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The Q-Flex LNG vessel *Tembek*, on christening, 11 September 2007.

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Containerships for Panama and beyond

WITH dimensions now in place for the coming expansion of the Panama Canal, over 120 ships of greater than 12,000TEU capacity have been ordered since May, in a flurry of orders that has seen even the largest of South Korean shipyards switch focus.

Samsung Heavy Industries has already secured orders for 29 such ships this year.

Its ship design for a 12,600TEU ship is 366m long, 48.2m across, and features a depth to the maindeck of 29.8m.

Shipbuilders have emphasised that no major structural changes have been required to make the leap from 10,000TEU to 12,000TEU-plus. However, there are aspects of the design that are novel. Conventionally, for example, the accommodation onboard a containership is positioned above the engineroom, but as containership sizes have increased, the accommodation area moved forward to the midship section, above the heavy fuel oil tanks. As well as improving visibility because of the forward positioning of the bridge, the two island deckhouse reduces vibration and noise experienced by the crew,

would mean capacity being considered on the basis of 14tonne container loads per TEU, while a 49m beam would mean the same capacity, but a lower tare weight, the builder said.

HHI also emphasised that, structurally, there had been little need for change in building these bigger ships. However, the builder also offered an insight into its thinking on productivity when it comes to building larger ships. It said that, where a conventional frame space is 3.6m, this could be increased to 4.5m, in order to reduce the number of pieces used. This was achieved by increasing the thickness of the frames, which could be a more economical solution, depending on ship size.

HHI already has a 15,000TEU containership design finished, while Daewoo Shipbuilding and Marine Engineering is pushing a new 14,000TEU ship design. Samsung, meanwhile, has what it is terming a 16,000TEU ship under development, although it concedes that the market is likely to stick at the current size limit for some years to come.

The 16,000TEU ship, whose capacity Samsung gives as equivalent to 12,000 containers of 14tonnes at scantling draught, stacks containers 22 rows across.

Samsung is said to be working in tandem with ABS on the new design and, in October, was expecting the first feedback on its initial design proposal. Tank testing of this initial design has already been done, with its speed and power curve, and its manoeuvring capability, already proven.

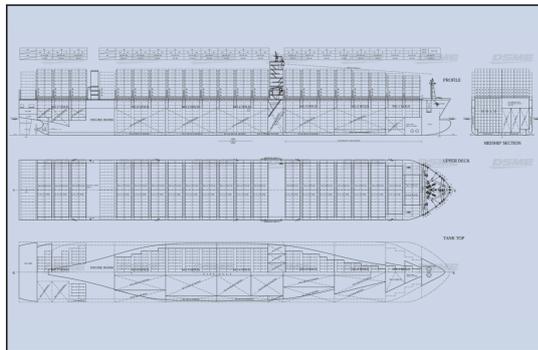
Even here, the builder favours a single engine, in this case a 14-cylinder K98MC-C unit from MAN Diesel, where others are said to favour twin eight cylinder engine solutions.

Whether the market will bear such behemoths remains a moot point, given that few ports around the world would be able to handle them. However, it should be noted that, 10 years ago, the same was said of the 8000TEU and 10,000TEU ships that have come to dominate east-west trading, and that it was actually the ports that geared up to handle such ships before any were ordered. It may well be that one means of establishing whether the giants of container shipping, such as AP Moller, have a developing appetite for even larger ships would be to establish the outreach of the shoreside cranes they are planning for the container terminals they operate.

In the meantime, the market's penchant for the biggest ships able to transit the expanded Panama Canal is certainly attracting shipbuilders more experienced in other vessel types to change strategy. Hanjin Heavy Industries, for example, has invested heavily in a completely new facility at Subic Bay, The Philippines, with the expressed intention of snapping up orders for larger boxships. The first of eight 12,800TEU capacity ships for NSC Schiffahrtsgesellschaft are due to be turned out of the yard from late 2010 onwards.

Again, in September, Greek shipowner Niki Shipping ordered nine 12,400TEU boxships from STX Shipbuilding for delivery from 2010. These ships are expected to be chartered to MSC. Construction of a new STX yard at Dalian, China, where mainstay output will be of bulkers, will allow the shipbuilder's soon to be expanded facilities at home to concentrate on 'value added' ships. ☺

A 14,000TEU capacity containership, courtesy of Daewoo Marine Shipbuilding and Engineering.



and the move means more containers can be stacked on deck. Container carrying capacity is raised by 700TEU compared to the same sized conventional vessel.

Samsung said that, to allay owner concerns that the accommodation block is too far from the engineroom, a new small duty room with its own pantry had been situated adjacent to the engineroom.

The new configuration also meant lower deflection of hatch diagonal and hatch cover movement.

Daewoo Marine Shipbuilding and Engineering said that it had orders for 18 ships of 12,600TEU capacity. In September, Seaspan Corp ordered eight 13,100TEU capacity vessels from Hyundai Heavy Industries. HHI also reportedly has orders for nine 13,600TEU ships, from German owners.

Although HHI said that the length for its 13,000TEU-plus ship had been set at 350m for the Panama Canal, and depth at 30m, it added that, as far as it was aware, some discussions were still ongoing over whether the beam would have to be limited to 49m, or could be 51m, which was dependent on the transit arrangements envisaged for the newly widened Canal. A 51m beam

Anti-fouling ban to go ahead

PANAMA has completed the task of ratification of the International Convention on the Control of Harmful Anti-fouling Systems for Ships, 2001 (AFS Convention). This will allow the Convention to enter into force on 17 September 2008.

The International Maritime Organization explained that Panama's accession meant that the entry into force requirement of 25 states representing more than 25% of the world's merchant shipping tonnage has been met. Before Panama's accession, 24 states representing only 16.63% of the world's fleet had ratified the Convention since its adoption in 2001. Panama's accession ensures the 25-state requirement is met and brings the world tonnage figure up to 38.11%.

Under the AFS Convention's entry into force conditions, the requirements will only become mandatory some 12 months after the entry into force conditions are met.

The key requirement of the AFS Convention is the prohibition of tin-based anti-fouling systems on ships' hulls. Note, however, that the European Union (EU) will not allow any ship into its ports or offshore terminals with a tin-based system on its hull after 1 January 2008.

SHIP STABILITY IN SPOTLIGHT

MORE than 70 experts from the international maritime industry met at Germanischer Lloyd headquarters in September to discuss the current status of the development and research in ship stability.

The two day workshop dealt with the probabilistic assessment of intact stability, showed trends in progressive flooding prediction, presented new cognitions of investigations on severe stability incidents like

Estonia, and informed about the simulation of parametric rolling, Surf-riding, broaching and capsizing in following/quarterming seas, numerical prediction of intact stability, as well as probabilistic approach to damage stability and survivability assessment plus intact capsizing investigations rounded off the programme of 28 presentations.

Under the topic 'goal based stability standards' Lech Kobyliński, Foundation for Safety of Navigation and Environment Protection, gave a speech about this IMO-concept. He said it was time to consider a holistic and risk-based approach to stability standards as an alternative to the existing prescriptive criteria used in daily work. This should be done in order to enhance safety and not to hinder the development of novel ship types. He pointed out that the risk of capsizing could be minimised by more detailed considerations of the procedure and special identification systems of hazards, as well as a methodology of risk assessment.

'Benchmark study of numerical codes for the prediction of time to flood of ships: Phase I' was the title of a presentation held by Frans van Walree, Maritime Research Institute Netherlands (MARIN), and Apostolos Papanikolaou, National Technical University of Athens (NTUA). The two experts presented a summary of the progress of an International Towing Tank Conference (ITTC) benchmark study on numerical codes for the prediction of time-to-flood of damaged passenger ships. For this study, simulation data for the flooding of a vessel has been provided by developers of several numerical codes and compared with relevant model experimental data. The steady state flooding condition is reasonably well predicted by the codes. According to the

speakers, the calculation of the flooding rates and transient phenomena is less satisfactory and urges on increased research effort in the future.

In a further presentation, first results of the on-going investigation of the *Estonia* case were shown by Petri Valanto, Hamburg Ship Model Basin HSVA. Since March 2006, a consortium consisting of the HSVA, the Technical University of Hamburg-Harburg (TUHH), and TraffGo HT, is investigating the accident for the Swedish Governmental Agency for Innovation Systems (VINNOVA). The results, mainly based on the motion simulation of the damaged ship in seaway carried out in the HSVA, including the simulation of the water sloshing on the vehicle deck. Relating to the studies and results, the participants of the workshop were able to get an idea of the early phases of the accident.

€500 MILLION ELIZABETH DEAL

FINCANTIERI and Cunard Line (Carnival Group) have reached an agreement to build a new super-luxury cruiseship of 92,000gt, worth approximately €500 million. Following the approval of Her Majesty, Queen Elizabeth II, the new vessel will be named *Queen Elizabeth*.

Queen Elizabeth will be the second largest ship ordered to date by Cunard following *Queen Mary 2*. She will have a passenger capacity of 2092 and will be built at Monfalcone shipyard for delivery in autumn 2010.

The order takes the number of ships under construction or on which building is set to start at the shipyards of Monfalcone, Marghera, Sestri Ponente, and Ancona to 16, equivalent to a market share of over 40%. Since the beginning of 2007, the shipbuilder has secured orders for eight cruiseships, including two options.

IMO APPROVAL FOR PUREBALLAST

PUREBALLAST, Alfa Laval's system for ballast water treatment, received International Maritime Organization Active Substance Final Approval over the summer, which confirms non-toxic operation and paves the way for the final stage of the Ballast Water Type Approval process.

Now, Alfa Laval has signed a contract for four PureBallast systems to be installed on vessels owned by German shipowner E R Schiffahrt.

E R Schiffahrt, which provides containerships to large liner companies worldwide, will install PureBallast systems aboard four of its upcoming newbuilds. Each vessel will have a capacity of around 880TEU and a PureBallast system with a flow rate of 500m³/h. The newbuilds, scheduled for completion in 2009, will be among the first to comply with the pending IMO regulations.

'Our policy at E R Schiffahrt is to combine productive container shipping with sound environmental practice,' said Mr Hans Huisman, E R Schiffahrt senior director

SMI goes French

PETER French has succeeded Kelvyn Derrick as chairman of the Society of Maritime Industries. Mr French is chief executive of BMT Group Ltd and has been a member of the Society's Board since 2005.

He said: 'I am very happy to take on this role at such a dynamic time for the industry. In recent years the Society has grown to be the trade association of choice for many companies in the maritime industries across its five business sectors. I look forward to working with my fellow directors on representing the best interests of the industry.'



Paying tribute to his predecessor, Mr French added: 'Kelvyn Derrick has been a valued member of the Board since 1996 and over the last three years has provided strong and balanced leadership as chairman of the Society. We therefore owe him a great debt of gratitude for his unstinting commitment in support of the sector.'

Peter French, new chairman of the Society of Maritime Industries.

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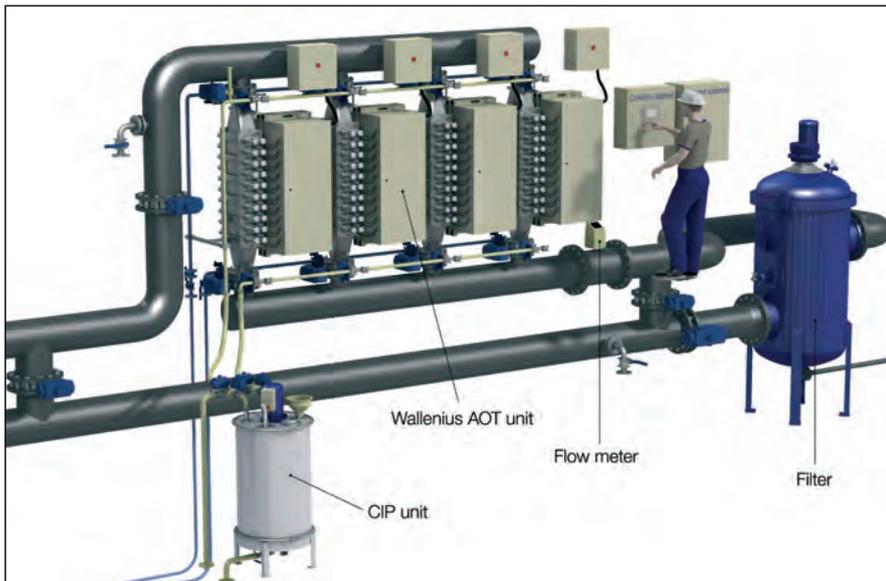
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Compact solution for ballast water treatment, PureBallast has won IMO approval.

for newbuildings. 'For that reason we have concentrated our search for water ballast treatment systems to non-chemical orientated solutions. PureBallast fits completely in our design goals.'

Lasse Gustavsson, secretary general of the World Wide Fund for Nature (WWF) Sweden, said: 'With the introduction of IMO regulations,

the problem of transporting species in ballast water urgently needs a sustainable solution. Only a chemical-free solution can solve the problem without contributing to another.'

Also committed to the PureBallast system is Wallenius Marine, onboard whose car carrier *Don Quijote* the first test version was installed in 2003. The first serial system was installed

onboard *Aida* in January 2007, and all Wallenius newbuilds will be equipped with PureBallast systems.

The ballast water treatment system was developed in a joint venture between Wallenius Water AB and Alfa Laval, have received the IMO Active Substance Final Approval, which means it is the world's first IMO approved ballast water treatment system.

SISTER FOR SEA CLOUD

LEGENDARY luxury sailing yachts *Sea Cloud* and *Sea Cloud II* are to get a new sister. The largest full-rigged three mast passenger ship ever built is taking shape in a Spanish shipyard and will be completed in September 2009. She will sail under the name *Sea Cloud Hussar*.

'We are proud to be able to continue the *Sea Cloud* legend with this new project,' said shipping company owner and chairman of the board of Hansa Treuhand Holding AG, Hermann Ebel, at the presentation of the plans in Hamburg.

The three-master will be 135m long; have a beam over 17m wide, and a total sail area of approximately 4000m² distributed over 27 sails. Up to 136 passengers can be accommodated onboard the new ship and will be cared for by 90 crew members.

Just like its historic, 1931-built sister *Sea Cloud*, *Sea Cloud Hussar* will be sailed in a traditional manner.



A hard hat, a flashlight and sound, professional judgement will always form the bedrock of effective classification services.

TECHNICAL PARTICULARS SEA CLOUD HUSSAR

Length overall:	135.70m
Deck length:	123.8m
Widest beam:	17.2m
Draught:	5.65m
Main mast height above deck:	48m
Total sail area:	3975m ²
Number of sails:	27
Passengers:	136; crew max 90
	69 outside cabins,
	of which 43 deluxe cabins with shower;
	23 junior suites and 3 owners' suites
	with veranda and bathroom with bath
	Lido bar and bistro; restaurant; lounge
	with bar; library; boutique; spa area with
	sauna, steam bath, and relaxation area,
	hydro-massage shower, massage and
	cosmetic treatments; hairdresser;
	bathing platform; sun deck; gym;
	hospital
Method of propulsion:	sails
	and diesel-electric engine (4920kW
	rated performance)
Gross cubic dimension:	approx 4,200

The yacht has been ordered by a subsidiary of Hansa Treuhand Holding, Sea Cloud Holdings, which will be marketing the new ship – along with *Sea Cloud*, *Sea Cloud II*,

River Cloud and *River Cloud II*. The group's in-house shipping company, Hansa Shipping, is responsible for planning the new ship.

The interior design work will be carried out by Hamburg company Partnership Design, which also designed the interiors for river cruiseships *River Cloud*, and *River Cloud II*, taken into service in 1996 and 2001 respectively, as well as for ocean-going *Sea Cloud II*.

The new tall ship is being built at the Factoria de Naval Marin shipyard near Vigo in Spain.

In addition to the sails, the main source of propulsion, the shipping company has selected a particularly environmentfriendly combined diesel-electric engine. In terms of design, the new ship will have clear modern lines while still remaining true to its sisters' romantic ideal.

ACL SWOOPS FOR ELLIOTT BAY

AMERICAN Commercial Lines has signed an agreement to acquire the assets of Elliott Bay Design Group, a naval architecture and marine engineering firm. EBDG is located in Seattle, Washington, and has recently opened a second office in New Orleans, Louisiana. The financial terms of the investment were not disclosed but are not material to the company.

The new company, Elliott Bay Design Group LLC, will continue to provide naval architecture, marine engineering, and production support to customers in

the commercial marine industry, while providing ACL with capability supporting its transportation and Jeffboat shipyard businesses.

EBDG was formed in 1987 and has grown to more than 60 architects, engineers, designers, and support personnel.

The transaction is expected to close in the fourth quarter of 2007.

SEMBCORP'S BRAZIL STRATEGY

JURONG Shipyard, a subsidiary of SembCorp Marine, and WTorre Empreendimentos Imobiliários SA (WTorre) have signed a memorandum of understanding to form a joint-venture company to own and operate a shipyard in Brazil. The strategic partnership is in line with SembCorp Marine's stated strategy to deepen its commitment and investment in Brazil to further grow its offshore business.

Located in the Southern Brazilian city of Rio Grande, the shipyard with an estimated total land area of 553.880m² will be equipped with a graving dock of 133m x 350m in size, with ancillary steel fabrication facilities.

The new drydock, to be fitted with a 600tonne gantry crane, and will be the largest and the first purpose-built facility to be built in Brazil for three decades. It will be capable of handling the construction and repair of semisubmersible units, including the largest production rigs, ship-shaped FPSOs, and fullscale topside fabrication capacity. Construction will be completed in June, 2008.

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Petrobras is expected to use the facilities of the shipyard for its projects, and has also signed a contract for this purpose, by renting the shipyard for the next ten years.

CLASSNK PASSES 150M GT

NIPPON Kaiji Kyokai, ClassNK, has passed the 150m gt mark in terms of tonnage classed for the first time ever this month. This is the first time that any ship classification society has attained this mark.

During its monthly meeting on 25 September, the Classification Committee officially confirmed that the Society had 6729 ships with a total of 150,048,643gt on its register as of the end of August 2007. The register saw a net increase of 916,304gt for the month, resulting in the total gross tonnage under NK class surpassing the 150 million mark for the first time ever.

The NK register has benefited significantly from the continued robust buoyancy of the global newbuilding market, which, combined with the recent trend towards the construction of ever-bigger ships, has encouraged further demand by shipowners for classification related services.

As a result, some 10 million gross tons of newbuilding tonnage have already been added to the ClassNK register since the first of the year.

This marked growth sets the Society well on its way to matching, if not breaking, its previous record gross increase of 15.01 million gross tons added during 2006.

Another effect of the large number of newbuildings entering NK class is the fact that the average age of the NK fleet continues to be comparatively young at about ten years of age.

SOLUTIONS FOR STRANDED GAS

DUTCH specialist ship designer Sea of Solutions, partner in the Offshore Ship Designers group (OSD), says it has developed a new, technically feasible and low-cost concept to exploit stranded gas fields.

The concept is another variant of continuous pipe compressed natural gas (CNG) carrier. The gas comes out of the ground into a coiled pipeline in the ship and is delivered to the shore facility without need for expensive offshore installations or shipborne installations. The company says that the CNG carrier can cope with unprocessed gas direct from the well and the coiled pipe design avoids the need for large complex pressure vessels built into the ship.

Nick Wessels, sales engineer at Sea of Solutions, says in the September edition of the OSD newsletter DESIGN Waves: 'The advantage of this concept is that the investment is in the vessel itself and is not related to a specific offshore field. It is an attractive means to develop fields for which the production rate or total volume cannot be easily predicted.'

Sea of Solutions says it has worked out the optimum vessel size, cargo pipeline size, and temperature and pressure of the stored natural gas for a typical stranded gas field. Optimal storage conditions are met with a cargo pressure of around 130bar and temperatures as low as possible without cooling equipment other than using seawater. With an overall length of 240m the ship can carry a coiled pipeline of about 218km length at speeds of 15knots. Typically, one load would equate to 515MMscf of saleable gas.

All parameters are open to change depending on position and size of fields to be exploited, but the concept is simple, flexible, and technically available today.

CNG A GO FOR BV

IN a separate announcement, classification society Bureau Veritas took the stage last month to say that market demand would inevitably lead to the development of compressed natural gas carriers.

Speaking at BV's Gas Tanker Seminar, held in Hamburg on 20 September, Fred Venner, BV manager for gas ships said that CNG ships will be suitable for routes up to

about 2500miles, with substantial parcels of natural gas suitable for such trades on the western US seaboard, in SE Asia, the northern N Sea, central America, and the Mediterranean.

Venner reviewed the main options for CNG carriage which include coiled and vertical steel pipe systems and steel and composite pressure vessels, and raised questions over safety. He also highlighted BV's new rules for CNG ships.

Bureau Veritas currently classes 190 LNG and LPG carriers totalling 4.4m gt and has an orderbook of 60 vessels totalling 2.6m gt. The fleet includes the only dual fuel and regasification LNG vessels in service.

LR GOES HELLENIC

LLOYD'S Register has created Hellenic Lloyd's, marking a new phase of strategic investment to further consolidate and increase its position in the Greek market. Greek shipowners currently account for some 20% of world tonnage and 26% of the worldwide Lloyd's Register-classed fleet.

Over the next 12 months a significant number of Greek technical and support staff will join Hellenic Lloyd's in a major expansion to increase both the capacity

TECHNICAL PARTICULARS GLOBAL 1200	
Loa	162.3m
Lpp	153.4m
Breadth (moulded)	32.2m
Depth (moulded)	16.1m
Draft (operational)	5.8m
Vessel speed	15knots

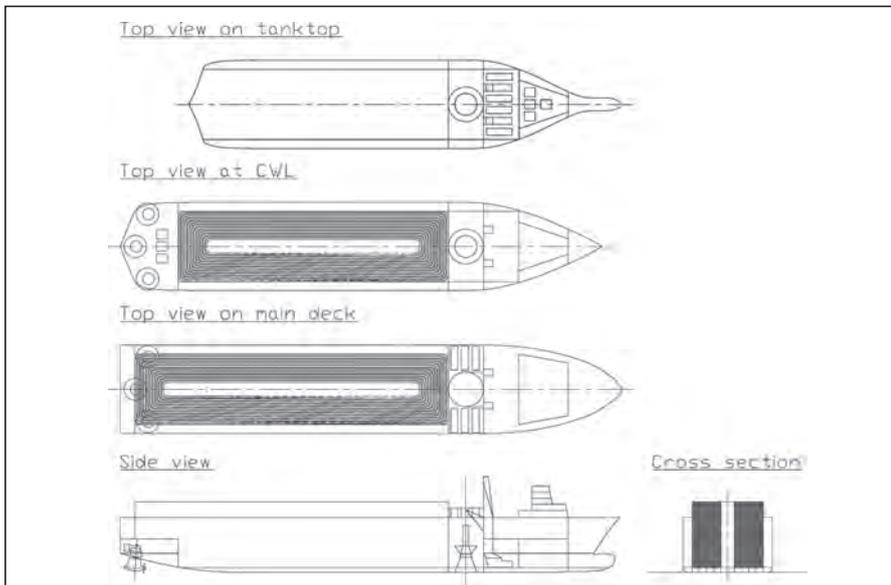
and technical capability of the Piraeus office. Great emphasis has been placed on enhancing technical expertise, which is available to serve the Greek community, and its ability to liaise with Far Eastern and European shipbuilders involved with Greek new construction business.

Lloyd's Register of Shipping and Industrial Services S A in Greece and Cyprus has changed its name to Hellenic Lloyd's S A to reflect the increasing activity, Hellenic identity, and character of Lloyd's Register's Greek operations as well as the importance of the Greek shipping communities' contribution to Lloyd's Register.

Lloyd's Register Asia today opened Shanghai's most comprehensive foreign-funded maritime training centre, putting in place the cornerstone of a 3-million-yuan commitment this year to the development of educational courses and related infrastructure in China.

Meanwhile, the new Lloyd's Register Maritime Institute (Shanghai) has been created to provide a centre of learning from where working surveyors and auditors can share their technical knowledge with China's shipbuilders, owners, and maritime students through specifically tailored seminars, lectures, and training courses.

Sea of Solutions concept for a CNG carrier.



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Richard Fain (CEO), Jarmo Laakso (project manager Celebrity Cruises), Lambert Kruse (managing director) push the button of the plasma torch.

The Shanghai office, which is expected to be the first in a network of such facilities provided by Lloyd's Register Asia in China and North Asia, will have the capacity to seat up to 50 'students' at each seminar, lecture, or training course.

Recent surveys conducted by Lloyd's Register's Marine Training Services (MTS) have indicated that seminars on environmental regulations, technical risk management, hull design, noise and vibration, and shaft alignment will all be eagerly received by China's maritime industry.

DPTAC CONSULTS ON SHIP ACCESS

THE Disabled Persons Transport Advisory Committee has launched a 12-week consultation on designing and operating passenger vessels and passenger shore infrastructure so that disabled people can use ships and ferries.

The Committee was set up by the Secretary of State for Transport to provide independent advice on the transport needs of disabled people.

Launching the consultation, Neil Betteridge, DPTAC chair, said: 'DPTAC is seeking views from the shipping industry, disabled people, and the government to help us produce the very best guidance; so that those who design, build, and operate ships and ports can make it easy for disabled people to travel by sea, estuary, river, or canal.'

Jean Dunlop, chair DPTAC Maritime group said: 'Providing ships and infrastructure that make it easier for disabled people to travel can improve travelling by ship for everyone. Disabled people, especially those with luggage or travelling in groups, often find travelling by ship a pleasant way to increase their mobility and this guidance will help them to achieve seamless travel.'

The consultation started on 11 September and runs to 5 December 2007.

ICE IN VARNA

ROMANIA'S International Contract Engineering (ICE) has entered into a cooperation with the Bulgarian Ship Hydrodynamics Centre (BSHC) in Varna to expand the services and capacities that ICE can offer to its clients.

Corneliu Marton, department manager and Adrian Simion, a senior researcher from ICEPRONAV, recently visited the BSHC facility to discuss details of the cooperation, which will give ICEPRONAV access to added capacity and hence improved response time for its tank testing services.

PIPELAY FOR KEPPEL

US offshore major Global Industries has awarded Keppel Singmarine the construction contract for its new pipelay/heavy lift vessel *Global 1200*. It is the third newbuild vessel contracted in 2007 to be designed by Sea of Solutions (see above), partner in the Offshore Ship Designers Group.

The previous two major vessels designed by SoS contracted this year were a 5000tonne heavylift vessel for Nordic Heavy Lift and a pipelay/heavylift vessel for Larsen & Toubro. Sea of Solutions was responsible for both concept and basic design of all three vessels.

Scheduled to enter service in April 2010, the dynamically-positioned *Global 1200* is a combination derrick/pipelay vessel with 1200tonne lifting capacity, 60inch pipelaying capacity, and 400tonne deep water lowering system capacity.

Global 1200 is a customised version of the Sea of Solutions' SOC 600 design and will be able to pass through the Panama and Suez canals. The design incorporates an AmClyde

single post crane on the aft and a centre firing line on the freeboard deck, the latter being a distinctive feature of most Sea of Solutions pipelay designs. For this project, Sea of Solutions teamed with Vuyk Engineering, one of its engineering partners.

The vessel is propelled by two 4500kW propulsion thrusters providing a trial speed of 15knots. Combined with the five retractable thrusters of 2400kW each and an 880kW tunnel thruster, the vessel is classed DP 2, however, diesel-generator and switchboard lay-out meet DP3 requirements to provide additional redundancy.

MEYER WERFT MEETS CELEBRITY

MEYER Werft has launched the production of the first steel plate for the second new giant passenger cruise vessel *Celebrity Equinox* for the cruise operator Celebrity Cruises (Miami). Richard Fain, CEO of Royal Caribbean Cruises Ltd, pushed the button of the fully automated plasma torch.

The first ship of the Celebrity Solstice class - *Celebrity Solstice* - will be delivered to Celebrity Cruises, an affiliated company of Royal Caribbean Cruises Ltd, in the autumn of 2008.

This new, energy-saving ship for Celebrity has a length overall of 315m, is 36.8m wide and gross tonnage of 122,000.

A total of four ships will be built, each offering space for accommodating 2,850 passengers in 1425 cabins. All standard cabins will be more spacious than they are on average in the industry. More than 90% are outside cabins, again 90% of which have their own balconies. The ships will be equipped with diesel engines and pod propulsion systems; the overall engine output will be 67,200kW (approx 91,400hp).

ROLLS-ROYCE IN US ACQUISITION

ROLLS-Royce has acquired US naval architecture and engineering firm Seaworthy Systems Inc, in a move it said would improve its marine support services.

Seaworthy Systems Inc, based in Connecticut, with offices in New Jersey, Virginia, and California, has provided expertise to the US Navy and Coast Guard for more than 30 years.

Its work will now be part of a TotalCare service Rolls-Royce is developing for naval customers - offering long-term guaranteed power availability and complete propulsion plant support for ships.

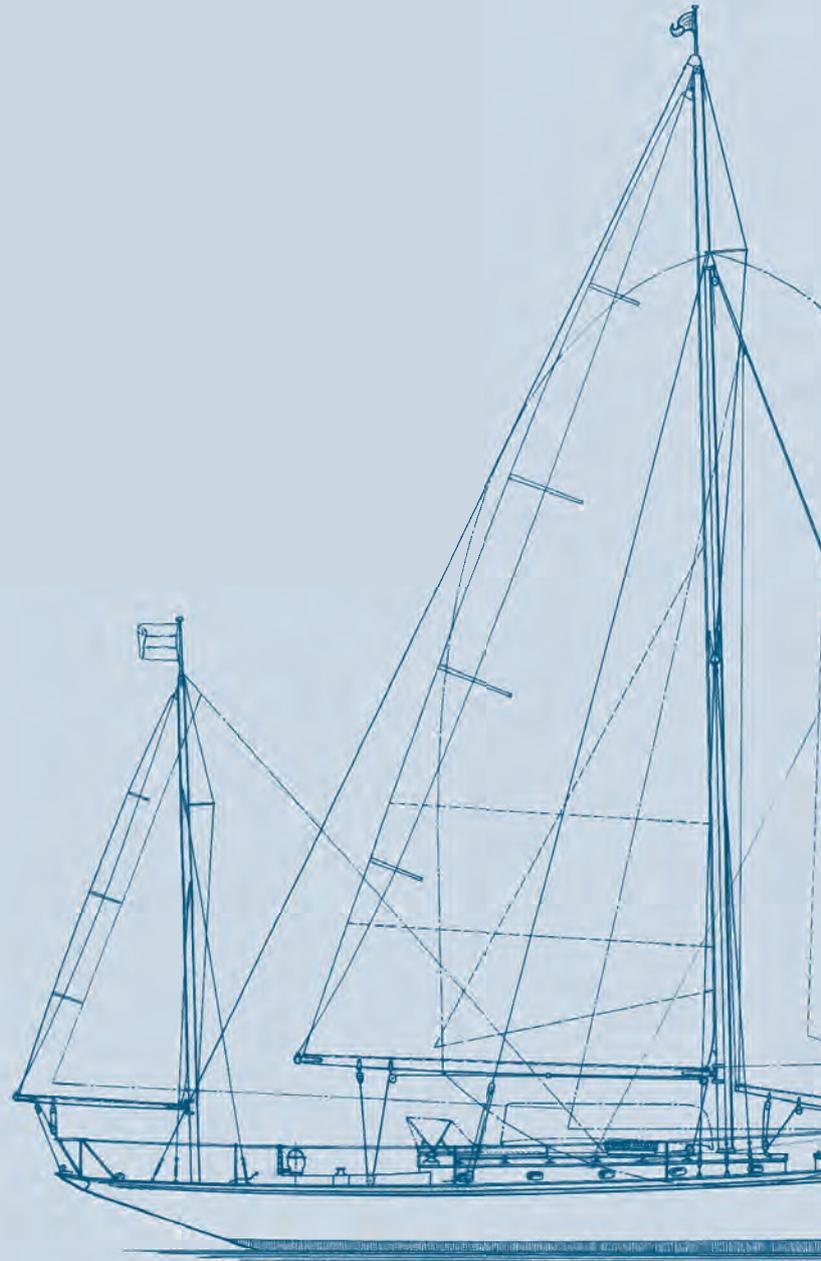
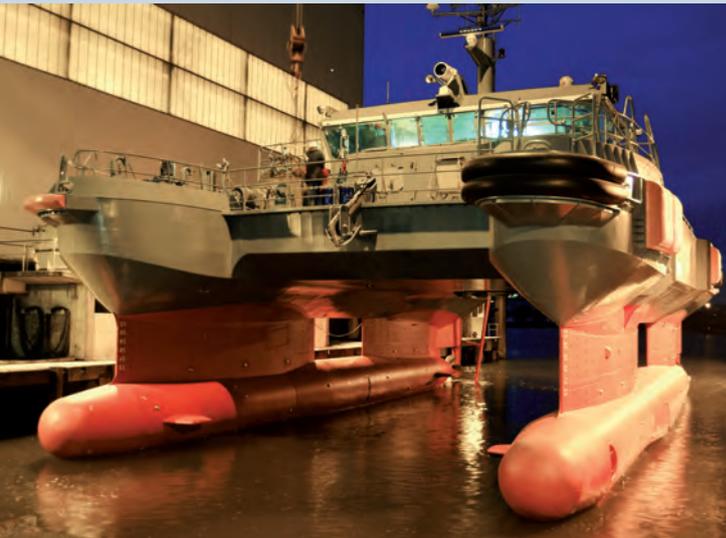
Seaworthy Systems Inc, which employs 58 people, has also worked with the US National Oceanic and Atmospheric Administration, the Department of Transportation's Maritime Administration (MARAD), Military Sealift Command (MSC), and commercial shipowners.

Its key skills include: ship design - from preliminary concept to contract, and modifications for hull and machinery; operations and logistics; onboard equipment maintenance; power plant and energy efficiency analysis; automated equipment maintenance management software.

It is currently providing engineering services, and software development and support, for the MSC under a ten-year contract. 



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Avant-garde rooted in a fine tradition

Class called in over MOL safety record

AFTER Mitsui OSK Lines recent poor accident record, the company says it has been focusing on efforts to enhance its operational safety.

MOL has called in a third party to assess its safety record, after its reputation was severely dented last year.

The shipping line called in Det Norske Veritas to provide an independent review of its safety practices, after four major accidents in 2007, including the loss of the 197,060dwt ore carrier *Giant Step*, the loss of 4813 cars from the 55,328gt car carrier *Cougar Ace*, an oil spill from the 261,284dwt VLCC *Bright Artemis*, and a fire onboard the 3400TEU containership *MOL Initiative*.

MOL general manager of marine safety, Captain Nemoto, said: 'Our long-term vision is to make the MOL group an "excellent and resilient organisation that leads the world shipping industry" and, as highlighted in our new three-year business plan (MOL Advance), we aim to operate 1200 vessels and secure revenues of US\$21billion at the end of the fiscal year 2012. At the same time, we need to ensure our growth is coupled with enhanced quality operations.'

He said: 'Our customers and other stakeholders suffered considerable stress and inconvenience as a result of these accidents. All MOL's group management is taking this situation very seriously and we have gone back to basics to devote our full efforts to ensuring safe operations.'

After the unfortunate series of events, MOL management established an 'Emergency Committee for Enhancement of Operational Safety' under the stewardship of Captain Nemoto.

According to Captain Nemoto: 'We concluded that the main root causes were not only related to human errors. Indeed, in addition to addressing the issue of increasing workload on the seafarers, we needed to consider the use of fail-safe equipment and facilities that exceed international standards. Also, we realised that measures must be taken to adequately monitor and respond to today's abnormal weather conditions.'

MOL management plans to spend JPY35bn (US\$296m) on improving the company's safety systems. 'The outlay will be spread over three years as highlighted in MOL Advance. Among the projects MOL will be spending heavily on is a central ship-safety management centre in Tokyo called Safety Operation Support Centre. This safety body will monitor MOL's 800-strong fleet, providing each ship with critical up-to-date weather and safety information,' said Captain Nemoto.

Further funds will be spent on improving ship management procedures and training seafarers. 'We will reinforce and improve education and training for all ranks at MOL training centres around the world. We will also introduce our competency evaluation system programme in MOL group ship



Captain Nemoto is a man with a mission. MOL's general manager of marine safety is determined to enhance the company's safety performance.



Captain Nemoto seen here in MOL's Safety Operation Support Centre, which monitors vessel movement and weather conditions all year round. The centre plays a vital role in ensuring the safety of the MOL fleet.



Training vessel *Spirit of MOL*: MOL offers its high-quality standard training and education to cultivate top-notch seafarers who will maintain safe, reliable operation on-board the MOL fleet.

[Photo: Courtesy of MOL]

management companies, manning companies, and MOL's own training centres. We believe this comprehensive approach will enhance the competency of our seafarers in a reliable and efficient manner,' said Captain Nemoto.

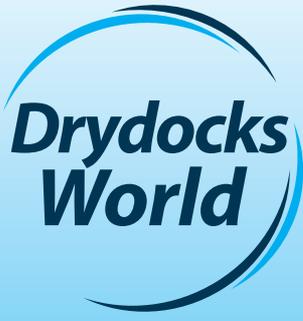
He also revealed MOL's plans to employ 400-500 new graduates from maritime colleges around the globe each year. 'We believe seafarer shortages are affecting safety so we need to address this by employing more graduates to serve on our vessels today and in the future. In this connection, we will use the MOL-owned *Spirit of MOL* vessel exclusively to train the multi-national graduates. They will receive both technical and operational training on this vessel as part of their training to qualify for their deck officer and engineer licences.'

Commenting on DNV's external review of MOL's ship-safety systems, Captain Nemoto said: 'We hired DNV to run a number of workshops at our Tokyo, London, and Singapore offices involving company superintendents, fleet masters, and engineers.

The group discussions were useful and helped to identify safety issues faced by employees in their duties. We held similar workshops for our seafarers in Manila, Mumbai, and Zadar, which resulted in the identification of several issues, including communication problems and the need to enhance seafarer education and training, and restructure ship management practices.'

'This basically involves a structural approach to safety. We find out where the owner is in terms of safety management procedures, find a base line to work from, then provide solutions and set goals,' added Fred Yoshida, DNV Maritime's marketing director in Japan.

Captain Nemoto also added, 'The third-party review, combined with our own internal survey, was considered the best approach as it delivers reliable, long-term safety improvements. This is important as safety will be central to MOL's business culture as we expand our fleet and services to meet the challenges ahead.'



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Faster and further with Ecospeed

Ecospeed is an extremely durable hull coating that will save on fuel costs and give increased speeds. It is expected to last for up to 25 years and is guaranteed for 10.

Amongst recent applications are a 275 metre, 5000 TEU container ship, several ice-class cargo vessels and a major cruise liner—with more of each category planned for the near future.

The Belgian Navy have been using Ecospeed on a number of their vessels since 2004 and have committed to applying it on the remainder of their fleet as the time comes for repainting.

The growing appeal of Ecospeed comes down to a number of key factors.

The final hull surface has very low roughness levels. This, together with its corrugated surface, gives fuel savings through reduced consumption and increased speed.

The strength and impermeability of the coating provides a very high degree of protection against mechanical impact and corrosion. The endless cycle of hull repainting every two to five years can therefore be dispensed with. Even after being tested under extreme Baltic winter and ice conditions it has proven to

be an effective protection against mechanical impact.

In addition, the coating has no adverse effect on the environment as it is entirely toxic-free.

Ecospeed can be used on most ships, offshore vessels and structures. It has proven to be ideally suited for fast moving container and cargo ships, cruise vessels and ice-going ships. Its use can remove major headaches for ship superintendents. With no repainting necessary, yet protecting the hull surface against corrosion, there will be many additional advantages such as significant savings on repair and maintenance costs.

Discharge requirements less than a year away

STRINGENT requirements for the discharge of certain ship-generated wastes in two areas designated 'Special Areas' under the MARPOL Convention will take effect in less than a year, following the completion of adequate provision of the necessary shore-side facilities.

FOLLOWING a 10-year regional project on the implementation of MARPOL, States in the 'Gulfs area' Special Area have now provided adequate reception and treatment facilities for MARPOL Annex I (oil) and Annex V (garbage) ship-generated wastes in ports, terminals, and ship repair ports in the area.

The implementation project was organised and administered by the Regional Organization for the Protection of the Marine Environment (ROPME) and the Bahrain-based Marine Emergency Mutual Aid Centre, with support from IMO's Integrated Technical Co-operation Programme.

Its successful completion was reported to the 56th session of IMO's Marine Environment Protection Committee (MEPC) in July this year by the countries bordering the 'Gulfs area'. Following an assessment of the submission by the MEPC's Informal Technical Group on Special Areas and particularly sensitive sea areas (PSSAs), the Committee adopted a resolution setting a date of 1 August 2008 for the discharge requirements in the 'Gulfs area' to take effect.

The 'Gulfs area' was designated as a Special Area under MARPOL Annexes I and V in 1973.

Similarly, taking into account the information provided by South Africa to MEPC 54 regarding the adequate reception facilities in that area, MEPC 56 adopted a resolution also establishing 1 August 2008 as the date on which the discharge requirements shall take effect for the Southern South African waters Special Area, under MARPOL Annex I. The Southern South African waters Special Area was adopted by the MEPC in October 2006.

Recognising that the new discharge requirements for these Special Areas can only take formal effect from 1 August 2008, the MEPC invited Member Governments and Parties to the MARPOL Convention to encourage the shipping industry and, in particular, tanker operators, to comply with them voluntarily, with immediate effect. A circular letter has been sent to Governments to that effect.

Elsewhere, the countries bordering both the Mediterranean Sea and Wider Caribbean regions are making stronger efforts to provide adequate reception facilities in their Special Areas under MARPOL Annex V. The regional Marine pollution Emergency Response Centre for the Mediterranean (REMPEC) is helping to organise a submission to the MEPC by the Mediterranean countries requesting that its Special Area status should come into effect.

How we got here

MARPOL Annex I Prevention of pollution by oil, Annex II Control of pollution by noxious liquid substances, and Annex V Prevention of pollution by garbage from ships, define certain sea areas as 'Special Areas' in which, for technical reasons relating to their oceanographical and ecological condition and to their sea traffic, more stringent requirements

Special Areas	Adopted	Date of entry into force	In effect from
Annex I: Oil			
Mediterranean Sea area	2 Nov 1973	2 Oct 1983	2 Oct 1983
Baltic Sea area	2 Nov 1973	2 Oct 1983	2 Oct 1983
Black Sea area	2 Nov 1973	2 Oct 1983	2 Oct 1983
Red Sea area	2 Nov 1973	2 Oct 1983	*
"Gulfs" area	2 Nov 1973	2 Oct 1983	1 Aug 2008
Gulf of Aden area	1 Dec 1987	1 Apr 1989	*
Antarctic area	16 Nov 1990	17 Mar 1992	17 Mar 1992
North West European Waters	25 Sept 1997	1 Feb 1999	1 Aug 1999
Oman area of the Arabian Sea	15 Oct 2004	1 Jan 2007	*
Southern South African waters	13 Oct 2006	1 Mar 2008	1 Aug 2008
Annex II: Noxious Liquids			
Antarctic area	30 Oct 1992	1 July 1994	1 July 1994
Annex V: Garbage			
Mediterranean Sea area	2 Nov 1973	31 Dec 1988	*
Baltic Sea area	2 Nov 1973	31 Dec 1988	1 Oct 1989
Black Sea area	2 Nov 1973	31 Dec 1988	*
Red Sea area	2 Nov 1973	31 Dec 1988	*
"Gulfs area"	2 Nov 1973	31 Dec 1988	1 Aug 2008
North Sea	17 Oct 1989	18 Feb 1991	18 Feb 1991
Antarctic area (south of latitude 60 degrees south)	16 Nov 1990	17 Mar 1992	17 Mar 1992
Wider Caribbean region including the Gulf of Mexico and the Caribbean Sea	4 July 1991	4 April 1993	*
Annex VI: Prevention of air pollution by ships (SOx Emission Control Areas)			
Baltic Sea	26 Sept 1997	19 May 2005	19 May 2006
North Sea Area	22 July 2005	22 Nov 2006	22 Nov 2007

Table 1: Special Areas and SOx Emission Control Areas.

* The Special Area requirements for these areas have not taken effect because of lack of notifications from MARPOL Parties whose coastlines border the relevant Special Areas on the existence of adequate reception facilities (regulations 38.6 of MARPOL Annex I and 5(4) of MARPOL Annex V).

for the prevention of sea pollution are mandated. Under the Convention, these Special Areas are provided with a higher level of protection from operational discharges than other areas of the sea.

MARPOL Annex VI Regulations for the prevention of air pollution from ships establishes SOx Emission Control Areas (SECAs) with more stringent controls on sulphur emissions.

Over the years, a number of Special Areas have been established under MARPOL Annexes I, II, and V. In addition, two SECAs

have been established under MARPOL Annex VI. A summary of these areas, and their current status, is shown in Table 1.

While the rigorous discharge requirements for many Special Areas under MARPOL Annexes I and V have taken effect, others have not. Until the States Parties to MARPOL bordering those Special Areas have informed the MEPC that there are adequate reception facilities in their Special Areas, the MEPC cannot establish a date for the discharge requirements of those Special Areas to take effect. 

Arriving at a definition of cgt

PRACTICAL application of new OECD cgt system, by Denis Menezes and Matthew Flynn, technical director and managing director respectively, Worldyards.com.

IN November 2006, the Organisation for Economic Co-operation and Development published a new set of rules for computing compensated gross tons, effective 1 January 2007. (For these documents, please note the following link: (<http://www.oecd.org/dataoecd/59/49/37655301.pdf>))

The basic definition of compensated gross tonnage remains unchanged since its first introduction in the late 1960s. 'Compensated gross tonnage (cgt) is a unit of measurement intended to provide a common yardstick to reflect the relative output of merchant shipbuilding activity in large aggregates such as 'World', 'Regions', or 'Groups of Many Yards'.'

The question of alternative aggregate capacity measures, other than deadweight and gross tonnage, was first tabled at 1966 and 1967 meetings between the Community of European Shipyards Associations - CESA (at that time named the Association of West European Shipbuilders - AWES) and the Shipbuilders' Association of Japan - the SAJ. A joint system for calculating compensated gross tonnage (cgt) was introduced by the associations in 1968, and this was subsequently adopted and promulgated by the OECD, with substantive revisions in 1984, 1994, and 2007.

This 2007 version was jointly introduced by the Community of European Shipyards Associations, the Shipbuilders' Association of Japan, and the Korean Shipbuilders' Association, but without the participation of China, Vietnam, and India.

The new system is essentially the same as the previous version in terms of segmentation of ship types. It eliminates the category of single hull crude oil tanker, and the resulting menu is 15 ship types. Product tankers are now grouped with crude oil tankers rather than chemical tankers.

In mathematical terms, the major difference is that under the old system the ship's gross tonnage was multiplied by a coefficient that was different according to the size of the vessel.

For example, bulk carriers in the deadweight bracket of 4000dwt to 10,000dwt would have a cgt based on the ship's gt multiplied by a factor of 1.10, but for a vessel of 10,000dwt to 30,000dwt the factor would decline to 0.70. The simple logic is that as any newbuilding gets bigger, they take less input to complete each measure of output (dwt, gt, or cbm).

As OECD explained, a simple factor measurement system had shortcomings: 'An inevitable consequence of the step function approach was that for ships with a tonnage near the size boundaries - particularly for smaller ships - this produced some inaccuracies. For example, the calculated cgt of a passenger

Ship type	A	B
Oil tanker (double hull)	48	0.57
Chemical tankers	84	0.55
Bulk carriers	29	0.61
Combined carriers	33	0.62
General cargo ships	27	0.64
Reefers	27	0.68
Full container	19	0.68
RoRo vessels	32	0.63
Car carriers	15	0.70
LPG carriers	62	0.57
LNG carriers	32	0.68
Ferries	20	0.71
Passenger ships	49	0.67
Fishing ships	24	0.71
NCCV	46	0.62

Table 1: A and B factors as per OECD segmentation.

vessel with a planned size of 9950gt, delivered with a tonnage of 10,050gt, would be reduced from 29,850cgt to 20,100cgt, due to this relatively small increase in gross tonnage.'

Rather than coefficients, the new system uses a formula with powers that results in a smooth 'curve' for all ships appearing in the specific segment, rather than the 'stepped' values according to the old size bracket system.

We also noted that OECD suggested that larger containerships were more complex and likely needed a stronger weighting. Bigger containerships, said the paper, often had more complex cell guide systems and post-Panamax ships in general, had a wider beam to height ratio requiring more steel work. In fact, the new calculation value for containerships was 12.56% lower than the old system.

Other significant reductions occurred for passenger ships (-26.52%), LPG vessels (-13.81%), and product carriers (-15.41%). One caveat from the OECD is that the system is not designed for understanding micro dynamics at individual shipyards.

Worldyards fully understands and respects the OECD's caveat but has decided to forge ahead and apply the system in as detailed a format as possible. The shipping

community is naturally intensely interested in understanding the productivity of individual shipyards, despite the limitations of the OECD system. Also of great significance, is the ability to understand the implications of switching between ship types where a yard building containerships switches focus to tankers.

The CGT system was not intended to be a measure applied to individual vessels of small groups, rather it is applicable for 'large aggregates'. However, that only begs the question of how to arrive at large aggregates without summing up of all the small parts, ie the ships. By definition, anyone doing shipbuilding analysis, be they researchers or shipbuilder associations, must make decisions on applying cgt values to single vessels.

Otherwise, the world is not in possession of a meaningful comparative measure of orderbook and shipbuilding capacity. That is the approach we adopt here.

Naturally, the dock size and production line will dictate the feasibility of switching, but again, if the analyst can judge the probability of how shipyard productivity will be used, then the OECD cgt system is a reasonable yardstick (or cgt-stick).

1. Bulkers							
	Sub-segment	Definition	Capacity Measure	A	B	Sub segment as per OECD	Sub-segment not covered by OECD; Designation given by WY
1(1)	VLOC	Very Large Ore Carriers, or bulkers with 200,000 dwt and above, typically purpose-designed for carriage of iron ore, only with much smaller cargo cubic capacity than conventional bulk carriers.	dwt	29	0.61	?	Bulk Carriers
1(2)	Capesize	Bulkers between 120,000 - 199,999 dwt	dwt	29	0.61	Bulk Carriers	-
1(3)	Handy-cape	Bulkers with dwt <= 119,999 and breadth > 39.5m. They are alternatively known as "mini-cape".	dwt	29	0.61	Bulk Carriers	-
1(4)	Post Panamax Bulkers	Bulkers between 50,000 to 110,500 dwt, and breadth >32.31m and <= 39m	dwt	29	0.61	Bulk Carriers	-
1(5)	Panamax Bulker	Bulkers between 55,000 - 84,999 dwt, and breadth <= 32.31m and loa >= 200 m. The ships with 229m loa are called Kamsarmax, with loa being compatible with Port Kamsar - bauxite loading terminal, Guinea.	dwt	29	0.61	Bulk Carriers	-
1(6)	Baby-Panamax Bulker	Bulkers between 50,000 - 54,999 dwt and breadth <= 32.31m and loa >= 200 m	dwt	29	0.61	Bulk Carriers	-
1(7)	Supramax	Bulkers between 50,000 - 64,999 dwt, and breadth <= 32.31m and loa < 200m	dwt	29	0.61	Bulk Carriers	-
1(8)	Handymax	Bulkers with dwt 40,000 - 49,999	dwt	29	0.61	Bulk Carriers	-
1(9)	Handysize	Bulkers with dwt 10,000 - 39,999	dwt	29	0.61	Bulk Carriers	-
1(10)	Bulker < 10,000 dwt	Bulker with dwt < 10,000	dwt	29	0.61	Bulk Carriers	-
1(11)	Self-discharging Bulkers	Ships that are able to discharge their cargo independently of shore side equipment by way of a gravity or top discharge system, permanently installed in the holds of various types of loose, dry cargo of a homogeneous nature.	dwt	29	0.61	Bulk Carriers	-
1(12)	Woodchip Carriers	Woodchips Carriers generally have six holds to carry woodchips in bulk. These bulk carriers are box-hold, square bottom vessels with wide hatches. Vessel sizes are typically 40,000 dwt to 50,000 dwt, while capacity is measured in million cubic feet. A standard size is usually 3.6m cbm equating to 47,000 dwt. Because of their low specific gravity, woodchips require a relatively large hold capacity. Cargo handling equipment includes an unloading system measured in tonnes per hour.	cbft	29	0.61	Bulk Carriers	-

Table 2: A and B factors based on Worldyards segmentation, as per OECD/Worldyards own designation for subsegments, which are not covered by OECD.

The new system

Two main changes have been made compared to the existing method:

- Instead of a table of cgt coefficients, depending on type and dwt size of the ships, the new calculation is based on a formula.
- Instead of dwt as the base for the choice of the coefficients, the whole system is now based on gt.

The new formula is :

$$cgt = A * gtB$$

Where A represents mainly the influence of ship type, and B is the influence of ship size, and gt is the gross tonnage of the vessel. The A and B values given by OECD as per their very broad segmentation are listed in Table 1.

One would quickly discover that the OECD segmentations are too broad or 'coarse' to be operational, on a micro level, for measurement of shipbuilding capacity and analysis of the orderbook. OECD would point out that the system is made that way intentionally as there was insufficient data to allow the derivation of factors for many ships segments and sub-

segments. In that way, the OECD factors cover a variety of related ship types as a sort of general average. The estimated measures are believed to be within a margin of 15% plus or minus and the system assumes that over or under estimations will be balanced in the aggregate numbers.

Through very detailed studies and extensive consultation with 'experts', Worldyards has developed the market-orientated segmentations as per Table 2. As a commercial concern and taking full responsibility of our interpretations, we compared our practical working segmentation to correspond with that of broad categories as given by OECD (as per Table 1) whenever possible. We marked the Worldyards subsegments - which are not clearly defined under an OECD category - with a '?' sign, and we then designate an OECD category.

The application of the new OECD system is a general guide that is, by definition, open to judgment and debate at the level of application (Worldyards would very much welcome comments at wy@worldyards.com).

We also note that the OECD's scope use of the cgt system, and Worldyards' adaptation, applies to self-propelled seagoing vessels

that meet the IMO definition of a ship. Naval vessels are not covered by this system, and the definition excludes un-powered dumb vessels and offshore installations, such as FSO/FPSOs and jack-ups.

Worldyards has examined at length the prospect for applying a CGT value to offshore projects. Our primary objective was to understand how shipyard capacity might be switched from offshore into commercial shipbuilding or vice versa. Based on our research, we concluded that the offshore industry output is akin to snowflakes; no two projects are alike enough for a standardised inclusion into aggregate measures for capacity or output calculations. In the naval arena, there has been some collaboration between private consultants and western governments. 'Naval compensated gross tonnage coefficients and shipyard learning' was first published by First Marine International in 2001 and then the methodology has been applied in several projects. The naval measure application appears to be primarily for benchmarking shipyard practices and understanding cost increases rather than applying to aggregate shipbuilding capacity of commercial and naval output. ☺



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- +technical assistance in maker selection process
- +technical assistance in documentation approval process
- +technical assistance during construction, dock trials and sea trials of designed object
- +additionally: resin handmade models of designed vessels till 1 m size
- +deck equipment, machinery and piping design, including coordination and material lists



USED SOFTWARE

NUPAS/CADMATIC, AutoCAD, TRIBON, NAPA, NISA/DISPLAY II, NAUTICUS, POSEIDON, RULESCALC, SHIPRIGHT, RHINOCEROS, EXPANDER.

REFERENCES

- + Skipteknik AS, Norway: workshop documentation of research vessels, PSV, Trawler /hull and machinery part. Support in preparation of machinery/piping class documentation.
- + Fjellstrand, Norway: workshop documentation of flying cats/catamarans.
- + Bergen Mekaniske Verksted AS, Norway: workshop documentation, including outfitting 3D coordination for Y160 project (seismic vessel), workshop documentation of hull and Engine Room 3D coordination for Y161 project (ROV/Construction vessel).
- + Gdansk Shipyard, Poland: supervision of hull construction and piping of Y160 vessel.
- + Lloyd's Register: FEM calculation, Napa modeling.
- + Cooperation with Groot Ship Design, The Netherlands: hull outfitting and ER arrangement documentation for general cargo vessel
- + Marin Teknik AS, Norway: FEM calculation, Classification Documentation and workshop documentation hull and piping for soil investigation vessel.



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Norwegian Gem the latest to shine

ON 1 October 2007 Meyer Werft delivered the 93,500gt cruiseship *Norwegian Gem* to Norwegian Cruise Line, in the Dutch port of Eemshaven.

This is the fourth ship out of a series of four the Papenburg shipyard is building for NCL, combining the modern event gastronomy of NCL's concept of 'freestyle cruising' with extravagant interior outfitting.

Some 70% of the ship's cabins are outside cabins, with most of them having their own balconies.

Upon delivery, *Norwegian Gem* left Eemshaven for a mini-cruise on 3 and 4 October, with 1800 passengers onboard. Starting on 6 October, she embarked on a two-night mini-cruise from/to Dover to Amsterdam. On 8 October cruises into the Mediterranean began. In the winter of 2007/2008, the ship will sail to the South Caribbean starting from New York.

The ship was designed in close cooperation with the owner, and was optimised by means of computer calculations and towing tests. Thanks to her slender outlines and podded propulsion system, the 15-deck ship is said to have outstanding manoeuvring and sea-keeping capabilities as well as low noise and vibration levels.

Norwegian Gem is subdivided into seven main fire zones. She has a two-compartment-ship status and has been designed in compliance with the latest IMO regulations. She is equipped with six tender boats, 14 lifeboats, and two fast-rescue



Norwegian Gem, on delivery.



Crystal Lounge onboard *Norwegian Gem*.

boats. Also four marine evacuation chute systems are provided to ensure very quick and safe evacuation in case of emergency.

Power is generated onboard by five diesel generators, each having an output of 14,400kW. The MAN Diesel engines type 12V48/60B can be operated with both diesel and heavy fuel oil. The generators' output (supplier: ABB) is 11,000v, which provides the ship with power for general consumers such as air conditioning system, bow thrusters, and lighting, but also two Azipods having an output of 19,500kW. These Azipods can be turned by 360° thanks to which the ship has outstanding manoeuvring capabilities.

The ship also features an integrated navigation and command system, type NACOS 65-4, made by SAM Atlas Marine Electronics is in use.

Up to 2,700,000litres of potable water per day are produced onboard *Norwegian Gem*. Via three evaporators and a reverse osmosis plant the water is produced. Black water and grey water are reprocessed bio-chemically in a bio reactor and dissipated from the system as service water. The biosludge produced is dried and incinerated in the ship's waste incineration plant.

Norwegian Gem has an interactive antenna network designed in ATM technology with glass-fibre cables and CAT5 cables, enabling the passenger to 'create' his own TV programme (pay-TV, teleshopping etc).

There are 1197 passenger cabins onboard, 405 of which are inside and 792 outside cabins. Various cabin categories are available, among them 44

suites and 132 mini-suites. Two unique suites, each covering 311m², feature their own living room, dining room, and three separate bedrooms, each having its own luxury bathroom.

The cabins are subdivided into inside, outside, and balcony cabins. They have their own bathrooms, colour TV sets, phones, safes, fridges, hairdryers, separate temperature control units, and Internet connections. There are also 27 disabled cabins that vary in terms of outfitting.

All told, the following cabins/suites are onboard:

Garden Villa	2
Owner's/Top-Suites	6
Penthouse Suites	38
Mini-Suites	132
Cabins - Balcony	352
Outside Cabins	235
Disabled Cabins	
- outside (balcony)	12
Disabled Cabins	
- outside (window)	8
Disabled Cabins - inside	7
Inside Cabins	405

The centre of the ship has been christened the Crystal Atrium and Java Café. Meanwhile, the main theatre stretches over three decks (decks 5-7) and is accommodated in the fore ship. Famous Broadway shows, musicals, and plays feature an atmosphere from classical opera house to modern music hall.

One of the main restaurants, located on deck 6, is the Magenta. Next to the 'Grand Pacific' this is the smaller of the two main restaurants and can accommodate more than 300 passengers. Since it is directly connected to the main galley, quick and smooth service is ensured.

The Grand Pacific itself, also on deck 6, has been designed to be reminiscent of the big ocean liners 'back in the good old days'. What makes this restaurant special is the glass-enclosed stem window.

On deck 7 is the Bliss Ultra Lounge, night club and bowling alley. This is the first time ever that four complete bowling lanes have been installed on a cruiseship. The bowling lanes are part of a new, 24-hour Sports Bar and Lounge complex. 

TECHNICAL PARTICULARS NORWEGIAN GEM

Dimension.....	93,500gt
Length overall.....	294.13m
Moulded breadth.....	32.2m
Number of decks.....	15
Draught.....	8.30m
Deadweight.....	7500t
Engine output	totally 72,000kW
	approx 100,000hp
Propulsion power.....	39,000kW
	= 53,000hp
Speed.....	25Kt
Number of passengers.....	2394
Number of passenger cabins.....	1197
Number of outside cabins	
(including suites).....	792
Number of inside cabins.....	405
Crew.....	approx 1100
Number of theatre seats.....	1042
Number of restaurants.....	12
Number of bars/lounges.....	11
Total weight of	
applied paint.....	approx. 220t
Total length of laid cables.....	2154km
Total length of laid pipes.....	212km
Flag.....	Bahamas
Classification.....	Det Norske Veritas
	1A1 "Passenger Ship"
	ECO CLEAN

Floating solutions for hard to get LNG

THE details may be scant, but the drive to capture what have to date been inaccessible gas resources is creating a new breed of floating storage and production vessel, dedicated to gas instead of oil.

In January 2004, Single Buoy Mooring Offshore created a 'Gas and Power' division to develop technology for the offshore production of Liquefied Natural Gas (LNG) and the infrastructures to handle the liquid gases from the production sites to the delivery points.

Several projects have since been initiated and they include the development of products to transfer liquefied gases in open sea such as tandem and side-by-side berthing systems for gas carriers, cryogenic swivels, a LNG floating hose solution, and a zero emission air vaporisation system to regasify LNG at the end delivery point.

The single most important project and the one which could significantly impact the future profile of SBM Offshore is the LNG FPSO; a means to develop, in a cost effective manner, gas reserves that were previously perceived as being either stranded (remotely offshore) or impractical or uneconomic for a development by means of traditional schemes (pipeline export or onshore liquefaction).

The significance of providing a solution for floating liquefaction of natural gas is that the industry may look again at the way it values gas assets.

Many players in the industry, including national and international oil and gas companies, utility companies, and others are now highly interested in the LNG FPSO. Although most components are already in service in the industry, such a vessel is technically quite complex and capital intensive.

In order to shorten the design and delivery cycle time, SBM has formed a strategic partnership with Linde A G, a leader in gas processing and liquefaction technology with significant 'build, own, and operate' experience in cryogenic gas plants. In liquefaction technology, Linde has already delivered a 35,000tonne barge - mounted liquefaction unit for Statoil's LNG Snøhvit project in the Norwegian Arctic Circle.

Linde and SBM have reached the stage where they consider the LNG FPSO ready for marketing and its definition sufficiently accurate to establish the cost and delivery time.

For the hull, which is a major critical component of the LNG FPSO, after evaluation of the technical options available, the self-supporting prismatic-shape IMO type B (SPB) LNG tank technology has been retained for the storage of liquefied gas. This technology isolates the tanks from the ship's interior using supports, as opposed to conventional prismatic membrane that are dependent on the structural strength of the vessel. IMO Type B is a standard that specifies the secondary layer between the liquid cargo and the hull, reducing the risk of leakage should cracking occur.



Concept for a new type of FPSO, dedicated to gas instead of oil.

The choice was said to have been driven by considerations such as accessibility for maintenance, robustness, and therefore long-term offshore life availability.

This hull can also be adapted to suit the requirements for floating storage and regasification units (FSRU) for which demand is expected to grow with the LNG market.

An agreement has now been signed between SBM and IHI shipyard of Japan, for the detailed engineering and the further construction of LNG hulls. SBM has funded IHI to develop the basic design of a 230,000m³ multi-function hull for a LNG FPSO.

The long-term agreement provides that IHI offers its construction capacity at the Aichi Works for an early project, and it binds the parties in an exclusive manner under certain conditions.

The global marketing efforts started in earnest in September, on the basis of the proposed schedule to commence production of gas from the first unit in 2012.

SBM among other things is contributing marine technology including hull and LNG storage tanks system, power generation system, the mooring system, cryogenic offloading systems, and FPSO operational experience.

The Linde Multi-stage Mixed Refrigerant (LiMuM) process has been selected for the liquefaction system based on its thermodynamic efficiency, robust design, compactness, and proven performance.

The FPSO facility will be able to treat, fractionate, liquefy, store, and export the LNG as well as any byproducts from the gas field production such as LPG and condensates. The nominal size of the developed facility provides an output of 2.5 million tonnes per year of LNG which, therefore, is typically

suitable for fields in excess of 1 trillion ft³ recoverable gas reserves. The comprehensive topside design will enable the process of almost any natural gas composition.

Linde and SBM said that they were confident that there would be strong upcoming demand for this type of facility.

For SBM Offshore, the objective of this LNG FPSO initiative is to place the Dutch public company as a pioneer in this market and to maintain a leading position in the long term, in the same way as it did in the crude oil FPSO lease and operate segment where it is still today the largest player.

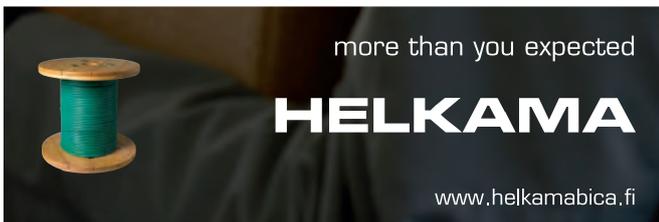
Linde said its contribution of the FPSO topsides would include gas pretreatment, C3+ fractionation, and natural gas liquefaction based on its proprietary LiMuM system. The company said that the integration of multiple large and heavy process modules with the hull structure and on a limited deck space required innovative solutions. LNG processing, utility supply, cryogenic offloading, and mooring systems had been designed to reliably operate under severe marine conditions and with minimal maintenance.

Aldo Belloni, member of the Linde Executive Board said: 'The newly formed Global Alliance with SBM is targeting the market of floating LNG facilities, which shall enable the exploitation of offshore fields, either too remote or too small for a conventional base-load approach. Furthermore, Linde Engineering aims to be a front runner in the field of marine-based industrial-chemical plants and this first application fits ideally into this strategy.'

It is Linde and SBM's intention to sell LNG-FPSOs turn-key or to offer liquefaction services in a build-own-operate model to the LNG industry. 



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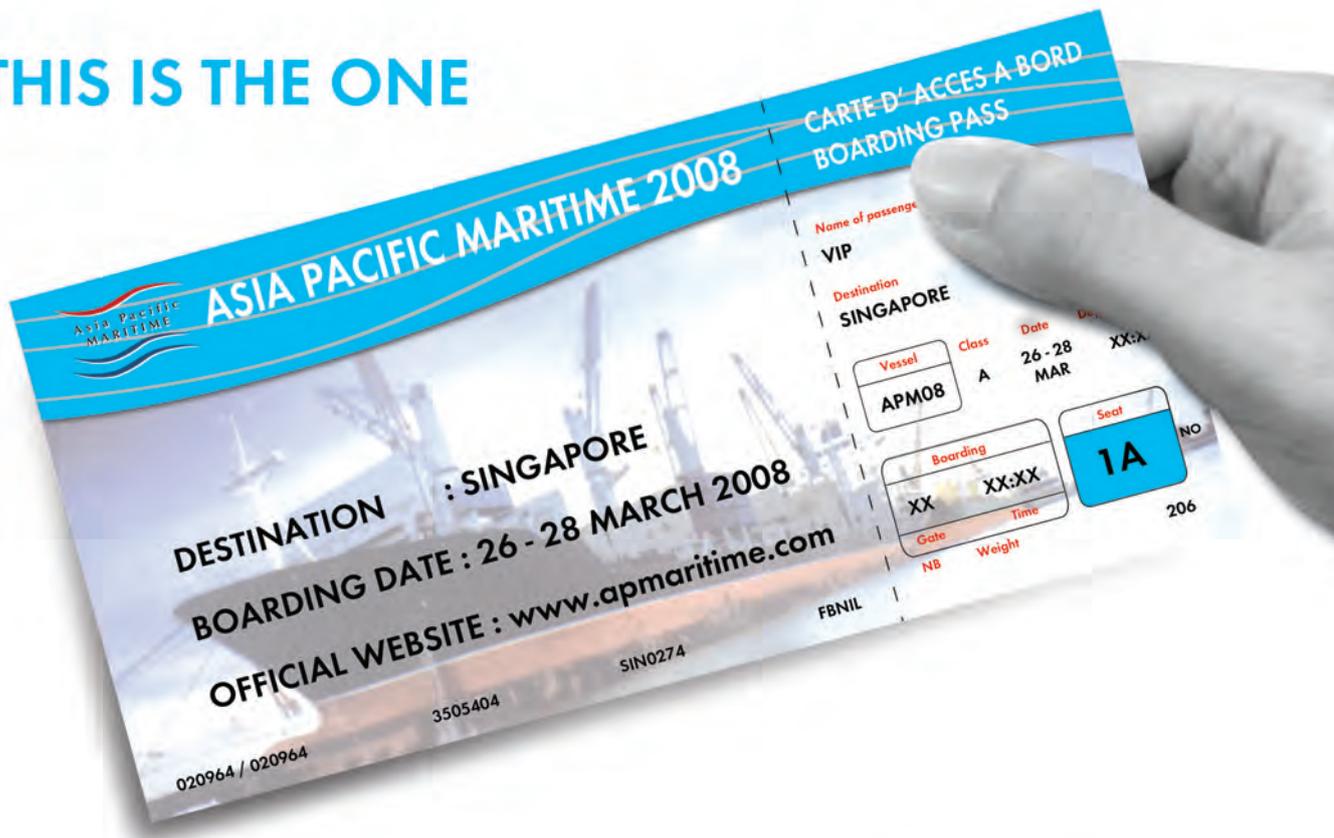
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Testing tank whips up hydraulic storm

THE advanced simulation requirements now demanded by the marine industry have been demonstrated by Moog Controls' recent supply of an advanced hydraulic technology to MARINTEK, the Norwegian Marine Technology Research Institute, located in Trondheim, Norway.

One often overlooked aspect of the current shipbuilding boom is the fact that there is huge demand for model testing facilities capable of running highly accurate and reproducible tests. MARINTEK offers one of the biggest ocean-basin laboratories in the world. 80m long, 50m wide, and an adjustable depth of 0m to 10m, it recreates sea conditions using an array of flaps – two on the end and 144 single flaps along its length. In addition, the basin is equipped with a carriage system that caters for free-running models at speeds of up to 5m/s, at any angle to the waves.

MARINTEK chose Moog as its partner to upgrade the Ocean Basin, built in 1981, with new technology, the aim being to make the system more robust and more reliable, but also to provide enhanced capabilities, such as larger waves over a wider area of the basin, and more directional flexibility. The most important driver for the upgrade was the need to increase overall performance. Indeed, an accuracy of 0.1degs for all flaps was requested to guarantee the creation of highly reproducible waves with a height of up to 0.4m as little as every 1.6 seconds.

Another major requirement was the capability to self-monitor – taking into account not only the cost-per-hour, but also the impact of the test results obtained on human safety and the investments required to build the resulting ships and platforms. The solution had to integrate into the existing environment, especially the waveform computation system and measurement equipment, while also offering flexibility to cater for future expansion. Due to the existing 700kW hydraulic infrastructure, a hydraulic solution was the obvious answer.

The solution supplied by Moog comprises 144 hydraulic cylinders, each controlled by a D636 Axis Control Valve (ACV) – a servo valve with axis control capability. With the position sensor of each cylinder being connected directly to the servo valve, the D636 closes the position loop and offers additional features such as self-monitoring of the control loops and the position sensor.

Each group of 12 ACV servo valves is connected via CANopen to a Moog Servo Controller (MSC), a freely programmable

Model testing at the Ocean Laboratory, Marintek.



The Moog solution for Marintek comprises 144 hydraulic cylinders, each controlled by a servo valve with axis control capability.

motion controller with multiple interfaces such as CANopen, Ethernet, and Profibus-DP. The MSC offers two independent CAN interfaces, each controlling six valves. The 12 MSCs are connected to the waveform computation system, distributing the set points and the actual position and status information from each valve. In addition to the hardware, the Moog Axis Control Software (MACS) – an IEC 61131-compliant development environment – was used to create the application programs.

Initially, a test system comprising one hydraulic cylinder, a position sensor, an Axis Control Valve, and a MSC controller was installed to verify the calculated accuracy and dynamics. Subsequently, with the results fulfilling all requirements, the upgrade of the whole basin commenced.

In total, 12 cabinets were installed along the length of the basin; each containing one MSC, connected via CANopen to 12 D636 Axis Control Valves. Due to the use of a fieldbus, the installation effort was surprisingly low considering the number of

devices and the physical size of the system. Indeed, CANopen was selected because of its multi-master capability, its flexibility, and functional safety.

'The biggest surprise for me was how easy it was to program this system with all the 144 axis,' said Frank Andersson, senior engineer at MARINTEK. Mr Andersson was involved in the software development from the start of the project, as he wanted to be able to extend the system by himself in the future.

As a result of the upgrade, the usable length of the basin for wave testing has been increased – thanks to the accuracy of the flapper movement – a major advance for testing high-speed ships and ferries as the number of test sequences can be reduced.

With the advanced feedback capabilities now available from Moog's ACV range, designers and engineers no longer have to trade force for accuracy and vice versa. Moog's servo valve capabilities are well known throughout the industry and this new technology only serves to reinforce the company's position within the hydraulic market. 

Welcoming a new Royal line

ROYAL Niestern Sander unveils its latest multi-purpose cargo ship.

THE recently inaugurated newbuilding hull number 834, *Lauwersborg*, is the first ship of a series of four from Royal Niestern Sander, Delfzijl, for Wagenborg Shipping, Delfzijl, featuring a forecastle, raised quarter deck, and deckhouse.

The yard has made extensive details available of the new vessel, which is to the 'KNS MP7350' design, and represents a lengthened version of the yard's KNS MP6100 design. It features two cargo holds, enclosed by a double hull construction and covered by weather-tight pontoon type hatch covers.

The design and equipment of the gearless vessel complies with:

- the requirements of The Netherlands Shipping Inspectorate (NSI) for unrestricted trading
- GMDSS A3 radiotelephony requirements
- Bureau Veritas rules and regulations
- Finnish/Swedish Ice Class 1A
- Saint Lawrence Seaways regulations.

The ship has been designed and built by Royal Niestern Sander in cooperation with various subcontractors.

In this design, the fore ship accommodates the forepeak, bow thruster room, a deep tank, and chain lockers. The forecastle space is situated above the forepeak and deep tank. The bow thruster room is situated between forepeak and deep tank, with a casing to the forecastle space. In the forepeak tank, two sufficiently large self-stowing chain lockers are located. Forepeak and deep tank are utilised as ballast tanks.

The double bottom construction and side tanks run the entire length of the hold area. The tank top is fitted to the shell. The main deck extends from the superstructure to the forecastle.

The aft ship accommodates the engine room including service tanks and aft peak. The upper aft peak is used for water ballasting purposes. The engine room features service tanks in the double bottom section and underneath the platform deck. Side tanks are partially situated above the platform deck. Freshwater tanks are situated in the aft off the engine room.

The superstructure is situated above the engine room section. The main deck accommodation spaces include a cook's cabin, the mess room, the galley, a changing room, a laundry, and a provision store. Complementing spaces on this deck are separated by watertight bulkheads. These spaces include the emergency generator room, the steering gear room, an AC room, a CO₂ room, and a store with workshop facilities.

Heating and ventilation of the accommodation is with a single-duct air conditioning system.

On the raised quarterdeck level, the three-tier deckhouse provides a captain's cabin, a chief engineer cabin, a first mate cabin, four crew cabins, one double crew cabin, a technical space below the wheelhouse, and an office. All



Lauwersborg - the first ship of a series of four multi-purpose cargo ships from Royal Niestern Sander, Delfzijl, for Wagenborg Shipping.

cabins are fitted with private sanitary units. The carpentry has been designed and installed by Royal Niestern Sander's carpentry department.

Aft of the deckhouse, the boat deck has been extended to create space for placing the MOB boat and liferafts, and the Officers' deck has been extended to create space for the embarkation platform towards the FFB.

The funnel is separated from the deckhouse and placed at centreline aft of the deckhouse. On the raised quarter deck, this structure provides a large store room on PS, a deck store on SB, and entrances towards the engine room, emergency generator room, and CO₂ room.

On the raised quarter deck, the accommodation ladder ship's entrance and the access to the main deck can be closed by means of a gate during stays in port. This makes the aft ship not accessible without permission. The ISPS required guard could therefore be replaced by an intercom/telephone connection towards the watchman onboard.

The close cooperation between Intersona, Royal Niestern Sander, and other subcontractors has resulted in a very comfortable accommodation area. Noise and vibration levels are far below the IMO regulations and ISO 6954:2000 guidelines.

Lightweight structure

In order to reduce the total weight, the vessel has been built partly of AH36 steel, allowing a maximum loading capacity.

The amidships double bottom features a tank top of 15mm thick steel plate. The double bottom is constructed with longitudinal frames and longitudinal frame spacing of 650mm. The bottom is strengthened with floors on every second frame and longitudinal girders as the boundary. Between these girders, longitudinal flatbars and HP profiles are fitted. The complete construction makes the vessel feasible for heavy cargo of 15tonne/m².

The side tanks are constructed with longitudinal frames and web frames. An ice-framing belt of longitudinal frames stiffens the shell. The fore ship is built with transverse frames with stringers in the forepeak. The bow thruster tunnel is incorporated into the shell and the centreline girder. The decks and the stringer deck are stiffened with cross beams

and longitudinal girders. In the fore ship and the aft ship a gradual transition from the longitudinal frame system into the transverse frame system has been made. The deck is also stiffened with longitudinal frames and the aft ship is made with transverse frames.

The reported excellent performance during ice navigation is obtained by the special shape of foreship and bulbous bow. The transom stern and the stem are locally reinforced to cope with push-tow services by icebreakers.

The stern includes a stern anchor for the Saint Lawrence Seaways. In the aft peak a 50mm thick ice knife has been incorporated in the construction, protecting the rudder. The decks are stiffened with cross beams and longitudinal girders.

The deckhouse is constructed with transverse frames with decks supported with longitudinal girders and stiffened with deck beams.

The vessel features two box-shaped cargo holds and is also geared for the transport of several classes of dangerous goods. The cargo holds are therefore equipped with:

- an explosion-proof mechanical ventilation system (six air changes per hour);
- ventilation ducts fitted to the bottom of the holds;
- a fixed manually operated CO₂ fire-fighting system fitted in the cargo hold;
- a fixed sprinkler system in the first two hatches of hold 1;
- separating bulkheads;
- a hold bilge system according to the rules of The Netherlands Shipping Inspectorate (NSI) for dangerous cargo with a dedicated ejector.

The non-explosion-proof equipment in the cargo holds can be switched off totally by means of a key switch in the bridge console. The coamings are fitted with coaming support lashing plates for fastening deck cargo. The hatch covers can also be fitted with timber stanchions on each side. In the side/wing tanks, flush mounted lashing eyes are fitted.

For bulk cargo stowing purposes two transverse grain bulkheads are fitted in the holds, each existing of two parts. The bulkheads can be fitted at several positions in each hold. Both holds are mechanically ventilated with a maximum capacity

of six air changes per hour on an empty hold. The holds are ventilated with two pressure fans each. In the midship on top of the bunkertanks, two hold dehumidifiers are also positioned.

The ventilation ducts on the midship are temporarily removable for the carriage of project cargo which exceeds the length of one hold. This construction makes the ventilators very easily accessible for maintenance.

Propulsion plant

The propulsion plant incorporates a medium-speed MAK 9M25C main diesel engine developing 2970kW at 750rev/min. The main engine has been resiliently mounted and runs on 380cSt heavy fuel oil. The main engine is fitted with a Flender Bruinhof reduction gearbox. The gearbox is fitted with a PTO drive for the shaft generator. Main engine, reduction gearbox, CP propeller, and generator are directly coupled without clutches. The propulsor consists of a Wärtsilä Lips, four-blade CP propeller featuring a diameter of 3400mm.

The main engine is equipped with a HT and a LT cooling water system, incorporating box coolers. In the HT system a heat exchanger and a circulating pump have been integrated for preheating the main engine. In the HT system a heat exchanger has been placed for heat recovery. Especially for the heating of the bunker tanks, a dedicated hot water system has been installed, which derives its heat from the cooling water system from the main engine during sailing operations.

The wheelhouse, situated on top of the deckhouse, is equipped with a complete Imtech Blueline integrated bridge system based on a three

work station system with full Radar, Ecdis Conning, and Heading pilot. The complete navcom package is supplied and installed by Imtech/Radio-Holland Netherlands. For the equipment, the owner, yard, and Eekels have designed a special ergonomic wheelhouse console built by Eekels.

The steering equipment consists of a Bot rudder in spade design, handled by a frequency controlled-type steering engine. The maximum rudder angle is 60° to either side. The rudder is controlled by a Rolls-Royce Tenfjord SR 722 steering gear. The steering gear is frequency controlled. The pump unit can be remotely started and stopped from the bridge. It can also be switched on with starters fitted on the steering gear. The steering gear can be controlled by means of the non follow-up tillers situated on the bridge and in the bridge wings, and from the autopilot. Switch-over between the three tillers and the autopilot is by means of a switch on the bridge panel. Emergency control of the steering gear is in the steering gear room, direct on the directional valves.

The fitting of a transverse bow thruster tunnel, from Veth, enhances manoeuvring capacity at slow speed with a 1200mm diameter fixed pitch propeller. The 350kW Veth bow thruster unit is electrically driven by frequency control. The bow thruster unit, powered by the shaft generator, is frequency controlled from the bridge. The installation is also equipped with a remote control system from the bridge and bridge wings, and with manual emergency controls fitted directly on the main engine.

Auxiliary power is derived from a Stamford shaft generator type HCMF, power output 510kVA, and two diesel driven generators. The PTO of the reduction gearbox drives the shaft generator. The two auxiliary generator sets are placed in the engineroom and consist of 200kW Sisu 645 DSBIG diesel engines, with Leroy Somer generators, and a power output of 231kVA. In the emergency generator room a 110kW Sisu 620 DSRG emergency diesel engine drives a 120kVA Leroy Somer generator. The gensets are equipped with a stand-still heating system.

The electrical installation consists of the following mains:

- 3-phase 400 VAC, 50Hz, for power supply;
- 3-phase 230 VAC, 50Hz, for lighting, small systems, and emergency systems;
- a 24 VDC circuit for instruments.

In case of a 'black out' of the shipboard power mains, the 230V emergency lighting will be automatically switched on. It will be switched off automatically as soon as the onboard power supply returns on-line.

The complete electrical installation was supplied and installed by Eekels Elektrotechniek. Eekels Elektrotechniek's scope of supply included: switchboards, control desks, alarm and monitoring systems, frequency controlled bow thruster motor, all lighting fixtures, a PA/General Alarm system, an emergency telegraph system, fire detection system etc. 



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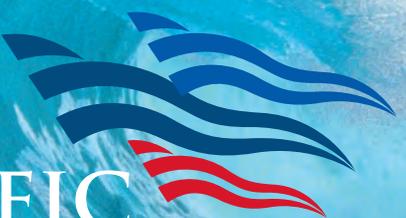
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Rolls-Royce signs £24m heavylift contract

ROLLS-Royce has signed a contract with RSE Shipping, of Singapore, covering the supply of integrated equipment systems for four large heavylift vessels.

The 45,000dwt heavylift vessels are of the Polarconsult PK148 design, and will be built at two unspecified Chinese shipyards, one in Wuhan and the other in Zhejiang province, subject to the yards attaining refund guarantees.

Although mainly intended for shipping wind turbine parts, the ships will be equipped with cranes to allow them to move other heavy cargo, especially as return loads.

For Rolls-Royce, the contract is worth about £24 million. In addition, there are options for systems for a further eight vessels, which could triple the order value.

SE Shipping is affiliated to, but independent of, Suzlon Energy, in India, one of the world's largest suppliers of wind turbines. The company will use the vessels primarily for transporting wind turbine components worldwide.

'This contract is a very important one for us,' said Birger Myklebust, president for Rolls-Royce's marine merchant business. 'It is a good example of the way in which the relationship between shipowner, supplier, and shipyard is changing.'

'Partnership with large equipment system suppliers such as Rolls-Royce gives customers



SE Shipping's concept for 45,000dwt heavylift vessels, to be built in China.

the opportunity to increase effectiveness, make better use of new technology, and achieve a better division of risk.'

From the autumn of 2009, Rolls-Royce will start a delivery programme of diesel

engines, controlled pitch propellers, tunnel thrusters, generator sets, steering gear and rudders, deck machinery, integrated bridge switchboards, and automation as an integrated system. 

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Hanjin readies for Subic lift-off

TRAILED to become the 'fourth largest shipbuilding facility in the world', Hanjin Heavy Industries' new yard in Subic Bay, The Philippines, is approaching its first phase of operations.

With activities at its Youngdo yard, near Pusan, subject to space constraints, Hanjin decided in March 2006 that its ambitions to grow would be best served by expansion overseas. By the end of 2007, the first of a planned pair of drydocks at an independent subsidiary Hanjin yard at Subic Bay will be complete.

The shipbuilder said that it had already optimised productivity in Youngdo, noting that where a 3400TEU capacity ship under construction would have occupied the dock for six weeks one year ago, that period has now been brought down to 40 days. However, in fostering expansion plans, it had concluded that building a new yard in Korea would be costly in terms of land price, while Korean-based shipyard workers would also be hard to find, and expensive.

Drawing on its 30 years of experience working in The Philippines in the civil engineering sector, an operation which had garnered good relations with government agencies, Hanjin was offered tax and other incentives to bring its design, shipbuilding, and sales prowess to the country.

The result is a US\$700 million commitment (so far) to complete a 230hectare shipyard complex at the Subic Bay Freeport Zone in Zambales by 2010. Dock 1 at the new facility will be 380m long by 100m wide, with first steel cutting expected to take place in March 2008. Discussion is still continuing over the dimensions of Dock 2, where delivery of the first of eight 12,800TEU capacity ships for NSC Schiffahrtsgesellschaft is due to take place from late 2010 onwards. Current thinking is that it will be larger, at 480m long by 135m wide.

Having started from scratch in The Philippines, Hanjin's new yard will be state of the art, with two 600tonnes cranes for each drydock and straight-line production from the outset. So far, 1500 local workers have been taken on, but this figure is set to rise to 10,000 by 2010, and to 20,000 by 2012.

While productivity levels are not expected to match those achieved in Korea for some time after start-up, Hanjin said that the cost of workers in The Philippines amounted to between one eighth and one tenth of those incurred by its home-based operations. It said that this figure was to be contrasted with costs incurred by contemporaries preferring to expand capacity through investments in China, where labour costs were already approaching one third of that experienced in Korea.

At time of writing, Hanjin already had 36 ship orders for the still under construction facilities. Alongside the eight mega containerships for NSC, 12 Panamax class containerships are on order for a variety of owners, as well as 10 x 3600TEU capacity boxships, two Aframax tankers, and four Capesize bulk carriers.

For the moment, Hanjin said it was focusing on turning 'conventional' vessels out of Subic Bay, although a spokesman hinted that senior managers were looking for opportunities for both docks in the field of gas tankers and floating production storage and offloading vessels.

Meanwhile, operations at Hanjin's homebase at Youngdo are currently focused on the money-making containership segment, where the Korean yard is turning out 3400TEU-6500TEU capacity ships on a series basis, while also offering ships of up to 8100TEU capacity. For example, the yard is eight ships into an 11-ship deal to supply 6250TEU capacity vessels to A P Moller.

Hanjin's spokesman said the yard saw no signs of an end to booming orders for containerships, into 2012 and beyond.



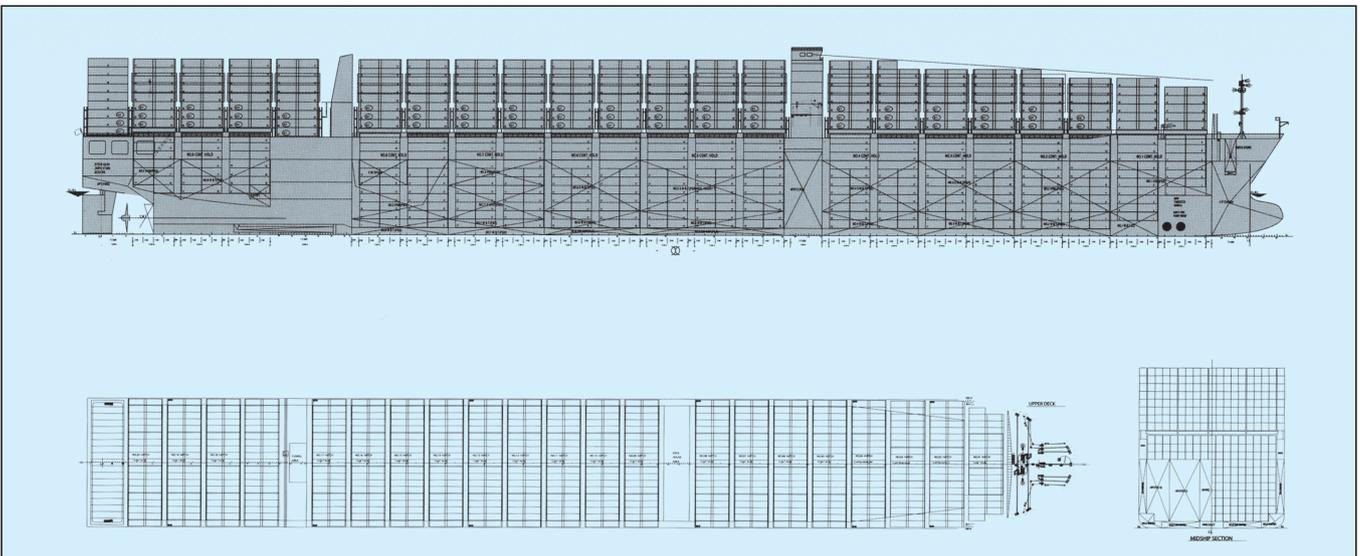
The Olongapo Skills Training Centre at West Bajac-Bajac, Olongapo City – part of Hanjin Heavy's commitment to training for its new Subic Bay shipbuilding complex.

However, it also has two 153,000m³ capacity liquefied natural gas carriers for Kogas. The first is due to be delivered in December 2008 and will be powered by steam turbines, while the second - due delivery in December 2009 - will be powered by dual fuel technology.

Longer term, the plan is to focus the Youngdo operation on more value-added tonnage. The yard said it was currently working on a ground-breaking, US\$200m-plus order to build two 120m-long dive support vessels for United Arab Emirates-based shipowner Gulmar. This is the first time that a Korean shipbuilder has received an order for a DSV from a foreign shipping company.

The 6200dwt, 115.4m-long by 22m-wide vessels will be multi-purpose operation support vessels for offshore underwater oil well operations. They will offer space for 120 crews and be able to support underwater construction up to 600m in depth. Each will also include its own decompression chamber for deep-sea divers, a 140t marine crane, and a helicopter landing deck. Hanjin was also recently contracted by Korea's Ministry of Maritime Affairs and Fisheries to deliver the first domestically-built ice breaking oceanographic vessel.

12,000TEU-plus class post-Panamax container carrier to be delivered by Hanjin Heavy from Subic Bay.





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Hyundai Heavy builds them bigger and better

PREVAILING bullishness among the elite of the shipbuilding world does not mean that yards can afford to overlook the need for continuous development in production and design.

Uptake of larger containerships could lead Hyundai Heavy Industries to reconsider the way it builds its hulls, for example, according to Chul-Hee Lee, HHI senior vice president, project planning office, shipbuilding division, containership production.

Containership demand has been growing fast and now represents over 50% of the output from the world's largest shipbuilder. Liquefied natural gas carrier and liquefied petroleum gas carrier production represent the next largest share of production, and is running at around 20%-25% of HHI's output, with tankers and other ships, such as bulk carriers, behind.

Mr Lee said that, until 2006, a capacity cap of around 10,000TEU had applied, but that the release of information by authorities controlling the Panama Canal over their expansion plans for 2015 had unleashed a surge in orders for bigger ships.

HHI had signed an order covering nine 13,600TEU capacity ships with German owners whose eventual dimensions were yet to be determined.

Meanwhile, in September, Seaspan Corp ordered eight 13,100TEU vessels after inking \$1.29 billion worth of deals with HHI and Hyundai Samho Heavy Industries Co. The vessels will be delivered between January and October, 2011.

Although the length for a 13,000TEU plus ship had been set at 350m for the Panama Canal, and depth at 30m, some discussions are apparently still ongoing over whether the beam would have to be 49m, or could be 51m, which was dependent on the transit arrangements envisaged for the newly

widened Canal. A 51m beam would mean capacity being considered on the basis of 14tonne container loads per TEU, while a 49m beam would mean the same capacity, but a lower tare weight.

Mr Lee said that, from the structural point of view, the gap between 10,000TEU and 13,600TEU did not entail any great change in thinking. However: 'These days, if possible, we would like to reduce the number of pieces included in order to improve productivity. For example, the conventional frame space is 3.6m, but if you can increase that to 4.5m then you can reduce the number of pieces. This is achieved by increasing the thickness of the frame, which can be a more economical solution and depends on ship size. This also requires increased plate thickness, so the overall weight of the hull increases, but the number of pieces is reduced.'

Mr Lee said that HHI already had a 15,000TEU containership design finished, but that uptake for such a ship would be governed by the availability of ports able to handle such tonnage.

He said that HHI was also forging ahead with new designs for other types of vessel. Earlier in the year, the yard delivered *British Emerald*, the first LNG carrier to be built in Korea to feature diesel electric dual fuel propulsion (see *The Naval Architect*, July/August 2007, pp8-10).

'We are very proud of our production,' said Mr Lee. 'After Chantier de l'Atlantique, we are the second in the world to deliver such a ship, and the first in Korea. When we started this project we were quite concerned about the sophistication of the control system, but it has proved very successful, with the assistance of BP and our suppliers.'

'Up to last year, we had only ever delivered LNG carriers that featured steam turbine propulsion, but

now we have delivered the diesel electric solution and we have just named the first Q-Flex vessel, featuring low-speed diesel in combination with reliquefaction plant.'

In the last case, Mr Lee was referring to the 9 September naming of *Al Gattara*, the first of HHI's 216,000m³ Q-Flex vessels to be named for Overseas Shipholding Group, in a ceremony that beat counterparts at Samsung Heavy Industries by just two days. This vessel is the first in a series of four sisterships to be delivered to OSG Nakilat, the joint venture between OSG and Qatargas Transport Company (Nakilat). *Al Gattara* will be delivered by the end of October. The second ship in the new fleet, *Tembek*, was christened on 11 September at Samsung Heavy Industries in Geoje Island, South Korea (see pp34-39).

This new generation of LNG vessels has significantly lower energy requirements than conventional LNG vessels due to economies of scale created by their size and the efficiency of the engines. Meanwhile, this is the first-of-its-kind onboard reliquefaction plant (from Hamworthy), which cools boil-off gas and converts it back to liquid for return to the tanks. Safety features include redundant systems such as dual propellers and rudders and environmentally friendly, low-emission electronically-controlled diesel engines.

Mr Lee said it was a matter for owner preference as to whether to choose the diesel electric or the low-speed diesel/reliquefaction plant solutions. It depended on the route where vessels were deployed. For example, if the route were to be Australia to Japan, or Nigeria

How to build ships at the world's largest shipyard.





LNG carriers from HHI – the first Korean yard to deliver dual fuel and slow-speed diesel/reliquefaction plant solutions.

to Europe, there would be few bunkering ports in between, suggesting that using boil off gas to power the dual fuel engine might be preferable. On the other hand, if the route were to be Qatar to Europe or the USA, the high availability of bunkering ports might point towards the low-speed diesel solution and the maximisation of the LNG delivered.

But, while mainstay products such as containerships and LNG carriers may dominate the turnover of HHI today, even this largest of shipbuilders is taking steps to add product offerings to its portfolio.

Mr Lee said the shipbuilder would look to enter the shuttle tanker market this year, with its eyes on ships of Aframax and Suezmax sizes. ‘We have to

deliver 80 ships per year with the same number of designers and so standard vessel types must be the majority of our workload.’

However, this does not mean that the shipbuilder is not seeking different design opportunities.

In September, GlobalSantaFe Corp ordered what will be HHI’s first drillship, with the ultra-deepwater exploration and development vessel due for delivery in September 2010. Shipyard construction costs are expected to total approximately \$740 million.

The drillship will be constructed in Ulsan, Korea, under a turnkey agreement, which provides that HHI will contract directly with equipment suppliers. The new vessel is an enhanced version of GlobalSantaFe’s GSF C.R. Luigs and GSF Jack Ryan drillships, which entered service in 2000. Like those rigs, it will be capable of drilling in water depths up to 10,000ft and is upgradeable to 12,000ft. In addition, the new rig will feature advanced dynamic positioning capabilities, triple activity load paths, a derrick rated for 4 million pounds, dual liquid-storage systems, larger quarters, and an efficient deck design that provides significantly more space than previous-generation drillships.

HHI, like many of the larger yards, has also been in protracted discussions over the possible future delivery of floating storage and regasification unit vessels (FSRUs).

Mr Lee said that the yard had basic designs that covered both a membrane containment solution for benign seas and a Moss-type storage solution for rougher conditions, but that only preliminary interest had been forthcoming from owners. ☺

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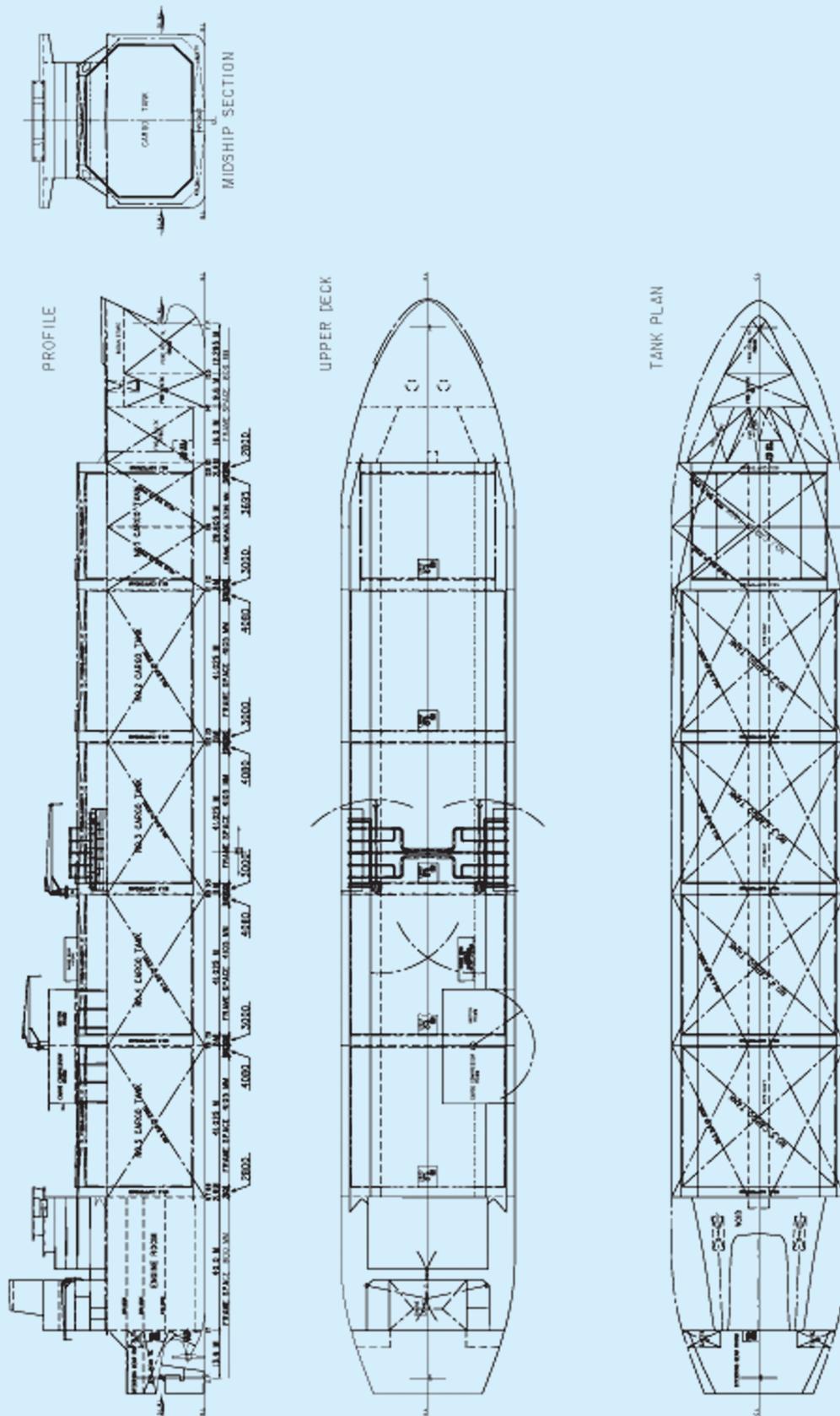
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General arrangement plan for a 216,000m³ capacity LNG carrier.



Hyundai Mipo on the march

MANAGEMENT at Hyundai Mipo Dockyard are pushing forward with ambitious plans to boost productivity. With no berths available until the first half of 2011, the yard has, like its peers, been enjoying the shipbuilding boom.

Turning out an impressive 66 ships in 2007, against 60 ships in 2006, HMD has focused on high productivity by offering a standard range of ships. It can deliver product and chemical tankers of between 13,000dwt and 75,000dwt, but in 2007 has delivered only 37,000dwt and 46,000dwt versions. One third of its output has been given over to containerships, where it offers 1800TEU, 2800TEU, 3500TEU, and 4300TEU standard varieties. In the latter market, the yard claims to be market leader.

HMD said that it saw significant order potential for gearless containerships of around 2000TEU capacity. It recently adjusted its 1800TEU capacity geared ship design, taking away the cranes and making slight modifications to the deck area in order to snaffle an eight ship order from a German owner, with delivery due in 2009-2010. The yard anticipates strong demand for this high value (\$48m) ship type next year.

In 2008, the plan is to push productivity up to around 70 ships while, in 2009, 73-74 ships are envisaged. In 2010, the target is 80 ships.

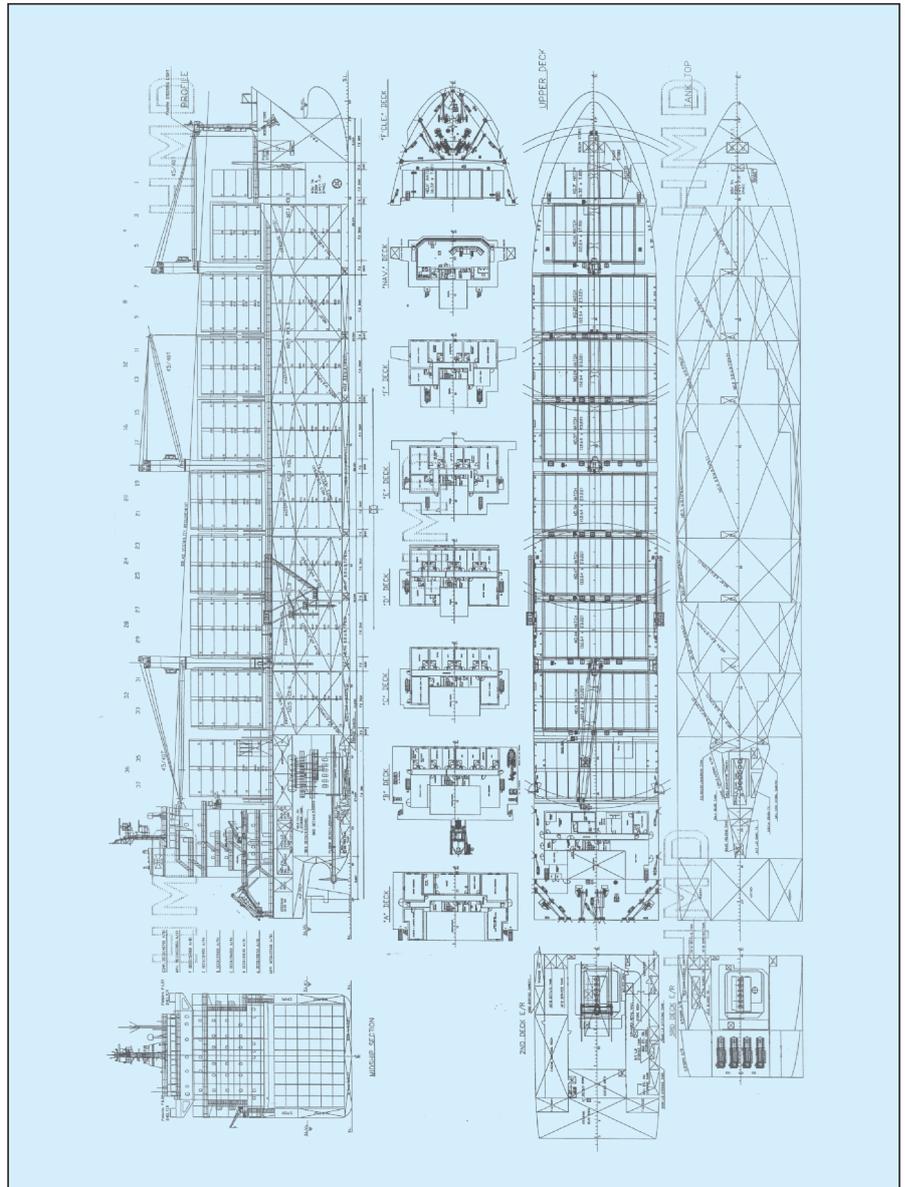
However, HMD has recognised the coming threat of competition for its bread and butter tanker business from China and, with such production ambitions, it has looked to diversify into other ship types.

It has won available orders for 12 liquefied petroleum gas carriers, four of which are of 35,000m³ capacity (for Eletson Holdings) and the other eight of which are semi-refrigerated and are of 20,600m³ capacity (three for Zodiac Maritime, three for A P Moller, and two for Bernhard Schulte). All of these ships are being classed by Lloyd's Register and are for delivery between the end of 2008 and the end of 2009.

While new refining capacity coming on stream points to further uptake of this specialised ship type, HMD said that the market for LPG carriers was currently 'on hold'; all the more reason, then to savour the shipbuilder's resounding entrance into the ro-ro and pure car and truck carrier market in 2007. Already it has secured orders for 20 PCTCs, of either 3500 unit or 6500 unit capacity, and 15 ro-ro ships. Car carrier orders have come from Ray Shipping (6500 unit capacity), Vroon, and Neptune Lines (3500 unit capacity). All of the ro-ro ships are for Grimaldi, with five being 24,400dwt container/ro-ro ships and 10 being smaller pure ro-ro vessels.

The 10,900dwt, 3500 unit PCTC is a 168m long ship, with a beam of 28m and a depth of 30.65m. It features a car deck area of 31,000m² and is driven by a MAN Diesel 7S50MC-C engine generating 11,620kW to achieve 19.6knots.

The larger 20,700dwt, 6500 unit capacity ship is 199.99m long, 32.26m across the beam, and



General arrangement plan for a 1800TEU capacity geared containership from Hyundai Mipo Dockyard. The design has been modified as a gearless ship, in order that HMD can quickly offer a 2000TEU capacity vessel.

35m deep. With 55,000m² of car deck, this ship is driven by the 7S60MC-C engine, generating 15,820kW, to achieve 20knots.

Grimaldi's 24,400dwt class container and ro-ro vessel is 210m long, 32.26m across the beam, and 34.2m deep. It features a car deck area of 37,700m² across 12 decks, and is driven by MAN diesel 8S60MC-C engines, generating 19,040kW of power, to achieve 20.9knots. Details of the other ro-ro design for Grimaldi remained unavailable.

With the exception of the ships for Neptune, all of these vessels will feature fixed pitch propellers. In view of its need to operate in the Mediterranean, Neptune has preferred a controlled pitch propeller solution.

Korean shipbuilders have dabbled in the ro-ro market before, but will generally smirk if

asked whether they made any money doing so. Now, though, at a time when the car industry's appetite for new tonnage remains undimmed, HMD points out that operational ro-ro tonnage is getting older. Both factors have obliged shipowners to accept higher build prices, at a time when slots are scarce for other reasons.

According to a spokesman: 'Last year we had long discussions with one owner over the construction of 3500 unit capacity PCTCs but, because of the price gap, we didn't secure an order. This year we have succeeded. We think that demand for ro-ros and PCTCs will continue to grow. More cars will need to be shipped and people in India and China will become wealthier. This is a market that is not 100 ships a year, but 10 ships a year, which would be a good number of vessels for us.'

Offshore sector pays off for Samsung

HAVING earmarked offshore as a key growth market in 2004, Samsung Heavy Industries has been making significant inroads, with a slew of orders for FPSOs and drillships.

SAMSUNG Heavy Industries recently signed a US\$450m contract covering topside construction of the innovative, 900,000bbls capacity BP Skarv floating production storage and offloading vessel, whose first oil production from the Norwegian sector of the North Sea is due in 2011.

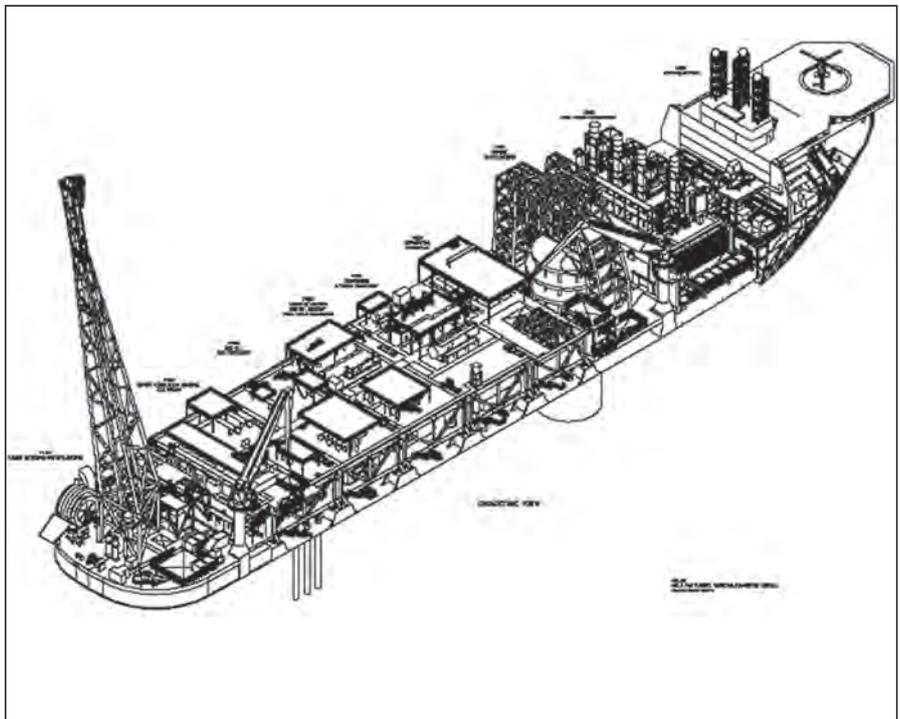
BP expects the completed ship will leave Samsung's Goeje Island yard in December 2010, for deployment in the Skarv field in the Norwegian Sea.

Samsung, which will build the BP Skarv vessel in its entirety, has been involved in the project from an early stage, after an initial front end engineering design study led by Aker. SHI developed the hull design at the FEED stage, as well as the overall concept design.

Specifically configured for arduous North Sea operations, the resulting vessel will be small for an FPSO, at 295m long and 50.6m across (128,000dwt), but very sophisticated. With accommodation for 126 personnel, the vessel will feature a 7000tonne internal turret mooring system,



BP Skarv FPSO: Artist's Impression 1.



BP Skarv FPSO: Topside Arrangement.

TECHNICAL PARTICULARS BP Skarv FPSO

Operating Field:	Skarv, Norway (Water Depth 370m)
Classification Society:	DNV Ship-shaped Production and Storage Installation (N)
Registration:	Norwegian
Oil Storage Capacity:	910,000 bbls
Loa/Lbp x B x D x Td (m):	295.0/277.6 x 50.6 x 29.0 x 19.9
Deadweight:	128,000MT
Hull Configuration:	Double Bottom & Double Sides
Mooring System:	Internal Turret (Blue Water)
Heading Control System:	Azimuth Thrusters 5 sets x 3.5MW
Electric Power Plant	
Main Generator:	Gas Turbines 4 sets x 32MW (GE LM2500) at Topside
Essential Generators:	Diesel Engine Driven 2 sets x 7MW (STX-MAN)
Automation System :	ICSS
Cargo Handling System:	Hydraulic Submersible Pumps 1400m ³ /h x 17 sets
Cargo Offloading System:	Stern Tandem Offloading System, rate 7000 m ³ /h
Complement:	126P (100 Cabins)

and five azimuthing thrusters from Rolls-Royce. It will include six topside modules weighing in at 2650tonnes apiece.

To improve ship motion control, the vessel will feature a 'sharp' hull shape, where conventionally FPSOs feature box-type hulls. Samsung says that, in the case of the BP Skarv FPSO, in order to endure North Sea conditions, and particularly green water ingress, the hull's block coefficient will be 0.75, where box type structures usually feature a block coefficient of 0.9.

Meanwhile, also due delivery by 2010, is the first of a pair of floating production storage and offloading vessels for Nexus Floating Production. While deployment information of

these ships has not been fully disclosed by the owner, they will also be appropriate for North Sea operations.

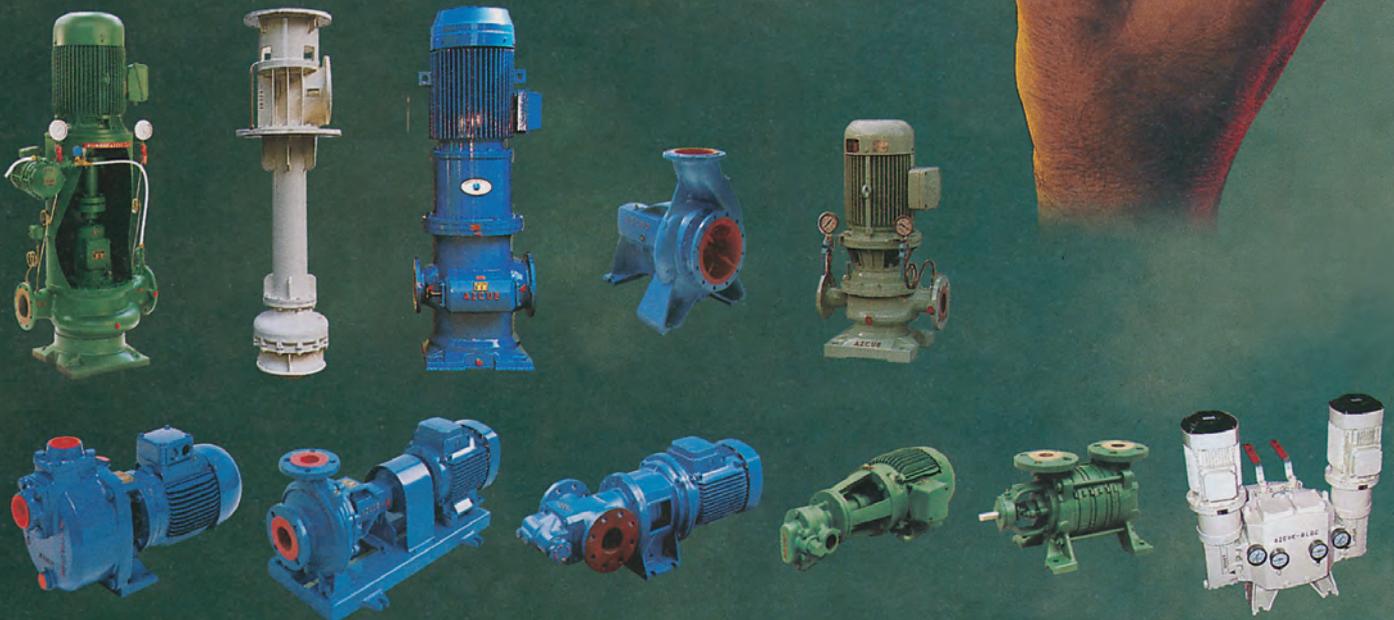
The Nexus vessel's hullform draws on Samsung's previous work in constructing shuttle tankers for Canadian and North Sea operations. The ice strengthening aspects of the shuttle tanker design have been dispensed with, but in all other characteristics, the hullform is similar, while the design also incorporates a controlled pitch propeller and azimuthing thrusters.

The 143,000dwt ships will be 258m long between perpendiculars (271m loa), with a beam of 46m. Capable of storing 950,000bbls and producing 80,000bbls of oil per day, their

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**TECHNICAL PARTICULARS
NEXUS FPSO**

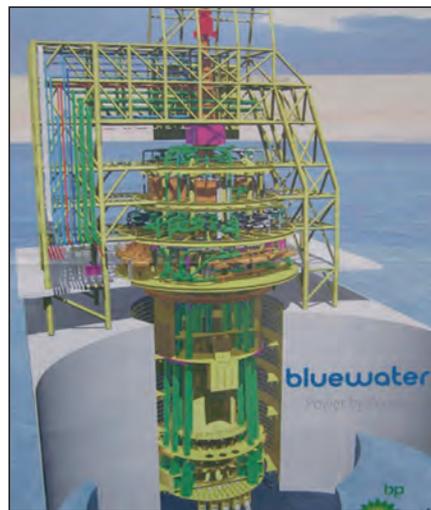
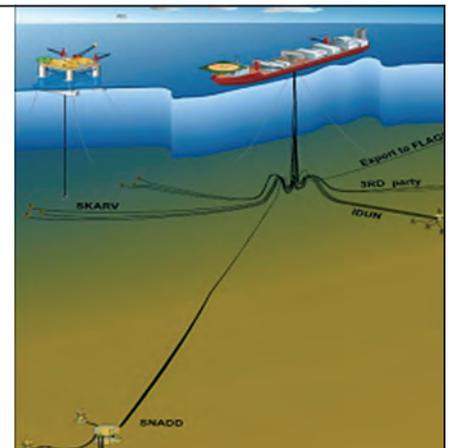
Buyer:..... Nexus Floating Production Ltd
 Operating Field:.....Worldwide including Norway
 Classification Society:DNV Ship-shaped Production and Storage Installation (N)
 Registration:NIS
 Oil Storage Capacity:..... 950,000 bbls
 Loa/Lbp x B x D x Td (m):... 271.0/258.0 x 46.0 x 26.6 x 18.2
 Deadweight:143,000MT
 Hull Configuration:.....Double Bottom & Double Sides
 Propulsion System:.....Main Engine 2 sets x STX-12V32/40
 Propeller: Single CPP 4 blades
 Thrusters:.....Stern Tunnel Thrusters 2 sets x 1000kW
 Mooring System:.....Submerged Turret Production (APL STP 5000)
 Electric Power Plant:
 Essential Generators:Diesel Engine Driven
 Main Switch Board:SAMSUNG
 Automation System:.....ICSS
 Cargo Handling System:.....Centrifugal Pumps 3000 m³/h x 3 sets
 Cargo Offloading System:.....Stern Offloading System
 Complement:80P

NEXUS FPSO: Topside

Topside Capacities:
 Weight10,000MT
 Oil Production80,000 bbls/day
 Gas Production1.5mmscm/day
 Liquids80,000 bbls/day
 Topside Engineering:.....under progress



BP Skarv FPSO: Field Location.



BP Skarv FPSO: Turret System (Blue Water).

topside units will weigh in at 10,000tonnes, while production will be through APL's submerged turret production system.

Combined, the BP Skarv and Nexus projects are worth around US\$2bn to the shipbuilder, but Samsung is by no means resting on its laurels. Next to be targeted is FPSO for Total's Usan

field, offshore Nigeria, which will require a vessel capable of storing 2 million barrels. Total has not made its final investment decision in this matter as yet, and therefore would not comment on the final yard of build.

At the same time, Samsung has been making significant progress in the market for drillships, with eight of these specialised ships ordered this year alone, worth US\$5bn, joining a further eight drillships already on order. All of these ships feature dynamic positioning capability DP3.

Thus far, two general designs and one modified design have been offered, in the shape of the 23,000m³ oil capacity 'Saipem 10000' and the 'Stena-class' drillship, plus the modified Saipem 12000. Already, 13 ships have been specified to one or other of the 'Saipem-class' designs (where the 10000 or 12000 refers to the water depth in which the ships operate, in feet), and this is now seen as the 'standard' Samsung offering.

Two of the 'Saipem-class' ships will be delivered to Mosvold, four were commissioned by Tanker Pacific Management, two are for Petrobras, one for Pride International, one for Seadrill and two for Cardiff. Only one is for ENI subsidiary Saipem itself.

Although, as noted, TPM initially contracted four vessels with Samsung, it has subsequently sold on one yet to be built ship to Pride International, meaning the latter now effectively has two ships on order at the yard.

One notable feature of these ships is their specially developed sheltered moonpool, which is reckoned to be particularly effective in reducing cruise resistance. Samsung said the feature yielded speed gains of around 1.5knots.

The three Stena-class drillships, the first of which is due delivery in November 2007 and has just undergone sea trials, are more complex. Specified for North Sea operations, and in line with stringent regulations emanating from Norway, they feature superior dynamic positioning performance, by virtue of six sets of 5.5MW azimuthing thrusters, and an improved moonpool design that is configured to reduce both sloshing impact and resistance. This is achieved by the inclusion of a patented fixed dampening structure.

The topside arrangements have also been optimised and feature a unique setback area for the drilling pipe. Usually, this is positioned on the upper deck, hampering efficiency and potentially

NEXUS FPSO: Artist's Impression 1.



**TECHNICAL PARTICULARS
STENA Drillship**

Registration:..... Bermuda
 Classification Society:..... DNV
 (NMD/PSA/Norsok)
 Dimension:.....Loa/Lbp x B x D x Td (m)
 228.0/219.4 x 42.0 x 19.0 x 12.0
 Deadweight:.....58,000MT at Td
 Electric Power Plant:.....6 sets x 7MW
 Propulsion & DP Thrusters :..... Azimuth
 Thrusters 6 sets x 5500kW
 Dynamic Positioning:..... DPS-3 Grade
 Drilling Capacity:..... Drilling Depth
 30,000ft, Water Depth 10,000ft
 Complement:..... 180P



Artist's impression, Mosvold drillship.

**TECHNICAL PARTICULARS
PRIDE Drillship**

Registration:..... Marshall Islands
 Classification Society:.....ABS
 Dimensions:.....Loa/Lbp x B x D x Td (m)
 228.0/219.4 x 42.0 x
 19.0 x 12.0
 Electric Power Generating Plant:.....7000
 kW x 6 sets
 (STX-MAN 16V32/40)
 Azimuth Thrusters:5500kW x 6 sets
 (Rolls Royce)
 Dynamic Positioning: DPS-3 Grade
 Drilling Capacity:.....Water Depth
 10,000 ft, Drilling Depth
 30,000ft
 Complement:.....200P



STENA Drillship: Artist's Impression.

floating storage and regasification unit, for which a FEED study is underway, before yards are invited to tender.

Already within its current orderbook, however, Samsung can claim to have broken new ground in this area. It has already secured a firm order for two ships to the innovative 'Flex LNG' design, where delivery is set for 2010 onwards.

Flex LNG is the joint venture formed by US-based investment company Galway Group, broker Barry Rogliano Salles, Samsung, Hamworthy, and Norway's MaritimeColours and Framoeng. It has specified two mould-breaking 289.6m long M-FLEX vessels that use the Samsung SPB containment system with delivery from 2010 onwards.

These 90,000m³ cargo capacity vessels will provide a unique capability range, currently not offered by existing LNG vessels or LNG vessels on order, in particular offshore LNG production. In addition to onboard liquefaction, the M-FLEX LNG/C ships will be able to accommodate side-by-side or tandem transfer of LNG. The ships may also be equipped with onboard regasification or onboard re-liquefaction (for more efficient storage).

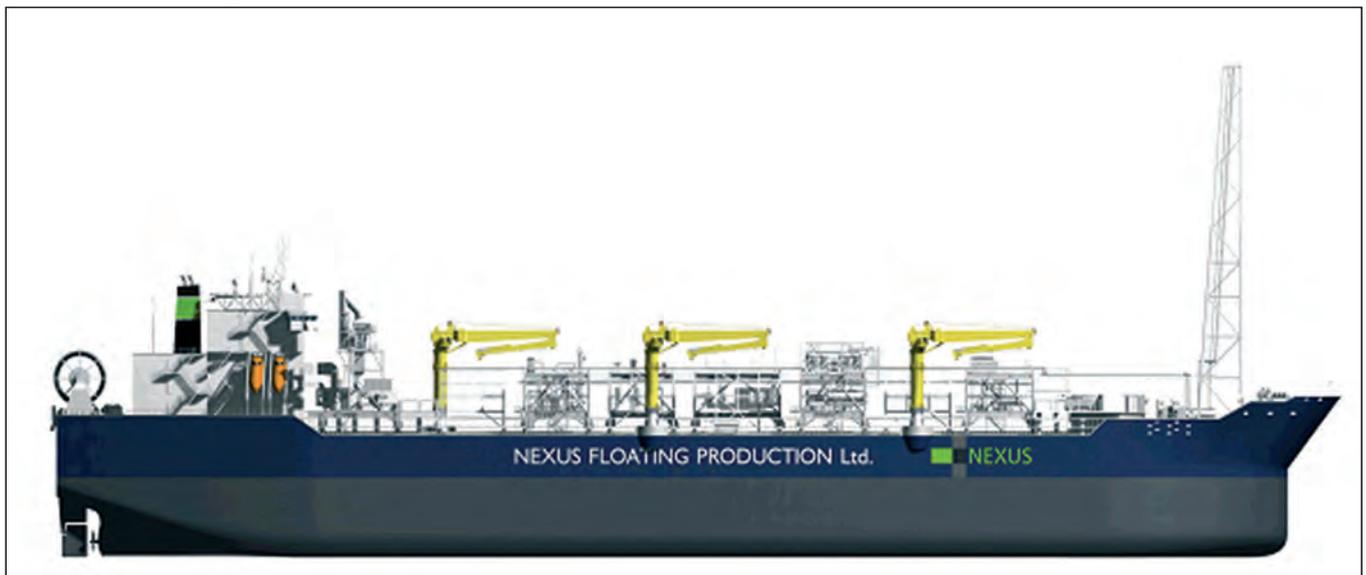
The onboard liquefaction capability will bring with it the means of recovering stranded gas from regions in the Pacific, around South East Asia, and off the West Coast of Africa not currently accessible.

there is only enough space to accommodate two pieces of pipe, the improved arrangement has room for three. Stena has an option for a fourth such vessel.

Having set out to go for offshore business in earnest in 2004, Samsung has made significant progress so far, and there is clearly more to come. The shipbuilder said that it had been approached by a variety of owners exploring the potential to build floating liquefied natural gas production storage and offloading units, where each potential project called for very different specifications. Shell UK, for example, had lodged an inquiry regarding a 490,000m³ combined LNG/LPG

compromising stability. Samsung has designed a 'lower set back' that is integral to the hull. The feature reduces drilling working hours because, where a conventional arrangement means that

NEXUS FPSO: Artist's Impression 2.



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UNDERWATER HULL



DECKS



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Appetite grows for mega-containerships

IN line with coming expansion of the Panama Canal, over 120 ships of greater than 12,000TEU capacity have been ordered this year alone.

Samsung Heavy Industries, which claims to have been the first to market with a 12,600TEU capacity ship, has already secured orders for a market-leading 29 such ships this year – 16 for Peter Döhle, five for Claus-Peter Offen and eight for Zim Israel Navigation. In total, the shipbuilder has 54 containerships on order.

Dubbed the 'PAAT Container' ship, where PA stands for the Pacific and AT for the Atlantic, these large ships are being built to the maximum size permissible to transit the New Panama Canal (as confirmed by Autoridad del Canal de Panamá). This means a length of 366m, a beam of 48.2m, and a depth to the maindeck of 29.8m.

Samsung reckons to have been leading the market in building ever-larger ships since 1990, when it launched its first 4000TEU capacity ship for Hapag-Lloyd. It says that the base structure for the 12,600TEU ship has been derived from its 10,000TEU forebear.

Even so, there are aspects of the design that are novel. Conventionally, for example, the accommodation onboard a containership is positioned above the engine room, but the new configuration sees the accommodation area moved forward to the midship section, above the heavy fuel oil tanks. As well as improving visibility because of the forward positioning of the bridge, the two island deckhouse reduces vibration and noise experienced by the crew; the move means more containers can be stacked on deck. Container carrying capacity is raised by 700TEU compared to the same sized conventional vessel.

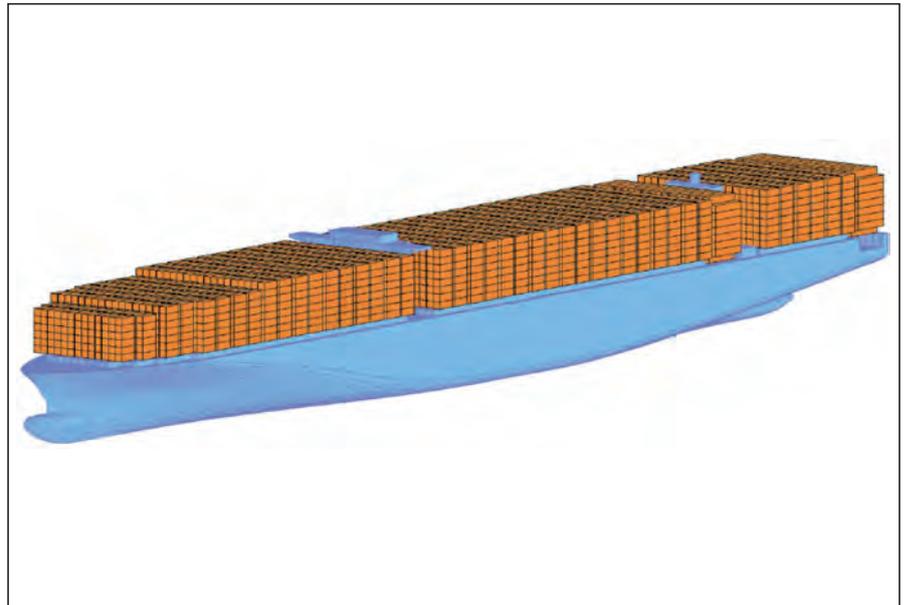
To allay owner concerns that the accommodation block is too far from the engine room, a new small duty room with its own pantry is situated adjacent to the engine room.

The new configuration also means lower deflection of hatch diagonal and hatch cover movement.

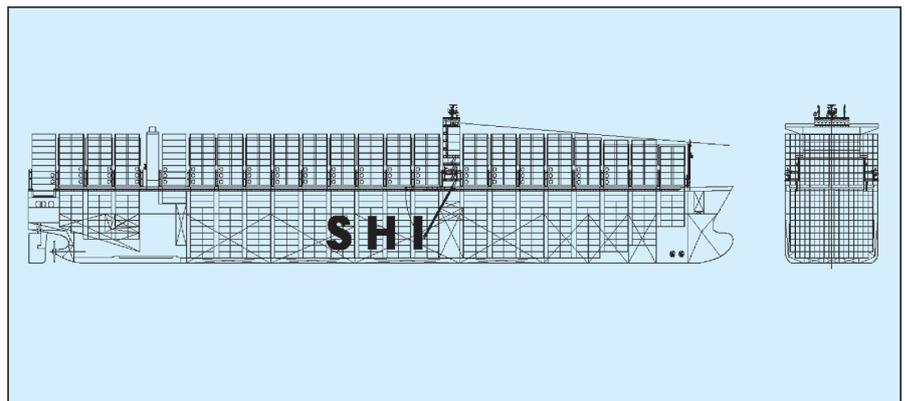
Based on the restriction against the future regulations, the new design features HFO double protection, while there is provision of a three tier lashing bridge.

Samsung also has orders for 16 larger 13,300TEU containerships, with eight for Mediterranean Shipping Co and eight for China Shipping Group. Of the same length and depth as their 12,600TEU capacity counterparts, these ships feature a 51.2m beam, in order to allow for an extra container row.

Already, the shipbuilder is looking towards even larger ships, with a 16,000TEU ship under development, although it concedes that the market



Design drawing for Samsung Heavy Industries' 12,600TEU capacity containership.



Samsung 12,600TEU capacity containership.

is likely to stick at the current size limit for some years to come. A 16,000TEU behemoth, whose capacity Samsung gives as equivalent to 12,000 containers of 14tonnes at scantling draught, stacking containers 22 rows across.

Samsung is working in tandem with a classification society on the new design and, in October, was expecting the first feedback on its initial design proposal. Tank testing of this initial design has already been done, with its speed and power curve, and its manoeuvring capability, already proven.

Even here, the builder favours a single engine, in this case a 14-cylinder K98MC-C unit from MAN Diesel, where others are said to favour twin eight cylinder engine solutions. While some have argued that ships of this size should be imbued with redundancy, through the installation of twin eight cylinder engines, Samsung believes that there is no reason why such an argument becomes compelling only in the case of the very largest of ships. Furthermore, it points out that a twin engine installation would be significantly more costly to run. Ⓢ



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First Q-Flex from Samsung

SEPTEMBER saw the naming of the Q-Flex LNG vessel *Tembek* at Samsung Heavy Industries in Geoje Island, South Korea.

Owned through a joint venture between Qatargas Transport Company (Nakilat) and Overseas Shipholding Group (OSG), the 216,000m³ capacity Q-Flex and the even larger Q-Max vessels are a new generation of LNG mega-ship.

Featuring membrane-type containment technology, the 303m-long, 50m-wide by 27m-high vessel can carry a sufficient amount of LNG to be able to run for 1.5 days at one time. It will be delivered to the shipowner in October, which will then run the ship from Ras Laffan in Qatar to Milford Haven in the UK.

The LNG ship runs on a low-speed diesel engine that is 40% more efficient than previous LNG ships that had used steam turbine engines. The natural gas is turned back to the cargo room through a reliquefaction plant from Hamworthy.

SHI received the order to construct this ship in October 2004 from Qatar Gas.

Including this order, SHI has received orders for 18 out of the 45 ships the big three Korean



Tembek, on christening, 11 September 2007.

shipbuilders secured after entering into long term contracts with Qatar Gas. Since 2003, SHI has received orders for 56 LNG ships out of a total of 172 orders for such ships worldwide, giving it a market share of 33%, and the number one

ranking in the world. Its order backlog stands at 39 ships and US\$9.1 billion, which is also the first in the world. Of the 14 worldwide orders for LNG ships, which are 260,000m³ or bigger in volume, SHI has received 11.

Ro-ro order adds another dimension

AS noted in the September news section of *The Naval Architect*, Stena Line has ordered two new ro-pax vessels valued at around SKr2 billion (US\$310m) from Samsung Heavy Industries in South Korea. The vessels will be put into service in 2011 and they are planned to operate the route Harwich to Rotterdam.

Samsung Heavy Industries has previously built a number of shuttle tankers and ice-class tankers for Stena Bulk.

The two, 11-deck new ro-pax vessels will be sisterships to *Stena Trader* and *Stena Traveller*, which went into service on the North Sea earlier this year. Classed by Lloyd's Register, the vessels will also be equipped with the latest energy management technology, making them as efficient as possible to run.

TECHNICAL PARTICULARS STENA ROPAX – SHI HN 1807/08

Shipowner:	Stena RoRo
Builder:	Samsung Heavy Industries Co, Ltd
L x B x D:	212.0x26.7x9.3m
Gross Tonnage:	31,000GT
Speed:	22.2knots
Main Engine:	10,800 kW x 2 sets
Passenger No:	300
Cabin:	130 rooms
Crew No:	34
Vehicle:	4050LM
Flag/Class:	U.K. / LRS
Contract Date:	Aug 2007
Delivery Date:	Apr 2011 (1st), Sep 2011 (2nd)



Artist's impression of the new ro-ro vessel type for Stena, to be delivered in 2011.

While mainstay work at the Korean yard continues to focus on containerships, LNG carriers, and offshore vessels, Samsung has kept a keen interest in developing its expertise in the ro-ro and ro-pax markets, since forming a dedicated team of specialists in 1992. It secured an order for three ro-pax vessels from Minoan Lines in 1998, two of 1000 passenger capacity and the other of 1250 passenger capacity. It followed up with an order for three 780 passenger capacity ships from Norfolk Line, for the Dover-Dunkirk route.

However, the latest ships for Stena feature higher freight and lower passenger (300) capacity.

Designed for Ice Class 1A operations, these ships will feature 4000 lane metres of freight capacity. The shipbuilder pointed out that they were also being built with energy saving in mind, featuring variable frequency shaft generators and automated control of the HVAC system.

Insiders say that the yard was asked to attach options for two more ships to the order, but was unable to oblige due to slot unavailability.

Given the weight of orders due delivery from Samsung over three years up to 2011, it is not surprising that few slots are available for passenger ships. A report recently run in Lloyd's List quoted a senior management figure at the yard as saying that Samsung was not looking to enter the cruise market for the time being. However, events in the interim may change such thinking. A spokesman for Samsung's dedicated passenger and ro-ro ship unit conceded that the company's existing 85,000gt cruiseship design was outmoded and would have to be rethought. Research and development was also needed into the development of a Korean-grown larger cruiseship design, including such basics as performance analysis, noise, and vibration.

However, he suggested that the coming ro-pax project for Stena could encourage domestic cabin producers experienced in building accommodation for cargoships to develop experience which could later be turned to the more complex cruise sector.

'Cruise vessels remain a longterm goal because of today's conditions,' said a spokesman.

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New concept for LNG carriage from DSME

DAEWOO Shipbuilding & Marine Engineering reckons to be opening a new chapter in gas carrier history, following its development of the 'structurally strengthened sealed LNG carrier' (sLNGc).

The shipbuilder said that the concept, which has been the subject of 10 patent applications and awaits approval from class societies, offered the means for a LNG ship to run a laden voyage without needing boil off gas treatment. It suggested that for a given route

– Yemen to the Gulf of Mexico – around 270tonnes of LNG could be saved, equating to around US\$1 million every year.

The main idea had been to design cargo tanks that will be able to withstand pressures of up to 170Kpa (abs), in order that BOG can be stored within the tank. DSME said it had carried out cargo tank tests for ships in operation and found that any pressure increase was controllable due to the large heat capacity of LNG. Heat ingress could

be absorbed by the LNG cargo. Where a conventional LNG cargo tank was designed to absorb pressures of up to 0.25bar, a new limit of 0.7bar would be required. Class was reviewing hull structure analysis for such a solution.

The shipbuilder is proposing three different concepts for the sLNGc. The first, the 'N' type, looks to achieve no BOG at all, instead featuring an efficient 'mixing device', to operate either with a two stroke diesel engine, or an electronically-controlled marine engine featuring gas injection (ME-GI). In the case of the two stroke engine, DSME says a gas combustion unit would be required for emergencies, but the solution could feature a downsized LNG vaporiser. For an ME-GI case, a LNG pump with HP vaporiser could be used instead of a BOG compressor, while again the LNG vaporiser could be downsized.

In this scenario, savings in both capital and operating expenses could be anticipated.

The 'P' type solution looks at scenarios involving partial BOG handling. Where some reliquefaction would be required in this case, DSME says that this could be done with a single train system and no gas combustion unit, with the actual reliquefaction plant and the vaporiser radically downsized, and 'excess' BOG saved.

If dual fuel, ME-GI, or gas turbine solutions were preferred, the P-type sLNGc concept would require no gas combustion unit, a downsized LNG vaporiser, while BOG dumping would be carried out at the manoeuvring stage and excess BOG saved.

In the case of steam turbine propulsion, the LNG vaporiser would again be downsized, while excess BOG could again be saved.

The 'Y' type sLNGc application looks at its use with conventional BOG handling. In all propulsion methods, excess BOG can be saved, in a solution DSME said offered the greatest amount of operational flexibility.

'The increased range of the cargo tank pressure operation gives advantages in the utilisation of BOG during manoeuvring, excessive BOG after loading port departure, and waiting conditions,' said the shipbuilder. 'Although the sLNGc has many application potentials for future LNG carriers of any types of propulsion system and floating storage and regasification units, it can have advantages for conventional vessels as well. Flexibility in the selection of propulsion system, maximising a deliverable cargo, a simple operation, and eventually low operation costs are all advantages. It can have additional advantages for ship to ship offloading operations. The system can be implemented very conservatively, and the changes from the existing design can be minimised. The only major physical difference is the hull structure reinforcement.'

DSME said negotiations were underway with a number of shipowners, including Exmar, covering the future development of the sLNGc concept.

CONTAINERSHIPS COME TO THE FORE

THERE has been a shift in the mix of vessels on order at Daewoo Shipbuilding and Marine Engineering this year, as the booming market for containerships has overtaken the builder's previous focus on liquefied natural gas carriers.

Turnover from 2007 shipbuilding production is set to reach WON7 trillion (US\$7.65 billion) this year, rising to WON8.5 trillion next year.

Where over 50% of that money has been generated by LNG carrier production until this year, the yard is forecasting that, by 2010, this will be overtaken by containership output, which will in turn go on to make up over half of sales.

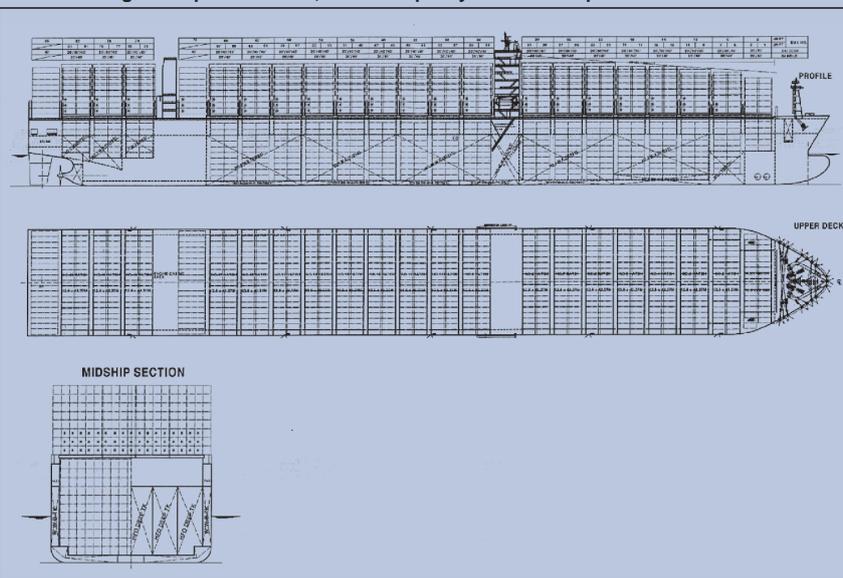
DSME said that 65 of the 92 ship orders it had secured in 2007 had been for containerships.

The shipbuilder is focusing on three basic containership types - a Panamax ship of 4400TEU capacity, an 8400TEU ship, and a 10,000TEU plus ship. The builder said that, this year, \$1.5 billion of orders had come for ships of around 4400TEU capacity, with \$6.7 billion being generated by ships of over 8000TEU. The yard also has orders for 18 ships of 12,600TEU capacity.

By comparison, the market for LNG carriers had slowed markedly this year, with market leader DSME securing orders for only six such ships. The yard's preference was to keep annual production of this specialist ship type to around 10-11 vessels per year, while it could turn out 17 LNG carriers in a peak year.

Planned productivity improvements meant that the yard had a target to generate WON10 trillion in 2011, the shipbuilder said. Yard productivity was determined by the number of times the shipbuilder opened its number one and two dock gates in a given year. Currently, DSME opens its gates 10 times a year, with number one dock turning out 20 ships per year and number two turning out 30 ships. From 2009, DSME plans to achieve 12 dock gate openings per year while, in 2012, the target is for 12 openings per year, with vessel output rising proportionately. More speedy construction is also anticipated from work in the yard's three floating docks, each of which currently turns out six to seven ships per year, and from on-the-ground construction. This will be achieved by a combination of building ships from larger blocks and from outsourcing a part of the block construction.

General arrangement plan of the 12,600TEU capacity containership from DSME.



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STX bulks up and readies for expansion

CATCHING the mood of the market early, STX Shipbuilding has been very active in the bulk carrier market this year, with a new yard under construction in Dalian, China integral to its success. The yard has secured orders for a total of 80 bulk carriers, consisting of 17 ships of 181,000dwt, 41 of 58,000dwt, and 22 of 81,000dwt. Orders this year alone have been worth some US\$4.2 billion.

The company, which has delivered 217 ships, has 254 further vessels on order, worth an estimated US\$13bn, and can now claim to be the world's fifth largest shipbuilder.

But current market trends are only part of the story for a yard repositioning itself. In February, STX formally secured a prestigious order for a 174,000m³ capacity liquefied natural gas carrier from Elcano, of Spain, breaking into a market that signalled its long term plans to change emphasis, away from being a constructor of medium-sized vessels, to a yard group whose Korean operation will focus on bigger and higher-valued vessels, including mega-containerships and VLCCs.

In September, Greek shipowner Niki Shipping ordered nine 12,400TEU boxships from STX Shipbuilding for delivery from 2010. These ships are expected to be chartered to MSC.

From yards in Jinhae and Pusan, and the soon to be operational Dalian site, STX can now offer a broad portfolio of ships, including 157,000m³, 174,000m³, and 210,000m³ capacity LNG carriers, containerships ranging between 2700TEU and 13,100TEU capacity, Aframax tankers, MR tankers, Panamax tankers and VLCCs, 6700 unit capacity pure car and truck carriers, LPG/ethylene carriers, and the three varieties of bulk carriers outlined above.

In line with expansion plans from other Korean builders, STX is working towards production from its new, No 2 skid launching berth at its Jinhae yard from the end of 2008. The additional facilities will mean that the shipbuilder will be able to deliver 12 more vessels per year from Korea.

Meanwhile, the new STX overseas yard at Dalian was established as an entity at the end of 2006, fortuitously just before Chinese authorities determined that no further fully foreign-owned shipyards would be allowed. Ground was broken in Dalian in March this year. The plan is for STX China to focus on 'conventional' vessels, such as the 58,000dwt and 81,000dwt bulk carriers, and a further 98,000dwt bulk carrier, as well as PCTCs.

In coinciding with the market's appetite for bulkers, STX emphasises that is equally ready to switch to other markets, should a downturn come to the bulker market.

Such a downturn was not anticipated for the remainder of 2007, or in the early part of 2008, while the market for VLCCs and mega-containerships was expected to flourish next year, as VLCCs were demolished or



STX Shipbuilding, Jinhae will add a second skid launching berth from the end of 2008.



STX Shipbuilding – now in position to offer liquefied natural gas carriers.

converted for other uses, and the container market's drive towards securing large-sized containership slots was sustained.

STX said, as its product portfolio had broadened, so had its use of advanced Tribon

CAD/CAM software from initial design to production, including all initial structural design, hull design, outfitting design and work preparation, and its use of the NASTRAN CAE System for structural analysis. ☺

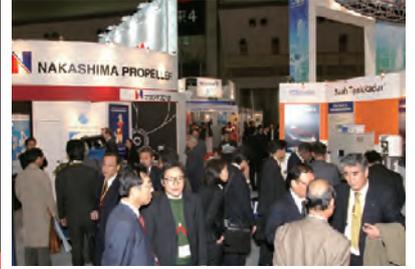
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Sekwang surfaces as shipbuilding force

AFTER almost eight years under the control of the Universal Church (The Moonies), INP Shipbuilding has emerged with a new name, new owners, new management, and a new business strategy that looks to get it back on production schedule this year.

Relaunched as Sekwang Heavy Industries in March, and now controlled by Sekwang Shipping, the company name may be new to shipbuilding, but the head of the yard will be familiar to many in the industry.

The new president is Sung-Eui Lim who, having graduated as a naval architect, went on to cut his shipbuilding teeth at KSEC (now Hanjin Heavy Industries), before a 25 year career with Hyundai Heavy Industries, starting from 1972 in the yard's design office.

He was stationed in London between 1977 and April 1980 as an HHI sales engineer. After his return to Korea, he was dispatched to New York in 1983 as managing director of the shipyard's regional office, serving there until 1987.

After 25 years with HHI, Mr Lim left the company in 1997, saying that he had found his last assignment – taking care of the shipbuilder's whole safety and environmental control package – fraught with conflict.

For the next nine years he pursued his own business interests. Then, in 2006, Mr Lim was approached by the Sekwang Group, which was keen to get in on the shipbuilding boom and launched a bid that saw it emerge with a 52% stake in the yard at the end of last year, with Samsung Corp owning 8% and the rest in the hands of private equity.

The Moonies' involvement in shipbuilding is not so far fetched as it may seem. As part of diverse interests, the religious organisation's 'business fronts' include the Astillero Atenil and Varadero Tsako yards in Uruguay. Furthermore, as explained by Mr Lim, the Universal Church came to control INP for what can only be seen as benevolent reasons, after the 60 year-old shipbuilder – formerly known as Cheung Gu – had expanded too fast in the face of a shipbuilding slow down in the late 1990s, and subsequently collapsed.

Even so, Mr Lim was dubious about the way INP was managed under its former owners. He said production was 'not taken care of properly', with deadlines allowed to slide. In 2006, the shipyard delivered what Mr Lim termed 'a ridiculous two ships'. This year, under new management, that number rose to 13, with targets raised for 2008.

Miscalculations were also made when it came to costing vessels constructed. 'We will lose money this year and next year, but 2009 should be a turning point, so long as we operate production in a normal way,' said Mr Lim.

When Mr Lim took over, he says, other issues also emerged. 'We now have three slogans in this company,' he explained. 'One is "Get awakened and be minded as a creative"; the second is "Do our best"; and the third is "Let's be clean – no corruption".'



Sung-Eui Lim, new president of Sekwang Heavy Industries.



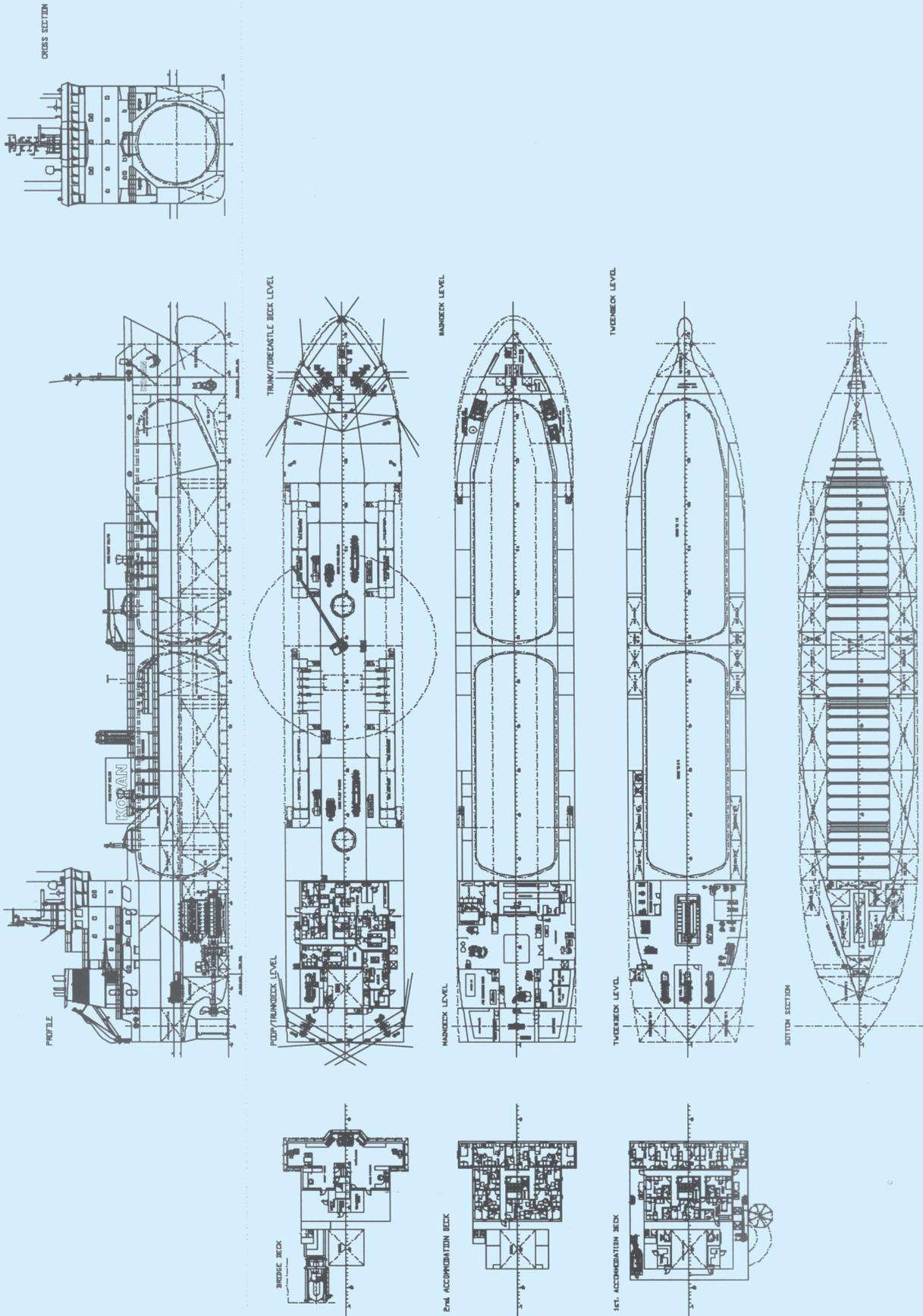
Ethylene carrier – one of a pair of complex ships delivered by Sekwang this year to Lauritzen Kosan.

Now capitalised at US\$50 million, and employing 313 people direct as well as 800-900 subcontractors, Sekwang's new management are all experienced shipbuilders. Mr Lim said he was seeking to bring in 30 more new staff and up to 100 more subcontractors.

Sekwang operates two separate main shipbuilding facilities, a larger facility at

Ulsan, and one at Mokpo. Its number one yard, which has a 300tonne capacity gantry crane, operates across three slipways, and is capable of building ships up to 20,000dwt. It has a satellite facility, 10km from the main yard, founded in 1999 and especially for block assembly. However, the addition of the third slipway at its number one yard meant that some of the block-building operation

General arrangement plan for 8000m³ capacity ethylene carrier built by Sekwang for Lauritzen Kosan.



carried out at the main facility had to be suspended last year. Mr Lim concedes that, last year and this year, subcontractor delays and low quality block deliveries were one reason for the slowdown in production.

As a matter of urgency, Sekwang has now opened a second block-building facility, at Samcheok, which started production in August and is due to be working to capacity next year.

As INP Shipbuilding, despite its production difficulties, the yard came to offer a wide range of smaller vessels, including asphalt carriers, stainless steel chemical carriers, ethylene carriers, and anchor handling tugs. The last two years saw the yard focusing on a range of stainless steel chemical tankers of different capacities, from a pair of 6300dwt ice class 1A ships it delivered to Marianne Wonsild in 2005, to the pair of 11,300dwt ships for Crystal Pool in 2006, the latter including a bulbous bow and going on to feature in *Significant Ships of 2006*.

The yard, in fact, has 17 chemical tankers on order, but also 11 anchor handling tugs.

It is now five ships into an eight ship order for 13,000dwt chemical tankers from Greek owner Evalend Shipping.

In September 2007, the yard delivered its second ever ethylene carrier, following on from a first delivery in May. The two, 8000m³ capacity, 115m long ships, *Isabella Kosan* and *Helena Kosan*, are owned by Lauritzen Kosan.

In October, Sekwang is due to deliver the first of three 10,000m³ capacity, 126.7m long



Sekwang Heavy Industries has set its sights on the offshore market as the means of stepping up deliveries and maximising productivity.

chemical carriers for three separate Japanese shipowners. Also due delivery in November is the first of a pair of 128.6m long by 20.4m wide chemical carriers for Hisafuku Kisen.

Other orders include one for four 13,000dwt chemical tankers for Primera Maritime. These 128.6m long, 20.4m wide by 11.5m deep ships are due to be delivered between February 2008 and January 2009, while three smaller 8000dwt chemical tankers are due delivery to Sichem Oslo between January and June 2008. Between early 2008 and April 2009, Sekwang Heavy will also deliver eight 20,000dwt chemical

tankers – its largest standard chemical tanker design – to its affiliated company Sekwang Shipping. These 147.3m long, 24.2m beam, and 12.8m deep ships have all been fixed for charter by domestic Korean owners. Sekwang Shipping is also taking eight 8800dwt chemical tankers from the yard, for delivery between August 2009 and May 2011.

Mr Lim said that now that production issues were being addressed, Sekwang was 'remodelling' its shipbuilding activities at Mokpo, with a view to building ships of up to 35,000dwt from the first quarter of 2008. With such a plan in place, Sekwang's Ulsan facility will be better placed to tackle Mr Lim's keen interest in stepping up its role in the offshore sector. Buying in design and machinery packages from third parties, such as Rolls-Royce, Sekwang's target is to secure 15 anchor handling tug and platform supply vessel orders in 2007.

'We are proud of the fact that we built such sophisticated ships as the ethylene carriers we built for Kosan,' said Mr Lim. 'They have proved themselves worldwide and we have talked about another four ships, but the price has been too high and so we are cautious of this market. Mr Lim said that a number of pricing miscalculations under former management had cost the shipbuilder dear. Our target now is building ships that we can deliver as quickly as possible.'

RINA – LLOYDS REGISTER SHIP SAFETY AWARDS

Nominations are invited for the 2007 RINA - Lloyds Register Ship Safety Awards.
Entries close 1st January 2008

The RINA- Lloyds Register Ship Safety Awards recognise recent innovations or developments which have led to an improvement of safety at sea, or which have the potential to do so.

Entries may be submitted directly by individuals or teams from universities and industry from any country, and may cover design, construction, research, equipment or operations. Entries are judged on originality, quality of design, feasibility of production and contribution to ship safety.

Members who are aware of recent work by a university, company or organisation which has or could lead to an improvement in safety at sea are invited to nominate them for one of the Awards, giving brief details of the achievement. The nominated university, company or organisation will then be invited to submit an entry.

There are separate categories for universities and industry. An Award of £1500 is made in each of the categories and will be presented at the 2008 RINA Annual Dinner.

Requests for further information and expressions of interest should be forwarded to:



Director of Professional Affairs
The Royal Institution of Naval Architects
10 Upper Belgrave Street, London SW1X 8BQ
Tel: +44(0)20 7235 4622
Fax: +44(0)20 7259 5912
Email: profaffairs@rina.org.uk



The *W*orld Superyacht Awards

Young Designer of the Year 2008

A new prestigious award for talented young superyacht designers is to be awarded at the Boat International Group 2008 World Superyacht Awards in Venice

Camper & Nicholson's International, the Royal Institution of Naval Architects and the Boat International Group are proud to announce the introduction of a new prestigious award for the world's most promising young superyacht designer. The award recognises the achievement of an outstanding young designer and the potential impact of their work on current or future designs for the superyacht industry. The Young Designer of the Year award will be presented at the 2008 World Superyacht Awards in Venice, which recognises the remarkable ingenuity and innovation demanded in the design, engineering and construction of the world's finest luxury yachts, and is the most obvious place for new designer talent to be recognised and celebrated.



The Award

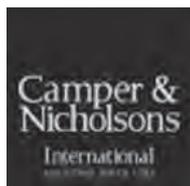
The award is open to anyone who is studying for a degree or vocational qualification in a subject relating to yacht or small craft design, or anyone who has already graduated within three years of the closing date for entries, which is 31 January 2008. Young naval architects and yacht designers from all over the world have been called upon to enter the competition via the extensive RINA global network. RINA has already had an impressive response from universities in countries as far afield as New Zealand and China, to those closer such as the UK and Italy. RINA's CEO Trevor Blakely is proud that RINA is supporting the new award for young designers: 'The superyacht industry is one of the most successful sectors of the maritime industry, and owes much of that success to the work of its designers who provide that unique combination of form and function, which is the modern superyacht. 'The World

Superyacht Awards Young Designer of the Year prize 2008 will be presented to the young designer who produces the best concept design for a superyacht. The entries will be judged by a group of leading world-class designers selected by the Boat International Group and RINA. The judges will be announced in the next issue of Boat International. 'The World Superyacht Awards Young Designer of the Year competition will provide an opportunity for superyacht designers of the future to demonstrate their ability and talents. I certainly do not envy the

judges in their task of selecting the best,' adds Blakely. The winner of the Young Designer of the Year 2008 will receive a prize of €5,000 and will be invited to receive the award at the renowned World Superyacht Awards ceremony on 18 April 2008 in Venice, Italy.

Sponsored by Camper and Nicholson's International:

'Following the joint Camper & Nicholson's International - Boat International initiative three years ago to reward the work of yacht designers and naval architects, we thought it was only natural to continue to collaborate with the Boat International Group and RINA in order to identify the young designers of the future,' says Camper & Nicholson's International's CEO Jillian Montgomery. 'Taking an active part in this competition prepares the grounds for the future in many ways. Firstly, by giving up and coming designers exposure and the opportunity to get in touch with potential clients, and secondly by offering our existing and future clients a glimpse of designs that could soon be on the drawing boards,' explains Laurent Perignon, director of marketing for CNI.



Entries should be submitted on CDROM or DVD, by 31 Jan 2008. If you are interested in submitting an entry or would like more information, please contact Giuseppe Gigantesco, E-mail: ggigantesco@rina.org.uk, Tel: +44 (0)20 7235 4622

The Royal Institution of Naval Architects, 10 Upper Belgrave Street, London, SW1X 8BQ

SLS concentrates on MR sector

THERE has been no shortage of Korean investors keen to play a part in shipbuilding's boom, and one of the newer arrivals has been SLS, now in control of SLS Shipbuilding – the former ShinA yard.

SLS took over the Tongyeong-based shipbuilder in August 2006, having previously been involved in producing locomotives, and took the yard off the stock exchange.

SLS Shipbuilding president Tae Jin Kwon was formerly a senior manager at Samsung Heavy Industries, while administration and finance president Hak Kyu Kim was formerly with Daewoo Heavy Industries. Meanwhile, sales vice president Pan Tu Sohn is well known in the industry as a former sales director at Samsung.

Since the takeover, there has been heavy investment in new facilities, with a new 195m by 45m floating dock purchased and delivered from China for ships of up to 50,000dwt, a new floating crane acquired, and yard space increased. Plans are also afoot to move the yard's administration building, in order to increase fabrication space.

SLS is also constructing a new ground berth, 'Number 3 Dock', featuring the skid loading system, to be completed by the end of 2007, for vessels of up to 80,000dwt. Its current two docks are limited to ships of 60,000dwt.

The new floating dock should add a further six to seven ships worth of production each year, with the ground dock expected to turn out the same number.

But, despite the heavy investment, there has been no loss of focus for a yard which has set out its stall as a deliverer of MR product and chemical tankers, pure and simple. While, in the 1990s, and in the early part of this century, ShinA delivered cement carriers, containerships, and car carriers, from 2000 it began to concentrate on chemical and product tankers, a focus that now sees the yard fully booked to the end of 2010 and into 2011, with a high number of repeat customers. This year SLS will deliver 17 MR tankers, with the plan being to raise this number to 24 vessels next year, and the 2009 target 30 ships per year.

Among its clients is the fledgling 'SLS Marine', which started operations this year, but has already ordered five 50,000dwt product tankers for delivery between the end of 2007 and 2008.

'Other companies have diversified,' said an SLS spokesman, 'but we have decided to concentrate on MR tankers, from simple ships to stainless steel chemical tankers. We currently offer ships in the 41,000dwt – 50,000dwt range, although we may offer a 70,000dwt ship if our facilities are modified.'

This does not mean that SLS is unwilling to be flexible when it comes to vessel design, however. The company points to its 14-ship order from Stolt Nielsen for a complex series of tankers as bearing witness to this.



SLS MR tanker – 40,000dwt product carrier.



49,700dwt product carrier for KCL Marine.

These ships are comprised of four 44,000dwt, 182m long by 32.2m across chemical tankers and eight 43,000dwt vessels of similar dimensions for delivery between 2008 and February 2011, with what are understood to be options for two further ships. The ships come in two storage varieties.

The 43,000dwt version of these ships features 45,350m³ of cargo tank capacity in 39 tanks, with 25,345m³ given over to stainless steel tanks (24 tanks) and 19,005m³ given over to coated tanks (15 tanks).

The 44,000dwt version of these ships features 47,500m³ of cargo tank capacity in 29 tanks, all coated.

SLS said it was also showing flexibility over tank coating. While normally offering pure epoxy coatings, it also now offered zinc coatings (zinc silicate coatings 100microns thick are a feature of the 43,000dwt Stolt tankers, and on 14 of the coated tanks for the 44,000dwt variant). The shipbuilder is now contracted to offer Marineline's advanced polymer coatings.

Again, while it had delivered over 50 ships that featured satisfactorily performing hydraulic cargo pumps, it had also looked to extend its offer to encompass electric pumps. Four ships delivered to Novoship had been equipped with electric deepwell cargo pumps from Marflex.

With an eye to heading off competition with emerging Chinese builders, SLS said it was now building on its experiences of delivering stainless steel cargo tanks, to target orders for more such MR tankers, and particularly those of IMO Types 2 and 3.

'We are thinking in the 30,000dwt-40,000dwt range,' said the SLS spokesman. 'That is our alternative sales strategy. We are well aware that our competitors are going after bulk carrier and containership business. We have seen other yards, like Mipo and STX, diversifying because they have raised their capacities and now need to build a lot of ships. They need to move into containerships and bulkers, while we are smaller and there is enough demand for us. We have decided to concentrate, to limit our design needs, and to work on productivity.'

Now the race is on to develop back-up facilities capable of supporting the shipbuilder's plans. The yard's spokesman said that its reliance on the supply of blocks by third parties had not been without its problems. Pricing and quality had both proved to be issues.

SLS has thus acquired an area of land in Gunshan, in the western part of South Korea, where it plans first to begin building blocks from 2008.

Once the facility is complete, SLS will take stock of the market situation and decide whether or not this second facility should be converted into a shipyard, with current thinking being that there may be opportunities to build Handysize and Handymax tonnage. ☺

Military Support Ships

13-14 November 2007, RINA Headquarters, London UK

Second Announcement



In an increasingly uncertain world the modern navy needs to be able to respond to a wide range of operational commitments and missions anywhere in the world. Logistic support ships are essential in providing these forces with greater reach and endurance, and allow self-reliance and sustained operations to be conducted away from a supply base. These ships may be involved in supplying fighting ships bulk consumables, supporting land based forces from the sea, provide forward aviation support and humanitarian relief.



With the implementation of new technologies, changing operational and regulatory environments new methods need to be investigated to make logistic support ships more flexible and economical. This conference will bring together all those concerned with the design, construction, equipment supply and operation to consider recent developments and discuss how they impact on the design of such vessels.

The conference will cover such topics as

- Ship to Shore Replenishment Craft
- Replenishment Ships
- Strategic Sealift Vessels
- Forward Repair Vessels
- Hospital Ships
- Disaster Relief Vessels
- Underway Replenishment (RAS/UNREP/VERTREP) Systems
- Ship to Ship Interface
- Onboard handling of stores



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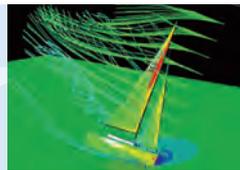
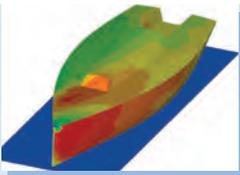
www.hpyd.org.nz

2 to 4 December 2008 Auckland, New Zealand

First Notice and Call for Papers
ABSTRACTS DUE 31 MARCH 2008

The third international conference on high performance yacht design will be held in December 2008, and will showcase the latest developments in yacht research from around the globe. This conference will be a venue where naval architects, engineers, designers and researchers can present and hear papers on the current state of high performance yacht and power craft technology. Advances in high performance yacht

design are being driven by a range of factors, including development of new racing classes and demand for increased size and performance of racing and cruising craft. Radical design concepts such as innovative new hullforms, moving keels and masts and new approaches to sails and propulsion systems require innovative approaches to analysis, design and experimental verification.



Papers are invited on all topics relating to the design of high performance power and sailing yachts including:

- Performance prediction and measurement
- Wind tunnel and towing tank technology
- Regulations and rating rules
- Computational methods
- Materials and structural analysis
- Hull and Appendage Design

Feedback from HPYD2:

"Many thanks for a both informative and inspiring conference. I have learnt a lot and will come back next time you arrange this outstanding event." *Stefan Qviberg, SQ Yacht Design, Sweden*

"A terrific, well organised conference which attracts the world's leading names in the yacht research field." *Claudio Fassardi, Noble Consultants, USA*

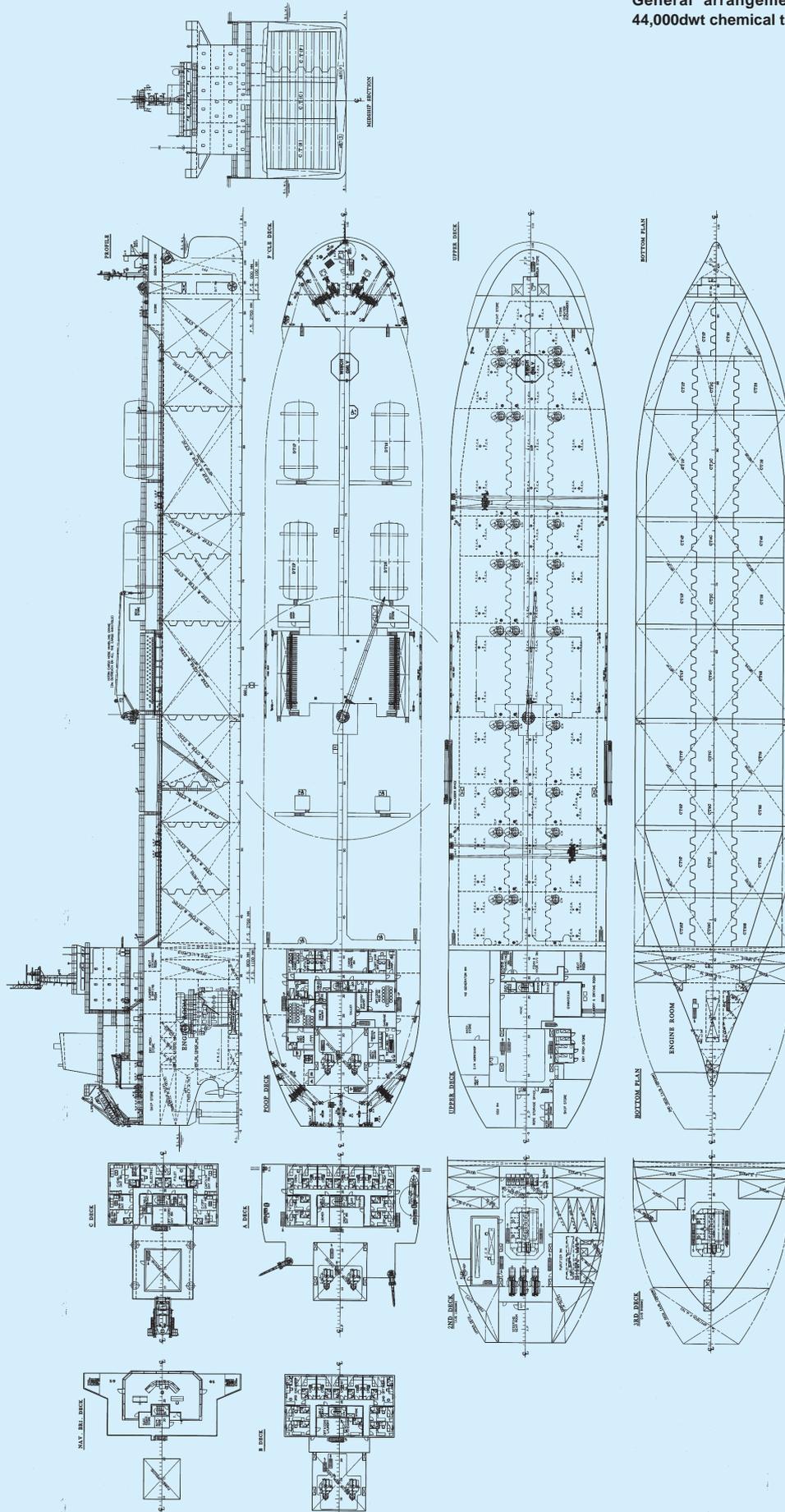


THE UNIVERSITY OF AUCKLAND
NEW ZEALAND



The Royal Institution
of Naval Architects

General arrangement plan of Stolt 44,000dwt chemical tanker.



SPP breaks the order century

THE market's appetite for new shipbuilding capacity is witnessed by events at South Korea's SPP Shipbuilding, based in Tongyeong, whose orderbook now extends to 110 ships, even though it has so far only delivered eight vessels.

Founded in 1997, as a crane builder, SPP took its first steps into shipbuilding as recently as 2004, as a supplier of blocks to established yards such as STX Shipbuilding, Samsung Heavy Industries, and Daewoo Shipbuilding and Marine Engineering. By 2005, the company had secured its first order for a fully-built ship through brokers, in the shape of a series of 50,000dwt product tankers for Turkey's Geden Lines.

Following up with orders for 50,000dwt MR tankers for Greek owner Transmed, the yard's early focus was on this ship type, with orders placed for 70 such craft, taking the yard's orderbook into 2010.

Occupying 120,563m² of space, the Tongyeong facility focuses on product tankers of 50,000dwt and 74,000dwt, although it could deliver ships of up to 90,000dwt. The operation uses the ground construction method and a 200m by 45m floating dock. It is served by a total of eight overhead cranes, with capacities between 100tonnes and 155tonnes, and is reckoned to be able to turn out ships at a rate of 12 per year.

Typifying its recent deliveries was *Dubai Star*, delivered in May, the second of a pair of IMO Type 3, 50,100dwt oil and chemical tankers for Emirates Trading Agency, of Dubai. The 183m long (174m between perpendiculars), 32m beam double hull tanker features a scantling draught of 13m, and has cargo capacity for 54,620m³ of liquids in its 12 coated cargo tanks, which are served by 12 x 600m³/h FRAMO submerged cargo pumps. The DNV-classed ship features 30%-35% high tensile steel in its construction. It is powered by a Sulzer 7RTA48T-B main engine, with an output of 9845kW at 127rev/min. *Dubai Star* is capable of 14.9knots at 90% MCR.

But, by 2007, it has already become clear that SPP is extending its portfolio of ships and plans further diversification.

Its second shipyard, south west of Tongyeong along the coast at Sacheon, was completed over the summer of 2007, where a 310m long by 86m drydock is capable of building two ships in parallel - one of Aframax beam and the other of Panamax beam - simultaneously, using the semi-tandem method. Facilities in Sacheon include two 600tonne capacity gantry cranes and a 600tonne capacity outfitting crane. The shipbuilder says that, if it concentrated on series-built MR tankers, it would be able to turn out around 24 ships per year from this yard.

But that is not the plan. Rather, as well as its standard 50,000dwt tankers, Sacheon will build 74,000dwt product and chemical tankers, 113,000dwt Aframax tankers, containerships of up to 3500TEU capacity, and bulk carriers.

SPP will begin building its first six 73,000dwt LR1 product tankers in 2009, for Overseas



SPP, which has rapidly emerged as a leading light among Korea's new breed of shipbuilder, completed its second shipyard over the summer.

Shipholding Group. The coated Panamax product carriers are scheduled for delivery in 2010 and 2011.

SPP has also secured orders for 113,000dwt Aframax tankers, with the build to start in 2010 and, noting strong demand for bulk tonnage, it has also secured orders for its first 59,000dwt 'Supramax' bulk carriers, with 20 ships now on order for a variety of Greek and Turkish owners.

Contrasting itself from other newer 'latecomer' shipyards, SPP notes that its build slots are almost completely full to the end of 2011. In being situated close to Geoje Island, home to more established shipbuilders, the company also stresses that it has been able to draw on local labour resources highly skilled in shipbuilding, with local industries also set up to supply components in volume.

SPP's 100-strong design team, located in Pusan, has been drawn from a range of existing yards. SPP concedes that, with the current workload, this number is not sufficient, and it outsources detailed design work to subcontractors. But, with a new 17-storey

design office in the offing close, the builder is putting down a clear marker that expansion of this element of its operations is in the air.

Furthermore, in stressing its solidity, the yard notes that Goldman Sachs invested US\$50m in SPP at the beginning of 2006, to become the group's second largest shareholder behind founder and chairman NY Lee. In late September, Goldman Sachs and UBS launched SPP's London Stock Exchange initial public offering. The company is offering 19.88m global depository receipts in the range of US\$16.27-\$21.41, to secure up to US\$425.7 million, in order to pay off debts and generate new operating funds. The deal suggests 63% of the offering will be of a primary nature.

And there is more to come, for, fast maturing shipyard SPP has no intention to settle for a limited range of ship types. While emphasising that it continues to be more than happy to deal through brokers, as a maturing operation, the shipbuilder notes that its recent deal with OSG could be classified as 'almost direct', while its dealings with Turkish owners are already being conducted on a direct basis. 

MacGregor makes its mark

KOREA'S appetite for diversification into ro-ro vessel construction has brought another fillip for MacGregor.

The company's ro-ro division has secured contracts to design and supply access and transfer equipment for 10 more ro-ro ships being built for Grimaldi by Hyundai Mipo.

The supplier said that the contract included design and fabrication of the equipment, which will be delivered between 2009 and 2011 and was worth more than €20 million.

Each shipset of ro-ro equipment will comprise: one cylinder-operated straight stern ramp, one bulkhead door on the tank top deck, one side-hinged ramp cover in two sections, one bulkhead door on the weather deck, one hoistable ramp between main and upper deck, two pilot/bunker doors and 18 hoistable cardecks/access ramps on two levels, plus two integrated access ramps on the upper car deck level.

The total weight of the ro-ro equipment is about 700tonnes per shipset.

Follow-up orders

Earlier this year, MacGregor won the cargo access contracts for 15 other vessels under construction at the Korean yard. Five of the vessels are 3500-unit deep sea ro-ro ships for Grimaldi, six are 3500-unit pure car/truck carriers (PCTCs) for Neptun Lines and four are 3500-unit PCTCs for Dutch company Vroon BV.

In this case, MacGregor said the contracts include the delivery of the design and hardware for the ro-ro equipment and the design and key components for the hoistable car decks, with an option for the fabrication of the car decks. Equipment is scheduled for delivery between 2008 and 2010.

Jinse goes with AVEVA

KOREAN yard start up Jinse Shipbuilding Co will be using AVEVA Marine's marine design and engineering life cycle solutions to build its first ships.

Jinse, a recent addition to the Korean shipbuilding industry, is based in Busan, the largest harbour city in South Korea. It has already received orders for 32,000dwt and 180,000dwt bulk carriers, with the former due to be delivered by early 2008. By adopting AVEVA Marine as the core technology for ship design, Jinse's engineering team is now placed alongside the giants of the shipbuilding industry.

Kim Tae Hyoung, director of Jinse Shipbuilding Co says, 'The onus is on us to build high quality ships in the most efficient manner. We believe that AVEVA Marine will lead to higher production accuracy, savings in calendar time, and less rework.'

Peter Finch, president of AVEVA Asia Pacific says, 'Using the AVEVA Marine portfolio, Jinse will be equipped with comprehensive solutions for the design, construction, and lifetime support of all types of ships. The portfolio also features sophisticated analysis capabilities that allow the most advanced ship design and comprehensive production-support functions to ensure efficient, high-quality shipbuilding. We anticipate that the Jinse-AVEVA partnership will carry on well into the future.'

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KCC steps up to the coatings mark

COATINGS supplier KCC is building on South Korea's shipbuilding boom to develop its presence globally. It believes the continuing emergence of Asian shipowners will play a key part in its plans, but KCC is also taking steps to build on relations with European owners.

The paint supplier said recent years had seen something of a change in uptake for its output. Historically, KCC marine paints supplied through the domestic shipbuilding market have been for the most part made for Hyundai Heavy Industries and its other shipbuilding affiliates.

However, while demand from HHI has continued to rise as the orders have mounted, Daewoo Shipbuilding and Marine Engineering has begun taking KCC product in volume, while Samsung Heavy Industries, Hanjin Heavy Industries, and emerging yards such as Sungdong Shipbuilding and Marine Engineering, and Daehan Shipbuilding have agreed to become mainstay outlets just this year.

In 2007, for the first time, KCC reckons it will be the number one supplier of marine coatings to Korean shipbuilders.

The coatings supplier said that as more and more customers had become familiar with the paints supplied by KCC to HHI, so they had begun to specify KCC coatings in discussions with other Korean yards.

Now, the drive is on to build production and distribution bases for overseas shipyards. With factories already established in Shanghai and Beijing, KCC opened for business in Guangzhou over the summer of 2007. Alongside the Singapore factory it established in 1992, it is also building production outlets in Turkey, India, and Vietnam. While the impetus for most of these facilities is the building up of automotive coatings business, the marine and industrial sectors also feature in the company's expansion plans.

Specifically in terms of marine products, KCC is also set to 'increase our network dramatically, in order to compete with our main competitors,' according to Steve Park, KCC marketing manager, marine project marketing department. KCC was looking for new relationships with OEMs overseas. It was looking beyond established relations with OEMs in The Netherlands and the US, to new markets, such as Greece, South America, and South Africa. KCC also plans to open a new warehouse in Dubai before the end of 2007, in order to supply marine coatings locally.

Hand in hand with its ambitions goes new product development. KCC has invested massively in its Jeonju plant, in order to be able to produce silicone monomers, in a first for Korean industry. Accordingly, its latest product launches include the silicone-based topcoat ST1020 and the silicone-based anti-fouling 'Lo-Frick'.

Owners including Neptune Orient Lines subsidiary APL, Korea Marine Transport Co, and Eukor Car Carriers have expressed satisfaction that ships coated with Lo-



Hyundai Heavy Industries' first vessel constructed on land, Novoship's 105,000tonne crude oil tanker *NS Challenger* also features coatings from KCC.



Customers for 'Lo-Frick', KCC's new silicone-based anti-fouling, have included APL.

Frick have shown good performance. KCC said it expected to coat three or four more applications this month alone.

The supplier said that, while the price of silicone-based coatings was three or four times the level of self-polishing paints, significant cost savings accrued to ships coated with silicone-based paints, due to the smoother hull finish.

'We are sure that the market for this kind of product is coming very soon,' said Steve Park, marine project marketing department marketing manager, 'and KCC is ready for it.'

At the same time, like other paint suppliers, KCC is being required to invest in developing identifiably non-toxic, self-polishing anti-

fouling paints, in line with the requirements set out in the EU's Biocide Products Directive and by the US Environmental Protection Agency. Tests in Ulsan, Indonesia, and California were focusing on a copper-free anti-fouling.

Also developing are requirements for new tank coatings to meet the IMO's new Performance Standard for Protective Coatings. KCC said that, as a product, its EH2350 tank coating was fully compliant with the standard, but that there remained an issue with application at shipyards. 'There is a new, small impact for paint suppliers,' said Mr Park, 'meaning that we have to match changes in workability. The yards have to increase their speed of production and so they are asking suppliers for better products. We are having to modify our products to match that demand.'

Mr Park said that drying time was the key issue. After five years of product development, KCC expected certification from DNV of a new generation of 'pure epoxy' product, identified as EH2030.

PSPC requirements have also meant key members of KCC's technical services staff have been obliged to secure new internationally recognised qualifications, through professional certification bodies such as FROSIO and NACE, in order that they are in the position to advise yards on coatings applications. 

Korean Register builds on growth

HAVING already secured more ships in class than in any time in its history, the Korean Register of Shipping continued to enjoy strong international growth during the first half of this year. The total number of ships classed with the society now stands at 2206 ships totalling 28 million gt (as at 31 August 2007). The vessels are predominately bulk carriers, tankers, and containerships but passenger ships, fishing vessels, and other general cargo ships also feature within KR's fleet.

The number of KR classed vessels owned by non-Korean nationals is also rising year-on-year and currently stands at over 20% of the total fleet.

In 2006, KR enjoyed what it termed 'an enviable Port State Control (PSC) record' comparable with, or better than other IACS members in both the Tokyo MOU (0.27% detention rate) and USCG region (0%). However, it conceded falling slightly behind its peers in the Paris MOU jurisdiction (1.47%), although KR pointed out that this was largely due to the few port calls being made in that area by KR vessels, resulting in just a handful of detentions skewing the figures. 'Nevertheless, we have already implemented measures to drive up quality of PSC record in that region,' said the class body. These measures include the establishment of a 'flying squad' of experienced surveyors dedicated to assisting vessels categorised as requiring 'special attention' during PSC inspections;

and offering of pre-inspection services for vessels scheduled to enter a port where PSC inspection is expected.

CSRs and KR

KR said it was 'a bit premature' to estimate the result of building ships under new common structural rules. 'We should remember that these are the first set of unified standards to be implemented among IACS members. However, any problems that have been identified so far have been reported to the IACS CSR group by the individual classification society concerned without delay. We believe that close communication and mutual cooperation between shipyards and classification societies will help overcome the majority of issues which might arise.'

KR said it has been continually developing its 'SeaTrust' software series, which allows the CSR to be applied effectively within the shipbuilding sector. KR's software is dedicated to IACS CSRs for both bulkers and tankers and 'has been well received by shipyards and ship designers'. Working with other IACS member societies, KR is actively engaged in comparing each other's CSR software to ensure unification.

Active IACS member

KR said it was actively participating in all IACS meetings and discussions. KR presently holds the vice chairmanship of the IACS Council and will take over the

chairmanship from 1 July 2008. The society is also making a positive contribution to the development of IACS CSRs through its chairmanship of one of the technical small groups and a number of project teams (PTs). Furthermore, from 2008 (and for a three year term) KR will hold the chair of the IACS Survey Panel.

KR has been a key developer of IMO submission papers on technical issues for the Korean government. For example, KR has made a significant contribution to the drafting of almost all of the documents submitted so far to IMO regarding goal-based standards. KR is also currently involved in a project to develop an ozone ballast water treatment technology with a Korean manufacturer. The project will be completed in the early part of next year.

Asked to comment on recent (fruitless) acquisitive moves by certain societies, KR said it found it unlikely that there would be consolidation between class societies themselves. 'Since most societies have their origins as national ship inspection organisations and are authorised by their respective national maritime administrations to perform activities for the promotion of maritime safety and the environment protection on their behalf, it would be difficult to consolidate.'

'KR has no intention to be a predator, nor a target for consolidation. It will continue to grow and develop through providing high quality services to the shipping industry.'



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Making the most of collaboration

SHIP design is a complex and time consuming process. Typically, the process is divided amongst specialist departments and subcontractors. Here, Napa vice president I Kuutti explains one approach to integration.

SHIPS are built in short series or as 'one of a kind' designs. The delivery time after signing the contract is often very short, leaving too little time for optimum design, purchasing, and manufacturing.

Complex and demanding ship design projects are managed by dividing the ship and the design process into manageable size, fairly loosely coupled parts and tasks.

The ship itself is split into fairly independent conceptual components thus allowing various groups to work concurrently:

- Decks, fore ship, aft ship, cargo block, etc
- Structural elements
- Outfitting systems and disciplines
- Building blocks
- Fire zones
- Compartments.

Furthermore, the design and building process is split into area, phases, and disciplines.

The modern ship design process is based on using subcontractors and outsourcing, even at the early design stages. Especially in European shipbuilding, the design is made to a large extent by engineering companies, not by the design office at the shipyard. This calls for advanced tools and methodologies for sharing and coordinating the design information.

However, it is very demanding to coordinate the independent tasks, manage design information within a complex network of independent players, and coordinate the design changes. Any ship is one entity and the process should be managed in such a way that any conflicts are avoided and risks of inconsistent design are minimised.

As the design evolves, conflicts between intersecting areas and systems often arise anyway. The resolution of these conflicts can be costly, especially at the latter stages of the design coordination. Therefore, effective collaboration amongst all stake holders is crucial for cost effective ship construction.

Modifications are much more expensive if design errors are found during the manufacturing stage. Therefore, the changes to improve the design are much better made at the early design stages, and the investments in the early design stages are considered feasible.

For these reasons, a lot of attention has been paid in the development of modern ship design systems, such as the NAPA system, to help manage the design process at the early stages.

In the first levels of integration the emphasis is on the technical integration of software tools with

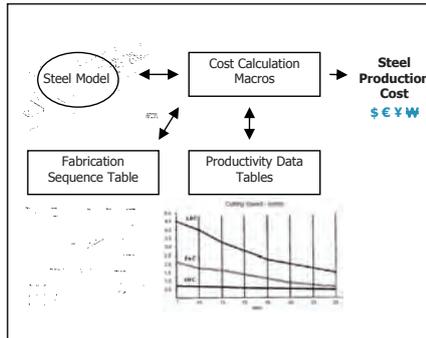


Figure 1: Components of NAPA Steel cost calculation.

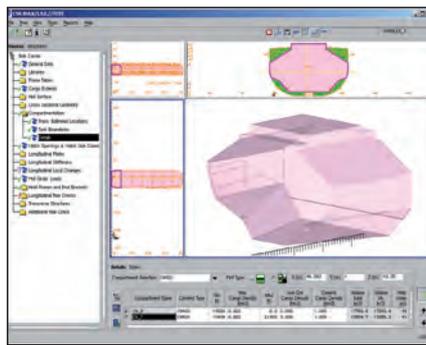


Figure 3: The real geometry of the aft most cargo hold.

the necessary input data. The integration available in the NAPA system is presented in the following chapters.

A 3D topological geometry model of a ship forms the backbone of the NAPA system.

The design information is defined directly into a 3D geometry model. All geometric elements in NAPA are defined through topological relations assuring the integrity of the 3D geometry even after very large scale design variations, especially when systematic and automated design variations are applied.

The design of a new ship starts from the hullform geometry, which is also the basis for the internal geometry. Compartments, decks, bulkheads, etc can be defined in NAPA in an arbitrary order applying various methodologies depending on the final purpose of the geometry.

Managing complex geometries in NAPA is made easy with the efficient use of reference surfaces that coordinate topological connections between individual compartments and surfaces. In order to have easier and better control of these reference surfaces, a completely new concept of reference surface arrangement has been introduced into the new NAPA version and these are taken into active use in the revised Geometry Editor.

A compartment model is needed at the first stages of the naval architecture; therefore, it has been natural that users have defined the compartments by referring to reference surfaces. The actual surface objects such as decks or bulkheads are typically defined at the later stage when they are needed for the structural design or weight calculation. However, as the use of surfaces is becoming more and more

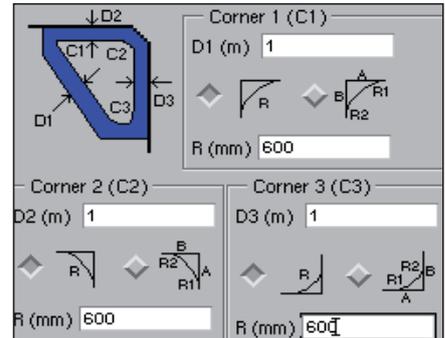


Figure 2: An example of a parametric design template used in the ABS CSR software.

important also at the early design stages, the need for having surfaces at the first design stage has become more obvious.

The NAPA system is already one of the most comprehensive naval architectural software packages and new functionality is added every year.

The NAPA system has been a totally integrated package from the very beginning regarding the calculation subsystems and functions. Input information for calculations is extracted from the 3D model automatically. The update check, on the other hand, ensures that the results are updated after any geometric change.

The integration of the analysis function with the 3D geometry model therefore facilitates doing all analysis calculations quickly and easily, providing users with direct access to the results after any design change.

Performance analysis

Engineering calculations were a top priority in the first NAPA releases. Attention was paid mostly to the technical figures such as speed and power, weight and capacities. As the NAPA system has developed towards a more complete suite of calculation tools, the importance of economical studies has become more prominent.

The development of new applications is now heading towards a complete and balanced view of the design as more and more attention is paid to economical figures. A key benefit of an integrated package is that it allows doing complete design optimisation while taking the economic aspects into account.

For these reasons the Weight and Cost subsystem was already developed years ago. The new release builds on this with a Steel Production Cost NAPA Manager Application for accurate calculation of production cost and man-hour estimates for each work item.

One design system is never able to cover all the needs in ship design. In a typical major shipyard, hundreds of IT systems of various kinds are used to support the design and building process. For this reason, interfaces with the other IT-tools are needed.

More than 50 interfaces have been developed over the years to integrate or interface NAPA with the external IT systems. The interfaces allow the NAPA system to communicate efficiently with almost all computer software systems used in the shipbuilding industry.

Drawn from the paper 'Integrating rules and practices with early design process', presented by I Kuutti, vice president, Napa Ltd, Finland to the ICCAS 2007 conference.

System-specific solutions exist to integrate NAPA with NUPAS-CADMATIC, FORAN, and Tribon/VM systems.

In addition, neutral interface formats, such as IGES or STEP, may be used for transferring the design information from NAPA to a receiving system and reusing it with minimal effort.

For example, when the NAPA Steel model used at the approval phase is transferred into detail design systems, a remarkable saving in time can be gained compared to re-entering/modelling the design, thus speeding up the detail design and avoiding human errors in reading the classification drawings.

Design automation

The routine tasks in every design phase should be automated in order to make the design process more efficient and in order to allow the designer to concentrate on creating new designs.

One of the key success factors in NAPA is the flexibility provided by the command language and supported by many multi-purpose tools such as:

- NAPA Basic macro language backed up by subsystem-specific service functions
- NAPA Manager for workflow control and process automation
- Table Calculation for versatile data management and quick application development
- Widget Editor for building purpose and organisation specific user interface components
- Topological and geometric functions for advanced geometry building and analysis.

The NAPA system is an open package with many tools that allow end-users to tailor the system to their specific needs and practices. The generic tools provided with the system are useful as such, but more efficiency and reliability may be gained once the tools are adapted to organisation-specific practices and standards. There are more and more examples of the effective customisation of NAPA to organisation-specific needs.

Parametric definitions offer very easy and fast methods to define a new ship project and do design variations. As all NAPA definitions can be made through text-based definitions with macros, it is actually possible to apply parametric definitions to everything that NAPA is used for. On the other hand, there are several applications where the parametric definitions are already available through a user-friendly graphical user interface.

Parametric hullform definitions have been available for several years and have been used for hullform optimisation and fast definition of new projects. The Hull Surface Editor contains special tools to work with the parametric hull definitions.

Design templates, as adopted in many NAPA Managers and in the ABS CSR software, are user-friendly tools using the parametric modelling technique. A typical design template contains a few important parameters with an intuitive input format. Depending on the preferred flexibility and complexity of the design problem, a parametric definition may contain just a few parameters or all possible design variables.

As an example, an Upper Wing Tank web frame template in the Bulk Carrier software offers very intuitive and easy-to-use, yet flexible definitions that allow the user to reach exactly the preferred end result.

CSRs and CAD/CAM

New common structural rules (CSR) for Tankers and Bulk Carriers came into force in April 2006. This has had a big influence on the design process of these ship types. Due to the complexity of the new rules, special software to calculate the requirements for the structure is needed.

Rule formulae are often based on different parameters than the actual geometric design. For example, the rules depend on unsupported span that can be derived from the geometry, but it is never a direct input in the design process. For these reasons, design variations are very time-consuming with the separated classification programs.

Traditionally, the rule programs have been isolated from the other design tools, but now with the ABS CSR software, the situation changes. Napa Ltd and

ABS have jointly developed software based on NAPA technology to assess the scantlings against the CSR requirements. A combination of NAPA Steel and ABS CSR software is available for Tankers and Bulk Carriers. The same 3D structure model can be used for both rule check and various other purposes.

Typical scantling assessment software is based on 2D sections of the ship. A different approach was adopted by ABS and NAPA. During the process of evaluating the rules a 3D model of the ship structure is created behind the graphical user interface. The calculations are then carried out by deriving the information from the model.

The user interface of CSR software has a workflow guiding the user through all necessary tasks. Each item in the workflow has an easy-to-use template asking from the user the information of the geometry in a 2D view. Then the 3D structure model is created on the basis of the user input.

The CSR software for Bulk Carriers can also handle non-prismatic parts of the ship, ie the real geometry of the hullform, and the inner structures are created. The rule evaluation is carried out either for a cross-section of the ship created by intersecting the 3D structure model or it is carried out in a 3D panel or stiffener.

The results of the rule calculation in CSR for Bulk Carriers are presented very transparently. The reporting system has three levels: detailed, intermediate, and summary. The user has full access to all intermediate results and can investigate the values for each parameter in the detailed report where the dependencies of the parameters in the rule formulas are shown in a hierarchical manner. The intermediate and summary report summarises the results in a standard PDF format.

Finite Element Analysis is an essential part of the structure design also from the classification rules point of view. The Common Structural Rules for Tanker and Bulk Carriers demand extensive FEM analysis to be made for all vessels. The FEM analysis is also applied for all large ships of different kinds, such as containerhips, LNG, cruise liners, etc.

If the 3D structure model created for other purposes cannot be re-used for this purpose too, the creation

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of a FEM-model can take up to several man-months for a complex structure. Therefore, the integration of FEM analysis into the design process is a vital part of enhancing the structure design process.

Figure 4 shows an extract of a FE model produced automatically from a Bulk Carrier created with the ABS CSR software. The meshing has been made in the NAPA FEM pre-processor and the actual structural analysis in a Finnish FEM package called FINNSAP.

The efficiency of structure design can be improved even more once the classification rules are integrated into the design package and the creation of the 3D model is supported by easy-to-use design templates.

The number of feasible designs is typically quite large with structures. Each design alternative contains thousands of free design variables for scantlings that the user must set during the design process. Without having efficient tools to analyse and compare different design alternatives, the designer cannot easily decide the best alternative.

A complete 3D structure model provides the designer with up-to-date numerical information for selecting the best alternative.

The NAPA Manager can also be used to integrate company-specific know-how and practices with the design tools. Many of the leading shipyards have defined an automated and standard process to manage their routine work. For example, Meyer Werft, Mitsubishi, Sanoyas, DSME, and Hyundai have all developed company-specific Manager Applications according to their own needs.

There are several obvious benefits offered by the company-specific Manager applications:

- Better quality by re-using the best practice with past experience
- Users will automatically apply company specific standards
- Quality of work will be more uniform for all users
- Every user will be able to work efficiently
- Experienced users can carry information to new employees through Manager development.

The cooperation with LR for implementing all Statutory Compliance rules with LR interpretations and procedures into NAPA Manager based application, called LR SCM, has been going on already for two years. The first set of rules have been put into production use at LR and the implementation continues to cover more and more rules and ship types in the future.

LR SCM will provide the user with very convenient tools to make sure that new designs fulfil the rules and regulations.

This LR SCM offers the following benefits to the shipyard users:

- LR interpretations are built into the process
- LR SCM can be used continuously during the concept and initial design stage to ensure the design complies with the regulations
- The application can also be used as a training aid for junior designers
- A design submitted for approval should be correct from the beginning
- Reduction in time from concept to delivery
- Improved quality.

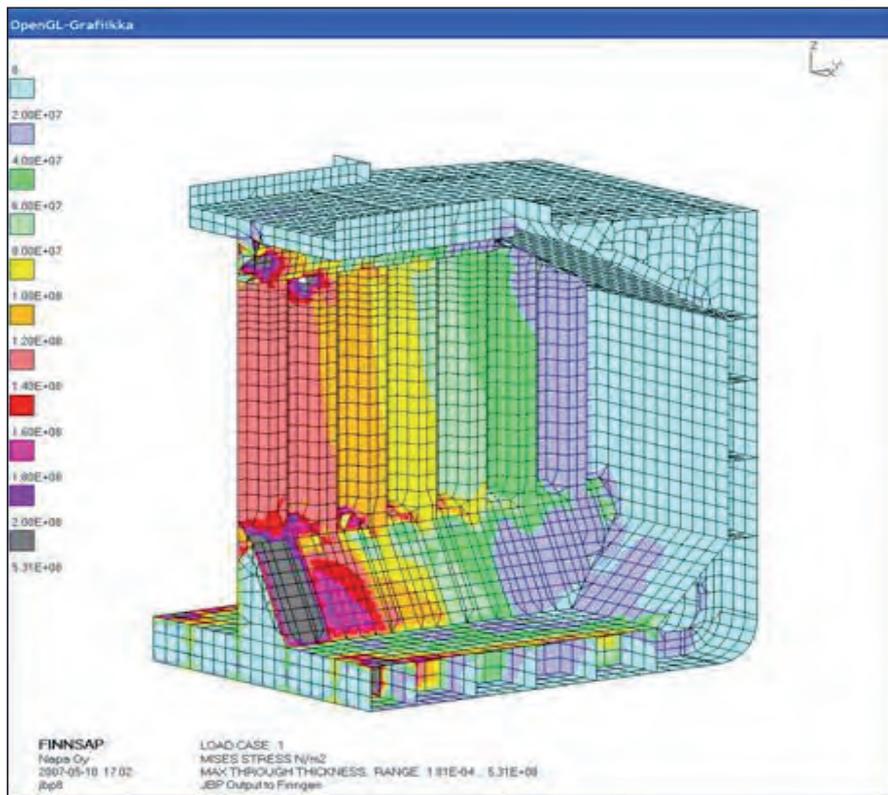


Figure 4: NAPA Steel integrating disciplines in structure design.

Further efficiency and cost reductions are provided when the optimisation tools are used to automate the search for the optimum combination of design variables.

Another example on using optimisation tools is finding the worst possible loading conditions according to MARPOL Unified Interpretation MPC 11 for intact stability, which has been implemented in the LR SCM Manager.

In order to help shipyards control the design information in a better way, security functions have been added into the NAPA system. The available functions allow encrypting an entire database or selected data. Also, the system allows the stripping of unnecessary data or setting some data to 'execute' mode, thus preventing the misuse of this information by the receiving party but allowing the user to still use it effectively inside the system.

The data security is supported by the ExportDB Manager Application. It is our wish that the NAPA user organisations would take these security functions into full use to be able to increase the data security while at the same time speeding up their design and plan approval times by sharing the design information in electronic format.

The NAPA 3D model can therefore be used to make shipyards, classification societies, shipowners and operators, research institutions, design consultancies, and model basins work more efficiently in a secure way.

Integrating technical analysis calculations with the 3D product model and database is essential for an efficient design tool, but this is not enough.

Cost benefits of created design alternatives should be verified with the aid of detailed cost model and the performance should be analysed through detailed performance analysis calculations.

Automating the routine tasks with proper tools will shorten considerably the time to create a new design

and complete the analysis calculations. On the other hand, parametric design methodology makes it possible to create new design variations quickly.

As the design must satisfy all design rules and regulations with proper interpretations, these also must be integrated with the design software.

Through integrating the optimisation tools into the design package, it is possible to find the best design alternatives faster.

The process of integrating all these essential tools into the NAPA ship design package has been continuing now for three decades. The integration of classification societies' rules and practices was started more actively just five years ago, and this work will continue quite actively for the next years to come. Already now many essential rules are available in a very flexible design tool, making the NAPA system the most efficient ship design package available in the market.

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SmartMarine for the smarter user

INTERGRAPH Corp has introduced SmartMarine 3D, its next-generation software aiming to streamline design processes, resulting in lower costs and faster delivery for the shipbuilding and offshore industries.

The announcement was made in conjunction with the 13th International Conference on Computer Applications in Shipbuilding, ICCAS 2007, in Portsmouth, United Kingdom.

Previously known as IntelliShip, SmartMarine is said to offer improved modelling, detailing, and manufacturing capability for offshore devices and ships.

SmartMarine provides a multidiscipline, integrated design environment that reduces costs and shortens project schedules for shipbuilders and offshore design firms alike. It couples engineering, automatic drawings generation, production planning, and manufacturing.

'SmartMarine is the most advanced marine design solution in the market today,' claimed Gerhard Sallinger, president, Intergraph Process, Power & Marine. 'It's a next-generation, full 3D system, not '2 1/2 D' as is the case with some other, old-fashioned systems that are still used in the marine industry.'

'The new product branding from IntelliShip to SmartMarine reflects the investment in the solution by leading marine systems clients, such as Keppel FELS of Singapore, COSCO Shipyard Group of China, or Grenland Group in Norway, to design ships and offshore devices more effectively.'

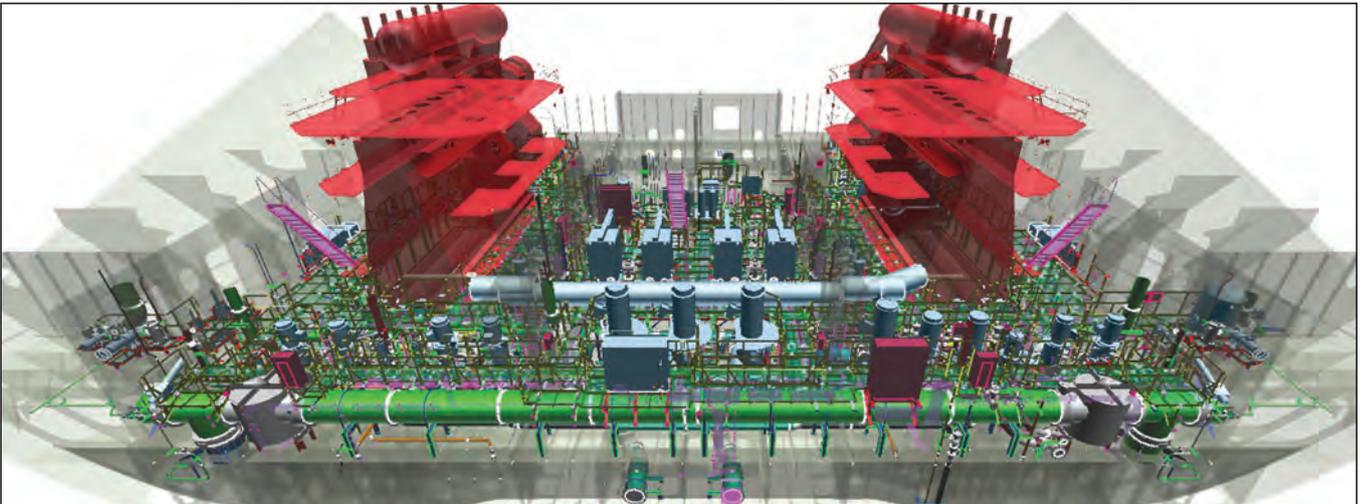
'Intergraph solutions have been expanded to support the offshore industry, with additional features for manufacturing and production planning and outputs, as well as modelling, detailing, and manufacturing enhancements,' Mr Sallinger said. 'Any marine structure, whether it's

naval or commercial ships, offshore platforms, semisubmersibles or FPSOs, can be delivered faster and better using SmartMarine.'

Originally derived from a plant design solution, proven in the most complex and demanding landside process and power plants, Intergraph software has expanded and evolved to meet the needs of the world's leading shipbuilding and offshore companies and classification societies. Users such as Samsung Heavy Industries (SHI) or the Odense Steel Shipyard Group have significantly reduced engineering time, rework errors, and material costs. Customers also foresee continued productivity improvements by using SmartMarine, the company said.

'The shipbuilding and offshore industries simply deserve better solutions than the outdated products still being used today. We believe that SmartMarine represents a giant step forward for the productivity of the industry,' said Mr Sallinger. ☺

Floor of an LNG carrier, showing two operation engines, pipe routes, and steel outfittings. This image was created by Samsung Heavy Industries (SHI).



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ICCAS journeys from the ancients to Mars

A REVIEW of September's International Conference on Computer Applications in Shipbuilding, held in Portsmouth, by Patrick Couser.

THE focus may have been 'Computer Applications in Shipbuilding', but over 2500 years of human history were covered in Portsmouth last month, as Kaj Johansson, chairman of the International Programme Committee, opened the ICCAS 2007 conference to a well-filled lecture theatre.

In the initial plenary session, the great trireme battle of Salamis in 480BC between the Greek and Persian fleets was discussed along with the prospect of a manned mission to Mars in 2033. These two widely-separated events highlighted one of the conference's main themes – that of human factors. In the case of the triremes, the kinematics of rowing helped to provide a hypothetical design for an ancient Greek trireme (no shipwrecks exist because these were unballasted vessels and when damaged, the crew would abandon ship and the wreckage would float on the surface); for the manned Mars mission human factors will be very significant for its successful completion; in both cases computer analysis has played a significant role.

Several interconnected themes kept recurring during the conference.

These included the management of the project through its entire life cycle from concept design, through detailed design, construction, operation, and final decommissioning.

Also central was the need to be able to collaborate with a large number of globally-dispersed partners and manage vast quantities of data – numbers as high as 250 parties working on a single project are relatively commonplace.

Martin Gwyther, vice-president PDM/PLM solutions, AVEVA, said: 'There is an increased need to work with partners: subcontractors, venture partners, designers, suppliers. Moving forward, there will be an increase in high-value, high-complexity ships.' He emphasised two key areas for IT investment: advanced, multi-user design CAD systems and ERP systems. These systems must address the needs for data storage, sharing, access control and security, configuration, and revision control, whilst providing tools for collaboration, review, messaging, visualisation, and workflow management. Many vendors were providing web-based solutions because they avoided the need for specific software to be installed and provided ease of remote access.

With the vast quantities of data produced, and the fact that often the same parties are collaborating on one project, but are competitors on others, it is vitally important to be able to control who sees what and how much they see.

Need to know basis

'Don't give the whole book if you only need to give one page,' said Marc Donoghue from PTC in his presentation.

Patrick Cahill of ShipConstructor Software shed light on some practical aspects of data transfer between geographically dispersed locations and highlighted some of the methods available to overcome the bandwidth limitations of the internet.

Mr Gwyther also emphasised the differences between automotive, aerospace, and shipbuilding projects. Automotive projects are characterised by relatively simple end products comprising between 2.5- and 10-thousand parts. Bulk manufacture is used to produce many thousands of identical products with maybe slight variants (colour, accessories) and this justifies a large initial outlay in prototyping and then design for optimum manufacture. The aerospace industry deals with significantly more complex systems (typically 150-thousand to 1.5-million parts). However, the reasonably large number of units constructed in each production run (albeit sometimes semi-customised), combined with the rigorous safety requirements, mean that it is cost-effective to build and test pre-production prototypes.

Unique projects

Shipbuilding, on the other hand, almost always deals with unique projects, especially for commercial vessels; even sisterships may vary considerably from one another. (A possible exception is naval vessels, where a series of near-identical vessels may be built.)

Ships are often extremely complex - vessels comprising between 2.5- to 4-million parts are not uncommon. Under these circumstances, it is not practical to build and test prototypes, and much of the detailed design and construction phases of the project are done concurrently.

These differences explain the need for domain-specific software, aimed at the shipbuilding market and the ability to be able to customise software to meet the design and construction practices and knowledge of individual shipyards. This was highlighted by presentations from several shipyards describing how they had customised existing software or developed their own software to meet their specific needs. There seems to be a general integration and convergence of the various management and design tools, and most of the software vendors targeting these projects have integrated lifecycle-management software which addresses these issues.

The concept of designing a vessel by first specifying the volumes needed to fulfil the design's capability requirements, as opposed to initially defining the hullform and then fitting the required components into it, were discussed by Ilmo Kuutti of NAPA and Professor David Andrews of UCL. Mr Kuutti highlighted the case of the design of a containership hullform around a container arrangement derived from the vessel's required container capacity. Professor Andrews showed how a wide range of different design alternatives could be investigated in the early stages of design of a naval vessel by considering the functional volumes

using a Design Building Block methodology, thus producing a design that is driven by the capabilities required by the end user.

Papers were presented by a range of interested parties: software vendors explaining the new features and capabilities of their software; software developers giving an insight into some of the more technical aspects of the software; end-users providing feedback from actual projects, the software selection process, software customisation, and how software can be used to capture in-house design and construction practices and knowledge; Peter Wright, from Newcastle University, described how design software could be used in an academic context and how it could be made more accessible to students.

Wide ranging interests

Topics as diverse as the use of CFD in initial design, highlighting the need for sophisticated visualisation and data interpretation software, to some of the latest developments of welding robot technology and the use of photogrammetry to record the 'as built' vessel and changes made during the vessel's life were discussed. Papers discussing 'design of experiments' and use of genetic algorithms for design space exploration and design optimisation were also presented.

Outside the lecture theatres, there was also plenty laid on for the delegates, providing an opportunity for informal discussions: Intergraph launched its SmartMarine 3D detailed design package (see separate article) with a live demonstration showing the interaction between different users.

What's in an acronym?

As always with a technical conference, delegates to ICCAS 2007 were bombarded with a wide range of acronyms. Here is a survival guide:

CAD	Computer Aided Design
CMMS	Computerised Maintenance Management System (Enterprise Asset Management)
CRM	Customer Relationship Management
ERP	Enterprise Resource Planning
IT	Information Technology
MRP	Material Requirement Planning
MRP2	Manufacturing Resource Planning
PDM	Product Data Management
PLM	Project Life cycle Management
SCM	Supply Chain Management

Attention Naval Architects

GHS continues to be the software tool most often used in the industry for ship stability, strength and salvage problems. Recent enhancements in **version 10.5** address the most difficult aspects of drilling-unit stability.

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Rembrandt fit for a Queen

NOMINALLY in its fourth version, BMT Seatech's unique PC Rembrandt ship handling training simulator now covers ship-handling training, briefing and debriefing, incident analysis, manoeuvre rehearsal, port approval, newbuild auditing, vessel familiarisation, and navigation training.

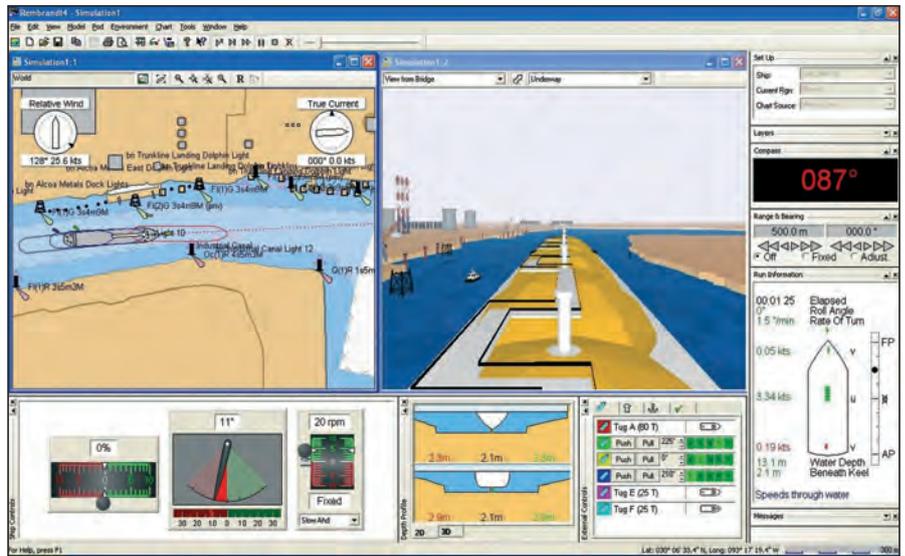
Version 4 represents a significant step forward for the system, based on customer feedback. Previous generations have featured planned chart views, whereas the latest version features three dimensional visuals. Drawing on new bank effect modelling, ship-to-ship modelling, and full scale data from shallow, narrow locations such as The St Lawrence Seaway and the Houston Ship Canal, BMT reckons that its new platform features a better than ever level of accuracy, based on more sophisticated mathematical modelling.

PC Rembrandt is characterised by its flexibility across a variety of applications. In its shiphandling application, the system is primarily aimed at junior officers and represents a bridge simulator to be used in tandem with normal training.

In manoeuvring rehearsal mode, more senior officers and masters can simulate a passage plan, perform risk assessments on any changes to that plan, and consider interactions with tugs and shore side equipment.

In incident analysis mode, the package has been used to analyse real incidents and to prove or disprove explanations for such incidents in courts of law. In compiling real inputs, such as those from a working chart, or from engine log data, the package can be used to look at the failings of specific components. A case in point has been its use to analyse bearing failures in podded propulsors, and has been useful in backing up recommendations that loads on main thrusters bearings should be minimised.

For traditional architects, the system can be used for newbuilding assessment, in order to



LNG ship arriving at an LNG terminal, courtesy of PC Rembrandt.

establish what the outcome would be of taking particular design options, and whether the design is compatible with the delivery schedule. PC Rembrandt was used, for example, as an assessment tool by future shipmanagers involved with the development of the latest Q-Flex and Q-Max generation of liquefied natural gas carriers, in order to assess the impact of choosing steam turbine, slow-speed diesel, diesel-electric or even gas turbine propulsion systems on manoeuvrability. Also assessed was whether these ships should feature single or twin screw solutions.

Again, it has been used for a similar analysis of container ships of 12,500TEU capacity and above, where the effects on shiphandling and the need for pilotage and tug assistance were assessed as they

related to the then live Diben Bay project, in the case of a single screw ship, a twin screw ship, and a ship featuring azimuthing pods.

Recent customers for the suite include Gulf Energy Maritime China Navigation, P&O Cruises, Chevron, AP Moller, and Disney.

P&O Ferries used the tool to assess what the effect of adding one deck apiece to two ferries would have on ship handling, and whether there was a need to install high lift or flat rudders.

PC Rembrandt has even been specified as part of the plan to decommission QE2, where it will be used to determine the operating envelope in Dubai for towing an old lady that will by then be without her own propulsion from the refit berth to her final destination. The key will be establishing when wind and currents will be at a minimum.

Stability check from NAPA

NAPA has introduced a new feature to its 'Manager' development platform that enables the designer to check that the ship complies with the rules and regulations concerning stability and damage stability easily at the design stage.

The feature, developed in collaboration with Lloyd's Register, is an addition to the Manager platform that already offers tools for the modelling of processes in the planning of different ship types, with ease of use and an intuitive user interface.

The Manager applications now developed include Lloyd's Register's expertise and interpretations concerning the Rules and Regulations for stability. They are therefore also certified by Lloyd's Register. The applications are also applied in Lloyd's Register's own approval process, thus streamlining the ship approval process considerably.

Other applications based on the Manager platform have also been developed and updated. The revisions include, among others, applications for planning of ship painting, automation of planning the isolation of passenger vessels, reviews of offshore structures, and for simulation of ship flooding.

The new features of NAPA Steel, a system for ship structural design, contain tools for cost accounting, calculation of painting surface areas and functions for classification designs, as well as considerable improvements to the user interface. The basic functionality of 3D-modelling has also been improved by developing a new Geometry editor that offers a visual and straightforward way of modelling the ship's geometry.

Aker signs up for FORAN across the board

AKER Yards has signed a contract with Spanish company Sener Ingeniería y Sistemas to implement the FORAN System across the group's shipbuilding organisation.

FORAN is already operating at seven Aker Yards group premises. Based on its experience using FORAN so far, Aker Yards has decided to extend the cooperation with Sener by making a FORAN Frame Contract for future investments into CAD/CAM shipbuilding solutions.

Currently, Aker Yards owns more than 350 licences of the main FORAN packages (hull structure and outfitting).

As a first consequence of the frame contract, FORAN is being implemented in Aker Yards Promar, the Brazilian shipyard located in Niteroi (Rio de Janeiro).

The most recent design information is available in Oracle database(s) for designers of a wide range of complementary disciplines throughout the ship design and production cycle, from concept to detail. The most recent design information is available in Oracle database(s) for designers of a wide range of complementary disciplines throughout the ship design and production cycle, from concept to detail.

Mitsui renews commitment to AVEVA

INDUSTRIAL conglomerate and shipbuilder Mitsui Engineering & Shipbuilding (MES) has renewed its commitment to AVEVA's plant and marine design and engineering life cycle solutions, by investing a significant amount in AVEVA's flagship product – AVEVA PDMS.

MES group's operations are diversified into eight portfolios that include environment-related recycling, IT and software services, shipbuilding, plant engineering and logistics, machinery and energy systems.

MES has recommitted itself to AVEVA PDMS to help it underpin operations in its Plant Engineering Division. MES first engaged AVEVA plant engineering solutions in 2000, when AVEVA PDMS was installed at Dash Engineering, an MES subsidiary in Cebu, The Philippines. Before 2000, AVEVA also had a long standing working relationship with MES on shipbuilding solutions.

AVEVA PDMS is an intelligent 3D plant design application used for accurate and clash-free plant design on projects of any scale. It provides the capability to check, change, and share design data across the project, making the complicated design and operational processes more fluid and easier to navigate through various players.

T Sakagawa, director of plant engineering, said: 'Now MES can continue to look forward to the added operational efficiency and fiscal benefits



AVEVA PDMS 12 working with the AVEVA P&ID 3D Integrator.

of working with AVEVA PDMS – a system that we've found to make the complexities of plant design and construction so much easier to understand, monitor, and manage.'

AVEVA PDMS operates like a 'virtual design office'. Its design tools, centralised project

control, and communications are designed to allow for effective use of capacity, wherever it exists. The use of PDMS generates faster and more fluid communications, easier control of the design environment, and more effective use of time.

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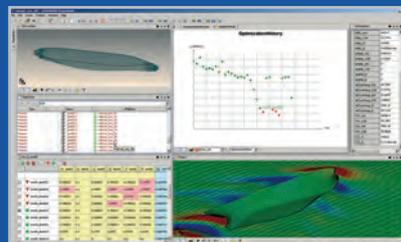


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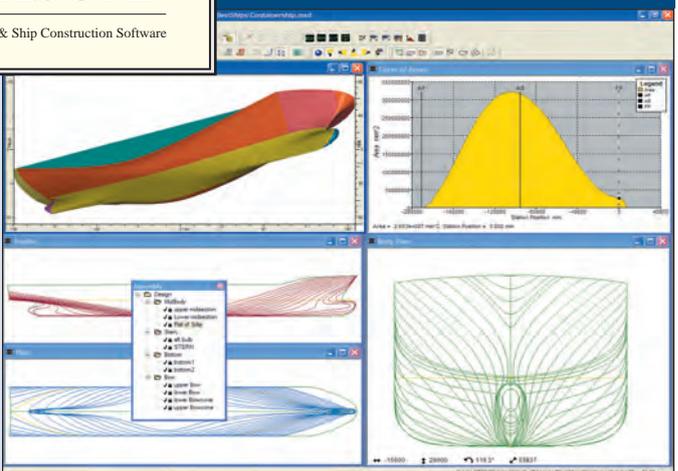
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MSC to get to grips with safety concerns

At time of writing, preparations were underway for the 83rd session of the International Maritime Organization's Maritime Safety Committee, which this year is being held in Copenhagen, Denmark.

High on the agenda was the Long Range Identification and Tracking (LRIT) System, wherein the MSC was being invited to make a number of decisions to ensure timely implementation. SOLAS regulation V/19-1 on LRIT will enter into force on 1 January 2008 and will apply to ships constructed on or after 31 December 2008, with a phased-in implementation schedule for ships constructed before 31 December 2008.

The LRIT system is intended to be operational with respect to the transmission of LRIT information by ships as from 30 December 2008. For the system to become fully operational by the deadline, the MSC was set to decide on the establishment and operation of the International LRIT Data Centre and the International LRIT Data Exchange. In addition, a number of issues relating to the tasks of the LRIT Coordinator during the initial implementation of the LRIT system and with respect to the performance of annual review and audit were also to be discussed. MSC would also decide on the financial model for the setting up and running of the LRIT system.

SOLAS regulation V/19-1 was adopted at MSC 81 in May 2006, along with performance standards. LRIT will be introduced as a mandatory requirement for the following ships on international voyages: passenger ships, including high-speed craft; cargo ships, including high-speed craft, of 300gt and upwards; and mobile offshore drilling units.

Also to be considered was the Global Maritime Distress and Safety System. Proposed amendments to SOLAS chapter IV look to add a new regulation, IV/4-1, covering GMDSS satellite providers. The new regulation provides for the MSC to determine the criteria, procedures, and arrangements for the evaluation, recognition, review, and oversight of the provision of mobile satellite communication services in GMDSS.

Proposed amendments to SOLAS chapter VI, meanwhile, look to add a new Regulation 5-1 on material safety data sheets, to require ships carrying MARPOL Annex I cargoes (oil) and marine fuel oils to be provided with a material safety data sheet before cargo loading.

Also proposed were amendments to the forms for the Passenger Ship Safety Certificate and Cargo Ship Safety Certificate contained in the appendix to the Annex to the 1988 SOLAS Protocol, to add a section to cover alternative design and arrangements.

Meanwhile, work on goal-based standards rumbles on. The MSC was expected to re-establish the Working Group for New Ship Construction to further progress the work on the issue. The reports of two correspondence groups were to be reviewed, namely the Correspondence Group on GBS for oil tankers and bulk carriers, and the Correspondence Group on GBS, based on the safety level approach.



MSC was due to meet as this issue was going to press.

The former group has developed the first draft of amendments to incorporate GBS for bulk carriers and oil tankers into the SOLAS Convention, for consideration by the MSC.

The MSC was set to consider the report of the Pilot Panel on the Pilot project on trial application of the GBS Tier III verification process using the IACS Common Structural Rules, including draft Guidelines for the verification of compliance with GBS, and review issues relating to funding of the Group of Experts to verify the rules of recognised organisations.

The Committee is working on the basis of a deterministic approach for GBS for hull construction for bulk carriers and oil tankers, and is also developing GBS based on the safety level approach.

With regard to GBS for bulk carriers and oil tankers, the MSC has already agreed on a five-tier system, consisting of goals (Tier I), functional requirements (Tier II), verification of compliance criteria (Tier III), technical procedures and guidelines, classification rules and industry standards (Tier IV), and codes of practice and safety and quality systems for shipbuilding, ship operation, maintenance, training, manning, etc (Tier V). Tier I goals and Tier II functional requirements have already been agreed in principle.

The list of Parties deemed to be giving full and complete effect to the provisions of the International Convention on Standards of Training, Certification, and Watchkeeping for Seafarers (STCW), 1978, as amended, was expected to be updated when the Secretary-General submitted his report on those countries whose reports of independent evaluations have been completed since the previous MSC meeting.

Other substantive issues due debate related to safety of life at sea included:

- Approval of draft Guidelines for fixed fire extinguishing and fire detection systems for cabin balconies;
- Approval of draft revised performance standards for Integrated Navigation Systems;
- Approval of draft performance standards for navigation lights, navigation light controllers, and associated equipment;
- Consideration of a draft performance standard for protective coatings for void spaces on bulk carriers and oil tankers;
- Approval of draft Guidelines for the control of ships in an emergency, which cover the responsibilities of all parties in a maritime emergency;
- Consideration of draft revised performance testing and approval standards for fire safety systems, submitted as proposed draft amendments to the International Code for Fire Safety Systems (FSS Code), with a view to future adoption;
- Consideration of a draft new Code of the International Standards and Recommended Practices for a Safety Investigation into a Marine Casualty or Marine Incident, revoking resolution A.849(20) on the Code for the Investigation of Marine Casualties and Incidents. The draft Code, together with relevant amendments to SOLAS Chapter IX-1, will be considered for approval with a view to subsequent adoption at MSC 84;
- Approval of a list of areas of the STCW Convention and the STCW Code to be considered under the comprehensive review of the Convention and Code;
- Approval of the draft International Code on Intact Stability, 2008 (2008 IS Code) and the associated draft amendments to the 1988 LL Protocol and 1974 SOLAS Convention to make the 2008 IS Code mandatory. 

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3D Sonar System promises obstacle avoidance

FarSounder, Inc has been awarded a US\$2 million grant from the National Institute of Standards and Technology (NIST) to develop a long range high-speed navigation and obstacle avoidance sonar.

With a view to improving the efficiency and safety of marine cargo transport, Warwick, Rhode Island-based FarSounder plans to develop a forward looking navigation and collision avoidance sonar system that provides real-time 3-dimensional location (bearing, range, depth) of obstacles at distances up to 3.2km (2miles) for vessels travelling at up to 65km/hr (35knots).

The project is said to open up new possibilities in marine navigation by addressing the economic, safety, and environmental problems associated with large vessel operations.

The sonar would improve the efficiency, profitability, and safety of commercial marine shipping by allowing for faster operation through more direct transit routes, with reduced risk of groundings or collisions with floating objects, FarSounder said. 'Negative environmental impacts associated with accidents involving shipment of hazardous cargo could also be reduced significantly.'

The technology will also be applicable to the cruise industry and high-speed passenger ferries, where it would provide greater passenger safety and reduce insurance costs.

The project, which is scheduled to last for 2.75 years, requires important technological innovations,

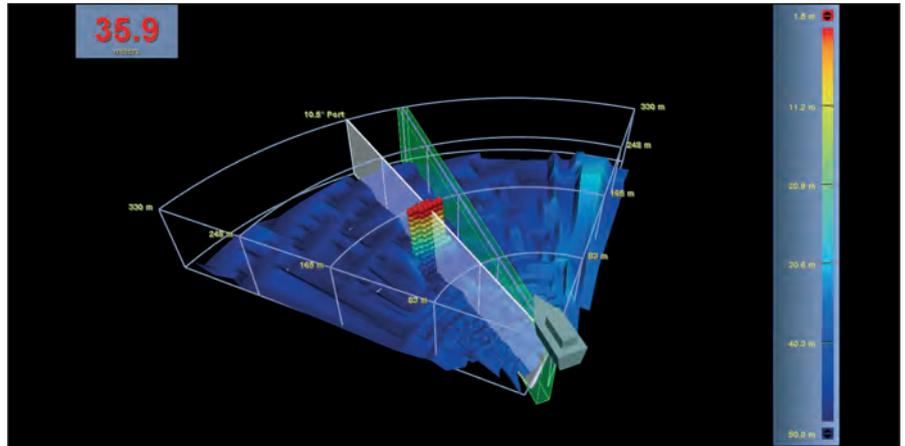


Image from the display of a FarSounder 3D Forward Looking Sonar - a piling of the Pell Bridge in Newport, Rhode Island is detected in about 36m of water at a range of about 160m.

including the development of high-speed signal processing algorithms to compensate for ship motions, the changing acoustic environment and background noise at high speeds, and development of other signal processing methodologies which would extend the state of the art for sonar signal processing.

FarSounder estimated that when fully deployed, such a system could reap economic benefits of up to \$500 million a year through increased efficiency,

reduced insurance costs, and reduced accident rates, in addition to the benefits of increased passenger safety and reduced environmental damage.

Used on commercial, government, and private ships for obstacle avoidance and shallow water navigation, FarSounder FS-3 sonars are capable of generating a complete 3-dimensional image of the sea floor and in-water objects at navigationally significant ranges with a single ping. They offer visualisation to understand 3D sonar images. ☺

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Cosalt to service Marin Ark MES

MARINE product and service provider Cosalt says it is now offering to service and maintain RFD Marin Ark evacuation systems in Europe. Only specialists trained by RFD are authorised to carry out this work.

Cosalt recently serviced the Marin Ark systems on the Baltic cruiseships *Aida Vita* and *Aida Aura*. Both vessels are equipped with four liferafts that can accommodate up to 430 people. In cases where there are more passengers onboard, two additional large liferafts, each capable of holding 109 people, are available on both ships.

The detailed inspection and servicing work was carried out at Cosalt's Hamburg branch. Initially the modules, weighing 6.2tonnes, were removed from the ships by crane before being inflated in the workshops where every raft underwent a hydrostatic test.

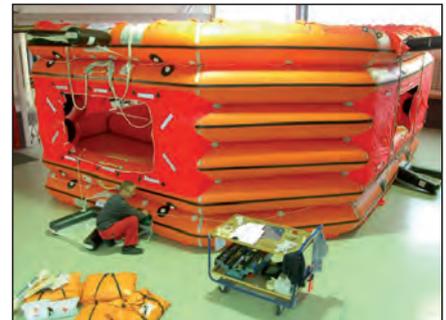
Six bottles, each containing 31.5litres of carbon dioxide, are required to fill the robust slides made from special foil. Each of these liferafts is 8.8m long, 6.8m wide, and 3.1m high. There is enough room to accommodate 109 people comfortably over a surface area of approximately 41m².

Other maintenance tasks included changing the water and emergency rations, inspecting valves, and checking first aid boxes, emergency paddles, and other accessories. In accordance with SOLAS regulations, maintenance of this sort must be carried out once a year, while the systems must be tested in the context of a drill every six years.



The 6.2tonne RFD Marine Ark rescue system modules are removed from the ship by crane and transported to the maintenance stations.

With a turnover in marine safety of over £100 million and a business network spanning 25 separate locations, 21 of which are fully approved liferaft and lifejacket service stations, Cosalt has the resources to coordinate the supply and servicing of marine safety equipment across Europe.



Special expertise is required to inspect and service the liferafts.

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Safety first, but small is beautiful

CRUISESHIP customers are increasingly looking for evacuation systems that meet safety requirements, but also do not take up too much space.

When Meyer Werft designed AIDA Cruises new 2700 passenger capacity cruise vessels, one of the considerations was that the evacuation system needed to be extremely compact. The resulting design, first seen aboard *AIDADiva*, but also due to be incorporated in her coming three sisterships, required placing the evacuation systems in a limited space between the liferafts and the cabins' balconies.

Viking, whose chute systems were chosen, said its selection had been due to the fact that its equipment was 'the most compact on the market'. Its VEC chute system arrangement on deck includes three 'on-rack' additional liferafts, but has a footprint of only approx 8m x 2.5m, 'a footprint that no other supplier could match,' according to Viking. The racks for holding additional liferafts were specially designed for *AIDADiva*. Their unique design holds three additional liferafts in almost the same space usually required for just two.

Storage space can also be an issue, even onboard large cruise vessels. AIDA Cruises also chose Viking's solid lifejackets because they are compact when folded, while their rectangular shape means they are easier to stack. Features such as a V-shaped neck and tapered bottom also make them even safer during evacuation.



Specially designed, compact container racks onboard *AIDADiva*.

To make manual bowing of system liferafts easier for smaller or less physically strong crew members, Viking and one of the world's leading suppliers of winches, Andersen, cooperated to design a special electric bowing winch for AIDA. Liferafts can now be positioned by pressing a button. The manual option remains, should the vessel experience a power failure during evacuation.

TECHNICAL PARTICULARS AIDA Cruises – newbuild lifesaving equipment

AIDAdiva
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Homeport:.....Genoa
"Dual flag approval":.....USCG
Class:.....Germanischer Lloyd (GL)
Engaged on route:.....Mediterranean
Yard:.....Meyer Werft
Hull no.:.....659
Yard delivery:.....May 2007
No of pers onboard:.....2700
No of crew:.....650
VIKING supply:.....2 x VIKING VEC
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(With 3 x 101 pers self-righting liferafts, SOLAS A-pack)
Additional VIKING 100DKS (101 persons, self-righting) as drop down liferafts positioned in special racks
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VIKING function test:.....March 2007

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VIKING delivery:.....February 2008
VIKING function test:.....Feb/March 2008

NB 660
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Environmental guarantee for fire suppression

3M has recently announced that its Novec 1230 Fire Protection Fluid will come with a 20-year Blue Sky Warranty, said to guarantee that in the event of the product being banned from or restricted in use as a fire protection agent due to ozone depletion potential or global warming potential, 3M will refund the purchase price of the fluid.

The liquid is based on sustainable technology, designed to balance the need for human safety and low environmental impact. Claimed to be a next-generation halon replacement with a zero ozone-depletion potential, meeting current and possible future halon replacement regulations, Novec 1230 has an atmospheric lifetime of five days and a global warming potential of only one day.

'Regulating authorities around the world have committed to the reduction of carbon dioxide and other greenhouse gases by imposing strict regulations, affecting many fire suppression agents that are on the market today,' said Joe Koch, business manager for 3M Novec Fluids. 'The Blue Sky warranty provides peace of mind for end users who specify fire protection systems charged with Novec 1230 fluid, knowing that their systems



will withstand the growing list of substances being targeted for emission reduction. To our knowledge, no other chemical clean agent comes with a compatible warranty.'

3M's Novec 1230 fire suppression fluid is said to be guaranteed against environmental regulation changes for 20 years.

The fluid is commercially available globally, and can be applied for streaming, flooding, inerting, and explosion-suppression purposes in several areas, including marine applications. It is said to leave no residue to clean up, so systems can remain operational, and additionally it can be used with existing materials of construction.

Novec 1230 is stored as a liquid, becoming a gas upon discharge, making it easy to handle and store. This low-vapour pressure liquid clean agent can be shipped by air in bulk quantities, and refilling after discharge is thought to be much simpler than filling from a bulk cylinder of a gas. This minimises the need to move system containers offsite.

Systems charged with the fluid can be used in specialised streaming and conventional total flooding applications, localised flooding systems, and directional spray-type applications. 



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The Royal Institution of Naval Architects

Design & Operation of LPG Ships

30 - 31 January 2008, RINA HQ, London.

First Announcement & Call for Papers

Sponsored by:



Following the success of the 2006 International conference on Design, Construction and Operation of Natural Gas Carriers and Offshore Systems, RINA will be holding a new conference in January 2008 relating to the Design and Operation of Liquefied Petroleum Gas (LPG) ships.

LPG vessels may have pressurised, semi-pressurised or fully refrigerated cargo systems, able to trade from both pressure and refrigerated storages. Fully-refrigerated ships will require a chiller to cool down LPG at the loadport or a re-heater to warm LPG discharging into pressure storage. The problematic characteristics of LPG have made it a late developer. Seaborne trade in LPG was less than 1 million tonnes in 1960, reached 17 million tonnes by 1980 and was in excess of 47 million tons by the year 2000.

The United Arab Emirates is the largest producer of LPG. Qatar's LPG market is now tipped to go the same way as its LNG market; it is on course to become the second largest producer of LPG by 2010 with an output of 14 million tonnes per annum. With increased LPG supplies, driven by increased LNG production and crude oil refining, operators could expect dramatically increased freight rates. At present there are orders for over 200 LPG ships, 60 of which are over 60,000 cu m. With the great changes expected in the LPG industry, this conference will provide a forum for discussion and a means of professional development for those involved with the design, construction and operation of LPG ships.

RINA invites papers on all aspects of the design and operation of LPG ships and associated systems, including the following topics:

- Design of vessels, large capacity, Shortsea and Coastal vessels.
- Design and Construction of pressurised, semi-pressurised and refrigerated cargo systems.
- Design practice, construction and materials selection.
- Corrosion and fatigue management and control.
- Stress and integrity analysis.
- Tank construction, welding and weld inspection.
- Cargo handling systems, engineering and equipment.
- Loading, unloading, operational developments.
- Regulation and Operation.

- I would like to offer a paper and attach a synopsis of no more than 250 words by 5 November 2007
- I wish to receive details on exhibition space and sponsorship opportunities
- I would like to receive a full programme brochure and registration form

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Please return to: Conference Department, RINA, 10 Upper Belgrave Street, London SW1X 8BQ
by fax on +44 (0)20 7259 5912 or by email: conference@rina.org.uk

Electronic trade in the Orient

THE first shipyard to join the e-marketplace ShipServ TradeNet is south Korean-based Orient Shipyard. The system enables the yard to trade electronically with its suppliers.

Its two yards, in Busan and Gwangyang, specialising in building bulk carrier vessels for German, Japanese, and Korean owners, will launch 5,598,000dwt of shipping between them this year. Gideon Lee, managing director, Orient Shipyard, comments: 'We are very excited to become ShipServ's first shipyard customer. From the moment we deliver a ship to a customer, they will know that all the parts in their ship can be ordered electronically.'

'There is a great overlap between our extensive supplier base already connected to ShipServ TradeNet and the suppliers used by shipyards around the world,' says Freddy Ingemann, ShipServ senior vice president of sales. 'Therefore, we are easily able to provide yards with the same electronic purchasing benefits as shipping companies. We have been able to implement electronic purchasing in a new market, ie the shipyard segment, within a short time. This not only means an increase in the number of suppliers connected to TradeNet, but also enables our existing supplier members yet again to grow their businesses.'

An electronic database of a vessel's parts will be required by future IMO regulations, especially the International Convention for the Safe and Environmentally Sound Recycling of Ships, which will set new standards for documents on the inventory onboard ships, with the intention of creating a 'digital ship' to follow the life of every physical ship.

Carsten Melchior, secretary general of BIMCO, said that such regulations would not only apply to newbuildings but would also concern existing ships which must comply no later than five years after the convention enters into force. The regulations will require a complete inventory of hazardous materials, identifying three types of hazardous material: material contained in the structure and equipment of the ship, operationally-generated waste, and stores.

Contact: Lone K Jensen, ShipServ, Hauser Plads 32, 3, DK-1127 Copenhagen K, Denmark. Tel: +45 3341 1070. E-mail: ljensen@shipserv.com www.shipserv.com

Chinese take-away for MacGregor

MACGREGOR has gained several recent contracts, both for feeder ship cranes, and crane and hatch covers, all to be built in China. Shanghai Shipyard has ordered 32 GL-type cranes, adding to other Chinese yard orders for feeder containership cranes, including 36 GL-type and 12 LC-type units from Wenchong Shipyard, and 38 GL-type units for Yangzijiang Shipyard.

The Shanghai Shipyard contract comprises eight shipsets of four GL4530-2 cranes, for 3600TEU container vessels, overall worth more than US\$15 million. The ships have been ordered by German owners, four by Reederei Thomas

Schulte, and the other four by L&B Shipping. The cranes will be delivered between September 2009 and May 2011.

Wenchong's cranes have been specified for 12 2800TEU container feeders for undisclosed interests, and each vessel will be geared with three wire-luffing GL-type cranes and one cylinder-luffing LC-type crane located aft. They will be delivered shipset by shipset between early 2009 and early 2012.

The cranes ordered by Yangzijiang Shipyard are for installation on 14 feeder containerships in two series: four 1350TEU ships will have two cranes installed, and 10 2500TEU carriers will each feature three GL cranes and a service crane. All will be manufactured in China by MacGregor's manufacturing partner Lüzhou Machine Co Ltd.

Combined crane and hatch cover contracts were placed by German owner Hermann Buss, for 10 new 30,000dwt general cargo ships being built at a Chinese shipyard. The agreement is said to be worth over US\$30 million, with delivery planned to start from spring 2009 and continue at monthly intervals.

40 GL-type cranes (GL6020/5024/4030, and 2430 in grab operation) will be specified four per ship; five of the vessels will have additional grab control systems. MacGregor's dry cargo division will supply folding weatherdeck hatch covers, the hydraulic system, fixed container lashing equipment for the deck and holds, and lift-away tweendeck hatch covers. This equipment is scheduled for delivery between 2008 and 2010.

Contact: Anders Berencsy, sales manager, crane division, MacGregor (SWE) AB, PO Box 4114, SE-400 40 Gothenburg, Sweden. Tel: +46 660 29 41 85. Fax: +46 660 29 42 87. E-mail: anders.berencsy@macgregor-group.com www.macgregor-group.com

Merwede's hydraulic lift

IHC Holland Merwede BV has acquired 100% of the shares of Vremac Hydraulics BV, based in Apeldoorn, The Netherlands. Vremac designs and fabricates hydraulic cylinders as single items or small series for specialist applications.

Merwede sees Vremac as an ambitious supplier with the best product/quality ratio in the market. Much of Vremac's produce involves custom-built cylinders, with an annual turnover of approximately €20 million. The company currently employs 70 staff, and the takeover is not said to affect employment, with operations continuing from Apeldoorn.

Supplying motion control systems for the dredging and offshore industry, Merwede believes that Vremac's cylinders are essential components within its hydraulic systems. Vremac has been the principal supplier of hydraulic cylinders to Merwede for the last few years.

It is believed that closer working relations between the two firms will result in more effective product development and an increase in added value on the dredging and offshore market. Joining forces may also reinforce the position on the after-sales market for hydraulic systems.

Contact: R van Krimpen-Baudesson, IHC Holland Merwede, Rivierdijk 586, 3371 ED Hardinxveld-Giessendam, The Netherlands.

Tel: +31 184 41 15 55. Fax: +31 184 677 301.

E-mail: shipyard@merwede.com www.merwede.com

International paints Africa

ONE of the world's largest crude oil carriers, the 442,500dwt V-Plus *TI Africa*, has had coating work completed by International Paint Ltd. Owned and operated by Overseas Shipholding Group Inc (OSG), the 2002 Korean-built vessel, one of four sisterships, recently drydocked in Dubai. 20,000m² of underwater sides on the 3.2 million barrel vessel were coated using Intersleek 900 fluoropolymer foul release.

OSG's decision to use the product was based on proven experience with Intersleek 700 silicone-based products on three of its existing VLCCs. Captain Robert Johnson, OSG's head of worldwide shipping operations said: 'OSG decided to apply International Paint's Intersleek 900 on *TI Africa* as we believe the benefits from this type of anti-fouling coating will contribute to a reduction in the vessel's environmental footprint by eliminating biocides and reducing



TI Africa had its 20,000m² of underwater sides coated with International Paint's Intersleek 900.

emissions, while at the same time enhancing the vessel's efficiency through the water.'

Introduced in February 2007, Intersleek 900 is smooth, with claimed low levels of average hull roughness, good foul release capabilities, and resistance to mechanical damage. Depending on application and in-service conditions, the 900 version is believed to offer predicted savings of a further 2% in comparison to the 700 type, and 6% in comparison to SPC anti-fouling. The absence of biocides also offer cost advantages at the next drydocking on treatment and disposal cost of wash water and blasting abrasive.

Contact: Jim Brown, marketing operations manager, worldwide marine, International Paint Ltd, Stonegate Lane, Felling, Tyne and Wear NE10 0JY, UK. Tel: +44 191 401 2417. Fax: +44 191 495 2003.

E-mail: jim.brown@internationalpaint.com www.internationalpaint.com

Icy glare reduction

SOLAR Solve Marine recently received an order from its worldwide distributor based in Norway.

The Royal Institution of Naval Architects

Marine Heavy Transport & Lift II

27-28 February 2008, RINA HQ, London

First Announcement & Call for Papers



The marine heavy transport and lift sector is enjoying a buoyant and growing market due to the recent boom in offshore oil & gas and large project cargo work. Current oil & gas prices have led to an increase in the number of offshore projects requiring transportation, installation or removal of a wide range of structures and modules. The project cargo transport market has been growing by 8-10% per year, particularly power generation and refineries work in US, South America, Africa, India, Pakistan and China.



As the structures and cargo become bigger and heavier and destinations seemingly more difficult to access the market is looking for more and better equipped vessels. There are also increasing safety and greater environmental concerns for all aspects of marine operations. Currently, there are about 450 heavy lift ships worldwide but of these about 40% are older than 25 years. The new generation of heavy lift vessels designs are responding to the demand for higher lifting capacity and larger outreach. There are also an increasing number of new design concepts aimed at servicing this increasing demand in the marine heavy transport and lift industry.



This conference aims to bring together naval architects, operators, project engineers, warranty surveyors and designers to examine the various design and operational issues associated with this industry. Papers are invited on all related topics including the following.

- Current design and operational experience
- Float over and float off: offshore discharge
- Station keeping
- Propulsion system redundant
- Ballast control, stability and stress monitoring
- Weather routing
- Design criteria for short trip scenarios
- Extreme cribbing loads
- Risk management

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12 Solasafe roller screens were supplied to the cruiseship *MS Nordnorge* for the wheelhouse windows on the navigation bridge.

The 123m-long vessel weighs 11,386gt, has 45 car spaces and 457 berths on six decks, and can carry 691 passengers. Operated by Hutigruten, the vessel was built in 1997 and its cruise itinerary includes the Norwegian coast and Antarctica.

Managing director Julie Lightfoot commented: 'Solasolv screens are very well known all over the world for their benefits at protecting navigation staff from solar radiation. What is not so well known is that they are just as effective at protecting personnel from the glare radiated by ice and snow. I suspect that the ship's staff on *Nordnorge* will get as much benefit from our products protecting them from the ice as they will from the sun.'

Contact: Solar Solve Marine, Tyne Dock East Side, Port of Tyne, South Shields NE33 5SQ, UK.
Tel: +44 191 454 8595.
Fax: +44 191 454 8692.
www.solasolv.com

B to D uses less fuel for Wärtsilä

WÄRTSILÄ has introduced a 'D' version of its RT-flex50 low-speed marine engine, which is said to give a higher power rating and lower fuel consumption than the existing 'B' model. The maximum continuous power output has been raised by 5.1% from 1660kW/cylinder to 1745kW/cylinder, with the same running speed of 124rev/min. Featuring five to eight cylinders in-line, the 'D' version covers a power range of 6100kW to 13,960kW at 99rev/min to 124rev/min.

Additionally, the brake specific fuel consumptions (BSFC) have been reduced by 2g/kWh, and at the maximum continuous rating R1, the full-load BSFC has been reduced from 171g/kWh to 169g/kWh. The fuel saving was enabled by employing the latest higher-efficiency turbochargers. The flexibility provided by the layout field for engine power can also be utilised to obtain greater fuel savings, as if a 'D' engine is derated to the same cylinder power output as the 'B' version, then the BSFC at full load is reduced by 4.5g/kWh.

For a typical bulk carrier with a six-cylinder RT-Flex50 engine, this could translate into annual savings of US\$76,000 when operating for 6000 running hours a year with HFO costing US\$300/tonne. Even greater savings are claimed if the engine is derated to a lower running speed at the derated power to gain the benefits of better propulsion efficiency.

The engines are suited to the propulsion of a variety of ship types, including bulk carriers, product tankers, multi-purpose cargo carriers, and feeder container vessels. Electronically-controlled common rail technology for fuel injection and valve actuation is incorporated, and the range is compliant with the MARPOL Annex VI NOx emission regulations.

Contact: Marit Holmlund-Sund, public relations manager, Wärtsilä Corp, John Stenbergin ranta 2, PO Box 196, FI-00531 Helsinki.
Tel: +358 10 709 1439.
Fax: +358 10 709 1425.
E-mail: marit.holmlund-sund@wartsila.com
www.wartsila.com



A six-cylinder Wärtsilä RT-flex50 engine.

Converteam positions itself for workstation launch

NEW C-Series dynamic positioning, automation, and general purpose workstations from Converteam are due to be launched at the Kormarine exhibition in Korea at the end of October. The series is said to have improved functionality compared with models currently available, with enhanced ergonomics and a human machine interface monitor with touch screen.

The DP workstation will include a three axis joystick, and a rationalised operator panel with graphical touch screen interface, intended to form a platform for innovative future developments. Steve Raynor, vice president, Converteam, commented: 'Kormarine is the start of a series of events where we intend to showcase the C-Series, and production will start early in 2008, when we intend to install the first system on a prestigious vessel.'

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Tel: +44 1788 563573.
Fax: +44 1788 563764.
E-mail: tammy.meahan@converteam.com
www.converteam.com

Team service now at AMOT

THE XTS-W bearing condition monitoring system from AMOT has now been assigned a dedicated team to service user requirements worldwide. The new department is aimed at tailoring ideal solutions to marine industry applications, while also engineering ongoing system developments to expand features and functionality.

This system is claimed to be a primary element of engine condition based maintenance programmes and the company is working towards a portfolio of monitoring systems for marine prime movers and other rotating equipment.

XTS-W provides real time monitoring of the crank train bearings in large two stroke diesel engines, giving an early warning of bearing wear and avoiding dangerous and catastrophic bearing failures. It also offers the possibility of eliminating

the need for open out inspections, which are both costly and a major cause of crank train bearing failures.

Contact: AMOT, Western Way, Bury St Edmunds, Suffolk IP33 3SZ, UK.
Tel: +44 1284 762222.
Fax: +44 1284 760256.
E-mail: info@amot.com
www.bearingwear.com

SAM's VDR goes retro

SAM Electronics has introduced the SAM 4330, an IMO-compliant, type-approved S-VDR, thought to be low cost. It is designed for retrofit to cargo vessels of all types and sizes.

Claimed to be simple to install, and featuring a flash disk embedded operating system for optimum reliability, the compact modular assembly is user-configurable via a terminal



The new 4330 S-VDR from SAM Electronics can be retrofitted to cargo vessels of all types and sizes.

computer. Its protected data unit has a standard recording capacity of 2GB, which can be downloaded via an Ethernet link in 15 minutes.

Data can be retained for more than 10 years without power supply, and the VDR includes a port for AIS data. The pre-assembled 16-channel main unit allows nine microphone and three VHF input interfaces, together with up to four video source inputs for radar and ECDIS, or CCTV.

A complete assembly for the 4330 is available with an extensive range of options, including a playback station, a data acquisition unit for conversion of analogue and digital signals for output to the main unit, and a remote control unit with multiple display facilities.

Also available is a special float-free protected data unit with an extended memory capacity of 8GB, and SAM Electronics reports that a number of new systems have already been commissioned by leading European ship operators.

Contact: SAM Electronics, Behringstrasse 120, 22763 Hamburg, Germany.
Tel: +49 40 8825 2647.
Fax: +49 40 8825 4118.
E-mail: info@sam-electronics.de
www.sam-electronics.de

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Mr. Kristian Holten Møller, tel: +45 2943 7220, e-mail: khm@shiptech.com

Mr. Kristian Carøe Lind, tel: +45 4093 4174, e-mail: kl@osk.dk

Please submit your written application and CV to: naval@osk.dk

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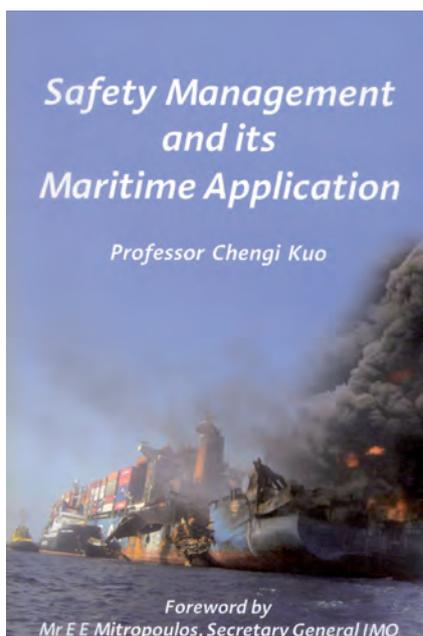
Safety Management and its Maritime Application

By Professor Chengi Kuo. Published by The Nautical Institute, 202 Lambeth Road, London SE1 7LQ, UK. 2007. 291pp. Paperback. ISBN: 1 870077 83 0. £27.50.

THE *Naval Architect* was among those recently invited onboard *HQS Wellington* for the launch of *Safety Management and its Maritime Application*, indicating that publisher The Nautical Institute feels that this book is worthy of publicity, and it is not difficult to see why. The cover of the book dramatically depicts what could go wrong if risks are not accurately assessed, showing the containership *Hyundai Fortune* ablaze in March 2006, with the suspected cause of the fire being fireworks stowed on or below deck.

The publication is part of The Nautical Institute's 'Maritime Futures' series, as it addresses the fundamental differences between the prescriptive regulatory approach adopted in shipping, and the safety case approach used in the offshore industry.

Author Professor Chengi Kuo is experienced in the fields of ship design and shipbuilding, graduating from the University of Glasgow, before investigating offshore oil exploration and production in the North Sea in the 1970s and 1980s. Safety management has been a considerable feature of his career, as he has been actively involved in ensuring a better understanding is gained of safety fundamentals in the maritime industry. Prof Kuo has conducted over 100 ship safety management workshops for professional engineers since 1993, he has acted as a consultant to over 30 companies worldwide, and he has already written six books and over 160 papers in conferences and journals.



This volume begins with a foreword by Mr E E Mitropoulos, secretary general, IMO, who believes that IMO's main work is to facilitate the development, adoption, and maintenance of a regulatory framework for the safe operation of ships by its member countries. He considers that Prof Kuo has brought together in one volume the different approaches to maritime safety that have been developed in IMO.

Chapter one starts by exploring what is actually meant by the term, 'safety'. A seemingly obvious question produced a wide variety of answers when Prof Kuo asked participants of his workshops. The early assumptions were dominated by the belief that safety is influenced by technical factors, but after the workshops there was a realisation that safety depends more on personal perception and that it is more effectively controlled through management.

The text covers safety assessment methods, with prescriptive regulatory approaches to safety and applications of regulations investigated. Hazard identification techniques and different types of risk assessment methods are also considered in further chapters, as well as the generic management system (GMS) for safety.

Human factors, a safety culture, plus leadership and teamwork round out the main section of the publication, before an appendix researches the role of management in safety, highlighting examples of both the use of the prescriptive regulatory approach and the GMS method.

This book is illustrated using many colour photographs, including one of the capsizing of *Herald of Free Enterprise* and one of the Piper Alpha disaster. Tables and charts comprehensively demonstrate the many methods, examples, and conclusions contained within the text, with points outlined in an easily discernable manner.

Clearly structured and easily understandable, this volume should prove useful to both students being introduced to the subject for the very first time, and experienced operators seeking greater awareness of complementary processes. ☺

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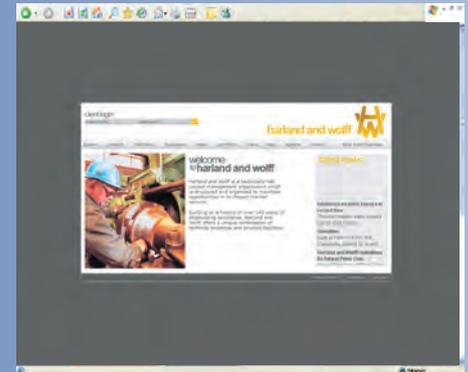
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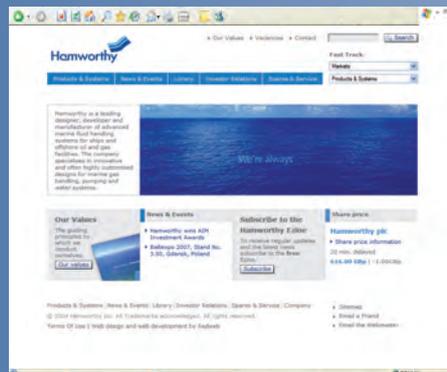
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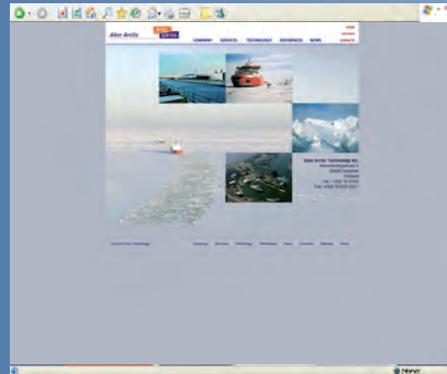
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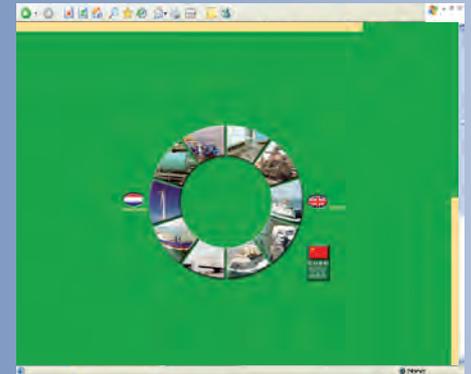
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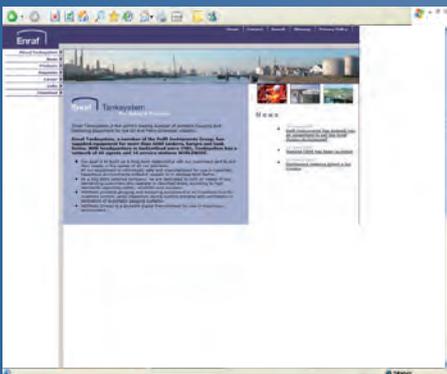
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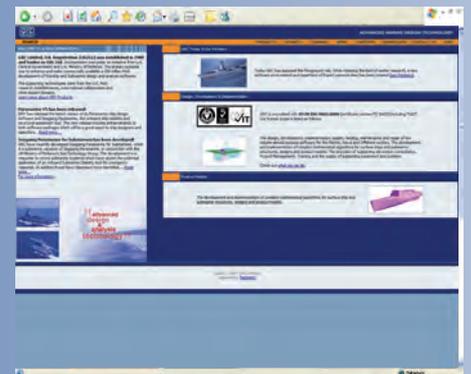
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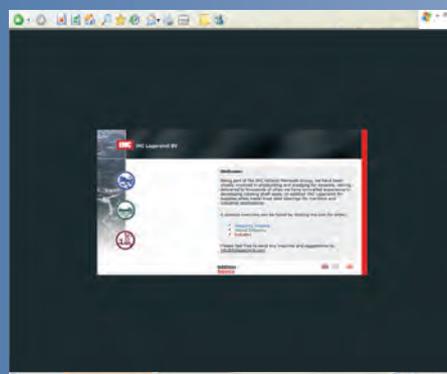
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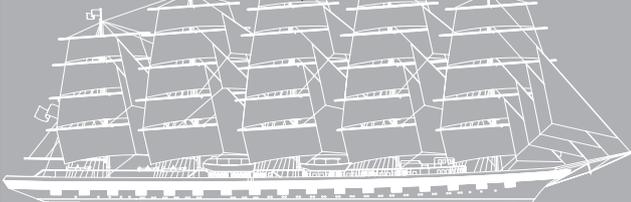


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