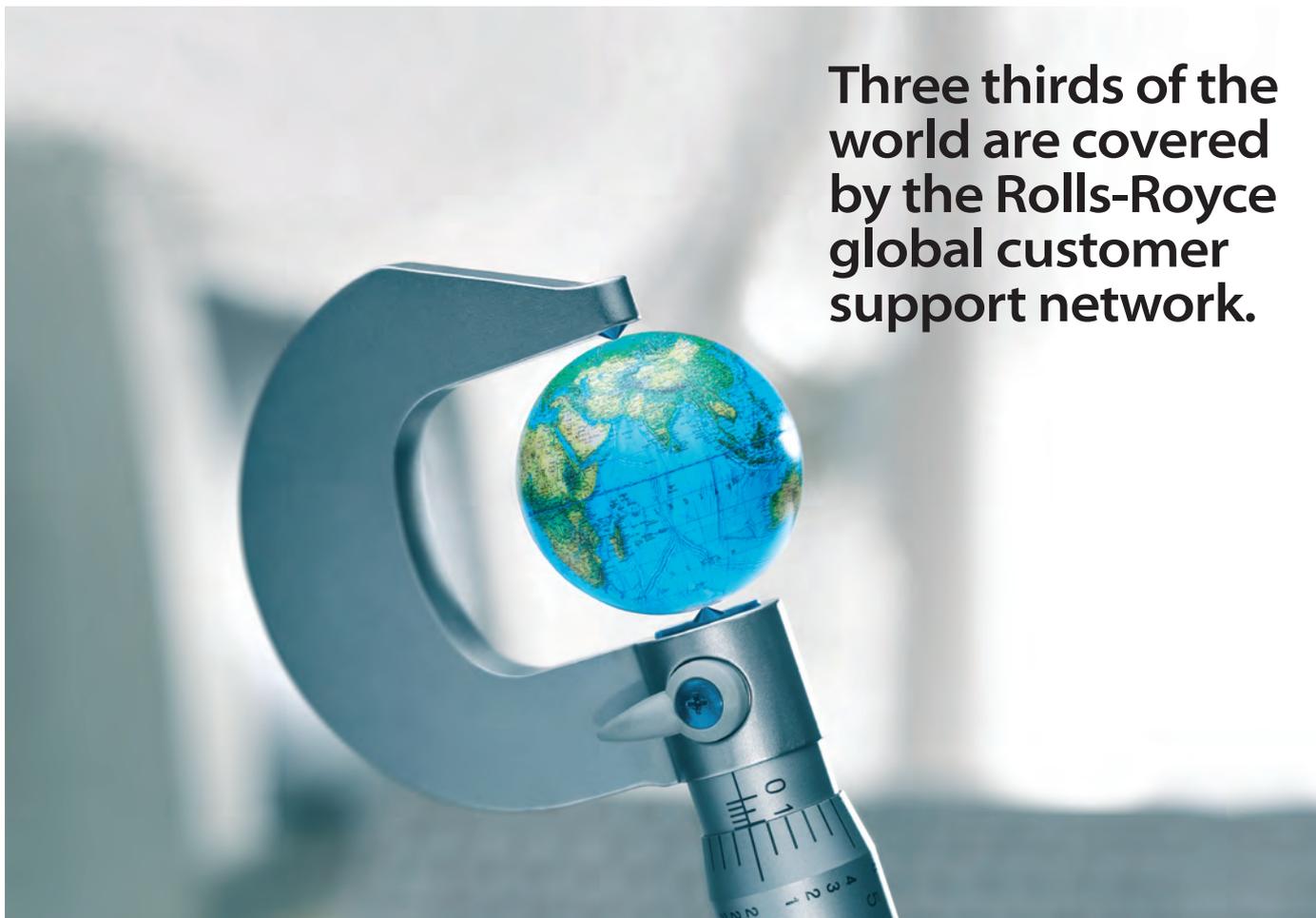




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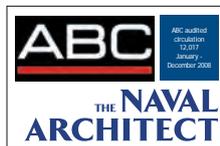
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7 Editorial comment

A different Class

8-13 News

- 8-10 News
- 12-13 Equipment news

15-18 In-depth

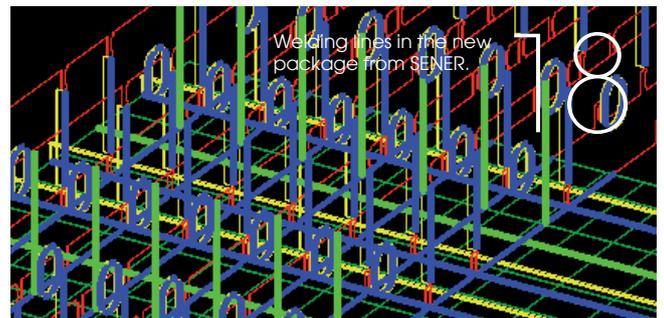
- 15-17 **Safety** | Risk-based rules find form at IMO
- 18 **Cad/Cam** | SENER's asynchronous step up

54 Book review

58 Diary



Steering committee for SAFEDOR gathers in Hamburg.



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21-53 Features

Feature 1 Tankers of the 21st Century

- 21-22 Explosive deliberations on smaller tankers
- 22 Vessel delays no stay against FTP
- 24-26 Rising to regas challenge
 - 26 *Gulf Deffi* joins fleet
 - 28 Trend towards higher performance
 - 29 *Anafi* heralds Eletson gas entrance
 - 31 Novel propeller gets Maersk endorsement
- 32-33 Sembcorp hangs onto floating solutions
 - 34 *Eagle* has eye on efficiency
 - 34 Capacity addition for LNG Barka
 - 35 Hamworthy tests at full scale
 - 36 *Hua San* weighs in
 - 37 Schott by both sides
 - 37 MAN and Maersk in fluid relationship

Feature 2 Diesel technology

- 39-40 New flexibility in line
 - 40 Combined force at your service
 - 41 Electronic engine drives on
 - 43 Wärtsilä has its finger on the pulse
 - 45 Wärtsilä and Mitsubishi renew vows
 - 45 LESS is more for cruise control

Feature 3 Noise and vibration

- 47-49 Comfort is key
 - 49 Rubber Design lifts capacity
 - 51 Desdemona to turn and turn and yet on
 - 51 Cut the cavitation noise

Feature 4 Turkish report

- 52-53 Emergency package for shipbuilding



On-line Edition

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



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A different Class

Will critical equipment, such as main engines, be omitted from the EC's Directive covering class mutual recognition?

The European Marine Equipment Council (EMEC) may still be savouring victory over the inclusion of mutual recognition of classification certificates in the EC Directive on common rules and standards for ship inspection and survey organisations, but there is mileage in the idea that the maritime sector is different from the other industries upon which the EC rested its argument.

The Directive introduces mutual recognition of classification certificates between recognised organisations (certificates of conformity with the organisations' own technical rules), in particular for certificates that apply to marine equipment and are issued on the basis of equivalent technical standards. EMEC believes that, through mutual recognition, its members will benefit from lower costs from the class societies they use.

Wording is still open to interpretation by the European Parliament, in March

Class has consistently suggested that one organisation approving work done by another will compromise safety, in an industry where European equipment suppliers may dominate the market, but Asian shipbuilders also do. The merits, or otherwise, of this argument, have simply been contradicted. Danish industry association Danish Maritime, for example, recently remarked: "It is difficult...to see how safety issues can arise if harmonisation takes place at the highest level. The present draft does not demand unconditional, unlimited mutual recognition but only that classification societies agree amongst themselves

upon the terms upon which they can base an approval of the certificates from others"

Class mounted an aggressive last ditch campaign to have what was considered to be the offending pronouncement watered down. That this proved unsuccessful has some in class casting aspersions that some in the so-called 'big three' (Lloyd's Register, Det norske Veritas and ABS) did not sort out their lobbying position early enough, but whatever satisfaction lies in such recriminations, the reality is that, subject to European Parliament agreement, class will have to adjust to a new working environment.

But what will the reality be like, given that it is understood that underwriters prefer things the way they are, and class has already started discussions with the EC over the practical interpretations of the issues raised, revolving around not applying the formulation to critical equipment, like main engines, for example?

Some wonder whether the EC is being entirely consistent in its dealings with class societies. On the one hand DG Tren (Directorate for Energy and Transport) wants mutual recognition. On the other, DG Comp has been mute on why it feels it necessary to raid class offices on the grounds of anti-competitiveness, and many believe that the Common Structural Rules developed to enhance ship safety lie at the heart of its moves.

Does DG Comp want IACS to be the type of loose trade association which will not be able to collectively take on the work necessary to develop rules at IMO? After all, members currently commit staff at

some cost to develop new standards. Why would they want to do that collectively, if the EU decided that organisations mutually recognise each others' standards anyway?

Perhaps it is wise not to name names at this point but, whatever the EC may think, not all class is the same.

There is also, according to sources in class, a more complex issue that goes to the heart of Solas. It is suggested that DG Tren did not fully understand the distinction between class and the concept of the Recognised Organisation, so laboriously developed at IMO. Whatever the merits of the Jones Act, for example, one scenario might see a US-based owner ordering a US-built ship to operate in US coastal trades under sovereign flag governance, but the classification society in question would, in some way, be accountable to EU regulation on mutual class recognition on, say, its European-built engine.

In these economic times, one wonders exactly which domestic pump-priming, proto-protectionist kind of president is going to wear that?

Correction Back on squat

The February 2009 edition of *The Naval Architect* contained two errors in the story 'Maximum Squats for *Victoria*', pp25-34. On p31, there is reference to squat varying directly with V². This should read 'V'. On the same page, reference is made to the range of squat varying as S0.81. This should read 'S^{0.81}'. The Editor would like to apologise for these mistakes in proof-reading. NA

Regulations

Alliance on ballast

Early March saw the launch at the International Maritime Organization of a new global industry alliance committed to tackling the threats posed by marine bio-invasions caused by the transfer of alien plants and animals in ships' ballast tanks.

Made up of a partnership between IMO, the United Nations Development Programme (UNDP), the Global Environment Facility (GEF), three major private shipping corporations (APL, BP Shipping, and Vela Marine International), and one shipbuilder (Daewoo Shipbuilding and Marine Engineering), the grouping aims to harness different skills and expertise to develop concrete solutions to this global environmental hazard.

According to IMO's findings, an estimated 10 billion tonnes of ballast water are being carried around the globe each year, and more than 3000 species of plants and animals are being transferred daily. As a result, a serious environmental threat has developed, caused by the introduction of alien aquatic plants and animals to new ecosystems, which may not be able to deal with the imported species. The damage done by these alien species is costing the world billions of dollars.

The Alliance will contribute to research and development of cost effective ballast water treatment technologies that can be fitted onboard ships. In addition, it will assist with exploring new ship design options such as 'flow thru' ballast tanks and 'ballast-free ships'. It aims to promote the transfer and diffusion of technology within the industry by opening a ballast water information exchange mechanism, developing training tools targeted at the maritime industry and establishing an industry dialogue forum.

The agreement was initiated by GloBallast Partnerships - a joint initiative founded by IMO, UNDP and GEF. More shipping corporations have expressed their interest to join.

Ancillary equipment

Rolls-Royce shifts east

Rolls-Royce Marine plans to transfer its corporate headquarters from London to Singapore in April, in a move it says recognises the increasing importance to Rolls-Royce of Asia-Pacific markets.

The new marine headquarters will have global responsibility for business development, marketing and corporate services. However, Rolls-Royce said its naval business will continue to be managed from the US and the submarine business will continue to

be managed from the UK. In addition, the group's offshore and merchant businesses will continue to be run and managed from the Nordic countries.

Indeed, it is understood that the move will only see the direct transfer of seven staff, but among them will be Rolls-Royce Marine president John Paterson. He said: "Rolls-Royce is a global business and while Europe remains a significant market for Marine, headquartering our business in Singapore further enhances our global position and will facilitate the development of growing markets in Asia. Working closely with key customers and suppliers in the region we will capitalise on Singapore's central position and maritime expertise as we continue to develop our business."

In 2008 Rolls-Royce established a global head office for its marine services operation in Singapore. The Rolls-Royce Marine business employs over 8,000 people worldwide, including 500 in the Asia Pacific region, and has major manufacturing operations in the UK, the Nordic countries, North America, China and South Korea.

Mr Paterson said that Rolls-Royce Marine's current orderbook was worth £5.2 billion, including as many as 70 offshore supply vessels to the UT Design, with deliveries to run into 2011.

Design

MDC gets three years funding

One North East is to pump a further £900,000 into Newcastle's Marine Design Centre, to support the next three years of operations.

David Hewitt, director at the Marine Design Centre, said: "This is great news for all those committed to the development of the sector in our region. It allows us to move forward with great confidence knowing we have the resources and investment to make a real impact over a sustained period of time."

David Hewitt.





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“We have come a long way in a short space of time. We have built up a dynamic regional membership base and put strategies in place to help the sector move forward. These are based on business development, attracting fresh blood into the sector and putting in place workshops, seminars and training programmes to address skills and technology issues.

“This extra funding will enable us to build on our successes so far, enhance the competitiveness of regional marine companies, promote their capability to the international market and create new opportunities for North East companies to grow.”

Ian Williams, One North East Director of Business and Industry, said: “North East England is still rich in marine design skills which are highly valued around the world. Recent years have seen a decline in the fabrication of ships - but the design skills are still here and the International Marine Design Centre provides a focal point for companies to win new work and boost their skills base.

Meanwhile, the MDC has been raising its efforts to make its mark on the international stage. It recently took part in a trade mission to meet executives involved in the oil and gas and shipbuilding sectors including Holland Shipbuilders’ Association, which represents over 90% of Dutch shipyards.

MrHewitt, commented: “We met with directors, designers and purchasing people. Many of them face problems in finding both the quality and quantity of design engineers for projects. We are clearly at the very early courtship stage with these new contacts, but we firmly believe that given time we will be in a position to put forward teams of design engineers from member companies for new opportunities.”

Classification

LR supports NTUA

The Lloyd’s Register Educational Trust (LRET) is working with the National Technical University of Athens (NTUA) to provide undergraduate and postgraduate scholarships in naval architecture and/or marine engineering over the next six years to assist exceptional students to further their maritime studies before taking up a career in shipping. The total support is going to be more than €170,000.

The award has been made of the first two scholarships, with winners Nikolaos Katzouros (undergraduate student) and Stylianos Polyzos (PhD candidate) receiving their scholarships from Michael Franklin, LRET director in the presence of Professor Christos Frangopoulos, chairman of the Naval Architecture and Marine Engineering Department of NTUA.

Mr. Franklin said: “The Lloyd’s Register Educational Trust is extending its support throughout the world to exceptional students who wish to study engineering and

science. Our aim is to identify the very best students and to assist and encourage them to become the leaders in their chosen fields. The world needs more engineers and scientists to provide solutions to many of the great challenges we face today, including energy use, climate change and efficient and safe transportation. We are delighted to be working with the National Technical University of Athens to help achieve this aim.”

Classification

Fuel cell guidelines from BV

Bureau Veritas has developed new guidelines covering the safe application of fuel cells on ships, which the class body said could have important environmental and commercial advantages for shipowners and operators.

Until now, fuel cell applications in shipping have been limited to a few pilot projects. BV product manager Gijsbert de Jong says the main obstacle to their wider application has been the lack of a comprehensive framework covering the technology. He said: “By developing these new guidelines, BV is breaking the vicious circle whereby the lack of a regulatory framework limits the possibilities for building and testing the prototype applications which are essential for determining the safety and performance criteria involved.

“BV’s guidelines for the safe application of fuel cells on ships take into account all relevant existing IMO conventions and guidelines, together with a wide range of international non-marine standards.”

BV said it was participating in the Green Tug project, an initiative led by the Offshore Ship Designers Group in The Netherlands to produce a new design for a near-zero-emission hydrogen-powered tug. As well as achieving a significant reduction in exhaust emissions, the fuel cell technology used in the new tug design also helps to increase propulsion efficiency by roughly 70% compared to a conventional diesel-direct drive installation.

Mr de Jong said: “The object of the BV guidelines is to provide criteria for the arrangement and installation of machinery for propulsion and auxiliary purposes, using fuel cell installations, which have an equivalent level of integrity in terms of safety, reliability and dependability as that which can be achieved with new and comparable conventional oil-fuelled main and auxiliary machinery. The guidelines currently have preliminary status and are subject to internal and external review. After taking into account all relevant feedback, they will be published as a Bureau Veritas Guidance Note entitled ‘Guidelines for fuel cell systems on board commercial ships.’



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Ancillary equipment

Noreq launches latest concept

Noreq AS has introduced a more user-friendly and safer concept of davits for life- and rescue boats.

Noreq Compact Davits are specifically designed for safe and efficient launch and retrieval of life-/rescue boats, for long term, reliable operation in harsh and hazardous marine and offshore environments.

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Latest concept davit from Noreq.

Launching of the life-/rescue boat is performed either from inside the boat or from remote control unit (supplied as standard). Operation of the life-/rescue boat is performed by an electric-/hydraulic driven system. The Noreq Compact davit system is designed in accordance with latest IMO/SOLAS requirements, the LSA Code and European Council Directive 96/98 on Marine Equipment (MED).

The new Noreq Compact Davits are available in several models and sizes for ship and rigs, with capacities for life-/rescue boats up to 23000kg.

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Propulsion

Wärtsilä's Odessa file

Wärtsilä Corp has opened a new office in Odessa, Ukraine, to meet the increased demand for land- and

ship-based power plant installations from customers based across Ukraine. The new office is manned by eight people. Wärtsilä said it would look to use the new office to expand its sales and services towards Crimea, Mariupol and Kiev.

Anatoliy Porkunov, managing director, Wärtsilä Ukraine, said: "Ukraine is an important region for Wärtsilä. It has vast potential for us. The new facility provides us with presence in a geographically important area and we can be closer to our customers, responding more quickly to their requirements. Until now, Wärtsilä's Ukrainian customers were served from Wärtsilä in Estonia. Our Ukrainian customers are happy to have a local presence with local man-power."

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Ancillary equipment

Rolls-Royce £12M deal

Rolls-Royce has won a £12 million order to supply fuel-efficient manoeuvrability systems for four new cement carriers. The 16,800dwt vessels, due for delivery in 2011 and 2012, will be operated by Kristian Gerhard Jebsen Group (KGJS). The order includes the Promas integrated propeller and rudder system, steering gear, tunnel thrusters and deck machinery. The system also includes switchboards, automation systems and an integrated bridge.

The combined Promas rudder and propeller system is said to increase propulsive efficiency by 4% to 6%, as well as offering improved manoeuvrability at high and low speeds. The vessels are being built at the Vinashin Group's Ben Kien shipyard in Hai Phong, Vietnam.

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Propulsion

Rexpeller in drill breakthrough

Kawasaki Heavy Industries, Ltd. has announced that it has received an order for 18 Rexpeller thruster units for three drillships to be used in an oilfield development project being conducted by Petroleo Brasileiro S.A. (Petrobras),

Brazil's state owned oil company. This is the first Rexpeller order for drillships to be used in exploratory drilling of new oil and gas wells. The order was placed by Samsung Heavy Industries Co. Ltd., in South Korea, which will build the drillships. The Rexpeller units will be delivered to Samsung in 2010 and 2011.

The Rexpeller is a fully azimuthing thruster that can generate thrust in any horizontal direction and be utilised as a propulsor, rudder and side thruster. Kawasaki has supplied more than 500 Rexpeller units since 1983 when the product was first released.

All 18 Rexpeller units for the drillship order will be are Kawasaki's KST-320LF/AU (4,500kW) model. The Rexpeller units on each drillship will operate concurrently to ensure the optimal positioning of the ship.

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Shipbuilding

ESAB welded to metal arc

ESAB is launching the Origo Arc 400i manual metal arc (MMA) welding machines with a choice of either the A22 or A24 control panels. These 400A power sources have been optimised for MMA applications, whether the requirement is for fabrication, on-site installation, repair or maintenance, both indoors and outdoors.

The machines are designed for a long, trouble-free service life in harsh operating conditions. The welding machines has a galvanised steel chassis, reliable IGBT inverter technology, a CAN bus to minimise internal wiring, and a dust filter.

Customers can choose between the A22 control panel, which features a simple knob for setting and adjusting the welding current, and a digital ammeter for displaying the current and the more sophisticated A24 control panel. This second panel benefits from a digital V/A meter and can be used for LiveTIG and MIG/MAG (CV mode) welding. Other functions available with the A24 panel include selection of electrode type, adjustable Arc Force and Hot Start, as well as a memory for storing welding settings.

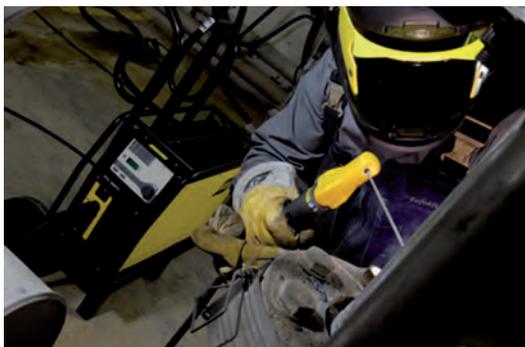
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Shipbuilding

Kemppi launches MIG/MAG

Kemppi (UK) Ltd based in Bedford has launched FitWeld 300, a compact MIG/MAG machine for tack welding that it claims offers up to 57% savings on input power compared to traditional MMA welding.

The compact, light-weight, three-phase 400V 50/60Hz FitWeld 300 has been designed as the replacement for MMA tack welding, by increasing welding speeds to twice that of MMA welding, which is said to be ideal for use in shipyards and heavy equipment manufacturing.

Rated 300A at a rate of 20% of the duty cycle, it has a 43V open circuit voltage and can be used with mild steel solid and flux cored wires, as well as stainless steel and aluminium wires from 0.8mm– 1.2mm. FitWeld measures 457mm x 226mm x 339mm and weighs 14.5kg

QuickArc clean arc ignition produces minimum spatter and fast arc stabilisation, the latest GT WireDrive to give a rapid response to welding gun trigger signals, as well as for multiple arc start use, while GasGuard automatically prevents welding when shielding gas is not present or is accidentally disconnected, and in-built lighting provides the welder with a white light to make wire spool changes and parameter adjustments easier and safer in low light working conditions.

Other features, including a control panel with easy to set up voltage and wire speed arc parameters, 2T and 4T gun switch selection, strong grab handles, enclosed wire spool holder, shielding gas flow adjustment and easy polarity change, allow either positive or negative welding, all making for faster, easier and safer welding, according to Kemppi.

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Risk-based rules to find form at IMO

Proposals to develop a risk-based approval process for ship design will be set before the International Maritime Organization's Maritime Safety Committee meeting at the end of May.

Four years of research under the SAFEDOR project have culminated in a critical submission from Denmark to the International Maritime Organization laying out proposals for an approval process for risk-based ship design.

The multi-national research project, coordinated by Germanischer Lloyd, involved 53 project partners.

Seeing safety as an objective rather than a constraint imposed by design rules was the initial goal of the EU-funded research project.

The SAFEDOR steering committee gathered in Hamburg during February to present the results of the project. Headed by chairman Dr Pierre C. Sames, of Germanischer Lloyd, the committee also included Karl-Christian Ehrke (SAM Electronics), Christian Breinholt (Danish Maritime Authority), Rolf Skjong (Det Norske Veritas), Tom Strang (Carnival Corp), Dracos Vassalos (The Ship Stability Research Centre), and Thomas Witolla (Meyer Werft).

Dr Sames said: "We expect that the number of risk-based design and approval applications will continuously grow, that the application of risk-based approaches in rule-making will increase and that the linking with risk-based approaches during operation will increase."

The steering committee credited three major achievements to the SAFEDOR partners: the creation of a documented framework for risk-based design; a series of innovative ship and system designs that showed the practicability of the SAFEDOR approach; and the development of an approval process for risk-based ships.

Dr Sames said that incorporating safety in the design process was by no means a new concept but that, in the past, safety has been added to a design during its later stages based on existing rules.

SAFEDOR research focused on five



The SAFEDOR steering committee gathered at Germanischer Lloyd offices in February to report the final results of the four year project..

ship types that are of major economic importance for Europe - cruiseships, ro-ro/ro-pax vessels, gas tankers, oil tankers and container vessels. For these, formal safety assessments and novel designs were generated.

Critically, though, SAFEDOR has been focusing on the development of an over-arching risk-based regulatory framework, to include the approval process, risk evaluation criteria, requirements for documentation and key personnel, as well as onboard documentation. A draft version of the proposals submitted to the IMO has been seen by *The Naval Architect*.

The risk-based approach to design has already been aired at IMO, where new rules covering fire safety and life-saving equipment onboard passenger ships were considered in light of 'safety equivalence' criteria, rather than being based on prescriptive regulation.

However, the proposals emerging from

SAFEDOR represent the first systematic risk-based rule proposals that are based not on one aspect of design, but on the complete ship design. Risk-based ship design is defined as "a methodology that integrates probabilistic and risk-based approaches in the design process of individual ship designs and ship system designs". In this context, ship design could be based on first principles to challenge areas where the traditional approach of prescriptive regulations based on empirical knowledge implies a limiting of the design solutions possible. "Hence, risk-based design extends the conventional design space to include novel ship designs with the potential of offering benefits to the shipowner, the shipyard and the system supplier," the Danish submission says. "Benefits could be that completely new ships and ship systems can now be realised or that conventional designs could be optimised cost-effectively."

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Dr Sames was keen to disentangle the risk-based approach to ship design from the concept of goal-based standards. “Even though the two are often discussed in one go, they are separate,” he said. “Goal-based standards are rules for rules, but the risk-based approach involves individual ship designs.”

To date, at IMO, where the risk-based approach has been pursued, work has focused on the notion of “safety equivalence”. Here, the Danish paper acknowledges: “Safety equivalence is an approach which offers the designer freedom with respect to alternative arrangements and equipment. Using safety equivalence to demonstrate compliance calls for provision of ‘a degree of safety not less than that achieved by using the prescriptive requirements’”. The challenge of using safety equivalence is to define an equivalent design and its implicit safety, the submission says.

One of the discussions held within SAFEDOR related to the formulation of different safety criteria. Here ‘absolute’ terms of reference for a ship’s ‘safety level’ might be established, rather than safety equivalence, by using the formal safety assessment approach already established at IMO. However, in the submission, there is ambiguity on how far authors wish to make this point explicit, where the Danish paper simply asserts that “safety equivalence is similar to the comparative risk assessment approach, in which a concept is compared to risk categorization of another system rather than to a specific criterion”.

Dr Sames said that a key part of the submission, and an aspect that distinguished it from risk-based rules developed to date at IMO, was the introduction of the concept of “preliminary approval”. Having established a generic design, the proposal sees clients/designers seeking such approval from an “Approval Authority” to verify that the design concept is feasible and acceptable. The idea is that, at this stage, the Approval Authority can lay out the conditions that will need to be met in order for a proposed design to obtain full approval at a later date.

The Approval Authority is defined as a general term for the organisation responsible for the approval. It includes flag administrations, classification societies and other organisations approving ship designs and ship system designs.

“The preliminary approval may therefore not be granted until all hazards and failure modes related to the design are identified and until control (or plans for how to achieve control) of these hazards and failure modes are demonstrated.”

The Danish submission says that the following conditions will need to be satisfied when granting preliminary approval:

- There should not exist any “showstoppers” (if so, a re-evaluation of the concept phase and possibly concept improvement may be carried out);
- The design is found feasible and suitable for its expected application.

The preliminary approval will enable the client/design team to demonstrate that an independent third party attests to the novel or risk-based design. Such a preliminary approval may be useful with respect to project partners, financial institutions and regulatory agencies. The preliminary approval may also assist the client/design team in staying focused on the most important issues.

Following the preliminary approval, the proposed process sees the client/design team advancing to the specific design and subsequently required risk assessments, testing and analyses. These phases are more detailed versions of the phase before preliminary approval. They will result in an increased understanding of the novel or risk-based design features.

The requirements related to the risk assessment of the specific design will be based on the novelty of the design, the risk assessment plans defined for the previous phase and the differences between the generic and the specific design. Typically, the Danish proposal says, the risk assessment will address the following:

- Identified hazards associated with the novel or risk-based design (update of generic analysis);
- Identified potential safeguards already included in the design;
- Identification of frequencies and consequences associated with the hazards, and the resulting risks;
- A risk model in order to perform

quantitative analyses;

- Description of data references, assumptions, uncertainties and sensitivities;
- Comparison of risk levels with evaluation criteria;
- Identification of potential risk reducing measures;
- Cost-benefit assessments in order to select the most appropriate risk reducing measures;
- Description of selected risk reducing measures;
- Re-evaluation of risk based on the additional risk reducing measures and comparison with evaluation criteria;
- Identification of issues that may require further analyses and testing;
- Identification of issues that may require special attention with respect to operations, accessibility and inspections.

The next step proposed is an “analysis phase” of the specific design. “In a first sub-step, a review of the analysis of the generic design is performed to determine the difference between generic design and specific design in order to specify the scope of the analyses that have to be considered in this phase. Thus, this analysis phase may contain an update of the HazId, a quantitative risk analysis and risk evaluation.” Here, there is to be a “close dialogue” between the Approval Authority and the client/design team with respect to the risk assessment. “In some cases, it is necessary that a representative from the Approval Authority participate in some of the meetings and/or workshops (e.g. workshops with the purpose of obtaining expert opinions) in order to ensure that all relevant issues are taken into consideration. The Approval Authority representative may be an expert within respective areas of the novel or risk-based design and qualitative and quantitative risk assessment.”

All work performed related to risk assessments will be documented and submitted to the Approval Authority in order for the Approval Authority to stay informed of the processes and to intervene, if necessary, the Danish submission says. Eventually, the risk assessments will be included as the basis for approval. **NA**

SENER's asynchronous step up

FORAN V60R3.0: new developments and improvements from well-known CAD/CAM systems supplier SENER.

Spanish company SENER has recently launched a new CAD/CAM marine system - FORAN V60R3.0 - which it says offers developments that considerably improve the performance during the ship design process.

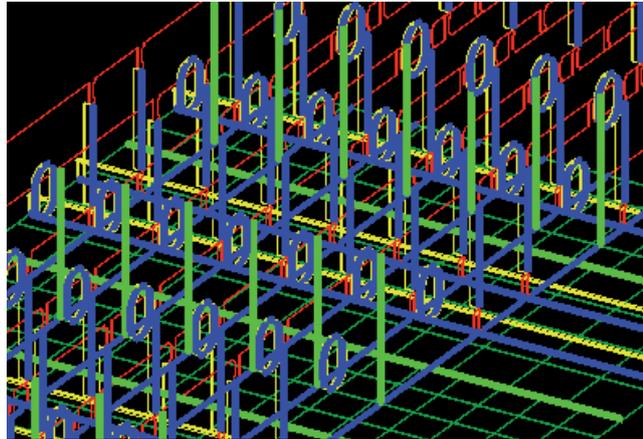
The V60R3.0 release from SENER allows the asynchronous replication of the FORAN database, complementing the synchronous replication available in previous versions. Asynchronous replication generates better remote performance as data modifications are applied immediately but transmission is delayed depending on the refresh policy, which is configurable. A simple conflict management procedure has been introduced

More than one slave server can be added to a replication group and mixed synchronisation modes are allowed. Other improvements have been added to facilitate the FORAN database administration (module FDBA).

With the aim of providing the software with features to manage the welding process, some improvements have been introduced to allow the definition of the welding procedures, including attributes and the automatic calculation of welding lines.

In FORAN, welding calculation is derived from the concept of contact between parts, either from a geometrical or a topological point of view. Welding procedures will be assigned to the different contact types in the build strategy, and it will be possible to obtain reports classified by welding procedures and interim products. The module FDESIGN takes advantage of the welding definition, as welding information will be represented in drawings including welding length, labels and symbols.

V60R3.0 includes the stability criteria MARPOL 23, the Rule 8 (Probabilistic method for passengerships) and the Bureau Veritas stability criteria. SENER said it was continuing to developing the new module for the general arrangement,



Welding lines in the new package from SENER.

which would be available in the next version, as well as the module which would integrate all the naval architecture modules with important improvements in all the areas.

The possibility to define holes in the profile web by using data coming from a penetration is one of the new options available for shell, decks and internal structure profiles. Another important improvement is to assign bevels in profile web end-cuts. Regarding plates, new capabilities to facilitate the definition and the automatic positioning of brackets have been incorporated into the new release.

Another interesting capability of this release is the possibility of importing 2D plate parts in DXF format within the module for definition of the hull structure (FHULL).

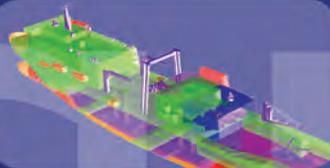
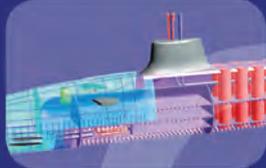
FDEFIN, a new module integrating all the outfitting standard management tasks, replaces completely the modules DEFIN (definition of basic tables, materials, norms, classes, etc) and FMODEL (definition of equipment 3D models). Additionally, all the functionalities existing in the module FPIPE for the definition of HVAC components and the management of the auxiliary structures and supports libraries have been implemented in the new FDEFIN module. The new

module has eliminated some important restrictions of the DEFIN module and has renewed and incorporated some other functionalities with a modern user interface, SENER says.

Drafting

One of the developments to be highlighted is a new auxiliary program (FDREGEN) that gives information about the drawings produced with the module FDESIGN that need regeneration. This auxiliary program informs the users of the FDESIGN drawings that need updating against the FORAN database. Depending on the type of drawing, the program uses a specific procedure to identify the drawings and items that must be regenerated. This new feature, in addition to the new configuration options in the templates, improves considerably the FORAN drafting capabilities compared to previous releases.

Meanwhile, new features for cable routing in FORAN benefit the ship's electrical design, including a new rule to allow different separations between cable segregation groups or the ability to modify part of the route of a cable. In addition, the cableway routing has been improved with the possibility to assign standard sizes and with a fill rule for nodal network segments and with new facilities for the creation of curved electrical segments. **NA**



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SAFEDOR

Design, Operation & Regulation for Safety

Final Conference

27-28 April 2009, International Maritime Organization, London

SAFEDOR (Design, Operation and Regulation for Safety) is about to complete its four years R&D programme. To mark this event, partners of SAFEDOR will present the latest and overall results of their work at a public conference at the premises of IMO on 27 and 28 April 2009. The event will provide an excellent opportunity to familiarise engineers with the principles underlying risk-based ship design, regulation, operation and approval, and to discuss a variety of applications.

Risk-based approaches in the maritime industry started in the sixties with the concept of probabilistic damage stability, were later on widely applied within the offshore sector and have been now adapted and refined to meet the requirements of the maritime and shipping sector. The SAFEDOR approach focuses on risk-based design and approval to provide a transparent and consistent methodology that accounts for the safety performance of a ship design along with other performance variables like speed, cargo capacity, endurance, etc. Thus, the aim of SAFEDOR is not only to provide the technical elements of a new design and approval methodology but also to establish a new safety philosophy.

SAFEDOR tackled this new philosophy in theory and practice. The modernisation of the regulatory framework is one central objective of SAFEDOR and results comprise the submission of Formal Safety Assessments for several types of ships and proposals for a risk-based ship and system approval processes along with acceptance criteria at ship and function level. The second main objective is to establish the process for risk-based design along with a novel decision-making concept and advanced simulation tools to predict the safety performance of a ship in extreme or accidental conditions. To ensure practicability of the new approaches, a variety of applications were performed which have resulted in a series of innovative ship and ship systems concepts and designs.

Standing for "Design, Operation and Regulation for Safety", SAFEDOR is an Integrated Project (IP) funded by the European Commission under the 6th RTD Framework Programme, in which a total of 53 project partners - coordinated by Germanischer Lloyd - from all sectors of the maritime industry in Europe are participating. More information is available at www.safedor.org.

If you have any questions regarding this event, please contact Amber Williams on:

Tel: +44 (0)20 7201 2401

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Email: safedor@rina.org.uk

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Explosive deliberations for smaller tankers

New legislative development on the installation of inert gas systems on tankers.

In line with strong industry lobbying, February's Fire Protection (FP) Subcommittee meeting at the International Maritime Organization made significant progress to broaden regulations covering the installation of inert gas systems on tankers.

Current regulations do not cover inert gas systems on newbuild oil and chemical tankers of less than 20,000dwt, even though such ships are just as likely to be transporting low flashpoint cargoes as their larger counterparts.

Intertanko went into the meeting saying it was pushing for simplification of inert gas regulations, and for them to be based on cargo type for newbuildings, rather than tank or vessel size.

"The catastrophic incidents on a significant number of small product tankers and chemical tankers, some of which have led to a tragic loss of life, have highlighted the fact that the shipping industry needs to update the current application of inert gas regulations to new oil and chemical tankers," said tanker owners association Intertanko.

Estimating the number of such incidents has proved difficult. Some sources in class suggest that the number of incidents may be higher than many suppose, because incidents which do not involve the loss of life are not always reported, but also because there are inconsistencies among the different agencies recording those incidents that are reported.

Whatever the true figure, there was sufficient concern by 2006 for inter-industry group to be formed, consisting of Intertanko, International Chamber of Shipping (ICS), Oil Companies' International Marine Forum (OCIMF), European Chemical Industry Council (CEFIC), International Association of Ports and Harbours (IAPH), International Association of Classification Societies (IACS) and International Parcel Tankers Association (IPTA), after working with a brief to look into the causes of such incidents and having examined the causes of 36 such incidents. This group submitted

a report to IMO, concluding that the prime cause of the incidents was a failure to follow procedures. They recommended that:

- IMO give consideration to amending SOLAS to provide for the application of inert gas to new oil tankers of less than 20,000dwt
- and to new chemical tankers

The group said that that this should only be on the basis of a full Formal Safety Assessment (FSA), including a cost/benefit analysis, however.

Following on from this, Norway submitted a paper to the 82nd session of the MSC, in December 2006, claiming that the existing SOLAS regulations are too complex and that industry guidance (i.e. ISGOTT and the ICS Chemical Tanker Safety Guide) is inadequate. On this basis the submission proposed a

"The shipping industry needs to update the current application of inert gas regulations to new oil and chemical tankers"

new work programme item for the BLG Subcommittee regarding the application of inert gas to both new and existing vessels. After lengthy discussions, during which it was pointed out that no justification had been offered for the assertions in the Norwegian paper, the Maritime Safety Committee decided not to accept the proposal and to ask the FP and Design and Equipment (DE) SubCommittees to look into the issue and report back.

The FP Subcommittee decided in January 2007 to recommend that "consideration" be given to both the

disadvantages and potential benefits of fitting inert gas to new ships. With regard to the existing fleet it was decided that any discussion should be put in abeyance until the outcome of deliberations on the requirements for new ships. In March 2007 the DE Subcommittee agreed to follow the line taken by FP.

In its discussions, the FP Subcommittee was to look into the pros and cons of inert gas for such vessels and to take into account the different operational demands on chemical tankers and the difficulties inherent in fitting such equipment to smaller chemical tankers.

Intertanko said it believed that the present structure and application of IG regulations incorrectly gave the impression that the risk from the cargo is related to ship size or cargo tank size, rather than to the properties of the cargo.

Intertanko and its membership believe that the application of IG regulations should be in response to the risk that is presented by the properties of low-flash point cargoes (flash point less than 60°C).

The trades association says that it further believes that the requirements for IG for new ships should be simplified and made more consistent. "This simplification can be best achieved by acknowledging that the application of IG should be based on the properties of the cargo carried rather than the size of the ship," an Intertanko statement said.

"If a tanker needs inerting for safety reasons linked to its cargo, then it should be inerted irrespective of the size/type of tanker and the size of the cargo tank," said Intertanko's marine director Capt Howard Snaith.

Intertanko says it therefore supports the principle of installing all new oil and chemical SOLAS tankers with IG systems (IG/IGG/N2 as appropriate), irrespective of ship size, ship type or cargo tank size. It also recognises the importance of the human element aspects and supports the continuation of further studies and training to address these aspects.

According to IMO secretariat, after a review of proposals made on these matters, FP agreed in principle that new

Smaller tankers are just as vulnerable as their larger counterparts.

oil tankers of below 20,000dwt should be fitted with inert gas systems by law.

However, indicating that there remains much to be done before regulations are fully developed, the Subcommittee also concluded that “further work needed to be done in order to establish what the minimum size of ships should be for which regulation would be appropriate.”

Furthermore, “The FP Subcommittee also agreed that requirements should be developed for the application of inert gas systems to new chemical tankers, and that, since chemical tankers presented much more complex problems than oil tankers, separate requirements may need to be developed to cover them.” *NA*



Vessel delays no stay against FTP

Germanischer Lloyd points out that market-driven vessel delivery delays may leave owners exposed to contravening agreed legislation on fuel tank protection.

The shipping industry may consider itself very familiar with the requirements of MARPOL Annex I Regulation 12A, covering oil fuel tank protection (FTP).

Most current designs are specifically adjusted to fulfil the requirements of FTP. The revision of MARPOL Annex I Regulation 12A specifies the design requirements for fuel oil tanks in ship newbuildings. It sets the requirements concerning the location and size of the fuel tanks in all ships with an aggregate oil fuel capacity of 600m³ and above. The application of the regulation includes ships whose building contract was signed on or after 1 August 2007, or where delivery is scheduled on or after 1 August 2010. In the absence of a building contract, the regulation is applicable to keels which are laid on or after 1 February 2008.

However, Germanischer Lloyd says there is a hidden risk in the application of



Scrutiny needed of the fine detail of fuel oil tank regulation, before deliveries are delayed.

FTP regarding the application dates. “First, the date of the building contract is relevant for the application of FTP. Moreover, the completion date has to be observed: if a vessel is completed after 1 August 2010, the provisions of FTP are applicable for that vessel,” the class body points out

GL recently noted a tendency towards slowing down the building process of vessels to adjust completions to the current weak freight market. Noting the benefits of delayed completions under certain circumstances, GL said it was concerned that shipowners and shipyards met the requirements of FTP. “If the completion of a vessel is delayed to after 1 August 2010, the provisions of FTP will apply for that vessel,” GL said. “Converting a completed vessel to meet the requirements of FTP will typically cause considerable expense. Therefore any proposition to delay the completion of a vessel should always include the consideration of FTP.”

In cases where modifications to the tank arrangement might be necessary, GL said it was prepared to offer services ranging from simple pre-checks to enhanced design proposals, which “would improve the environmental safety and reduce the economical impact of the alterations at the same time”. *NA*



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Rising to the regas challenge

The first ship to be converted from a standard gas carrier into a floating storage and regasification unit has entered full operations.

The first liquefied natural gas (LNG) delivery to involve *Golar Spirit* since its conversion from a gas tanker to a floating storage and regasification unit took place at the Petrobras gas import facility in Pecem, Brazil between 18-26 January 2009.

The ship, the first of what will eventually be three conversions for Golar LNG, represents the first vessel to have regasification plant retrofitted.

Excelerate Energy already operates eight purpose-built 138,000m³ and 151,000m³ capacity ships capable of regasifying onboard, developing proprietary technology in-house by shipowner Exmar, for installation onboard the so-called Energy Bridge Regasification Vessels (EBRVs) built at Daewoo Marine and Shipbuilding Engineering.

The first LNG cargo was delivered offshore at Excelerate's Gulf Gateway deepwater port by *Excelsior* in March 2005 off the coast of Louisiana

Regasification offshore is reckoned to cost around half as much as the same operation performed onshore. Regasification afloat also promises gas supplied on a continuous basis from plants far from metropolitan areas, which is taken as offering environmental and security benefits.

The Excelerate system is capable of regasifying around 14 million m³ of LNG per day, allows discharge of LNG at pressures ranging between 35bar and 100bar.

In a move that would later be taken up by other technology developers, Excelerate's regasification plant was designed around a set of shell and tube type vaporisers. This type of vaporiser has been extensively used in land-based regasification plants. The use of shell and tube vaporisers has several important advantages for offshore applications – they are compact, simple to operate, energy efficient and are not affected by ship's motions. Nevertheless, Exmar has emphasised that, in the design process, special attention had to be paid to the particular requirements of the marine environment, with the accelerations due to the ship motions needing to be considered.



Excelsior – the first ship ever to include shipboard regasification plant, entered service in 2005.



Golar Spirit – the first ship ever to have been converted from a standard LNG carrier to a floating storage and regasification unit.

Extensive Finite Element calculations were carried out to verify the mechanical integrity of the design.

Feeling the heat

The Excelerate system's primary heating source for the vaporisers used for regasification is sea water. The sea water is fed from the heating water/ballast pumps, located in the ship's engine room, through the heating water booster pumps located in a pump room in the ship's forward area, from there fed to the LNG vaporisers and finally to an overboard discharge located in the forward area of the ship.

However, US authorities took against the seawater-based heating solution, citing concerns of the impact that cooled discharged water would have on plankton (where seawater is offloaded at temperatures 10°C colder than the water taken onboard).

Thus, the Excelerate system today also features steam heaters in the forward pump room which allow, depending on the prevailing environmental conditions or regulatory restrictions, additional heating of the seawater before sending it to the vaporisers, or circulation of the heating water in a fully enclosed system thus avoiding entirely the use of seawater. Steam is in this

case fed from the ship's main boilers located in the engine room.

Other authorities have taken a different environmental view from their counterparts in the US, particularly those overseeing afloat regasification in warmer seas. Drawing on a vessel's boilers to generate steam means using extra energy, for example.

Thus, newer products emerging in the market have tended to take account of where a ship will operate now and in the future when it comes to the heating solution preferred.

Golar Spirit, which was converted at Singapore's Keppel Shipyard, features regasification plant designed by Moss Maritime.

At 289m long, and with a breadth of 44.6m, Moss Maritime vice president gas, Tor Skogan said that *Golar Spirit* had been specified by Petrobras to be able to deliver 7 million m³ of natural gas per day, with a maximum delivery pressure of nearly 100barg [bar gauge]. The ship offers storage capacity for 129,000m³ of LNG at -163°C.

"The plant uses steam as the heating medium for the LNG vaporisation," said Mr Skogan, "and this steam is taken from the existing ship boilers. The heat exchange with LNG takes place in shell and tube vaporisers, with steam on the shell side and LNG on the tube side. The LNG vaporisation takes place at elevated pressure, with upstream LNG booster pumps providing the required pressure according to the off-taker's specification."

Golar Spirit's plant is arranged in three parallel 'trains', with each constituting an LNG booster pump, LNG vaporiser and the necessary valves and instrumentation. Each train is able to deliver 50% of the specified overall maximum capacity, hence giving redundancy and possibilities for scheduled inspection/maintenance while still fulfilling specified gas deliveries. All three trains are installed within one single compact module, which is installed between the LNG tanks on main deck of *Golar Spirit*. The module weight is less than 300tonnes, which Mr Skogan said was "insignificant with respect to stability evaluations for a vessel having a displacement in the order of 100,000tonnes".

Mr Skogan emphasised that the Moss regasification plant was distinguished by its direct steam vaporisation, but also that the system could be adapted for seawater heating, depending on customer requirements.

Also witnessing the rise of the floating regasification option is gas handling systems specialist Hamworthy, which has three significant projects ongoing. One involves steam heating plant featuring an intermediate glycol loop, the second is a steam/seawater-heating hybrid solution, featuring an intermediate loop containing propane, while the third is characterised as a seawater-only heating solution.

Hamworthy director LNG, Reidar Strande, said that the choice over whether to use steam or seawater as the heating medium for LNG depended on the waters an FSRU would operate in. Aside from US restrictions, he

said that a combined steam/seawater system would offer shipowners flexibility, where a vessel deployed in warmer climates could use the seawater solution, with the option of using steam if it was redeployed to colder waters.

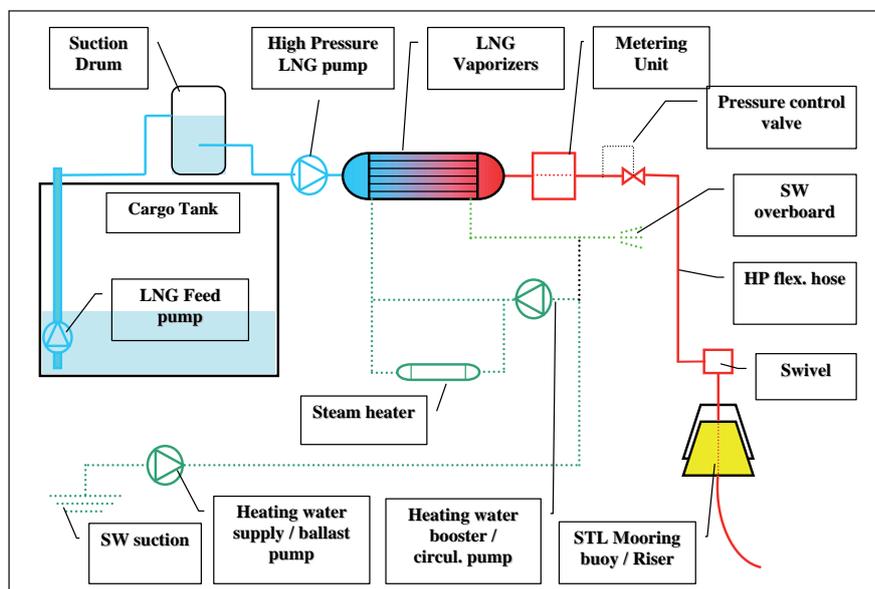
Two 145,000m³ shuttle regasification vessels (plus one option) have been ordered by Höegh LNG on behalf of a 50/50 joint venture established with Mitsui OSK Line from Samsung Heavy Industries. These ships, the first of which is due delivery, feature onboard vaporiser systems to serve the Neptune LNG deepwater terminal, 35km north east of Boston, Massachusetts, in 80m of water.

In this case, and in line with US restrictions, each shipset will feature steam/glycol heating, with a regasification capacity of 210tonnes/hr of LNG with a send-out pressure of 115bar. The average send-out capacity of each 'SRV' (shuttle regasification vessel) will be 11 million m³ per day, with a peak capacity of approximately 21 million m³ per day. Vessels will typically moor for four to eight days, depending on the demand ashore. Hamworthy is supplying three regasification skids per ship.

The first onboard vaporiser system has been installed on the 145,000m³ LNG SRV *Suez Neptune*. Gas trials are scheduled for May/June 2009 and the ship is expected to be in operation around September 2009.

In October 2009 gas trials will be taking place on the second Neptune SRV, *Suez Cape Ann* (hull No 1689), which will have equipment installed at Samsung in February 2009 for operation in Boston in January 2010.

In its second deal, Hamworthy is supplying a steam/seawater heating-based regasification solution as part of a second conversion project for *Golar LNG*. Three regasification units have already been retrofitted on the 138,000m³ LNG carrier *Golar Winter*, which will also be chartered by Petrobras as an FSRU in an LNG import project located in Guanabara Bay, Brazil, where gas will be sent from the vessel to an onshore gas grid. Gas trials will take place in April 2009 for operation in July/August 2009. The three propane regasification skids offer capacity of is 7 million m³/day.



Schematic for a shipboard regasification unit, courtesy of Exmar.

The *Golar Winter* system will be based on seawater heating, supplemented by an intermediate propane loop, although an open-loop steam heating approach is also available. The intermediate propane circuit between seawater and LNG is applied to avoid freezing.

In the case of *Golar Winter*, each 70tonne skid is 10.5m long, 6.1m wide, 8m high, and contains pumps, motors, heat exchangers, instrumentation and control systems to provide the required capacity. The plant is installed in front of the trunk and the equipment is designed for marine installations and cryogenic working conditions and can handle large variations in send-out capacity.

A separate Hamworthy project, also to involve Golar LNG, relates to the yet to be converted LNG carrier *Golar Freeze*, Hamworthy will supply what Golar LNG



Floating storage and regasification unit, as envisaged by Moss Maritime.

project manager Hugo Skår termed a “purely seawater-based heating system”.

Hamworthy anticipates delivering skids in September 2009, although Mr Skår confirmed that a shipyard had yet to be confirmed.

The 96,000gt FSRU will be operated off Dubai by the Dubai Supply Authority (DUSUP), with technical management

coming from Shell. *Golar Freeze*, a Moss-type LNG carrier built in 1977, will be chartered by DUSUP from Golar LNG and converted into an FSRU, to be moored indefinitely offshore within DP World Jebel Ali Terminal. LNG ships will moor alongside *Golar Freeze* to offload their cargoes. Gas will be piped through a sub-sea pipeline from *Golar Freeze* into the Dubai natural gas pipeline network to industrial customers. Shell said that the regasification capacity of *Golar Freeze* would be 3 million tonnes a year, with first gas expected during 2010.

Golar emphasised that, despite placing the equipment supply contracts with Hamworthy to cover *Golar Winter* and *Golar Freeze*, it had worked closely with Moss Maritime on the technical scope for all three of its FSRU commitments, given that the Norwegian company had originated the storage technology onboard. [NA](#)

Gulf Deffi joins fleet

Gulf Navigation Holding PJSC has kicked started 2009 by taking delivery of *Gulf Deffi*.

Gulf *Deffi* is the third in a series of four 45,931dwt chemical tankers ordered by Gulf Navigation Holding PJSE, located in Dubai, due to be delivered to International Shipping Company, a subsidiary of Saudi Basic Industries Corporation (SABIC) on 15 year time charter agreements. The ships are operating or will operate under a commercial and technical agreement with Stolt Nielson.

Contracted at a cost of US\$55 million, the vessel was financed by Fortis Bank; the total amount of financing for all four of the vessels being US\$185 million, equivalent to 85% of purchase price.

Gulf Deffi offers a capacity of 54,300m³, in 20 specially coated cargo tanks. Classed as an IMO Type II chemical carrier, the vessel will have the capability of carrying a broad range of petrochemical products, and has been built to meet prevailing environmental, safety and security standards.

Commenting on its latest acquisition, engineer Abdullah Al Shuraim, chairman, Gulf Navigation Holding PJSC, noted that the vessel was contracted to meet the robust demand for such tankers. He went on to say:



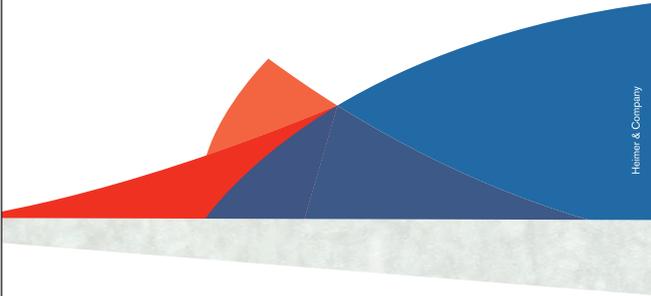
Gulf Deffi the latest delivery to Gulf Navigation Holding PJSC.

“Passing through the consequences of the world financial crisis, the addition of *Gulf Deffi* to the GulfNav fleet constantly aims to strengthen the gains made in 2008, which was a remarkable year for GulfNav. We were able to deliver a solid performance, superior financial results and impressive growth across all maritime business areas.

“The chemical tanker sector continues to be the healthiest sector in the entire industry with steady growth. The firmness and high performance of the chemical tanker sector continues to offset any decline in the other sectors” he added.

GulfNav also has two 44,000dwt IMO Type II chemical tankers due for delivery. [NA](#)

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Trend for higher performance

Vessel performance is closely linked to the level of fouling to the hull and propeller. Force Technology introduces SeaTrend, its latest performance monitoring system.

Five ships managed by the Clipper Group, three of which are tankers, are benefiting from SeaTrend, the latest performance monitoring tool from Force Technology.

Force reports strong interest in the new tool, with discussions continuing over its use involving “a number of shipowners, operators and technical managers, representing a large number of ships”.

SeaTrend offers continuous performance evaluation of voyages, including hull and propeller performance, with the aim of offering a straightforward approach to efficiency enhancement and fuel reduction. Using the system, data from ships is reported to a central database and analysed by a propulsion model developed by Force.

The system consists of an onboard application where the crew register data and a web-based system ashore. The system onboard the ship runs on a standard Windows platform, while ashore customers simply access the data and reports via an internet browser covering performance analysis reports on a fleet-wide basis.

The reports provide technical managers with the information needed to determine optimal cleaning intervals of the hull and propeller. SeaTrend also enables technical managers to evaluate the performance gain that would be accrued by a dry docking, and to compare different hull treatment and paint systems.

Jesper S Jensen, technical manager, Clipper Project ship management said that Clipper had been using SeaTrend for around one year. “Based on this experience we have recently signed up for two more vessels and we are indeed looking forward to seeing the performance improvement after the forthcoming dry docking.”

Force Technology senior project manager and research and development coordinator, hydro and aerodynamics, Kjeld Roar Jensen said that fouling of the hull and propeller



Monitoring vessel performance against a ship model can help technical managers to decide when to drydock.

respectively were estimated by comparing the operational data collected onboard a vessel with a mathematical reference ship model at the same draught, speed and weather conditions but with a clean hull and propeller. “The difference between the operational data and the ship model is considered as being caused by fouling and may be represented as a speed loss or increased fuel,” he said

“During development of SeaTrend we have realised the necessity to develop a system which may be used throughout an entire fleet without the need for any specialised instrumentation. Thus we rely on the existing instrumentation. However, we do require either a torsionmeter (measuring propeller power) or a fuel flowmeter to estimate the power.”

The system does not require additional reporting from the ship, as it relies on data already registered onboard the ship. i.e., it simply replaces the existing daily noon/position-reporting procedure and ensures that it is done in a standardised manner.

SeaTrends’ ship model represents a theoretical model of the vessel’s propulsive characteristics and is able to simulate the propulsive characteristics considering

variations in draught, wind, waves and shallow water. The ship model is based on theoretical and empirical methods taking the following factors into consideration:

- Still water resistance
- Wind resistance
- Wave resistance
- Shallow water resistance
- Open water diagram of the propeller
- Self propulsion factors, i.e. as wake, thrust deduction and relative rotational efficiency

The model is tuned by means of model test and sea trial results.

The system generates two reports: one is a voyage summary report, covering a single ship over a specified period; the other is a charter party analysis report, which contains detailed and summary information for a single voyage and compares the reported data against the charter party. Here, the reported wave data is compared with data obtained from NOAA (National Oceanic and Atmospheric Administration), in order to verify the ship’s reporting.

The system is provided as a service to the shipping company at an annual fee per vessel. **NA**

Anafi heralds Eletson gas entrance

Eletson Corp has entered a new market sector, following February's delivery of its first liquefied petroleum gas (LPG) carrier.

Built at Hyundai Mipo Dockyards (HMD) in Korea, the 22,010dwt *Anafi*, has been constructed to Lloyd's Register class, and is the first of a series of four LPG ships being built by HMD for Greek owner Eletson, which has hitherto focused on oil products.

Lloyd's Register has worked with Eletson and HMD at all stages of construction, using design tools covered by Lloyd's Register's ShipRight procedures for structural detail analysis and fatigue design assessment. During construction the ship was surveyed and monitored to meet the requirements of Lloyd's Register's ShipRight construction monitoring procedures.

The class body said that its ShipRight SDA and FDA procedures helped identify critical areas of the ship structure. "By applying these procedures at the new construction stage the number of structural defects that a ship will experience in service will be reduced, by ensuring closer attention is paid to the detailed design in identified areas of stress concentration."

Using the tool, alignment tolerances must be defined, with LR surveyors ensuring that these locations are closely monitored during construction by the shipyard quality assurance teams.

Lloyd's Register said *Anafi* was also distinguished by "a higher standard of bridge layout and visibility - to the requirements of



Anafi, Eletson's first LPG carrier is one of a series of four ships for the owner from Hyundai Mipo Dockyard.

Lloyd's Register's NAV1 Class Notation... *Anafi* will be well prepared to navigate the increasingly congested waters of the world's major trade lines".

The original purpose of NAV 1 was to clarify the requirements for one man watch (not an issue for gas carriers), but the notation also provides a clearer list of requirement than SOLAS and ensures that particular attention is paid to the bridge. In general, this provides a means of getting

class to check the design and layout of the bridge, a function which would otherwise only be done by Flag. In short, LR ensures the sightlines and field of view. In particular, there is only one additional requirement beyond SOLAS V/22 - that someone moving inside the bridge can gain a 360° field of view.

Anafi has a length of 165m, a breadth of 28m and a moulded depth of 17.8m, with engine power of 9,480 kW. **NA**

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Novel propeller gets Maersk endorsement

Leading shipowner is the latest to opt for fuel saving, unconventional propeller shape.

The CLT (contracted and loaded tip) propeller has secured a key reference, after A.P. Moller-Maersk committed to the concept, following an internal study covering devices designed to reduce fuel consumption in existing ships and newbuilds.

The CLT, designed by Spanish developer Sistemar and also marketed by shareholder Studio di Ingegneria Navale e Meccanica, of Genoa, has been specified for the 35,000dwt tanker *Roy Maersk*, one of a series of 171.2m long, 27.4m across the beam sisterships delivered by Chinese builder Guangzhou Shipyard between 1995 and 2000.

The shipowner selected the CLT as one of the most promising means of reducing fuel consumption and emissions in 2006, with calculations being performed to estimate what the effect would be of deploying the device.

A first set of model tests was carried out between October 2007 and February 2008 at HSVA, Hamburg, using a scaled down version of a 2500TEU capacity containership. In summer 2008, A.P. Moller-Maersk decided to continue its tests, which would this time feature a model of a 35,000dwt tanker. Again, model tests, which encompassed towing, open water, self propulsion, wake field, cavitation and pressure pulse measurement, were undertaken at HSVA, but this time they



Roy Maersk - the first of what could be many A.P. Moller-Maersk ships to feature the CLT propeller.

were supplemented by tests undertaken at the CEHIPHAR facility in Madrid.

The full scale fixed pitch propeller, which will feature a diameter of 5.25m (where a conventional propeller would be 6.65m across), and a blade area ration of 0.48 (compared to the conventional 0.56), will be manufactured at the Wärtsilä plant at Drunen, in The Netherlands.

The four-bladed CLT, operating at 127revs/min, will be installed during *Roy Maersk's* next drydocking, which is due in September 2009, at Portugal's Lisnave yard.

Sea trials will follow, when the fuel saving performance of the CLT concept will be compared to a sistership of *Roy Maersk*, operating with a conventional propeller.

A.P. Moller-Maersk has been characteristically reluctant to quantify

anticipated fuel consumption efficiency gains, although it has gone on record as saying that, should the gains claimed for the CLT be achieved in full scale operations, it will adopt the concept across its fleet, representing a further endorsement for a design which can already claim 270 references, including around 20 tankers.

According to the supplier, power savings of between 5% and 8% have been achieved when the CLT has been applied to ferries, while ships operating at higher loads and lower revs/min, such as bulk carriers and tankers, can expect to achieve gains in the region of 7%-10%.

The largest ships to date to feature CLT propellers are a pair of 155,000dwt bulk carriers, which feature propeller diameters of 7.8m. **NA**



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SembCorp hangs onto floating solutions

Tanker conversions remain a key market for Singapore's SembCorp.

With forward orders to 2012 totalling some S\$9bn, Singapore's SembCorpMarine looks as well placed as any yard group to weather shipping's economic storm.

Building on its well-established expertise in the Floating Production, Storage and Offloading vessel (FPSO) market, the company continued to secure tanker conversion orders for its Jurong and Sembawang shipyards as 2008 drew to a close.

In December, Jurong Shipyard tied up a contract to convert the VLCC PSVM (ex *Bourgogne*) into an FPSO for specialist marine contractor, Modec.

Delivery is scheduled for the first quarter of 2011 and the vessel is expected to be deployed on behalf of BP in West Africa off the Angolan coast in water depths of between 1500m and 2500m.

The S\$200 million deal will see an external turret mooring system and process facilities fitted and the installation of gas turbine generators, oil separators,



Rarua, formerly the 92,802dwt tanker *Andaman Sea*.

gas injection/lift and water injection systems.

SembCorp said the FPSO, which will have production capacity of

150,000barrels of oil per day and a storage capacity of 1,600,000barrels, would be designed and built to enable it to remain at sea for 20 years without drydocking.

The Modec deal came hot on the heels of SembCorp securing a S\$99m contract with Dynamic Producer, a subsidiary of Brazilian offshore giant Petroserv, when the latter chose Sembawang Shipyard for its first DP floating, drilling, production, storage and offloading (FDPSO) vessel conversion project in the third quarter of last year.

Sembawang, which has previously completed five DP projects, will convert a 111,567dwt tanker into a FDPSO with drilling capabilities and storage capacity of 300,000bbls. Delivery is scheduled for the final quarter of this year and the vessel is expected to be operated by Dynamic on charter to Petrobras in oil fields off the Brazilian coast.

Last autumn SembCorp also redelivered *Queensway*, a newly converted Floating Storage and Offloading (FSO) vessel with 1,140,015barrels of oil storage capacity, to Tanker Pacific Offshore Terminals.

The contract, completed at Jurong shipyard, comprised the marine hull

Conversion count dwindles

The number of single hull tanker conversion projects either completed, underway, pending or planned totals some 54 very large crude carriers (VLCC), 15 Suezmax and 24 Aframax vessels, according to London broker Simpson, Spence & Young. Of the VLCCs, 21 conversions have been completed, 12 are now at yards, seven are pending and 14 are scheduled but have not commenced. Most of the VLCCs are being converted into very large ore carriers (VLOCs), although the collapse of bulk carrier freight rates and doubts about the financial and operational viability of some newer Chinese yards have put some pending conversion projects at risk. "Obviously the 'pending' and 'planned' are much less likely to happen now than a few months ago," said SSY director Peter Norfolk.

Italian classification society RINA has been involved in 14 projects involving the conversion of oil tankers into dry cargo ships -11 bulk carriers and three general cargo ships - plus one conversion of a containership into a general cargo vessel.

Three of the tanker to dry cargo conversions have now been delivered but Dino Cervetto, RINA marine division manager of plan approval services, said the pipeline for these projects had now run dry. "We have noticed that there are no more projects of this type of conversion, but only in a couple of cases the owner has decided to stop the conversion project. The freight rates aren't there any more."



Queensway, a newly converted Floating Storage and Offloading vessel with 1,140,015 barrels of oil storage capacity, for Tanker Pacific Offshore Terminals.

conversion and turret integration as well as the installation of the mooring, riser, offloading and power generator systems. The yard also fitted fuel gas treatment skid modules and a helideck structure.

The *Queensway* deal marked the third deal struck by Jurong with Tanker Pacific during 2008. In April the company delivered the FPSO vessel *Raroo*, formerly the 92,802dwt tanker *Andaman Sea*. The conversion included installation of an internal turret and processing facilities for crude separation, water injection and chemical injection.

Prior to deployment off New Zealand in April, three boilers were fitted on deck to generate 24MW of power, while piping and electricity systems were also overhauled.

Designed to operate for 15 years without drydocking, the FPSO has the ability to process 40,000 barrels of oil per day.

Last year Jurong was also scheduled to complete the conversion of the 148,255dwt oil tanker *Freeway* into the FPSO vessel *Montara* for Tanker Pacific with delivery initially mooted for the third quarter of 2008. SembCorp, however, was unable to confirm when the contract would be completed. A spokeswoman said: "Conversion is in progress for the vessel."



Dhirubhai-1, formerly the 188,696dwt tanker *ST Polar Alaska*, was delivered Aker Contracting.

Norway's Aker Floating Production took delivery of a new FPSO from Jurong last summer when *Dhirubhai-1*, formerly the 188,696dwt tanker *ST Polar Alaska* was delivered to its subsidiary Aker Contracting.

The yard installed an internal turret, three 5MW steam turbine generators, three 5MW gas turbine generators and processing equipment for oil production,

crude separation and gas compression.

The FPSO will be the first deep water vessel of this type to operate off India, and will be deployed undertaking field production work for Reliance Industries off the country's eastern coast. It will boast processing capacity per day of some 60,000 barrels of oil per day and 15 million m³ of gas, and a liquid injection capacity of 80,000 barrels of oil per day. **NA**

Eagle has eye on efficiency

Bigger and better newbuild joins Aframax tankers managed by AET.

TECHNICAL PARTICULARS	
Length, oa.....	245.50m
Lengthy, bp.....	234.00m
Breadth (moulded)	42.00m
Depth.....	21.50m
Full load draught (moulded)	14.95m
Gross Tonnage	59,671gt
Deadweight	110,448tonnes
Main engine	MITSUI-MAN B&W Diesel Engine 7S60MC X 1 set
Maximum continuous output.....	14,280kW x 105rpm
Speed	15.3knots
Complement.....	28 persons
Classification	Lloyds Register
Flag.....	Singapore
Date of delivery	10 December 2008

The latest delivery from Mitsui Engineering and Shipbuilding Co Ltd to Maybaru Shipping & Trading Pte Ltd, the 110,000dwt type double hull Aframax tanker *Eagle Sapporo*, is distinguished by larger tank capacity and deadweight than 10 preceding sisterships.

Eagle Sapporo, built at Mitsui's Chiba Works, is the 11th in the series, and features a beam of 42m, while overall length of the vessel is 245.50m, and length between perpendiculars is 234.00m. She has a speed of 15.3knots. The 110,448dwt vessel has a cargo tank capacity of 128,000m³. *Eagle Sapporo* will also be managed through AET Shipmanagement from its office based in Singapore.

The vessel is also characterised by her advanced hull form, and features the latest a bulbous bow and includes a Mitsui Integrated Propeller Boss and Wing (MIPB), which features Mitsui suggests contribute to making her the most energy efficient Aframax tanker afloat. The main engine is a Mitsui-MAN B&W Diesel Engine 7S60MC, equipped with an electronically-controlled lubrication system that is designed to minimise the use of engine cylinder lubricating oil.

A fixed type flammable gas detecting system is applied in the ballast tanks and pump room, and the cargo pumps are of the self-stripping type, to enable better operation. Ballast water can be exchanged through a sequential method. [NA](#)

Capacity addition for LNG Barka

Refined thinking characterised the delivery by Kawasaki Shipbuilding of its latest liquefied natural gas carrier, LNG Barka to Lloyds TSB General Leasing (No.3) Limited.

LNG Barka was delivered on the 29 December, 2008 with the first voyage completed in January this year. *LNG*

Barka represents the builder's latest design of a 153,000m³ LNG carrier, and is 289.5m long, 49m across the beam, and has a gross tonnage of 122,000gt, and has a speed of 19.5knots.

The vessel will be managed by NYK LNG, subsidiary of NYK based in the UK. The primary use of the vessel will be for the transportation of LNG from the Sultanate of Oman to Japan, through a contract with Osaka Gas.

Where previous Kawasaki LNG carrier builds have featured a capacity of 145,000m³, *LNG Barka's* capacity is 8,000m³ greater, by virtue of the installation of a two metre tall cylindrical extension in the mid-section of

three of the four tanks onboard the vessel. The overall size of the hull has remained the same as its 145,000m³ counterparts, however, allowing the vessel to enter most of the major LNG terminals in the world.

The vessel achieves a boil-off rate of 0.15% per day due to the enhanced thermal insulation performance of the Kawasaki Panel System. The vessel also has a double-hull and a double bottom that add to the protection of the tanks.

The wheelhouse features a computer-controlled navigation system and a 360deg view window that allows for one-man navigation. The cargo control room is equipped with an Integrated Automation System (AIS) that monitors and controls the cargo system. This system is also operated in the engine room, to monitor the engines. [NA](#)

TECHNICAL PARTICULARS	
Length o.a.....	289.5m
Width.....	49.0m
Depth.....	27.0m
Full draught	11.90m
Gross tonnage	122,000gt
Deadweight tonnage.....	77,000dwt
Cruising speed	19.5knots
Shipbuilding yard.....	Kawasaki Shipbuilding Corporation
Ship management company	NYK LNG (Atlantic) Limited
Completion date.....	29 December 2008

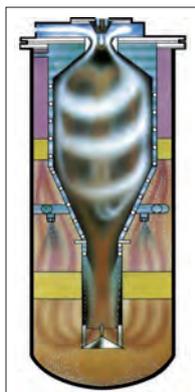


Kawasaki delivers its latest LNG hull design.

Hamworthy tests at full scale

New test facility at Hamworthy Moss opens up new research and development opportunities.

In what represents an industry first, a full-size inert gas generator has been installed in the Hamworthy Moss test shop, in Moss, Norway. It is expected not only



to accelerate design development but also to offer new training opportunities.

“Our new IG

High inert gas quality is made possible by a tailor made combustion chamber.

generator test unit is a vital piece of equipment to speed up the innovation process in Moss,” said Geir Hellum, managing director of Hamworthy Moss. “It is now possible to test new designs in a short period of time and at no risk. This dramatically improves delivery of new designs for customer contracts.”

The new test facility will allow Hamworthy Moss to develop products ahead of customer requirements. Given the fact that Hamworthy Moss has delivered some 2000 inert gas systems since the 1960s, it is understood that one of the primary areas of research will be to focus on how inert gas cleaning technology could be adapted for the scrubbing of conventional heavy fuel oil to reduce shipboard sulphur emissions.

The test unit was ready to be fired up after five months of preparations, and has now entered its test programme. “Designs to be tested offer very significant cost savings, and many can be implemented for the existing orderbook, producing immediate benefits,” Mr Hellum said.

Meanwhile, a company source said that the fact that Hamworthy Moss was the only company able to field a 1MW, 450V, 60Hz-equipped rig opened up new opportunities for after sales activities, such as training programmes for crew and other technical personnel. Courses are being developed in response to the growing demand for training and education requested by shipowners. **NA**

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Hua San weighs in

Shanghai Waigaoqui Shipyard delivered what is claimed to be the first very large crude carrier (VLCC) to be built to Common Structural Rules (CSRs) at the end of 2008, to Singapore's Ocean Tankers Pte.

Hua San, which is claimed to be the biggest VLCC by weight built to date is 318,000dwt and is the first of a series of six VLCC's to be constructed to the latest common structural rules (CSRs),

applicable since April 2006, featuring increased strength and a more robust design. She measures 330m in length, 60m across the beam, 21m in draught and has a speed of 16knots.

Hua San was delivered to its owners five months ahead of schedule with another five sister vessels on the orderbook, all to Lloyd's Register Class.

While its structure may be of most interest, Solar Solve draws attention to the fact that the ship will also feature 61 DIMMLIGHT roller blinds for windows in the accommodation area, with an additional 10 Solarsafe roller sunscreens for the navigation bridge windows

to reflect glare, heat and UV light from the sun onboard *Hua San*. The order also includes all five sister ships.

Paul Hopkins, Solar Solve Marine's sales and marketing executive commented on China's newbuild growth: "China's demand for crude oil shows little sign of abating, even in these recessionary times. Predictions vary but the consensus is that Chinese shipping companies alone will need another 40 to 65 VLCCs by 2010. Ocean Tankers has already placed another order with Shanghai Waigaoqiao Shipyard for a further six of this new vessel class and Solar Solve expects to be supplying them with more products." **NA**

TECHNICAL PARTICULARS	
Length o.a.....	330m
Beam.....	60m
Depth.....	30m
Draught.....	21m
Speed.....	16knots

The 318,000dwt *Hua San* was the biggest tanker to be delivered in 2008.



Schott by both sides

LNG carrier business has become a mainstream business for specialised pump feedthrough supplier Schott.

With an estimated 70% market share in the liquefied natural gas carrier market for its glass to metal feedthroughs for pumps, German company Schott reports a new order from an unspecified Japanese pump manufacturer that will further build its market presence.

Schott's glass to metal feedthroughs have been in the wider market for 25 years, but the company reports that LNG carriers are increasingly becoming one of its main applications.

While it is being pumped, LNG is subjected to high pressure of up to 150bar. The chassis and internal electric motors of the pumps that are a permanent component of the tank's cladding are immersed in liquefied gas. For this reason, they must be sealed perfectly, particularly where the electrical connections from the deck of the ship lead into the pump.

Schott relies on a technique called compression seal. "This calls for both the



Ulrich Dirr (left), manager sales, and Dr. Oliver Fritz, manager technology, at Schott, examine a large-scale feedthrough.

glass isolator and the copper conductor to be placed inside a stainless steel housing and then be heated up so that all of the elements melt together," said Dr. Oliver Fritz, technical manager large scale feedthroughs at Schott Electronic Packaging in Landshut, Germany. "As the assembly cools down, the glass solidifies and the stainless steel housing contracts to

a greater degree than the glass. Due to the differences in the coefficients of thermal expansion of the materials used, the glass isolators are subjected to compression and a hermetic joint is created," he added.

Later, when the cold liquefied gas flows through the pump, the stainless steel contained in the housing of the feedthrough continues to contract, exerts even more pressure on the glass and, thus, helps ensure that it remains sealed.

Dr Fritz contrasted Schott's product line with the plastic seals supplied by certain competitors. "Unlike the epoxy grouting used by competitors, the pressure barrier in the glass version that Schott relies on does not contain any organic ingredients that age rapidly in response to the severe temperature cycling and, thus, lose their hermeticity. In comparison with hermetic pressure barriers that feature a ceramic-metal bond, glass feedthroughs are less likely to experience breakage." [NA](#)

MAN and Maersk in fluid relationship

MAN Diesel PrimeServ and Maersk Fluid Technology have formed a new partnership, where MAN Diesel PrimeServ will represent Maersk Fluid Technology's SEA-Mate line of products to operators of MAN Diesel equipment.

SEA-Mate is a product line designed to provide technologically-advanced solutions with respect to fuels or lubricants, allowing operators flexibility, advanced performance reduced operating costs.

The focus of a new partnership between Maersk Fluid technology and MAN Diesel Primeserv will initially two-stroke engines, and both the optimisation of system and cylinder-lubricant usage as well as improved engine performance. In addition, tools will be provided to allow for near real-time oil analysis as an enabler for predictive maintenance

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Otto Winkel, senior vice president MAN Diesel PrimeServ., said: "This is a great opportunity for the engine operators who ultimately will be able to blend cylinder oil onboard to a suitable base number and thereby cater for the actual engine condition." [NA](#)



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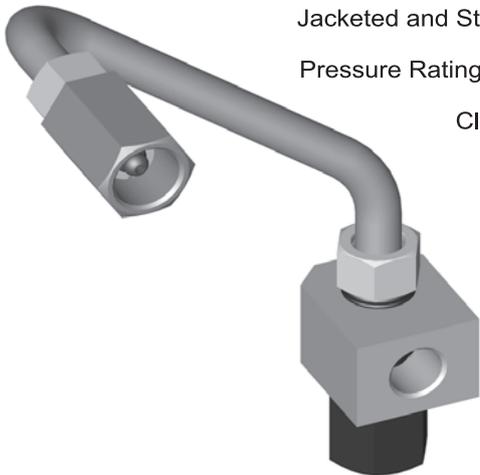
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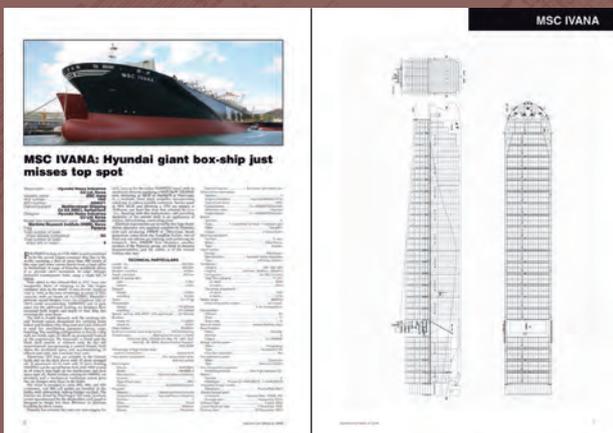
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New flexibility in line

First dual fuel reference for MAN Diesel promises to deliver new levels of operational adaptability for owners.

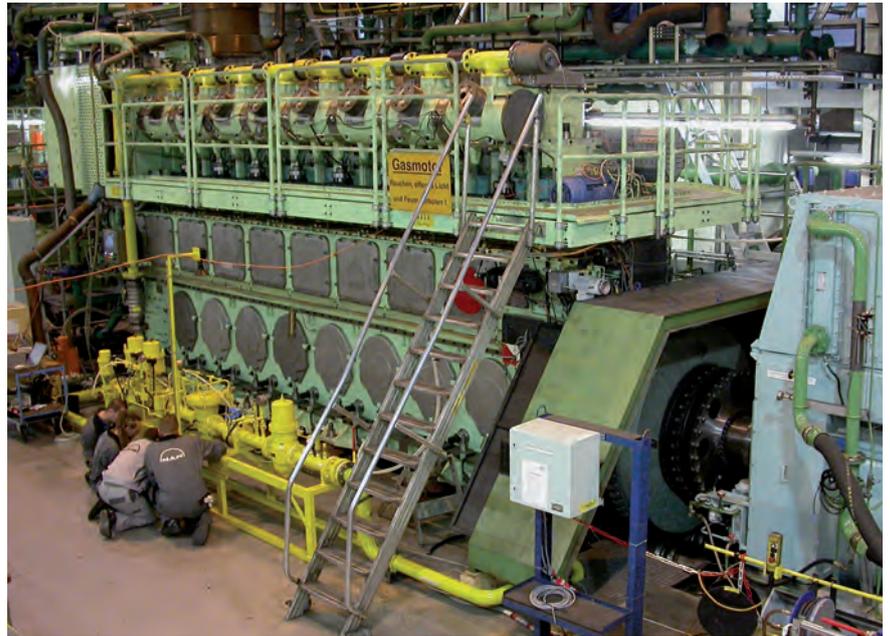
The largest liquefied natural gas carrier to feature electric propulsion based on dual fuel engines is due delivery in April 2010 but, rather than scale or the fact that this is its first DFDE reference, engines supplier MAN Diesel continues to emphasise that the configuration selected will confer superior operational flexibility compared to anything specified to date (first reported in *The Naval Architect*, March 2008, p47).

The ship itself, due delivery to Spanish owner En Elcano from South Korea's STX Shipyard, Jinhae, will be 299.9m long overall, and feature a breadth of 45.8m, a depth of 26m and a service speed of 19.5knots. With its storage capacity of 173,600m³ of LNG, this ship may appear unexceptional in light of the Q-Max behemoths already delivered to Qatargas, but the point of interest lies in the propulsion solution preferred.

MAN Diesel's 51/60DF dual-fuel engine is based on the 48/60B heavy fuel engine and offers 1000 kW/cylinder output in both gaseous and liquid fuel operating modes. For marine applications it is offered in inline versions with 6, 7, 8 and 9 cylinders and vee configuration versions with 12, 14, 16, and 18 cylinders.

It can be run on either gaseous fuel or liquid fuel and can switch between fuels at any engine load. In its gaseous fuel mode the engine burns natural boil-off gas (NBOG) evaporating from the LNG cargo, ignited by a distillate fuel micro-pilot. The distillate fuel micro-pilot amounts to less than one per cent of the energy required by the 51/60 DF engine and is injected via a common rail system which allows flexible setting of injection timing, duration and pressure for each cylinder. In the back-up liquid fuel mode, the 51/60DF engine operates as a normal diesel engine injecting either marine diesel oil (MDO) or heavy fuel oil (HFO) through a separate, normally dimensioned injector in a camshaft actuated pump-line-nozzle system.

At 1.5 g/kWh (IMO cycle E2), in gaseous fuel mode the 51/60DF already complies



The new 51/60DF engine from MAN Diesel passes its shop tests in December, before shipment to STX.

with IMO Tier III limits for emissions of oxides of nitrogen (NOx) by considerable margins.

The four-stroke, medium speed dual-fuel gas engine passed the final landmark on its way to its first commercial applications in the marine sector as recently as December 2008, when production units completed their factory acceptance tests at MAN Diesel's Augsburg works, witnessed by shipyard STX of Korea, owner EN Elcano of Spain and classification society Bureau Veritas.

Overall flexibility is based on five equally rated inline 51/60DF dual-fuel engines - in this case inline eight cylinder type 8L51/60DF engines each producing 8000 kW at 514revs/min. MAN Diesel says that, compared to configurations consisting of vee and inline engines, the all inline concept maximises load sharing potential and allows any engine to be serviced at any time without affecting the LNG carrier's sailing schedule or the engines' level of fuel flexibility.

Most LNG carriers with DFDE

propulsion systems that are listed in today's orderbooks have been specified with four main engines. Only recently have owners started to consider plants with five DF-engines of equal or similar cylinder numbers.

"DFDE propulsion puts no limit on the ship size, as the required installed power can be increased simply by adding a few cylinders (e.g. 5 x 9L51/60DF)," says MAN Diesel. "Hence, in the case of the MAN Diesel 51/60DF engine, the diesel-electric concept can be easily extended to cater for future large vessels in the 200,000m³-plus capacity range by adding, say, five cylinders compared to engine configurations in today's standard sized vessels (155,000m³).

"For LNG carrier application, an inline configuration consisting of five L-type engines provides an increased and desirable range of benefits compared to mixed configurations with four engines of inline and vee type. As the maximum power drop is only 20%, if one engine is out of service,



Largest LNG carrier with DFDE propulsion (5 x 8L51/60DF) ordered by Spanish owner EN Elcano at Korean yard STX Shipbuilding.

the inline configuration confers the greatest power reserves.

“On the other hand, the mixed V/L-type configurations with four engines face restrictions. In fact, a vessel equipped with such a plant will experience a serious power drop, down to 67-70% of the installed engine power, if one of the large engines is out of service.

“Thus, the inline configuration not only promotes excellent maintainability of the plant but also provides more power reserves than the mixed configurations, and thus the benefit of additional safety margins for the vessel.”

MAN Diesel says that one of

the problems when using mixed configurations, where engines have different numbers of cylinders, is that all engines need to be brought into operation to satisfy the vessel’s power needs. “The inline configuration with its higher operational flexibility promotes smooth engine load factors, even when one engine is out of service.”

In the non boil-off mode during the round trip of laden and ballast voyage, a maximum of two engines will need to change between gaseous and liquid fuel. If full boil-off mode is permissible during ballast voyage, only one engine needs to

change between gaseous and liquid fuel – i.e.the operator can run four out of five engines continuously on the optimised fuel/lube oil combination without any interventions.

“Under varying operating profiles or weather conditions, the inline configuration maintains its operational flexibility and ease of use,” says MAN Diesel. “Mixed configurations reach operational limits and restrictions sooner, thus forcing the crew to change engine settings; the question of when to use which engine with which fuel at which load arises more often. The inline configuration facilitates the operation of the plant, reduces the workload on the crew and thus provides additional vessel safety.”

In short, the 5 x L type configuration “allows the shutdown of any engine at any time while keeping the loads of the remaining engines within permissible limits”.

The multi-engine configuration also provides “an excellent level of redundancy and safety, a situation well comparable to the cruise sector, according to MAN Diesel, where vessels have operated with four-stroke Diesel-Electric plants for decades”. **NA**

Combined force at your service

Swedish company Chris-Marine AB, of Malmö, has taken over Brøndby, Denmark-based IOP Marine A/S, in a consolidation that both parties believe will increase their reach in the high precision maintenance machines business for diesel engines used on ships and in power plants.

Chris Marine works with all major international engine builders in the development of grinding and cutting techniques and working methods for the maintenance for slow speed and medium speed engines. IOP Marine, meanwhile, manufactures hand-powered and air-powered fuel-injector test rigs and hydraulic power packs for maintenance of two- and four-stroke diesel engines from MAN Diesel, Wärtsilä, Rolls Royce, MaK and others.

As part of the move, Chris-Marine Group has appointed Peter Lundgren as chief executive. He has served in The Netherlands, Switzerland and Hong Kong for the last 20 years, with the experience from several different executive management positions within companies including Alfa Laval and ABB.

Electronic engine drives on

MAN Diesel's type 32/44CR four-stroke, medium speed engine with common rail fuel injection recently passed the final milestone on its way to commercial applications in the marine sector.

At the MAN Diesel works in Augsburg, Germany, the first production version of the 32/44CR recently completed its Type Approval programme in the presence of representatives from shipyard Lloyd Werft, shipowner K/S Combi Lift and classification societies ABS, Bureau Veritas, Det Norske Veritas, Germanischer Lloyd, Lloyd's Register of Shipping, China Classification Society and Registro Italiano Navale.

As a result of the approval, the engine is now certified for use as both a propulsion engine and to drive shipboard generator sets. According to MAN Diesel, of special significance is the fact that the 32/44CR has been cleared for use in propulsion systems based on only a single engine.

The 32/44CR is MAN Diesel's first all-electronic engine and the first to be offered exclusively with the company's own, in-house developed version of common rail and no other form of fuel injection. Electronics is the enabling technology of common rail fuel injection and Type Approval evidences the classification societies' confidence

MAN Diesel's home grown on-engine safety and control system, SaCoSone, includes a number of inbuilt redundancy features which the supplier says guarantee that the 32/44CR's electronically controlled systems continue to function dependably, even when individual components malfunction or fail.

As part of the test procedure on the first production engine one complete cylinder unit - i.e. cylinder head, liner, connecting rod and big-end bearing shell - and a crankshaft main bearing shell were removed from the engine and examined. As expected, all components were still in very good condition.

As an integral part of the Type Approval process, during the engine development process the original six cylinder inline 6L32/44CR prototype had already been subject to an extreme condition test in the presence of a number of classification societies. The prototype engine was run for an extended period (54 hours) at both



The recently Type Approved MAN Diesel type 8L32/44CR common rail engine is one of two for heavy lift vessel *Combi Dock III*. Seen here is sistership *Combi Dock I* leaving Cape Town harbour. The vessels are identical except that the newer ship uses two 4880kW eight cylinder 8L32/44CR diesels instead of two 4500kW rated nine cylinder 9L32/40 predecessor engines.

maximum permissible output (117 %) and idling condition with its lube oil and coolant temperatures and pressures close to their alarm limits. After this procedure a more comprehensive range of key components was removed and inspected for accelerated wear.

The engine involved in Type Approval was the first of two inline eight cylinder type 8L32/44CR heavy fuel engines purchased

by K/S Combi Lift, a joint venture between ship owners Harren & Partner of Germany and J. Poulsen Shipping of Denmark. The engines are each rated 4480kW at 750revs/min and will be used in *Combi Dock III*, a semi-submersible heavy lift vessel initiated at the Christ steel fabrication works in Danzig, Poland and currently under completion at the Lloyd Werft Bremerhaven shipyard in Germany. [NA](#)

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Wärtsilä has finger on the pulse

Latest order endorses claims from Wärtsilä that its Retrofit Pulse Lubricating System (RPLS) cuts lubricating oil consumption and saves engine operating costs.

German shipowner Niederelbe-Schiffahrtsgesellschaft mbH & Co KG has signed Wärtsilä to kit out 23 containerships with its Retrofit Pulse Lubricating System (RPLS).

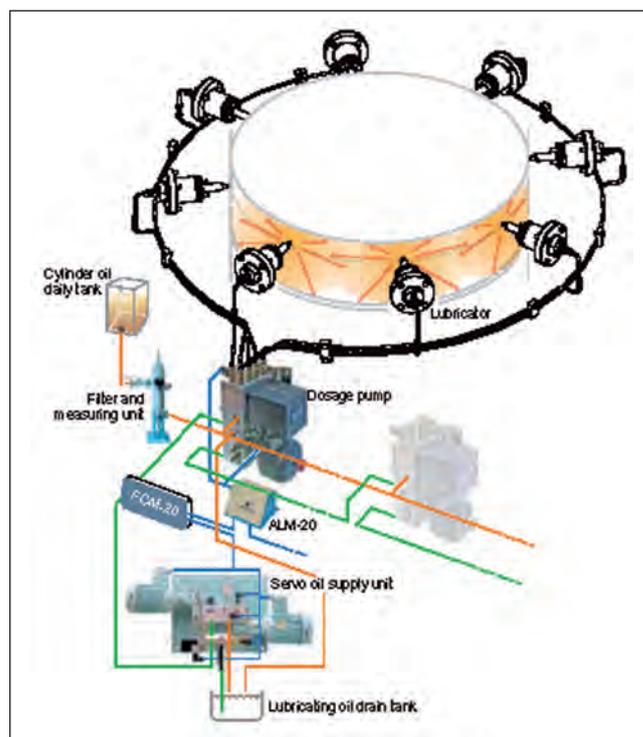
The system, which aims at reducing engine operation costs, will be fitted to Wärtsilä RTA84C and RTA72U onboard the ships.

“In 2007, we purchased the RPLS for our 19 ships equipped with the Wärtsilä RTA96C engine.” said Bozidar Petrovic, managing director, Reederei NSB. “The retrofits have proven to generate the promised saving in cylinder lubricant... Therefore, we have decided to retrofit our whole fleet of Wärtsilä two-stroke engines to provide our shareholders with the lowest operating cost possible. With its precise timing and accurate metering of cylinder oil considerable cost savings will be achieved.”

The Pulse Lubricating System (PLS) system cuts cylinder oil consumption without compromising piston-running reliability, by accurately metering and precisely timing oil delivery, and improving the distribution of cylinder lubricating oil to an engine's cylinder liners. It enables the guide feed rate for cylinder lubrication oil to be cut to 0.8g/kWhr in Wärtsilä RTA and RT-flex engines. Added to this is the benefit that the system can be installed when the ship is either in transit or at a normal port stay, minimising the disruption to the commercial operation of the vessel.

The first vessel to be retrofitted with the PLS was the 7500TEU containership *Cosco Shenzhen* in September 2006. The vessel is owned and chartered by shipping company E.R. Schiffahrt GmbH & Cie KG. The RPLS was fitted while the ship sailed from Hong Kong to San Francisco via China.

“The RPLS solution has delivered all the benefits promised,” says Claus Tantzen, technical manager within the fleet management department at E.R. Schiffahrt. “In addition to cost-savings we are on the lookout for operational reliability. The



Arrangement of the Retrofit Pulse Lubrication System on one cylinder of a Wärtsilä low-speed engine.

system is being fitted to all nine Wärtsilä RTA96C engines in our fleet.”

Low consumption

The RPLS cylinder lubrication solution is said to trump traditional systems by its electronically-controlled feeding of cylinder oil. Compared to accumulator systems, Wärtsilä claims that the RPLS can help achieve typical yearly savings of up to US\$200,000 for a 12-cylinder RTA96C engine running for 7000 hours a year with cylinder oil costing US\$1700/tonne.

The RPLS is based on a lubricating module for each cylinder with a dosage pump and monitoring system, which delivers pressurised cylinder lubricating oil to lubricators (quills) that fit existing cylinder liners of the Wärtsilä RTA and RT-flex engine types. Each lubricating module is equipped with two separate supply lines for cylinder lubricating oil and servo oil.

Once the Wärtsilä Engine Control System (WECS) switches the 4/2-way solenoid valve in the lubricating module to the open position, servo oil flows to the drive side of the central piston of the dosage pump in the lubricating module. As the central piston is actuated, it feeds cylinder lubricating oil from the lubricating oil supply to the metering ducts, and then discharges it from the lubricators at high pressure. The cylinder oil is supplied at defined positions of the working piston, the position of which is constantly detected by the control system from the reference signal given by the crank angle sensor. At the end of the lubrication work cycle, the directional valve in the lubricating module directs the servo oil to the return-flow side of the central piston of the dosage pump, which then returns to its initial position. The metering chamber is filled again with cylinder lubricating oil to be ready for the next lubricating cycle. **NA**



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Wärtsilä and Mitsubishi renew vows

Ten year extension to agreement that traces its marine roots back to 1924.

Wärtsilä and Mitsubishi Heavy Industries Ltd have signed a ten-year extension of an existing co-operation agreement for the sale, manufacturing and servicing of Wärtsilä low-speed marine diesel engines. Mitsubishi is the longest-standing member of the Wärtsilä family of low-speed engine licensees, with the company having been a licensee for Sulzer low-speed marine engines since 14 January 1925. Sulzer diesel engines were incorporated in the Wärtsilä engine programme in 1997.

The licence co-operation agreement is a basis for the exchange of diesel engine technology between Wärtsilä and Mitsubishi, defining and regulating intellectual property rights, and the

delivery and feedback of technical information and support.

Over the years, Mitsubishi has contributed to the development of Sulzer and Wärtsilä low-speed engines and often built the first examples of new engine types. Most recently, the partners jointly developed the Wärtsilä RT-flex50 and Mitsubishi UEC50LSE two-stroke engine types.

Under a closer alliance, established in 2005, the two companies agreed to share resources and experience for improved business. In 2006, Wärtsilä and Mitsubishi joined with China Shipbuilding Industry Corporation to establish a factory for low-speed marine engines at Qingdao, China, through the joint venture Qingdao Qiyao Wärtsilä

MHI Linshan Marine Diesel Co Ltd (QMD).

A further joint project was agreed in 2008 between Wärtsilä and Mitsubishi for the design and development of new small, low-speed marine diesel engines of cylinder bores of 350mm and 400mm and a power range of 3500kW-9000kW. Mitsubishi is taking an important role in this project based on its successful experience in this small bore sized engine range. Each is available as Wärtsilä RT-flex electronically-controlled common-rail and Wärtsilä RTA mechanically-controlled engine types. Based on the RTA engine designs with these two bore sizes, Mitsubishi is also developing its own UEC-LSE series engines. **NA**

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Vast reserves of oil and gas are expected to be exploited in the Russian Arctic, including the Barents Sea, the Pechora Sea and Kara Sea. There are also new gas fields being developed on the Yamal Peninsula. There is a need for large tankers, LNG carriers and associated support vessels to transport the oil and gas and maintain operations in these far northern locations. Increasing numbers of passenger ships are also operating in low temperature environments.

Vessels operating in the Arctic regions are exposed to a number of unique demands. The pressure of first year and multi year ice imposes additional loads on the hull, propulsion system and appendages. New designs have evolved such as the Double-acting principle. The extreme environmental conditions can also have significant effects on vessel systems and machinery.



Low temperatures and poor visibility can have profound effects on the crew and vessel operations. Current operational experience in the Arctic is limited to much smaller vessels than those that are envisaged. There is great probability that new owners and operators without operational experience in these harsh conditions will enter the market. This will impose a need for guidance for these owners and operators, as well as shipyards building vessels for cold weather service.

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Comfort is the key

Feadship*'s approach to motion research and development, as recounted by Chris van Hooren, manager design De Voogt Naval Architects.

Owner and guest well-being are essential ingredients for a successful yacht and motion comfort is a key factor therein, as a recent survey shows¹.

Discomfort values shown in Table 1 relate to ferries and cruise vessels. Yachts are generally smaller and the design criteria for noise, vibration, air quality and the like are generally much stricter. This means that seasickness and motion-related balance problems are even more important for overall comfort onboard yachts.

This was confirmed by Steven Rattner during the Owner's Summit of the GSF 2007². Mr Rattner stated that ownership among families that can technically afford a megayacht is ridiculously low, at one per cent compared to anything else this group owns, and that motion discomfort is the main reason: "They don't want themselves, their family or friends to feel uncomfortable on their big toy and they now believe that the size of these yachts and stabilization technology, especially at anchor, has addressed a major problem in motion sickness. If we continue to solve this we will see much higher penetration."

Feadship has long been aware of the importance of motion comfort. Seakeeping tests are always commissioned in the case of prototype yachts and model test results validated by full-scale observations³. In addition, Feadship participated in several motion research and development projects in the EU and implemented the results in new designs⁴.

The behaviour of a yacht is the combined effect of the wave environment, the design parameters and operational measures taken by the captain. The resulting comfort depends on the physiology and psychology of owner and guests (human factors).

* Feadship is a joint venture between three leading names in Dutch shipbuilding: De Vries, Van Lent and De Voogt.

reported cause (ferries & cruise vessels)	%
Seasickness	20
Motion related balance problems	16
Noise	10
Vibrations	9
Air quality	8
Other / None	37

Table 1

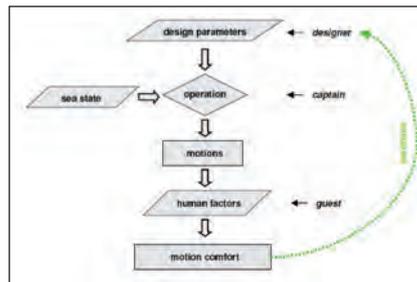


Figure 1

The relationship between the factors determining motion comfort is illustrated in Figure 1. Feadship aims to close the loop by implementing feedback from the owner and crew in its new designs.

Design parameters

A yacht's behaviour in waves depends on several design parameters (see Table 2) and Feadship gives high priority to solutions that offer the best achievable motion comfort.

The larger the boat, the less motion is experienced in a seaway. To better understand the effect of size on motion comfort, Marin analysed seakeeping tests with various Feadship yachts. In Figure 2, comfort levels in head seas are plotted against boat length for various wave conditions. An interesting finding is that for lengths over 60m, size barely changes motion comfort.

While the hull form of displacement

yachts has changed little over the decades, there has recently been a trend towards higher speeds. At such speeds a conventional flared bow shape results in discomfort due to vertical acceleration and slamming induced vibrations. In such conditions the yacht loses speed, either by added resistance from wind and waves or the voluntary speed reduction to alleviate discomfort.

An example of a hull form that is more suitable to maintain speed in rough seas in the 20knot-25knot range is the axe-bow concept developed in The Netherlands⁶. A similar hull form was applied on Feadship's X-stream and F-stream concept designs (Figure 3).

Accommodation Arrangement

How boat behaviour is experienced depends very much on one's position onboard. The centre of the motions generally lies on the waterline level at about one third from aft. Marin determined comfort levels for various fore and aft positions via seakeeping tests with Feadship models.

The results are summarised in Figure 4, where comfort levels in head seas are plotted against longitudinal position for various wave conditions. If motion comfort matters, designers should locate sensitive accommodation areas in the best fore and aft location. A good example is Feadship's F-stream design (Figure 4).

Parameter	Effect	Discomfort	Advice
Boat size	Vertical and transverse accelerations	Seasickness	Bigger is better
Roll period	Rolling and transverse accelerations		Not too short to avoid jerky motions
Transverse stability	Rolling in transit	Human mobility	Not too low
Roll stabilization (fins, anti-roll tank, etc.)	Reduces roll at anchor and in transit	Boarding	More is better
Heading control at anchor	Reduces rolling at anchor	Water sports	More control is better
Draft forward and bow flare	Slamming and hull vibrations	Noise	Sufficient draft. Avoiding shallow flare angles without sacrificing too much buoyancy
Stern shape	Slamming at anchor	Jerky motions	Avoid flat sterns
		Vibrations	Provide ballast option
Interior arrangement	Magnitude of vertical accelerations and slamming induced vibrations		High-comfort areas aft of amidships
Bilge keels	Rolling in extreme conditions	Safety issue	Larger is better

Table 2

CR = 100 - K · A · H · S	
CR	Motion Comfort Rating 0%=absolutely dreadful; 100%=perfect
K	Scaling factor
A	Total effective acceleration
H	Habituation factor
S	Susceptibility factor

Table 3

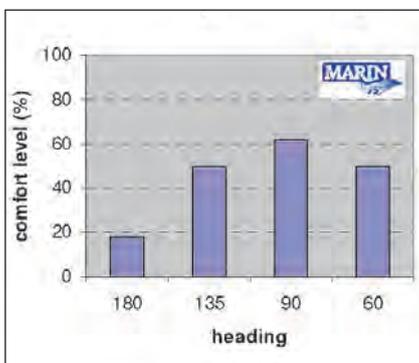


Figure 5

Operational measures by the captain can considerably influence motion comfort. Areas with adverse wave conditions may be avoided (weather routing) or the yacht

can wait in port for favorable weather. Once in a given sea state, heading and speed are the captain's only remaining comfort control options (Figure 5). When anchored, measures that give the captain control over heading, stability and draft can significantly influence roll motions and slamming below the stern.

Quantifying Comfort

Research helps us establish a relatively simple relationship between ship motion and motion comfort⁵. Here comfort is determined by the dominant factor listed in Table 1: seasickness. It should be stressed that sickness often refers not to actual vomiting but to an unpleasant feeling,

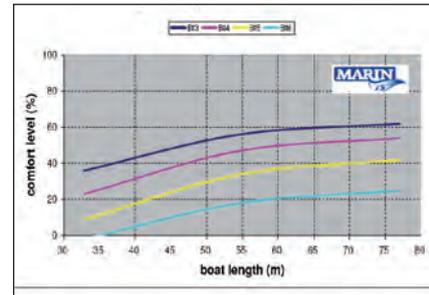


Figure 2.



Figure 3.

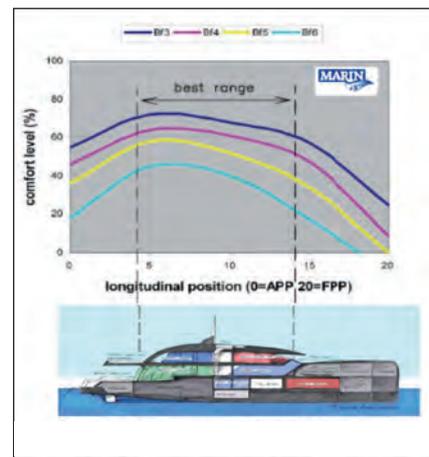


Figure 4.

headaches or loss of appetite. The equation for the Motion Comfort Rating is given in Table 3, where the total effective acceleration results from the boat's combined motions. Passenger habituation and susceptibility factors represent the human element.

The most important parameters for motion comfort are the accelerations experienced onboard. Direction and magnitude of acceleration depend on ship design, sea state and operation. To account for the way different motion frequencies contribute to discomfort, different frequency weightings are taken into account in the following equation:

$$A = \sqrt{[k_x^2 a_{wx}^2 + k_y^2 a_{wy}^2 + k_z^2 a_{wz}^2 + \dots]}$$

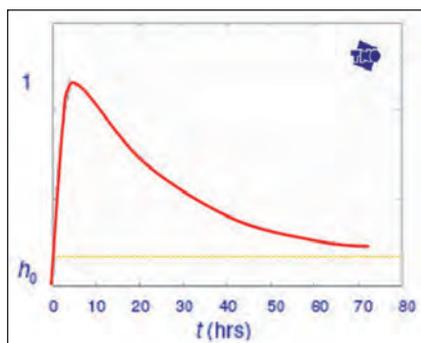


Figure 6.

while others are unaffected. A significant finding of the referenced research^{1,5} is the clear relation between sickness susceptibility and age, gender and sickness history (Figure 7).

As we grow older we become less susceptible to sea sickness. Females appear twice as susceptible as males, and both are twice as susceptible if they have been sick before.

As owners become ever younger, the age issue increases in importance, especially as their wife and children will likely be within the most sensitive 10-30 year range.

Slamming

While the above concepts cover normal ship motions, other aspects include 'predictability' (unexpected motions) and slamming-induced noise and vibration. Current research is addressing the latter issue and concepts like the Vibration Dose Value seem more appropriate.

As in all aspects of motor yacht design, Feadship sees feedback from owners, passengers and crew as crucial. Generalizing the lessons learnt and applying them in new designs is the way forward in high quality design. A precondition in achieving this goal is to close the loop between designers and users. We now have a rational criterion available to quantify motion effects. The

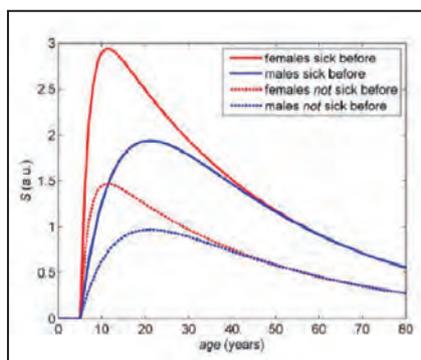


Figure 7.

Generally it takes some time before people get seasick. When the motions persist for hours to days, most people become used to the motion. This habituation factor is depicted in Figure 6 and plotted against time. It takes at least two days to overcome the initial inconvenience of ship motion: A key point for 'short stay' guests (long weekends).

A major problem with understanding seasickness is that some people get very sick

next step will be to raise awareness of the key design parameters that govern comfort and the design tools that balance these with the other (often conflicting) design issues.

Acknowledgement

Thanks to Jelte Bos from TNO Defence, Security and Safety, and Reint Dallinga from Marin. *NA*

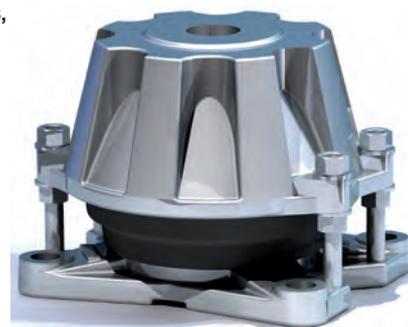
References

- 1) Bos J.E. et al.: "Susceptibility to seasickness" (2005). *Ergonomics* 50:890-901.
- 2) Steven Rattner: "A personal account of Ownership experience" (2007). *Global Superyacht Forum 2007: The Owner's Summit*
- 3) Gumbs, F. et al.: "Practical Experience on reducing motions and improving comfort on board large motoryachts" (2000). *Project 2000, Amsterdam, the Netherlands*
- 4) Dallinga R.P. et al.: "Seakeeping of motor yachts and passenger discomfort" *Project 2003, USA*
- 5) Bos J.E.: "A ship passenger comfort model" (2007) – company confidential. *TNO Defence, Security and Safety, the Netherlands*
- 6) Keuning, J.A. et al.: "The axebow", a further improvement on the seakeeping performance of a fast monohull (2002). *Schip en Werf de Zee: Marine Technology*, 12 (1), 31-36.

Rubber Design lifts capacity

Rubber Design, of The Netherlands, has introduced a new set of conical mountings, used for main engine, auxiliary engine and generator set applications, in the shape of the RD 'X' range. By virtue of remodelled geometry, the RD214X is said to have up to 40% more load capacity than its forerunner RD214 product, while the RD114X's load capacity is 70% above the RD114 it replaces. The RD114X is designed for use in conjunction with larger bore engines.

Using the new range, Rubber Design said that operators had the option of deploying "a significant reduction" in the number of mountings, or using the same number of mountings based upon a softer rubber grade/hardness compound. "By using the softer grade/hardness compound an even better isolation grade can be achieved," said Rubber Design. The new RDX range also incorporates a special high tensile strength steel central spindle (limiter) and comes in a lightweight aluminium or in a cast iron version.



Rubber Design's RD214X conical mounting.

THE INTERNATIONAL CONFERENCE ON COMPUTER APPLICATIONS IN SHIPBUILDING (ICCAS 2009)



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1-3 September 2009, Shanghai, China
Second Announcement & Call for Papers

SHIPBUILDING ICCAS Shanghai • 2009

ICCAS 2009 will be the 14th International Conference on Computer Applications in Shipbuilding. The 2009 conference will be held in Shanghai, from 1-3 September 2009.

The conference will review operational experience from existing computer applications in the design and build of ships and offshore structures. It will also examine the advances in Information Technology which have contributed to increased productivity in both shipbuilding and maritime operations; including increasing co-operative working between shipyards, marine equipment and system manufacturers, engineering partners and shipping companies.

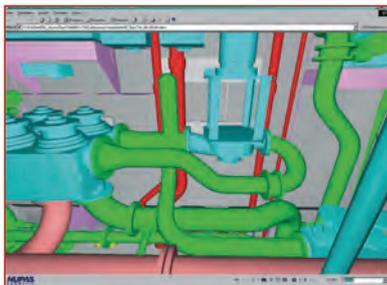
The conference will cover the full range of topics related to computer applications, including separate programs, integrated systems, knowledge management, simulation and virtual reality applications, for:

- Early design, including concept design, tendering, initial design, general arrangement, cost and work estimation, hull form, hydrodynamic analysis and basic structural design, risk based design
- Detailed and production design, including structure, machinery, hull and outfitting design
- Parts manufacturing and assembly, including prefabrication, shop automation, robotics, assembly and accuracy control
- Material management, including material control, supply chain management, logistics and e-solutions
- Management of shipbuilding projects, including planning, work-flow analysis, PDM and ERP applications
- Commissioning, inspection and maintenance, including life-cycle maintenance, life-cycle cost management, environmental cost management, parts and systems reliability, inspection standards and risk management
- Skills management, knowledge transfer and other human resource issues
- Innovation, innovation management and innovation impact assessment, including new materials and eco design

Papers are invited on the topics to be covered by the conference. Such papers should focus on advances made in information and communication technology with respect to methods, tools, standards and organisational adaptations in the different application sectors of the shipbuilding industry. Where appropriate, papers should also describe the potential impact of the innovation described to productivity improvements.

The conference will attract a large international audience and provide a forum and means of professional development for all parties interested in computer applications in shipbuilding.

Key dates and up to date information will be displayed on the website at:
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Desdemona to turn and turn and yet go on

Prospects are shaping up that TNO's highly advanced Desdemona movement simulator may have a maritime application.

Dutch research body TNO is understood to have reached an agreement with Marin to explore the usefulness of the Desdemona motion simulator in a maritime context later this year.

Said to be unique, the multi-purpose Desdemona simulator recently installed at TNO will push the limits of movement simulation. Desdemona is a movement simulator, disorientation trainer and advanced research lab, all in one.

Most motion simulations take place in standard hexapod simulators, but these do not allow the exact simulation of really complex or extreme movements. Desdemona (DESoriëntatie DEMONstrator Amst) is a simulator offering an extended movement envelope. It is the result of a collaboration



The Desdemona motion simulator.

between TNO and the Austrian company AMST Systemtechnik and combines the possibilities of both the hexapod and the centrifuge. The Desdemona cabin with modular layout is mounted on a fully gimbaled system that is able to rotate around

any conceivable axis. The system as a whole allows two metres of vertical movement, combined with eight metres along a horizontal sledge. The sledge itself is able to spin as well.

Desdemona is based on Spherical Washout, TNO's own motion cueing algorithm based on the proven advantages of the conventional hexapod algorithms and Dynamic Flight Simulation. Desdemona was originally designed for spatial disorientation research and training, for human movement perception and motion cueing R&D, and for advanced flight simulation. However, Desdemona allows a much wider use, e.g. in military, civil and small aviation, space programmes, and TNO is also emphasizing its potential in the shipping and the automotive industries. [NA](#)

Cut the cavitation noise

The United States of America tabled a work programme at the International Maritime Organization's 58th Marine Environmental Protection Committee, promoting action to minimise the incidental introduction of noise from commercial shipping operations into the marine environment.

John Carlton, of Lloyd's Register, gave an insight into the work the classification society has been doing on such concerns at a recent LR Technology Day.

He said that it was known that in certain circumstances marine mammals are reluctant to approach large ships too closely, but whether this is because of distress caused by noise or a natural reluctance to come too close to another large moving maritime object remains unclear.

However, while little is known about the auditory thresholds and audiograms for larger mammals, a body of information is available for the small marine mammals.

In marine mammals the audiogram is typically U-shaped, implying that at the upper and lower frequency ends of the hearing

range hearing is less sensitive than in the middle of the frequency range. Such a hearing sensitivity is similar to that of humans.

When compiling the known data on the Toothed and Baleen whales, Pinnipeds and Sirenians it is clear that there is an abundance of communication and navigational signals produced by these mammals within the frequency range 100Hz to 100kHz with, in the case of the Baleen whales, frequencies down to 10Hz.

In terms of the contribution of cavitation to these noise emission spectra, a significant amount of work has already been undertaken, both in naval and merchant ship communities. Each type of cavitation has a characteristic noise signature associated with it, depending upon the cavity dynamics that are involved.

Mr Carlton said, however, that

considerable further work was required, at full scale on the observation of the cavitating structures, particularly in the following areas, he said:

- characterising the noise emissions from different types of cavitation generated by merchant ships' propellers at their various ranges of operating conditions
- methods of de-coupling machinery noise from merchant ships in order to attenuate noise transmission into the sea
- understanding the response to noise spectra of the larger marine mammals, particularly in relation to relative extents of the phonation to hearing frequencies
- understanding more clearly the noise transmission paths in marine mammals
- the physical and behavioural response of marine mammals to ship noise emission stimuli. [NA](#)

Emergency package for shipbuilding

Turkey's shipbuilding industry is estimated to have grown by 300% in the period 2003-2008, but the last six months have seen the sector buckle in the face of plummeting demand.

In early March, the Turkish government was poised to launch a targeted stimulus package for the shipbuilding industry.

Transport Minister Binali Yildirim said: "The main objective of the package would be to ensure that ship orders already received will be executed." According to local reports, though, the minister did not rule out the possibility that Eximbank, the state-run export credit agency, would extend loans for the construction of ships sold as exports.

In 2003, Turkey had 37 shipyards and 5000 workers in the sector. By the middle of 2008, the sector consisted of 150 yards and employed 36,000. Between then and now, nearly 9000 workers have been laid off. Over the last six months, it is reported that only two or three ship orders have been placed in Turkey.

Buoyed by the then shipbuilding boom, Turkish shipbuilders found themselves at a fork in the road around two years ago. Having built a solid reputation based on delivering good quality tankers of up to 20,000dwt and containerships of up to around 1900TEU capacity, they needed

to decide whether to stick with these niches, or to scale up capacity and enter the market for larger tonnage

Some, like Tuzla-based Selah, followed the cautious path. The company specialises in vessels of up to 30,000dwt. General manager Ersan Tezmen said: "We were expecting some slowdown in the economy – now we are living it. So we were conservative in our spending, investing only in what was absolutely necessary to maintain operations and increase efficiency. All I can say now is, Thank God!"

The yard has a 16,800dwt cement carrier under construction for Naftocement, as well as a 12,600dwt chemical tanker and a 13000dwt steel-tank chemical tanker, both for Turkish owners. However, Mr Tezmen said that three customers with options for two chemical tankers and one cement carrier had said that they needed to wait until the end of 2009 before making any decision. Another project, to build a 56,000dwt bulk carrier to a design devised by Japanese shipbuilder IHI, to the account of the ICDAS conglomerate had also been shelved.

"To the end of 2009, we have deliveries in hand, but we must get orders before November," said Mr Tezmen.

Others, like Tuzla Bay's Sedef Gemi Insaati, took the expansion route, building a new drydock dock designed to turn out Capesize bulk carriers and capable of handling blocks of up to 750tonnes. Sedef technical director Osman Yurtsever told The Naval Architect that, in light of market conditions, the yard had switched tack. With the drydock's gate to be erected next month, the new facility will be ready for operations by May. However, Mr Yurtsever said that the plan was now to market the dock to the repair sector for at least one year, with the target being ships of above Panamax size.

Also slanting its strategy towards the repair market is Besiktas Shipyard, located in Yalova, 15km from Tuzla. It too is completing work on a new drydock, with a target start date of August 2009, although in this case the plan was to target repairs all along.

Besiktas began work on developing its own shipbuilding facilities as recently as October 2007, with first steel cutting taking place in April 2008, although the wider Besiktas group has been involved in new construction using hired slipways for a number of years, having been responsible for the delivery of 17 tankers of between 4300dwt and 18,000dwt.

The Yalova facilities include a 150m long slipway for new construction. Thus far, the yard has been concentrating on the construction of an initial three 3900dwt IMO Type II chemical tankers. Built to a Besiktas design, these ships are due to be delivered from June 2009, and are said to be destined for British and Danish owners. Besiktas is also understood to be in the advanced stages of discussion covering four projects, to build three ship types – a 3300m³ capacity LPG carrier, platform supply vessels and a small passenger ship for Polar expedition cruises.

However, given the current newbuild market climate, Besiktas acknowledges that it has purposefully slowed down its construction activities, and that it is now looking to repair services for future growth. On completion, the new drydock will be 235m long, 38m wide and 9m deep.

Conceding that these are "tough times", Cicek Shipyard vice president Mehmet Berke Cicek said that there was nonetheless a need for Turkish yards to change in their mentality. "We need to represent ourselves as much as possible and show the world what we can do," he said.

Cicek has built up a solid reputation for delivering ice class 1A chemical tankers,

TECHNICAL PARTICULARS

Chem Flower

Length (oa):	84.91m
Length (bp):	77.97m
Breadth:	12.60m
Depth:	6.40m
Design draft:	5.30m
Scantling draft:	5.40m
Deadweight:	3,150 tonnes
	(at 5.30m draft)
Gross:	1,980 tons
Main engines:.....	2 x 6-cylinder Mitsubishi
	S12R-MPTK diesels each generating
	940 kW @ 1600 rev/min
Service speed	11 knots at 85% mcr

of 15,000dwt, 18,000dwt and 26,000dwt. Now it is working its way through a series of 20,000dwt chemical tankers, 22,000dwt multi-purpose containerships and 58,000dwt bulk carriers. The company has also developed a new design for a 3150dwt chemical tanker, and a 25,000dwt double hull bulk carrier.

“We are concentrating on smaller tankers because of the IMO banning of single hull tonnage comes into effect at the end of this year, and so there will be a clear need for ships of less than 5,000dwt,” said Mr Cicek. “There is not much data out there about how many vessels of this size are single hulled, but recent intelligence from Lloyd’s Register suggests that 60%-65% of the fleet in this class is over 20 years of age.”

Four 3150dwt IMO Type II chemical tankers are being built, originally to Cicek’s own account, but they were subsequently sold on to Maltese owners. *Chem Flower* is the lead ship of a series, and satisfies Ice Class 1B regulations. On these ships, cargo space is divided by troughed centreline and transverse bulkhead, into 12 tanks, each fitted with a Hamworthy-Svanehøj electrically driven, deepwell pump rated at 150m³/hour. They will come complete

with their own especially compact nitrogen generators to accommodate dangerous cargoes – an unusual feature for ships of this size, Mr Cicek said. MarineLine coatings have been selected by Cicek to give the ability to carry a wide range of cargoes.

Another interesting facet of the project has been that it has supplied Mitsubishi Heavy Industries with a breakthrough reference in Turkey for its 12-cylinder medium speed S12R engine. Each ship is fitted with two of the MDO-burning main engines.

Local MHI agent Enka Marketing Export & Import said that the four stroke, turbocharged S12R-MPTK had been selected for its enhanced environmental and operational performance. The engines, working in tandem with twin azimuthing propulsors and a bow thruster, conferred superior manoeuvrability by virtue of low turnover of 1600revs/min, as well as achieving lower exhaust emissions than comparable engines burning HFO. ENKA said that the engineroom lay-out was also distinguished by its simplicity.

Mr Cicek, said that the full redundancy offered by the twin engine/twin screw

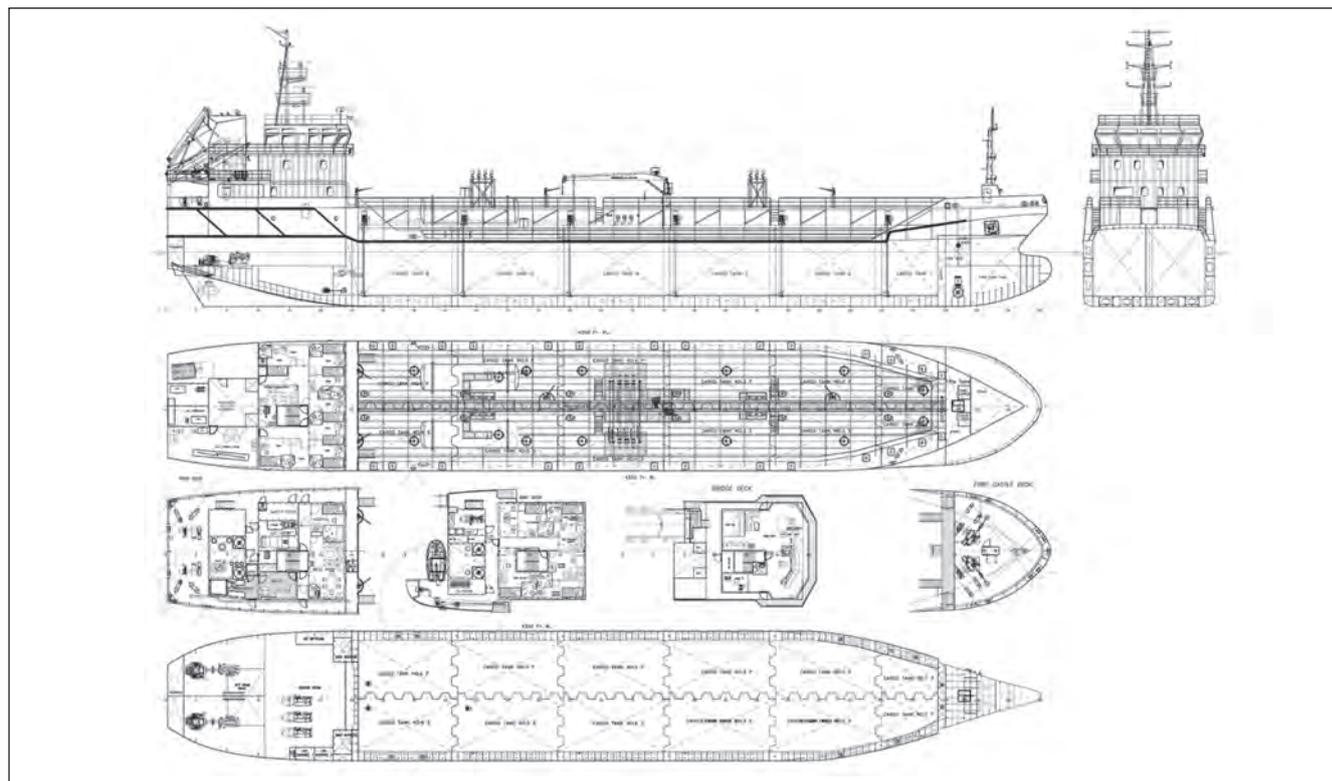
solution meant that, even with only one S12R engine running, these Bureau Veritas-classed ships would be able to achieve speeds of 9knots.

With the first ship undergoing sea trials at time of writing, the remaining three ships will be delivered at four-monthly intervals in 2009.

Opportunities continued to exist in the bulk carrier market, Mr Cicek said, despite the market being “upside down at the moment”. “From 1977 to 1984, 1600 Handysize vessels were built,” he said. “Ships of over 30 years old should be scrapped right now, due to operating expenses, but also because in this catastrophic market most of them cannot find any insurance.

“Our latest double hull bulk carrier design will be ready in 2010, and if it is accepted by the market, we will try to build a series of such ships. Our biggest competition will come from Japan, so we will need to develop a ship that is a little different – achieving lower fuel consumption, operating a controlled pitch propeller on one engine, with a shaft alternator producing energy during a voyage without using the auxiliaries. **NA**

GA *Chem Flower*.



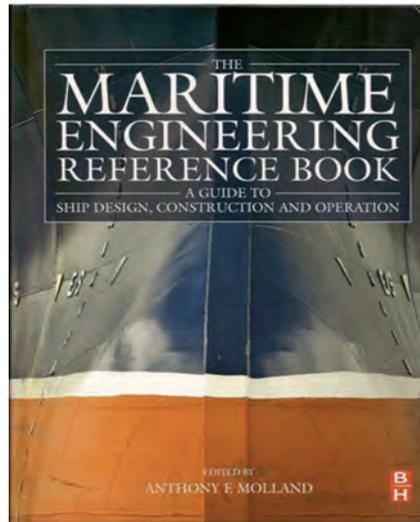
The Maritime Engineering Reference Book

Review by E. C. Tupper

The Maritime Engineering Reference Book

A Guide to Ship Design, Construction and Operation

Edited by A. Molland, published by Elsevier, Butterworth-Heinemann as a hardback, 2008, 920 pp. ISBN-13 978-0-7506-8987-8, £99.99.



The editor, who is well known to many of our members, is Emeritus Professor of Ship Design at the University of Southampton. He has lectured in ship design and operation for many years and carried out extensive research and published widely on ship design and hydrodynamics.

The book is intended to be a one-stop source for engineers involved in marine engineering and naval architecture. To this end it has been compiled using extracts from twenty books in the range of maritime books in the Elsevier Butterworth-Heinemann collection. These extracts have been taken directly from the source books, with some small editorial changes. For instance, it was necessary to renumber sections and figures and link the sections within chapters. As is to be expected, the source books exhibit significant differences in style and these have been

left. Where appropriate some additional, more recent, references have been added.

Each chapter takes a particular topic and, to give a feel for the coverage, the number of pages devoted to each is shown in parenthesis. The first eleven chapters of the book deal with: the marine environment (42); marine vehicle types (32); flotation and stability (41); ship structures (65); powering (163 – resistance and propulsion); marine engines and auxiliary machinery (139); seakeeping (95); manoeuvring (58); ship design, construction and operation (92); underwater vehicles

(64); marine safety (92). The twelfth chapter is a glossary of terms and definitions. The coverage ranges from the basics to more advanced concepts to cater for the differing needs of potential readers.

Because of the way the book has been compiled there is inevitably some repetition of material between chapters in order to retain the readability of each chapter and to enable each to be studied individually. Because it draws only upon Elsevier books there are some gaps in what one might expect to find in a book of this size and title. Thus there is little information on small craft and on offshore activities, both of which have been important to our members in recent years and which are of growing importance. This is said as a fact, not a criticism of the editor.

The book should appeal to a wide readership although many of those at whom it is aimed will already possess one or more of the books used to create it. It is somewhat expensive but this is because of the wide coverage. Naval architects, marine engineers and seagoing officers will all find it a useful collection of information within one cover. It will also be of interest to engineers, scientists and others whose work brings them into contact with maritime matters and may need to read up on a specific topic. **NA**

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- Offshore experience and an understanding of inspection and certification
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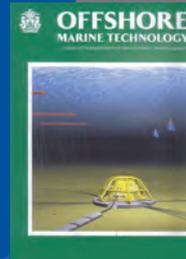
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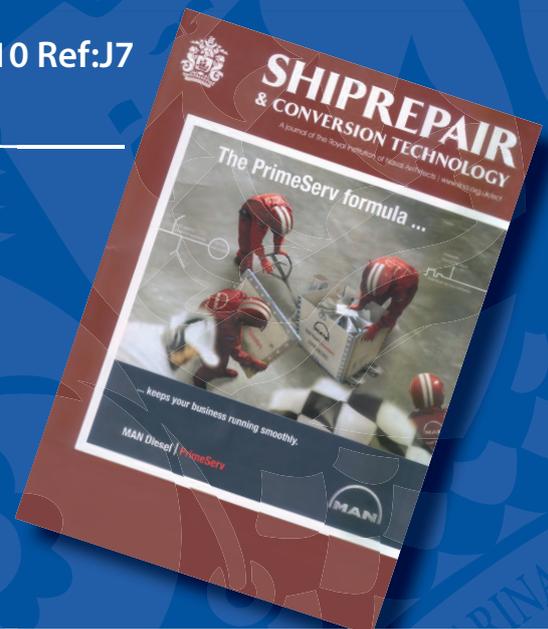
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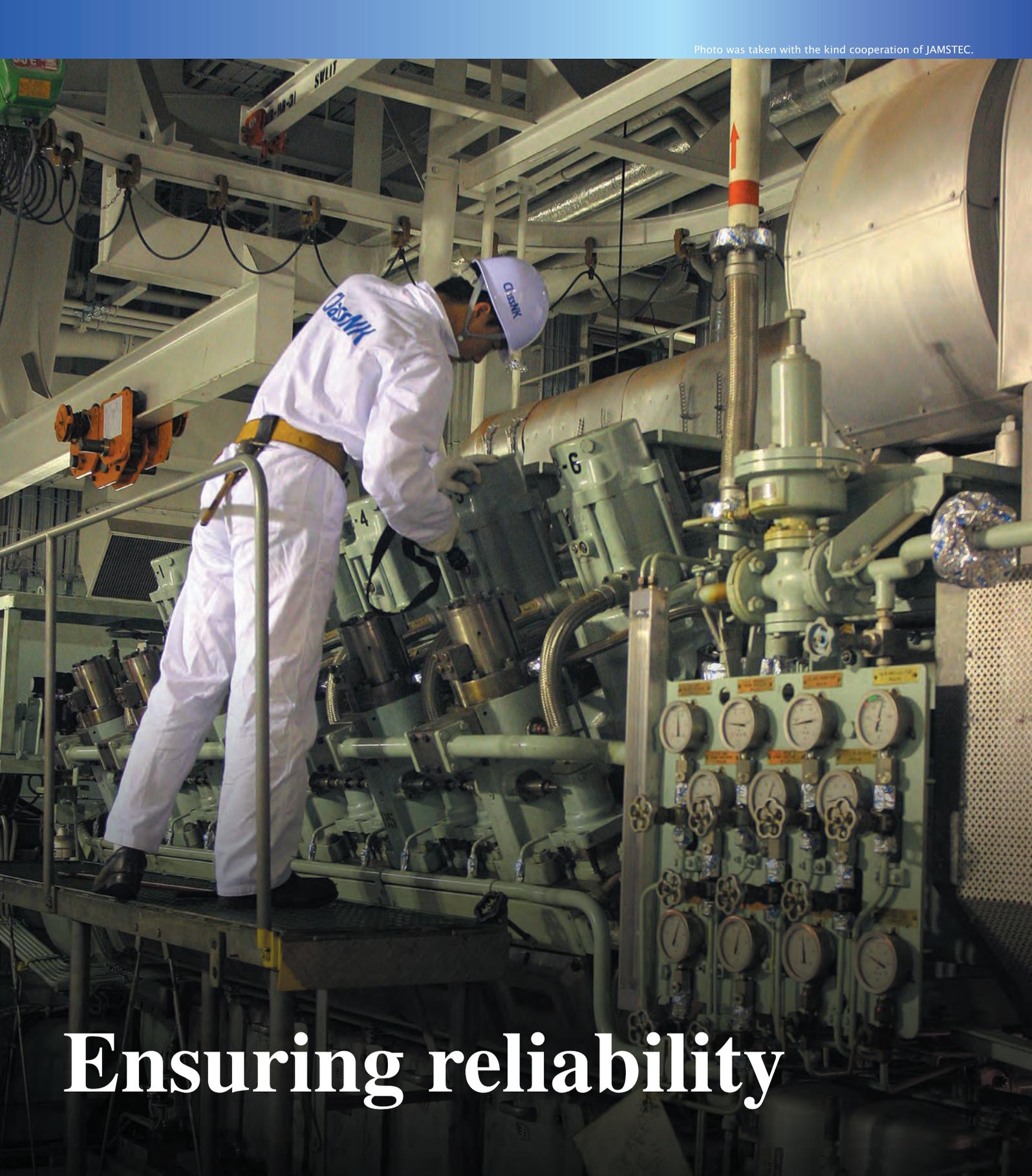


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