-free oxidant that is fully bio-degradable.

The system is able to handle capacities from 250m^3/hour to 1000m^3/hour, and a combination of modules will be able to serve larger pump capacities. Various configurations are feasible, but the basic designs comprise a containerised system, a skid-mounted system, or a modular system.



Schematic of a skid-mounted SEDNA S500 system.

The way forward

At the recent meeting, MEPC also adopted a revised procedure for approval of ballast water management systems that make use of active substances (G9), which updates and clarifies the procedure.

To date, 13 States, representing about 3.62% of the world's merchant shipping, have ratified the International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention), which was adopted in February 2004. This process continues to drag as the convention will not enter into force until 12 months after no fewer than 30 States, constituting at least 35% of the gross tonnage of the world's merchant shipping, have become Parties to it. *NA*

Wärtsilä's slick Swedish deal

Laurin Maritime has placed an order for six Wärtsilä Senitec oily water separators.

Last year, Wärtsilä acquired Swedish company Senitec AB, specialising in environmental technology products for separating waste such as oily water and sludge. This buy-out has enabled Wärtsilä to expand further into the Swedish market, an advantage reflected when the firm received an order from Gothenburg-based Laurin Maritime AB.

Signed in March 2008, the contract called for six Wärtsilä Senitec M1000 oily water separation units to be delivered in mid-April. The systems are due to be retrofitted to six of Laurin's vessels, and the order included six SolidPac units to handle solid residues.

Most of the ships to be retrofitted are based in the USA; therefore it was a prerequisite that they were approved by the US Coast Guard. Testing demonstrated a discharge of less than one part per million of oil in the water consistently over prolonged operation.

The contract was placed with Wärtsilä on the basis of the separators' discharge performance, the sustainability of the performance over time, the simplicity of operation, and the claimed payback time of less than one year.

The separators can be installed, with equal convenience, either in newbuilds or as retrofits, with performance already verified in the Finnlines fleet. The unit is designed and built for continuous operation and is capable of cleaning $1m^3/h$, or $24m^3/day$, of sludge and bilge water. It also fulfils all local and global environmental requirements.

The SolidPac accessory enables removed solids to be treated and de-watered for easy, separate disposal, rather than merely returning them to the sludge tank. Where larger volumes of sludge and bilge water need to be treated, the Senitec M-series includes the M2500 unit, capable of cleaning $2.5m^3/h$. *NA*

The Senitec M1000 oily water separator will be installed aboard six of Laurin Maritime's vessels.

Hyde seeks approval

If uptake of a technology is to be considered its ultimate endorsement, the Hyde Marine ballast water treatment system is high on the list of those technologies breaking through ahead of pending legislation.

Hyde Marine says that no other company can claim as much experience in delivering ballast water treatment systems for full scale operation.

So far, seven of Hyde's treatment systems have been delivered on a commercial basis, and Hyde says it has recently received an order for six Guardian ballast water treatment systems to be delivered in 2008.

In fact, Hyde Marine has been involved in ballast water treatment (BWT) since 1996, when it teamed with the University of Michigan to study potential technologies for BWT, particularly for ships operating in the Great Lakes St Lawrence Seaway System. This led to Hyde's participation, beginning in 1997, as the engineering contractor for the Great Lakes Ballast Technology Demonstration Project (GLBTDP) - one of the first BWT research programmes in North America. It conducted tests of filtration technology for BWT aboard a Canadian Great Lakes bulk carrier, *Algonorth*.

Subsequently the company developed five full scale systems delivered in 2000 and 2001 with capacities ranging from 200m^3/hr to 350m^3/hr.

The first of the current Hyde Guardian systems, based on filtration and UV disinfection, was installed aboard the cruiseship *Coral Princess* in June 2003 and has operated trouble free for nearly five years. A second system was installed aboard the RCL Celebrity brand cruiseship *Mercury* in late 2006.

Now the system installed aboard *Coral Princess* is set to become one of the first systems accepted into the US Coast Guard's STEP (Ship Technical Evaluation Program) this spring. This will allow the system to be used in US waters for the life of the ship.

The Hyde Guardian system is currently also undergoing type approval testing, as per IMO G8 Guildelines, under the UK MCA in conjunction with Lloyd's Register. Testing is being conducted at the NIOZ test facility in The Netherlands and started in April.

The Hyde Guardian ballast water treatment system is being taken up by the market ahead of legislation.

The HBWT system has two main components - the auto-backflushing filter and the in-line UV system. During ballasting, the flow is processed through the filter and UV system and then back to the main ballast system. During deballasting the filter is bypassed and the water flows only through the UV system and then overboard through the discharge line.

The patented stacked disc filter technology ensures reliable removal of solids and larger organisms. The filter design captures and stores large amounts of solids while the automatic back flushing allows for continuous flow while keeping the filter elements clean.

The UV system uses high output, medium pressure lamps oriented perpendicular to the fluid flow which results in high performance and compact size for easy installation. An automatic, quartz sleeve cleaning mechanism ensures consistent, reliable UV dosage.

A single control panel operates the entire ballast water treatment system (filter, UV, valves, and booster pump, if required). All operations and indications can be viewed via the LCD panel, and the system can easily be integrated into a ship's control system to allow for operation and monitoring in the control room.

The system is modular in configuration to fit the available space on existing vessels and Hyde has also developed a complete, skid mounted Hyde Guardian system, which has been offered for several newbuilding programmes. The first skid mounted system is currently under construction and orders for multiple systems for newbuildings are expected in 2007 and 2008.

Hyde is also involved with the commercialisation and marketing of a natural biocide for BWT called Seakleen. While not yet available for sale, Seakleen has also been extensively tested both on land-based installations and, last autumn, at full scale aboard a 45,000dwt tanker operating on the US West Coast. 'The onboard tests also show that Seakleen meets the IMO requirements and is used in very small concentrations, as low as 1 part per million,' said Hyde.

The product should be commercially available in 2008. *NA*

ACO moonlights for AIDA

Continuing its supply partnership with cruiseship operator AIDA, ACO has provided grease separation systems for the latest club resort newbuild, *AIDAluna*, writes Clare Nicholls.

ACO Marine, part of the Czech Republic-based ACO Group, has delivered its Lipatomat NS15 grease separator for the third vessel in AIDA's club series, *AIDAluna*. The wastewater treatment company has already provided grease systems for the first two club ships, *AIDAdiva* and *AIDAbella*, and has also received a letter of intent to supply the prospective fourth, fifth, and sixth vessels in the series.

AIDAluna is currently being constructed at the Meyer Werft shipyard in Papenburg, Germany, and it is due to enter service in April 2009. The vessel will be 252m long, with 1025 passenger cabins aboard.

The cruiseship will have to cope with an average of 250m^3/day of galley water from an estimated 3100 passengers; therefore the Lipatomat system was chosen as, unlike most separators, it does not need to be fully discharged at regular intervals.

Grease and/or sediments are separated within the process and then disposed of without interrupting the operation of the unit. This allows isolated handling of both grease and sediments onboard and is reckoned to reduce the overall space requirement of the system significantly.

Grease aboard cruiseships is usually burned in an incinerator, with the sediments being stored separately prior to discharge ashore.

Lipatomat usually discharges grease, sediments, and treated water on a gravity 'flow-through' principle, but for AIDA it was necessary to pump these waste streams to independent tanks against a 3m-5m discharge head. To meet this requirement, ACO developed a bespoke solution comprising the automated Lipatomat 15 grease separator, a pumping station for treated galley water connected to an outlet from the grease separator, and two progressive cavity pumps directly connected to the grease and sediment outlets.

The Lipatomat grease separation unit from ACO Marine to be installed aboard the third in AIDA's club resort series.

All components were mounted on a common frame, and were piped and wired complete with an integrated system control panel. This compact, modular solution is claimed to have greatly simplified the shipyard's installation of the grease separation system onboard the vessel.

The Lipatomat system can accommodate capacities up to 15litres/second, and by locating the inlets and outlets slightly above the separation chamber, the resulting small hydrostatic pressure means that separation efficiency is unaffected by ships' movement and vibration.

The grease accumulates in the upper cone of the separator, whilst the sediment drops to the lower cone. The grease remains liquid due to the heating element located in the upper cone and clean water passes freely and continuously through the grease separator.

ACO has previously supplied Lipatomat units for Cunard cruise vessels *Queen Mary II*, *Queen Victoria I*, and *Queen Victoria II*. This year will also see the company providing grease separation systems for SB 1166 Thor, a jack-up rig being built at Hellenic Shipyards on behalf of Hochtief, and a 1000 person ferry to be constructed by Boden Werft. ***NA***

AIDAluna, under construction at Meyer Werft. The vessel will have a bespoke grease separation fitted onboard.

Hamworthy on cruise control

There has been a glut of recent orders for Hamworthy.

At the turn of the year Hamworthy's water systems division secured orders for advanced water treatment and/or desalination systems for cruiseships building at Meyer Werft, Fincantieri, and Mariotti. The ships have been ordered on behalf of AIDA Cruises, Costa Crociere, Cunard Line, Holland America Line, RCI/ Celebrity Cruises, and Seabourn.

Equipment delivery is scheduled from mid-2008 to early 2011.

The systems onboard these cruiseships will utilise Membrane BioReactor (MBR) technology, featuring side-stream crossflow. This is reckoned to satisfy and exceed the most stringent Alaskan standards (33CFR159.309), and also the new IMO MEPC 159(55) standards which are due to be implemented in 2010.

As well as these newbuild installations, MBR fittings can be retrofitted. The MkII and MkIII MBR units are claimed to be able to achieve 20% to 25% savings for energy consumption, as well as a reduction in required operational man-hours. *NA*

The Hamworthy MBR unit aboard AIDA 4.

Three stage bilge treatment from RWO

RWO's headquarters in Bremen, Germany, is the venue for the company's recently-opened customer training centre, which adds to the professional training courses and service network it already provides. The establishment of this facility is intended to inform the firm's clients of up-to-date bilge water policies.

This launch was preceded by the development of the Splitting and Filtration Unit (SFU), which is able to pre-treat difficult bilge water and meets individual requirements using a three-stage automatic process.

Ship Construction, 6th edition

Review by E C Tupper

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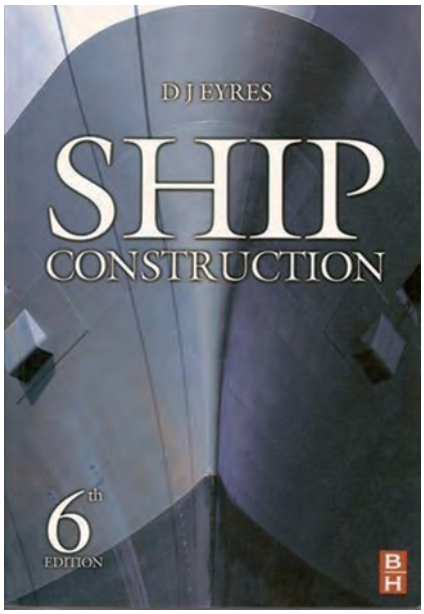

This book is the sixth edition of a well established text. The fifth edition was published in 2001. The author is a former lecturer in naval architecture at Plymouth University, UK, who has worked in UK and Norwegian shipyards. Before retiring he was the manager of policy and standards development with the Maritime Safety Authority of New Zealand and represented that country at meetings of the IMO Maritime Safety Committee.

The book is aimed at students of marine sciences and technology, in particular those following BTEC National and Higher National courses. It will be useful also to undergraduates in marine technology and naval architecture, and those on courses leading to an Extra Masters Certificate.

The book closely follows its earlier form with 32 chapters divided into seven parts. The first part gives a brief introduction to the phases of ship design and basic definitions of ship terms and main hull parameters. It concludes by discussing the development, in form, size, and layout, of various ship types. This gives the student an understanding of how ship design responds to the economic and functional demands of the marketplace, as well as to changing technology.

The second part deals with the classification societies; the two main shipbuilding materials - steel and aluminium - their production, composition, and heat treatments for desired qualities; typical sections; and tests. It concludes by discussing the stresses to which ships are subject.

"This is a very readable book which makes the reader aware of the many changes in ships and shipyard methods occasioned by technological developments and, in particular, the computer."

Part three covers various welding and cutting processes used in the shipyard and the inspection and testing of welds. In this edition laser welding is covered, along with welding automation. Part four is devoted to shipyard practices. The drawing office and lofting work, stock control, plate and section preparation, and priming, prefabrication, outfitting, and launching are all covered. Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM) are introduced. Part five deals with different elements of a ship's structure, with separate chapters devoted to tanker construction and liquefied gas carriers.

Part six deals with the outfitting of the ship - cargo access, handling, and restraint, including hatches and bow and side doors for ro-ro ships. It then considers the nature and form of various types of corrosion, leading on to passive and active forms of corrosion control. This part concludes with a review of ventilation systems, insulation, and refrigeration.

The final part covers international regulations, the International Maritime Organization, tonnage, load line rules, and structural fire protection, all of which can have a significant impact on ship design and construction.

This is a very readable book which makes the reader aware of the many changes in ships and shipyard methods occasioned by technological developments and, in particular, the computer. It provides the student with a good general insight into modern shipyard processes and the end product, the ship. The subject matter is presented clearly and the coverage is broader than might be inferred from the title.

It is illustrated by over 130 diagrams, some of them new to this edition. References for further reading that are given at the end of chapters have been updated, many being to the conferences and transactions of RINA.

The new edition introduces useful websites to help the student research further. Those, for whom this book is intended, will find it very useful in imparting knowledge in a field for which there are few textbooks. *NA*

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Request for Proposals – Operation of Floating Dock and Self Propelled Modular Transporters (SPMT) Transfer System

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For further information please contact Mark Pasalich or Luke Willcock on Tel: +61 8 9482 7517 Fax: +61 8 9481 3315 Email: mark.pasalich@landcorp.com.au

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30th June 2008: Notification of authors
15th August 2008: Manuscript submission

Fees

Registration fee is £450 including Conference Proceedings CD-ROM, printed paper summaries and conference dinner.

Contact

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Universities of Glasgow & Strathclyde,
100 Montrose Street, Glasgow G4 0LZ, Scotland, UK,
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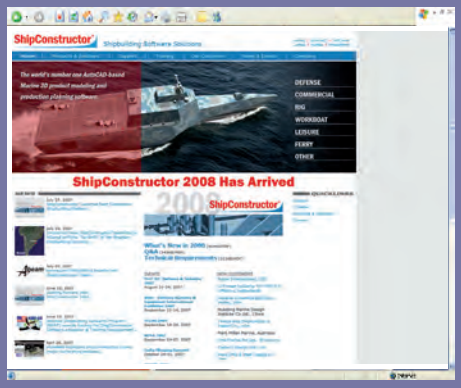

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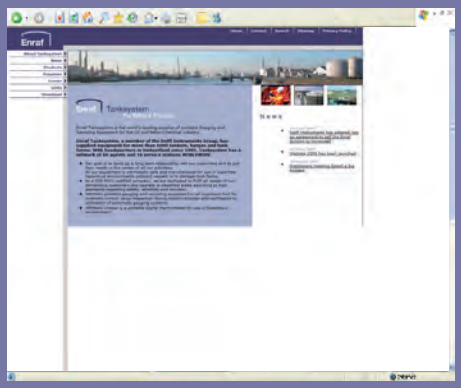

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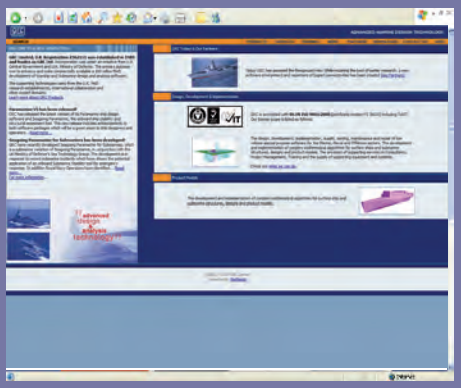

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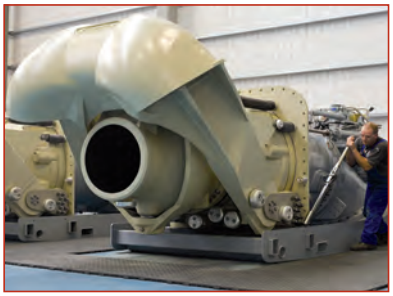

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