

# THE NAVAL ARCHITECT



APRIL  
2007



Think of us when you are  
**planning clean ships**



Certification (ISO 14001 for example) requires shipowners to minimise the environmental impact of their operations. For over 70 years MacGREGOR has come up with innovative engineering solutions, and its latest is a range of cargo systems – cranes, hatch covers and RoRo – that all use electric drives.

Development focused on three main aims: compared with hydraulic systems the new products had to be environmentally friendly, they had to provide equal or better performance, and they had to cost the same. The main advantages are that hydraulic oil leakages are eliminated, there is no need to fit hydraulic pipework on board, electric drives are easy to monitor and maintain, and they offer energy savings.

We understand ships and we know about cargo handling.

**Profit from our experience**

**MacGREGOR**

[www.macgregor-group.com](http://www.macgregor-group.com)



[www.rina.org.uk/tna](http://www.rina.org.uk/tna)



## First Class tankers: a new perspective



Tankers are like a work of art – the more quality they offer, the more valuable they are. Welcome to GL, your First Class partner in improving the operational safety and profitability of your tankers!

Germanischer Lloyd Aktiengesellschaft  
Vorsetzen 35 · 20459 Hamburg/Germany  
Phone +49 40 36149-0 · Fax +49 40 36149-200  
headoffice@gl-group.com · www.gl-group.com



**Germanischer Lloyd**  
OPERATING 24/7

**THE NAVAL ARCHITECT**  
International Journal of The Royal  
Institution of Naval Architects

**Editor**  
Hugh O'Mahony

**Editorial Assistant**  
Clare Nicholls

**Design/Production Manager**  
Sandy Defraigne

**Group Advertisement Manager**  
Debbi Bonner

**Assistant Advertisement Manager**  
Matthew Clifton

**Advertisement Production Manager**  
Stephen Bell, PGDip

**Marketing Manager**  
Adelaide Proctor

**Publisher**  
Mark J Staunton-Lambert

Published by:  
The Royal Institution of Naval Architects

Editorial & Advertisement Office:  
10 Upper Belgrave Street  
London SW1X 8BQ, UK

Telephone: +44 (0) 20 7235 4622  
Telefax: +44 (0) 20 7245 6959  
E-mail: editorial@rina.org.uk  
advertising@rina.org.uk  
Website: www.rina.org.uk/tna  
Subscriptions: subscriptions@rina.org.uk

Printed in Wales by:  
Stephens & George Magazines  
Merthyr Tydfil

The Institution is not, as a body, responsible for opinions expressed in *The Naval Architect* unless it is expressly stated that these are the Council's views.

Registered charity No. 211161

© 2007: The Royal Institution of Naval Architects. This publication is copyright under the Berne Convention and the International Copyright Convention. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted without the prior permission of the copyright owner. Permission is not, however, required to copy abstracts of papers or of articles on condition that a full reference to the source is shown. *Multiple copying of the contents without permission is always illegal.*

A one-year subscription in 2007 to *The Naval Architect* costs £110 (UK), £110 (Europe), and £125 (Rest of the world).

Audited Circulation 11,312  
JAN - DEC 2006  
ISSN 0306 0209



# THE NAVAL ARCHITECT



The recently upgraded 100m long towing tank at the Australian Maritime Hydrodynamics Research Centre. This and further development of its cavitation tunnel see the embellishing of what are already the best test facilities in the Southern Hemisphere. *See p13-14.*

## PRINCIPAL ARTICLES

- 10-11 **Safety:** *Cougar Ace* – the tipping point  
13-14 **Research & development:** AMHRC raises standards to new heights  
15 Softonex builds on low pressure

## SPECIAL FEATURES

- 16-23 **Ro-Ro**  
16-19 Cobelfret adds ConRo to the mix  
20-21 Stena backs the Superferry  
21 Seatruck sizes up  
23 Stora Enso takes latest specials on paper  
23 Ice class for Epic
- 24-33 **Danish Marine Industries**  
24-25 High Profile reputations  
27 The rise of the three-way control valve  
27 Lyngsø's latest in automation  
28 Emri exerts its quiet control  
28 MAN promotes the power of concentration  
28 Sem-Safe system set to spread  
29 Evacuation systems gain critical mass  
30 G&O Bioreactor beats wastewater standards  
30 Drains need designing too  
33 ScanVibra's systematic approach  
33 Mega yachts to gain from fishery thinking  
33 Terrorists to feel the Force
- 34-44 **Cad/Cam Update**  
34-37 Lofting solutions for mid-sized shipyards  
38-39 ShipConstructor leverages AutoCAD experience  
40-41 Collaborative tools for design distribution  
43 Latest updates to enhance SARC offering  
43 New Features in Autostructure 3.2  
44 Imaging functionality for flexible shapes  
44 Developer takes rights for rebranded DELFTship
- 46-51 **Interiors & Accommodation**  
46 The flooring tests that may be flawed  
47 Designteam themes in time and space  
49 HVAC testbed to beat the best  
49 Wellness on the largest scale  
50 MSC reaches for Zenith  
51 Mivan works from bistro to bar  
51 Infotainment broadens its appeal

## REGULAR FEATURES

- 3 Editorial comment: Size from a different angle  
4-7 News round-up  
9 Letters to the Editor  
53-54 Trade and equipment news  
64 Diary

from 18,000 to **36,000** running hours

ABB TPL...-B  
2-stroke turbochargers  
run 36,000 hours  
without a bearing inspection.

*Long-distance runners.*  
[www.abb.com/turbocharging](http://www.abb.com/turbocharging)

# Seatrade europa™

Cruise Ferry Rivercruise Convention

25-27 September 2007

CCH - Congress Center Hamburg, Germany

In co-operation with



*We have attended **Seatrade Europe** since 2001  
and we will certainly be back in 2007!*

**Sylvia Minten, Manager Service & Communication,  
Cruise Port Rotterdam**

*This event is **growing** in terms of both visitors and exhibitors.  
It attracts increasing numbers of **high-level** attendees  
and I look forward to more **growth** in 2007.*

**Dirk Moldenhauer, Managing Director,  
Hamburg Cruise Center**

**Register your interest today:**

Tel: +44 1206 545121

Fax: +44 1206 545190

Email: [sales@seatrade-global.com](mailto:sales@seatrade-global.com)

Principal sponsor



Sponsored by



Supported by



European  
Cruise Council



Port of Hamburg Marketing Reg. Ass.™



VFF  
Verband der  
Fährschiffahrt und  
Fahrtouristik e. V.



[www.seatrade-europe.com](http://www.seatrade-europe.com)

# Size from a different angle

**W**HAT is possible is not always the same as what is most desirable and the challenges posed to salvors by ever larger container and passenger vessels provided the central theme for this year's International Salvage Union's Associate Members' Day, held in early March.

Issues of scale, but also problems arising from other aspects of rapidly evolving ship design peppered comments made by Hendrik Land, general commercial manager, SvitzerWijismuller, in a presentation provocatively entitled 'Limits to growth?'. Given that his company is a subsidiary of A P Møller-Maersk, operating the largest container tonnage on the sea, it is not surprising that such matters are due his consideration.

Challenges would not come much greater than discharging a heavily grounded containership offering 12,000TEU of capacity at an exposed location, in winter weather, or rescuing around 5000 terrified people from a new generation cruiseship in an exotic, environmentally sensitive location.

Many may prefer not to think about such scenarios, but salvors are not in the fortunate position of being able to shy away from them.

In the past, salvors have shown themselves ready to come to grips with new problems and greater demands. Exemplary has been their ability to respond to the large tankers hit by missiles during the Iran-Iraq war in the 1980s. In the case of tankers, size has not been the only issue – the mass introduction of double hull tankers raised new concerns for

it could prove impossible to source such equipment in a timely manner, Mr Land pointed out. Furthermore, if a vessel had a heavy list or trim, this factor could dominate the discharge plan.

The case of ultra-large passenger vessels could be seen as even more vexing, given the potential for loss of human life. For all the work that is going on towards ships becoming their own liferafts, it is unrealistic to expect distressed passengers to share the view of seafarers that staying on the ship is often the safest move in an emergency.

The fact that such vessels tend to sail in very sensitive, extremely remote and, in some cases, hostile areas means that getting there with the right equipment is the challenge, whatever the subsequent tasks involved. In a recent passenger vessel operation after a ship grounded in Antarctic waters, divers found themselves working in 0°C water to patch fuel tanks and make the vessel ready for a controlled voyage to stop-over ports and an eventual repair destination.

While the cruiser is more likely to be considering his/her next leisure activity, the salvor must consider what would happen if an emergency were to arise onboard one of the latest generation cruise vessels. How could such numbers be taken off in a safe, orderly manner? How could rescuers cope with such large numbers of distressed people, many of them elderly and with limited mobility? How would such an evacuation be achieved in bad weather? Could sufficient resources be mobilised in good time, given the trend for cruise itineraries to take in very exotic, remote locations?

There is no sense in suggesting that the trend towards larger containerships and cruiseships can be reversed but the ISU's annual event certainly pointed up the fact that such ships are trading, fully insured, suggesting that salvors are, at least, rising to the challenge in the eyes of the insurance market.

However, perhaps it would be worthwhile for ship designers themselves to step back from the art of the possible once in a while to consider the consequences of their ingenuity in the case of the unthinkable happening.

For example, Mr Land also pointed out that it took over 100,000m<sup>3</sup> of cooling water to cover a fire hazard in the case of a 4000TEU capacity containership. Larger vessels than this placed pressure on the salvor's ability to assemble large-scale firefighting resources. An ultra-large containership could be lost if it proved impossible to mobilise sufficient firefighting capacity in the critical first 24-48 hours. On the other hand, there was also a risk that the deluge of water required could sink the ship.

Access is another problem compounded by containership size worthy of consideration. In every shipboard fire situation, the first priority is to make it safe enough to board and carry out an inspection. Cooling water can be used to create relatively safe conditions for boarding but, here again the risks of internal flooding must be taken into account, including the danger of adding to stresses within a damaged and weakened hull.

Firefighting in container stacks is also notoriously difficult and dangerous work. It can be very difficult to reach the fire and very large vessels aggravate these difficulties, where thermal radiation is intense and the use of immense quantities of cooling water is the only effective counter.

Again, the very largest cruiseships already in service are characterised, in one way, by the proliferation of compartmentalisation, where the ship's host of small spaces and bulkheads are penetrated by multiple pipe and cable runs, together with inconveniently located air intakes. Here, sealing on a massive scale is labour-intensive and 'it is always difficult to restore watertight integrity,' Mr Land observed. 

**Star Princess: it is unrealistic to expect distressed passengers to share the view of seafarers that staying on the ship is often the safest move in an emergency.**



salvors, ranging from accelerated corrosion and hazards when working in void spaces, to explosion risks and questions over stability in the damaged condition.

Mr Land pointed out that salvors were able to confirm that most first and second generation containerships were very strongly built. However, 'new generation vessels may be optimised and we must wait and see whether this factor has any bearing on future casualty statistics and outcomes'.

Other physical constraints are also often overlooked. Large barges and cranes with very long reach are essential but often hard to find. In the case of ultra-large containerships,

## EMEC welcomes harmonisation vote

THE vote of the EP TRAN Committee and the adoption of the report from Luis de Grandes Pascual MEP, on the Commission's Draft Classification Societies' Directive has brought a ringing endorsement from the European Marine Equipment Council (EMEC).

EMEC chairman, Pim Van Gulpen, said: 'We strongly appreciate that the European Commission first, and now the European Parliament – at this early stage of the first reading – have recognised the importance of improving the efficiency of the classification system. We believe that the Draft Classification Societies Directive is a very important project for the whole maritime community and for the transport policy of the European Union. This Draft Directive will lead to the harmonisation of technical standards for marine equipment and to the mutual recognition of certificates.'

He said that the vote, which sets the target for recognised organisations, class rules and regulations, as well as their implementation, to be progressively harmonised, would release important resources for research and development activities, 'now used to cover certain classification costs which do not generate any added value: this will allow us to greatly increase the safety and environmental performance of our products'.

EMEC was confident that the plenary sitting of the EP would confirm the vote.

The report calls for recognised organisations to introduce mutual recognition of certificates based on equivalent standards. In order to do so, they will, in those cases that are appropriate, 'adopt the most demanding and rigorous models as their reference,' said EMEC. 'This will contribute to enhance both safety at sea and the competitiveness of the marine equipment industry: only the most efficient manufacturers and service providers will succeed in this market.'

The Commission will have the task of supervising the process of harmonisation of class rules. In addition, should self regulation fail to secure the expected result, it will have the duty of proposing the appropriate measures. However, EMEC said Classification Societies would have a sufficient amount of time to develop harmonisation through their own activity.

**US BALLAST BILL AMENDED** - MICHIGAN's Senator Levin has introduced the National Aquatic Invasive Species Act of 2007 in the Senate to amend the Non-indigenous Aquatic Nuisance Prevention and Control Act of 1990. This 132-page bill addresses ballast water exchange, ballast water technology, and research and technology.

Like the ballast water management bill that was introduced in the House of Representatives by Representative Miller, the Senate bill will implement many of the requirements of the IMO Ballast Water Convention but with an added discharge standard 100 times greater than that stipulated in the IMO Convention. However, unlike the House bill, this Senate bill does not provide for supremacy over the Clean Water Act, nor does it pre-empt states from developing their own ballast water standards, both of which are considered essential by Intertanko.

**FINCANTIERI'S DOUBLE BILLION DEAL** - FINCANTIERI has reached agreements with Oceania Cruises and Silversea Cruises to build up to five luxury cruiseships, including two options.

The agreement with US-based owner Oceania calls for the construction of two 65,000ton cruiseships, each worth approximately US\$500 million, for delivery in the autumn of 2010 and the summer of 2011; the deal also includes an option for a third ship to be delivered in 2012. Details of the contract and financing will be defined at a later date.

Oceania Cruises currently has a fleet of three smaller ships of approximately 30,000gt.

The new nine-deck ships will be 251m long and 32m wide and will reach a cruising speed of 22knots. They will be able to accommodate 1280 passengers in 640 cabins and suites, most of which (93%) will have a panorama sea view. In addition, 83% of passenger accommodation will have a private balcony. The overall design was developed by Yran & Storbratten Studio.

Italian operator Silversea has signed an agreement with Fincantieri for a 36,000gt cruiseship with a passenger capacity of 540 for delivery in early 2009; there is also an option for a sistership.

Silversea currently has a fleet of four ships: *Silver Cloud*, *Silver Wind*, *Silver Shadow*, and *Silver Whisper*.

Fincantieri chief executive, Giuseppe Bono, said: 'Fincantieri, drawing on the expertise and experience the company has built up over the years, is now entering the promising market of luxury, medium-sized ships. Thanks to these projects we have further expanded our product range, which now covers the full array of the market – from mega yachts of over 70m to cruise of over 130,000tonnes.'

**FIRST FSO FOR VIETNAM** - ABS has revealed that it is to class the first floating storage and offloading vessel to be built in Vietnam.

The news confirms an agreement through which Vinashin and PetroVietnam have signed a contract for the newbuilding of a 150,000dwt FSO.

The ship will be built at the Nam Trieu Shipyard (NASICO), one of the 20 plus shipyards under the Vinashin Group of shipyards. It will be built to a design from Sinus (based in Poland), with ABS London Engineering providing the design review. Delivery is estimated for the end of June 2008.

In other news, ABS reports that Dr Kirsi Tikka has been promoted to the position of vice president global technology and business development.

**INTERFERRY MAKES DESIGN PROPOSALS** - FOUR potential demonstration projects have been defined under the joint initiative by trade association Interferry and the International Maritime Organization to cut the alarming death toll on domestic ferry operations in developing nations.

A working group including government and industry representatives from pilot country Bangladesh has proposed trial projects based on four key issues – training, weather forecasting, vessel design and overcrowding – after a meeting in capital city Dhaka.

### NEW CHAIRMAN FOR KR

KONG-Gyun Oh has been appointed Korean Register's (KR) new chairman by the class body's board of directors. Before his appointment, Mr Oh was director general of Incheon Regional Maritime Affairs and Fisheries Office.

The newly elected chairman started his career with the Ministry of Maritime Affairs and Fisheries of the Republic of Korea in 1979, and has served in various senior positions within the Ministry over the past 28 years.

He graduated from Korea Maritime University in 1975 with a bachelor's degree in machinery and obtained a master's degree in law from the same university in 2004.

Kong-Gyun Oh, Korean Register's new chairman and chief executive officer



Together with the IMO, where it has consultative status, Interferry has undertaken to provide technical resources and to seek financial aid for whatever trials the Bangladesh authorities choose to implement.

Hopes of an early decision have been encouraged by indications of financial and practical backing from the World Bank, specialist German banking group KfW, the US National Oceanic and Atmospheric Administration and UK training specialist Videotel, whose president is former IMO secretary-general William O'Neil.

Among the numerous issues of vessel design that could be addressed, retro-fitting of hydraulic steering was pinpointed as the most practical improvement in the short term - even though such equipment is not yet readily available in Bangladesh - with the reduced response time helping to avoid collision or grounding at times of high congestion or low visibility.



# You're not alone.

**We're always there to support our clients in whatever location or situation they find themselves.**

The world is where we work. Whether it's the Mid-Atlantic or the South Pacific, our local expertise means we can deliver what you need and what we promise.

Hamworthy people create this global presence through a network of local offices and manufacturing facilities. It allows us to be fast, more direct and better informed.

Hamworthy Middle East is the latest edition to our global support network. Hamworthy now has over 750 employees supporting ship owners and shipyards throughout Europe, the Middle and Far East and North America.

To find out more visit [www.hamworthy.com](http://www.hamworthy.com)

## NEWS ROUND-UP

The ten-year initiative is aiming for a 90% cut in ferry fatalities in developing nations – conservatively estimated at more than 1,000 deaths a year.

**DAMEN BUILDS KOOLE TANKER** - DUTCH Shipyard K. Damen, of Hardinxveld-Giessendam, has signed a contract with Koole Tanktransport, of Zaandam, covering construction of a new chemical tanker for the transport of vegetable oil in bulk.

The vessel, with a length of 110m, a breadth of 13.50m and a moulded draft of 4.60m, will be constructed entirely at the shipyard in Hardinxveld-Giessendam, executed in seven sections to offer cylindrical stainless steel tanks with a total capacity of 4.050 m<sup>3</sup>. Delivery is due for 2008.

The sea-going tanker will be built according to the rules and regulations of Bureau Veritas. The vessel will be sailing under the Dutch flag.

The propulsion installation consists of one main engine, make Wärtsilä, type 9L20, output 1800 kW at 1000 rpm and a Lips/Wärtsilä controllable pitch propeller installation.

**DNV SIGNS IN VIETNAM...** - DET Norske Veritas and Vietnam Register (VR) have signed a new corporate agreement designed to strengthen both positions in the growing Vietnam market.

The agreement outlines a cooperation in training and work sharing for single and dual classed vessels within newbuilding, ships-in-operation and certification of materials and components for the shipping industry within Vietnam.

The Vietnam shipbuilding industry's stated ambitions include coming to equal the technological level achieved in other regional



Design drawing for the latest chemical carrier for Koole.

nations. Accordingly, it is aiming to develop in such a way that 60%-70% of products for ships can be produced domestically, according to Vinashin.

DNV said it had achieved leading foreign class society status in Vietnam, racking up over 70% of the current newbuilding orders placed in the Vietnamese yards. These orders include bulk carriers, car carriers and tankers for international and domestic owners.

**...JOINING CCS ON COATINGS** - ELSEWHERE, a joint venture agreement named 'CCS & DNV Technology Institute' has been signed by China Classification Society (CCS) and DNV. The institute which is to be established in Shanghai aims to support both the maritime and offshore industry on laboratory and research challenges, initially related to coating.

The agreement includes the setting up of a Technology Institute in Shanghai, which will be the first of its kind in China and initially focus on coating and corrosion services. The institute will perform tests according to international

standards, in particular the new International Maritime Organization performance standard for protective coatings.

Areas of cooperation will also include laboratory facilities, expertise and services related to materials, welding, fuel and lube oil analysis.

**LR INTO TURKEY** - MEANWHILE, Lloyd's Register and Turkish classification society Türk Loydu have signed a cooperation agreement that the partners say will enhance maritime safety and encourage technical excellence. The agreement encompasses the classification of ships and mobile offshore units during new construction and in operation, certification of materials and components, EU Directive appraisal and verification, management systems certification, consultancy, research and development, technical training and information technology.

The first contract under the new agreement has already been signed – a dual-classing arrangement for a 117m long IMO Ship Type



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

2 chemical tanker, to be built in a Turkish shipyard for the Turkish shipowner ASLI. The ship will be assigned Lloyd's Register's ballast water management descriptive note and Environmental Protection notation.

**FURTHER MEGA-CONTAINERSHIP DELIVERED** - ODENSE Steel Shipyard has presented the latest in its series of 11,000TEU plus capacity container vessels to the A.P. Møller – Maersk Group.

Like her three predecessors, *Evelyn Maersk* will be part of the series of the world's largest container vessels, and she will like her sister vessels set new standards for safety and environment. Environmentally friendly silicone paint covers the hull of the vessel below the waterline – reducing water resistance and cutting the vessel's fuel consumption by 1200 tonnes per year.

With her 14-cylinder Wärtsilä RT-flex diesel engine, which develops 110,000bhp, the ship will after delivery enter Maersk Line's worldwide service. She will be registered in Copenhagen and will be commanded by Captain Niels Beyer Nielsen with Oskar Vestergaard Jensen as chief engineer.

**LATEST LAUNCH FROM BARRERAS** - HIJOS de J. Barreras, of Vigo, has launched its latest containership, *Ruiloba*, built for Compañía Trasatlántica Española. At 160m long and with a beam of 24.8m, the ship has been built to Lloyd's Register class, so as to obtain the Class: +100 A1 CONTAINER SHIP.

This 1200TEU capacity vessel, including 170 reefer slots, is said to incorporate advanced systems for the transport of containers. Equipped for a crew of 21 people, it has a range of 7,000 miles at trials speed. In trials *Ruiloba* reached 18knots.

The builder said the ship featured propulsion equipment integrated in its four-stroke diesel engine, to develop a maximum power of 10,395kW at 500rpm, a shaft line with variable pitch propeller made of high resistance alloy Ni-Al-bronze; and auxiliary groups formed by three diesel engines of 1100kW at 1500rpm., each connected to an alternator. Systems incorporated in the engine room include centralised refrigeration, formed by centralised titanium plate coolers for fresh water, refrigerated themselves by means of a sea water system.

**AKER SIGNS WITH AKER** - AKER Yards has entered into a Nkr4bn (\$657m) contract with Aker Oilfield Services to build four large well intervention and construction vessels, and an option for another two vessels, subject to financing.

The owner has a cancellation possibility for the two last fixed vessels. All vessels will be delivered from Aker Yards' sites in Norway.

The vessels are to Aker Yards design, type Aker OSCV 06 WI, developed for Aker Oilfield Services on basis of the OSCV 06 design, adapted for well intervention purposes. Delivery of the first vessel is scheduled for spring 2010, and the following vessels will be delivered at approximately six months intervals.



*Ruiloba* from Barreras – 'advanced systems' for the carriage of containers.

The vessels will be 157m long with a beam of 27m, and will be equipped with an active heave compensated crane, a remotely operated vehicle, launching systems and a derrick for well intervention purposes. The vessels will have DP Class 3 and Ice Class. The vessels will have a maximum speed of 18knots, which is of significant importance for global operations in order to minimize mobilisation time. ⚓

# Setting the Standard for Service.



# ABS

Setting Standards of Excellence

# Alert!



A Nautical Institute project sponsored by Lloyd's Register



## The International Human Element Bulletin

**Issue 13** is devoted to the subject of fatigue suggesting that the problem is more prevalent than it is often believed and goes beyond issues of manning levels and watchkeeping patterns, which are seen as causing major difficulties in small, short sea ships.

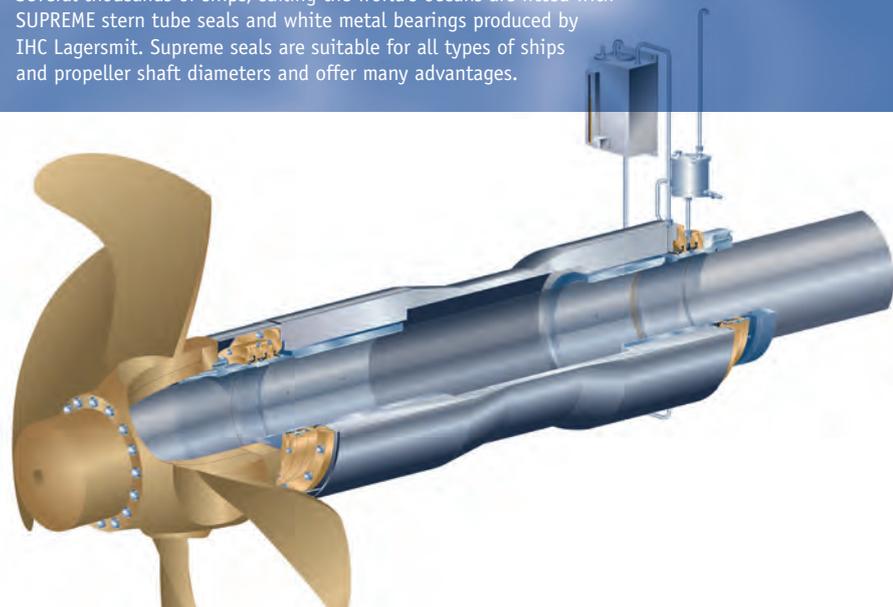
It takes a close look at fatigue causes and effects, and advocates a proactive policy to mitigate the effects of fatigue through a range of management strategies. It also suggests that a great deal can be done by ship and equipment designers to produce workplaces that reduce the effects of fatigue.



**Issue 13 is now available from [www.he-alert.org](http://www.he-alert.org)**

## SUPREME<sup>®</sup> Stern tube, seals and bearings

Several thousands of ships, sailing the world's oceans are fitted with SUPREME stern tube seals and white metal bearings produced by IHC Lagensmit. Supreme seals are suitable for all types of ships and propeller shaft diameters and offer many advantages.



**IHC Lagensmit BV**

[www.ihclagersmit.com](http://www.ihclagersmit.com)  
Tel.: +31 (0)78 6910472 Fax: +31 (0)78 6910477  
Member of the IHC Holland Merwede Group

### The Sinking of Estonia

Sir - I was very interested to read Anders Björkman's article in *The Naval Architect* on pages 6-9 in the January 2007 issue. I first got interested in this disaster after reading the works of Björkman [1] and Ling [2] on this topic, together with the publication of JAIC report on the web [3]. I think that Björkman's book is well worth reading!

The question is did *Estonia* sink or capsize or both? Now the JAIC argue that the visor door was torn off the forward end of the vessel and that this caused the 7m ramp door to be opened, causing the watertight car deck, namely Deck No 2, to become flooded with a consequential loss of the vessel. However, the vessel took some 40 minutes to sink and if this vessel were lost, solely due to the car deck becoming flooded, the vessel should have capsized in about two minutes, as was the case in *Herald of Free Enterprise*. Experiments carried out by my group in the University of Portsmouth [4-7] on 1/100th scale models of *Herald of Free Enterprise*, have found that the ro-ro ferry always capsizes if the car deck becomes flooded and if at the same time, the vessel is not holed below the waterline. Experiments have also found that less than about 1200tonnes of water on *Herald's* car deck would have caused it to capsize in less than two minutes. This figure ties up with the quoted figure of 2000tonnes of water on *Estonia's* car deck to cause it to capsize. Now according to Björkman's calculations [1], there was about 18,000m<sup>3</sup> of 'air space' below the watertight car deck. This meant that for *Estonia* to sink, due to water on its car deck, but with an otherwise intact hull, it will have needed about 18,000tonnes of water on its car deck to achieve this, but this was not possible as only about 2000tonnes of water on the car deck would have caused the vessel to capsize and turn turtle.

Additionally, according to reports, *Estonia* initially heeled over to an angle of about 50° to starboard. The vessel was then righted to an angle of about 15° to starboard and this enabled some of the passengers and crew to evacuate the vessel. How did the vessel right itself to this much smaller angle of heel? It was not done by pumping the starboard ballast tank into the port ballast tank, as prior to departure, the vessel had an initial starboard angle of heel and it was necessary to empty the starboard ballast tank and fill the port ballast tank to rectify this deficiency. *Estonia* must have achieved this partial recovery, by turning itself in a very tight turning circle, together with suitably operating its stabilisers. Did this manoeuvre cause the visor to have excessive transverse hydrodynamic

forces on it, so that it was ripped off? Now *Estonia* was travelling from east to west, so why was the visor found about one mile west of the disaster area? In any case, if *Estonia* had achieved a starboard angle of heel of about 50° due to the ingress of water on its car deck, it could not have righted itself back to a 15° angle of heel. It would simply have rolled over, cargo shift would have worsened this situation.

The JAIC's explanation is that *Estonia's* visor was severely mauled by huge head-on waves, which caused the visor to break away symmetrically, due to a couple about the longitudinal horizontal plane of *Estonia's* visor, however, photographs of a lug on the now recovered visor, show that this lug was bent about *Estonia's* longitudinal vertical plane! This latter observation appears to indicate that transverse hydrodynamic forces may have been involved!

Now on Deck No 1, which was one deck below the watertight car deck, namely Deck No 2, some surviving passengers reported that prior to *Estonia* heeling over to about 50°, the ingress of water was detected on Deck No 1. Where did this water come from? It could not have come from the car deck, because it was a watertight deck and in any case, the stairwells were near the centreline of the ship. If water had appeared on the car deck, it would have sloshed to one side and could not have defied Newtonian physics by flowing upwards towards the ship's centreline.

*Estonia* lies in the Baltic, at some 80m depth, thus, further research on this topic should prove a worthwhile task and might even clear up some of the scientific mysteries that are associated with the sinking of *Estonia*.

#### References.

- 1] Björkman, Anders, *Lies and Truths about the M/V ESTONIA*, 6 Rue Victor Hugo, F 06240, Beausoleil, France. ISBN 2-911469-09-7.
- 2] Ling, Nigel, 'Letter to the Editor on Ferry Safety', *The Naval Architect*, May 1996.
- 3] 'Final Report on the Capsizing of the MV *Estonia*', Edita Ltd, Helsinki, Finland, March 12, 1997. ISBN 951 53 1611 1.
- 4] Ross, C T F, Roberts, H V and Tighe, R A Tests on Conventional and Novel Model Ro-Ro Ferries@, *SNAME J of Marine Technology*, Vol 34, No 4, 233-240, Oct 1997.
- 5] Ross, C T F, Stothard, S and Slaney, A, Damage Stability Characteristics of Model Ro/Ro Ferries@, *SNAME Journal of Marine Technology*, Vol 37, No 1, pp 57-63, Winter 2000.

6] Ross, CTF, Mourtos, Ioannis and Papanikolaou, George, Effect of Longitudinal Bulkheads on Damage Stability of Model RO/RO Ferries@, *SNAME J of Marine Technology*, Vol 40, No 1, pp 20-24, January 2003.

Yours faithfully,

Professor Carl T.F. Ross, DSc, FRINA,  
University of Portsmouth,

Anglesea Road, Portsmouth PO1 3DJ, UK.

E-mail: carl.ross@ntlworld.com

### Naval architects and safety

Sir - Naval architects are generally more familiar with the physical rather than with the social sciences. May I therefore be allowed to strengthen some of the arguments about social cost-benefit analysis in 'Naval architects and safety', September 2006 *The Naval Architect*, page 162?

The gradual extension of such economic ideas into the maritime field must be welcomed, and not simply because it is desirable to have consistency between this and other modes of transport - where it has been used on an increasing scale since the early 1960s. Since CBA is concerned with all parts of society, we are necessarily concerned with the value of life. This may indeed be distasteful - to the point of impossibility - if we consider a specific person: but this is not the position when rules are being made. Then we are considering a statistical life, whose identity and characteristics are necessarily unknown to us.

In principle, there are three solutions; but two may immediately be rejected. No one supports a zero valuation of human life; nor could any public body afford to support a value of infinity. This leaves us with the problem of finding a logical basis for something in between, and this is just what successive generations of researchers have tried to do, with increasing degrees of success and in a literature which is readily available and increasingly applied. In like manner, substantial progress has been made in evaluating the environmental effects of maritime disasters, eg, in developing the hedonistic approach. There is indeed much more to be done (young researchers, please note!) but it does not behove the maritime world to lag behind.

Richard Goss, FRINA

1 Weir Gardens

Pershore, Worcestershire WR10 1DX, UK.

# FUEL PIPES?

**SHEATHED & SINGLE SKIN  
DIESEL FUEL INJECTION PIPES**

**For Main Engine, Auxiliary & Standby Applications  
Common rail & pump and line formats to 2,000 Bar  
Design & Manufacture or Sub-Contract to your drawings**

**GIRO ENGINEERING LIMITED**

Talisman, Duncan Road, Park Gate,  
Southampton, Hants, SO31 7GA England



25-29 April 2007



**Call Giro**

THE FUEL PIPE SPECIALISTS

**Complete Solutions for Engine Builders,  
Retro-Fit Kits or Replacement Parts  
Class Approved ISO 9001**

Tel: +44 (0)1489 885288; Fax: +44 (0)1489 885199

E-Mail: giro@giroeng.com subject "Fuel Pipes"

Internet: www.giroeng.com

duoline

SOLAS  
compliant

## Cougar Ace: the tipping point

**RE-EXAMINATION** of a study undertaken last year on the stability of the car carrier *Cougar Ace* lead Milan Hofman & Igor Backalov, of the Department of Naval Architecture, Faculty of Mechanical Engineering University of Belgrade, Serbia, to some interesting conclusions.

ON that summer night, as many times before, the 190m long car carrier *Cougar Ace* sailed from Yokohama to Vancouver, heading to deliver nearly 5000 cars to the Canadian and American market. It was July 23<sup>rd</sup> 2006 just before midnight, the ship was in the middle of the North Pacific, some 230miles south of Aleutian Islands, when suddenly a strange and dramatic accident occurred. During the ballast exchange operation in the open sea, the ship heavily listed to some 60° port and remained floating and stable in this abnormal position.

On hand reports described the sea conditions as choppy, but not high. Some indicated, more precisely, wave heights of approximately 3m (sea state 5) and wind speed about 30kn. Others also mentioned a large wave hitting the ship during the operation.

Although the crew, the ship and (most of) the cars onboard were rescued, this was one of the major sea accidents of 2006 and the marine community is still waiting for some official (unclassified) report on the event.

By a strange coincidence, the authors of the present article investigated the stability of the *Cougar Ace* class of ship a whole year before the accident, as part of their investigation into IMO Weather Criterion and the potential for it to be substituted by a new rule based on the stochastic behaviour of ships in gusting wind and irregular waves.

*Cougar Ace* was chosen to be the sample ship by pure chance, as representative of a typical car carrier. Therefore, it is interesting to reconsider the results in the light of the later dramatic events. Did we, and could we anticipate the *Cougar Ace* accident?

IMO Weather Criterion is, as is well known, the basic stability standard of seagoing ships today. It supposes ship in beam waves and beam wind of mean speed 26m/s, and limits the dynamic list due to such rough weather. Although its scenario is clear and sound, the methods of the calculation (being those of the 1950s) are not. The wind speed is considered constant, and wind gusts are accounted by a 50% increase of wind moment. The waves are supposed regular, and their irregularity is accounted for by reducing the resonance roll amplitude to 70%. Because of this, and a number of other shortcomings, an extensive research project is being conducted, aiming to adjust, or substitute this classical criterion with the new tools available today. The paper [1] is just one of such attempts. It supposes the Weather Criterion scenario, but predicts ship behaviour in such rough seas by solving the appropriate nonlinear differential equation of rolling. In that equation, the actions of irregular



**Cougar Ace** floating listed but stable after the accident.

waves and wind gusts are accounted for from wave and wind spectrums corresponding to the mean wind speed of 26m/s.

The time history of ship motion is calculated and, from it, the probability that the ship would list to some given angle (or capsize), is found. The results are compared to the results of classical Weather Criterion, and the correlation of the two approaches analysed.

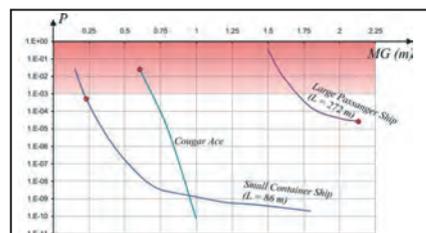
Some of the results that could concern the *Cougar Ace* accident are presented in Fig 1. The diagram gives the probability  $P$  that the ship would capsize in the Weather Criterion Storm in two hours vs metacentric height  $MG$  for three sample vessels: small containership, *Cougar Ace* class ship, and large passenger ship.

Although very different in form and size, all the three ships have large lateral areas, so are expected to be vulnerable to the action of beam wind. The red marks (the dots) on each of the probability curves correspond to the minimal metacentric height prescribed by the Weather Criterion. They define the critical probability for each sample ship. The Weather Criterion would be in accordance with the new, probabilistic approach only if all the critical probabilities are of the same order of magnitude. But that is not the case.

The critical probabilities of the three sample ships differ for three orders of magnitude, showing the inconsistency of the Weather Criterion from the probabilistic point of view. Concerning *Cougar Ace*, the figure shows that her critical probability is the highest (of the order  $10^{-3}$ ), so, if her metacentric height is at the minimum prescribed by the present rules, she is the most insecure of all the ships analysed.

From what has been presented, and a number of other results given in paper [1], it was concluded that the maximum allowable probability to capsize or reach the limiting angle of 50°, in two hours of Weather Criterion Storm, should be of the order  $10^{-3}$ . The only ship that did not satisfy such requirement was *Cougar Ace*!

Her (and only her) critical probability is in the forbidden zone of Fig 1. Consequently, *Cougar Ace*'s metacentric height should be increased (at



**Fig. 1** Probability of capsize vs metacentric height of three sample ships.

least by some 10cm) above the minimal value prescribed by the Weather Criterion, to make her as safe as the other vessels tested.

On the basis of such results, we are very tempted to claim that we anticipated the *Cougar Ace* accident. However, that is far from the truth. The presented calculations include some uncertain assumptions: for instance, there was a doubt over how to treat the ship superstructure above the main deck; is it watertight? If it is, present stability standards specify that this may be taken into account.

Actually, the *Cougar Ace* results correspond to the watertight superstructure up to 18.5m, not the whole 33.5m above the keel line.

Because of this, and some other assumptions and approximations, the obtained results should be understood only as an index of stability, ranking the vessel's safety in the beam storm, rather than as an actual capsize prediction. So, all one can conclude on the basis of the presented results is that they rank the *Cougar Ace* stability in beam storm as very low.

It was reported that *Cougar Ace* floated in a stable, unchanged and inclined position for days after the accident. So, the actual event proved the integrity of her superstructure. We have, therefore, to revise the analysis by including the whole superstructure in the stability calculations. Although some very important data is still missing (exact draught and metacentric height, exact wind speed and its direction, wave height and direction, even the exact ship geometry, etc) the results that we obtain give not only the qualitative, but also some quantitative pointers.

Furthermore, they will show the potential of the probabilistic method when applied. It should be stressed, however, that all the information on the accident we had was from websites. All our attempts to gain more detailed data from the parties involved remained unanswered. So the results should be considered as an opinion of the authors, only.

As stated, the main difference between the present attempt and the one given in paper [1] is that we now include, in stability moment calculations, the whole watertight superstructure. We also suppose (on the basis of published photos and number of cars onboard) that the ship was not fully loaded, and reduce her draught to 8m. But, before applying the probabilistic tools, we stick to the classical method, analyse the *Cougar Ace* stability curves, and see where it leads us.

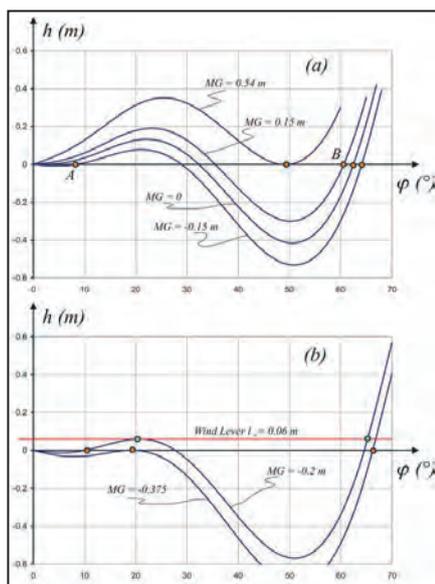


Fig. 2 *Cougar Ace* righting lever for different metacentric heights.

The curves of righting lever ( $\phi$ )  $h$  for few different metacentric heights, together with the corresponding stable equilibrium positions, are presented in Fig 2a. All the curves show typical minimum (the saddle) at approximately  $50^\circ$ , after which they steeply increase due to the watertight superstructure. The listed stable positions are usually connected to negative metacentric heights and small angles of heel, such as position A in Fig 2a. In addition, *Cougar Ace* and similar ships with high closed superstructure may float highly listed even with positive metacentric heights (see positions B in Fig 2a). Such highly inclined equilibrium (so clearly seen in the real event, Picture 1) is possible if, and only if, *Cougar Ace*'s metacentric height is below 0.54m. On the other hand, the minimal metacentric height according to the Weather Criterion is calculated to be 0.55m. So, without any advanced tools, one concludes that the metacentric height during the event had to be lower than required!

This simple, but very important result seems to indicate a human error during the ballast discharge as the main cause of the accident.

In Fig 2b, two typical situations of static stability loss, are presented. One, corresponding to  $MG = -0.2$ m, at which the ship would be tipped over by constant wind moment (at the reported wind speed of 15m/s), and the other, corresponding to  $MG = -0.375$ m, at which the ships would be tipped over at still weather, with no wind and waves. Both metacentric heights are, as seen, strongly negative. The dynamic analysis, which would include wind, waves, and their irregularities, is not pushed further with these classical tools. In fact, it would involve some doubtful assumptions concerning the roll amplitude and wind gusts (such as those adopted as part of IMO Weather Criterion). Instead, we continue with the more advanced probabilistic tools, aiming to find the actual (dynamic) conditions of the event.

We suppose (as indicated in the reports) the following weather conditions on the critical night: the mean wind speed of 15m/s; the

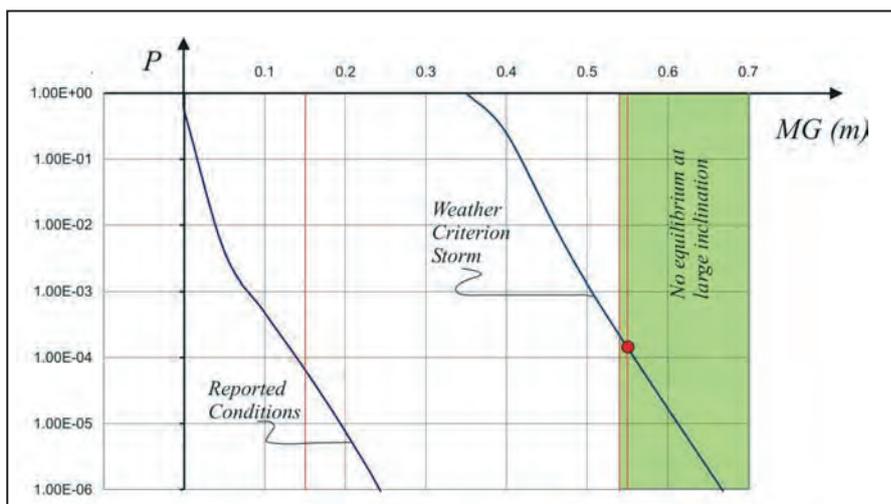


Fig. 3 Corrected *Cougar Ace* P – MG curves.

significant wave height of 3m; and the worst – beam direction of wind and waves. The irregularity of wind and waves is accounted for by Davenport and Bretschneider spectrums, as explained in paper [1].

On the basis of such (somewhat uncertain) input, the probability that *Cougar Ace* would reach and stabilise in the highly inclined equilibriums (the positions B in Fig 2a) in two hours is calculated. The results are presented in Fig 3. In the same figure, the corrected probability curve of fully loaded ship in severe Weather Criterion Storm is given.

The curve 'Reported Conditions' shows, contrary to the classical static analysis, that the metacentric height at the event could have been positive. However, it had to be very small, below some 0.05m. If the ship had, at least, the IMO very minimal  $MG = 0.15$ m, the probability of the event in two hours would have been of the order of  $10^{-4}$ , and the accident would have been avoided.

It is important to note that *Cougar Ace* could carry enough ballast to explain the critical reduction of metacentric heights during the ballast discharge. Namely (among others), the ship has three port, and three starboard ballast tanks in the bilge, with the total capacity of over 4000t. The discharge of these tanks would reduce the MG from the proper value of 1.4m, to the critical value of 0.05m. On the other hand, if the ship's metacentric height was about 1m, the discharge of only one pair of bilge ballast tanks (port + starboard) would not provoke the critical situation. The simultaneous discharge of two pairs of bilge ballast tanks (2 port + 2 starboard), however, would cause the accident!

The curve 'Weather Criterion Storm' in Fig 3 is obtained under somewhat different conditions than the corresponding curve in Fig 1. It gives the probability that the fully loaded ship would list to  $50^\circ$  (not capsize) in two hours. Here, the angles of capsize in the considered cases are very high, so  $50^\circ$  has to be considered as the limiting angle in Weather Criterion calculations.

Nevertheless, the results show that the critical probability (the red dot) is shifted downwards compared to the corresponding curve in Fig. 1. It is of the value  $O(10^{-4})$  – outside the unsafe zone.

The correction of the *Cougar Ace* probability curve proves, therefore, that she is not an unstable ship in rough beam seas, after all!

The results turned out to be very different from what they first seemed. We expected to prove that *Cougar Ace* class ships are inadequate from the stability point of view, and that such a lack (indicated in paper [1] a year before the accident) was the main reason for the tragic event.

Instead (and as a paradox) the analysis showed that *Cougar Ace* is a ship with proper stability if the requirements of the rules are met, but indicated some inconsistency of our previous analysis. The actual accident proved water tightness of the *Cougar Ace* superstructure, not accounted for in our prior investigation. When this was corrected, the revised analysis showed that the ship could not tip over in the reported storm, unless her metacentric height was much lower than required by the stability rules.

The only other (but very unlikely) explanations of the event could be a freak wave scenario, or a parametric resonance, not to be considered in the present investigation.

So, on the basis of the available data, one could deduce the following scenario of the event:

- The ballast exchange operation in the open sea, aiming (presumably) to comply with the strict environmental rules;
- Serious error during the ballast discharge. For instance, unintentional discharge of four, instead of two bilge ballast tanks;
- Tip over, most probably by swell and wind gust, as MG fell to some 0.05m, or less.

Although this opinion relies on insufficient input, it gives (we believe) a proper insight into the event, especially in the absence of any official report.

#### Literature

[1] Milan Hofman & Igor Backalov, 'Weather criterion for seagoing and inland vessels – some new proposals', proceedings of International Conference on Marine Research and Transportation ICMRT'05, Ischia, Italy, September 2005.



# Enraf Tanksystem

## HERMetic UTImeter Gtex

**Portable closed/gas tight Electronic gauge for:**

- Cargo inspection, inventory control
- Custody transfer
- Topping off
- Free water detection
- Verification of automatic gauges
- Back-up system

### Benefits

- No calibration required
- Temperature accuracy  $\pm 0.1^\circ \text{C}$
- Continuous temperature reading
- Tape accuracy  $\pm 1.5 \text{ mm} / 30 \text{ m}$
- Weight with 15 m tape: 4.4 kg
- 2 years guarantee



For safety and precision

For more information: [www.tanksystem.com](http://www.tanksystem.com)



innovative reefer vessels



innovative ship outfits



offshore field development ships



semi submersibles



heavy lift ships



inland innovative transport systems



multi purpose vessels



bulklers



container vessels



research vessels



cad/cam application



navy supply vessels



## SCHIFFKO GmbH

Member of the Wärtsilä Group of Companies

Stubbenhuk 10  
20459 Hamburg  
Tel.: +49-40/376090  
Fax: +49-40/373315  
E-Mail: [info@schiffko.com](mailto:info@schiffko.com)  
Web: <http://www.schiffko.com>

### Marine Design Services, Research and Consulting

Consulting, naval architecture, engineering and CAD/CAM services, initial, basic and detail designs, development of technical innovations ready for construction and operation of ships. Plan approval, inspection and construction supervision. Application of CAD/CAM in technical areas including consulting and training. Onboard computer systems for ships loading and stability, safety operation and maintenance. Designs of all kinds of commercial craft and ships like tugs, patrol boats, yachts, floating cranes, supply boats, crane ships, pipe- and cable layers, research vessels, container ships, bulkers, tankers and various offshore supply and support vessels.

SCHIFFKO's expertise and engineering covers Hull, Machinery, Electric, Outfit and Accommodation as well as integration of specialized systems.

## AMHRC raises standards to new heights

**FURTHER** development of its cavitation tunnel and a recent upgrade to its 100m long towing tank sees the Australian Maritime Hydrodynamics Research Centre embellishing what are already the best test facilities in the Southern Hemisphere.

**T**HE Australian Maritime Hydrodynamics Research Centre is a collaborative research organisation, established in late 2002 by the Australian Maritime College (AMC), the Defence Science and Technology Organisation (Maritime Platforms Division) of the Department of Defence, and the University of Tasmania.

The vision of the Centre is to provide an internationally competitive experimental and theoretical hydrodynamic research capability for Australia. The Centre aims to provide the nation with a suite of complementary hydrodynamic research facilities and to develop an advanced capability and the intellectual capital in Australia for research into the hydrodynamic performance of naval and civilian craft and offshore structures. The customer base includes defence, maritime industry, and research academia.

The research capability of the AMHRC is supported by infrastructure provided by the facilities of the AMC, which is believed to possess one of the most, if not the most, extensive range of maritime research facilities of any maritime university in the world.

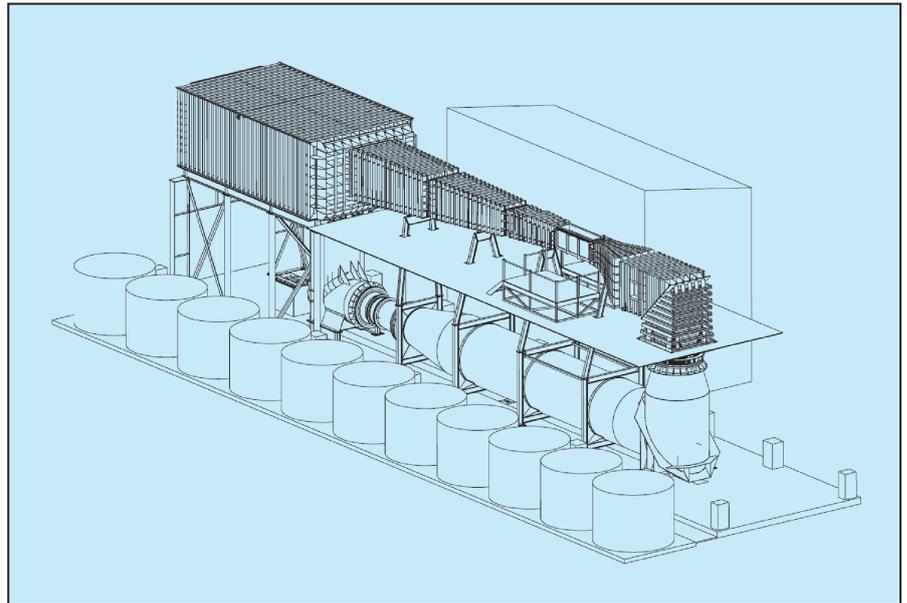
To achieve its ends, AMC is investing in a continuing upgrade programme for AMHRC facilities. Today, these facilities include:

- Cavitation Tunnel: A closed, variable pressure, recirculating water tunnel used for the study of flow about ship hulls, underwater vehicles, and propulsion and control equipment. Investigations may involve the study of cavitation and other two phase flows, steady and unsteady flows, turbulence and hydroacoustics. The tunnel is being upgraded with improved test section flow properties and background noise level systems, for active control of free and dissolved gas content and control of the test section ceiling boundary layer. The capabilities of the tunnel have been developed for the rigorous modelling of cavitating/turbulent flow physics, and to utilise fully the capabilities of modern diagnostic instrumentation. A range of specialist instrumentation has been developed or purchased as part of the new tunnel development.

- Towing Tank: A tank for conducting hydrodynamic experiments on physical scale models for a wide variety of ocean going vessels and structures. Dimensions are 100m in length, 3.5m width and variable water depth up to 1.6m. This facility recently underwent a major upgrade that has resulted in a number of improvements and additional capabilities.

- Model Test Basin: A 35m long by 12m wide test basin with a multi-element wave generator that is used to study interactions of vessels with wave patterns, other vessels and bodies, and boundaries such as wharves, banks, and the sea

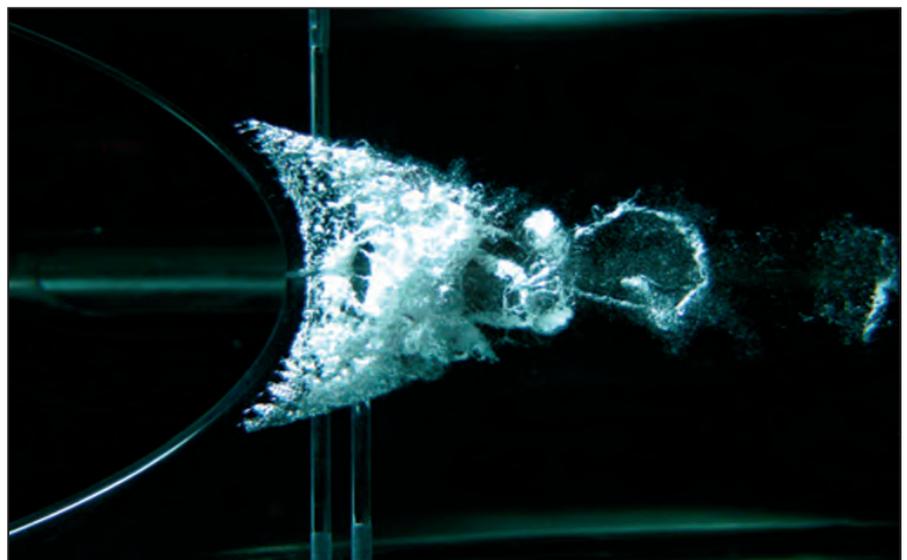
**Unsteady cavitation occurrence on the lip of a water-jet inlet duct.**



Cavitation tunnel general arrangement – 3-dimensional view.



Surface flow visualisation on surfboard fins.



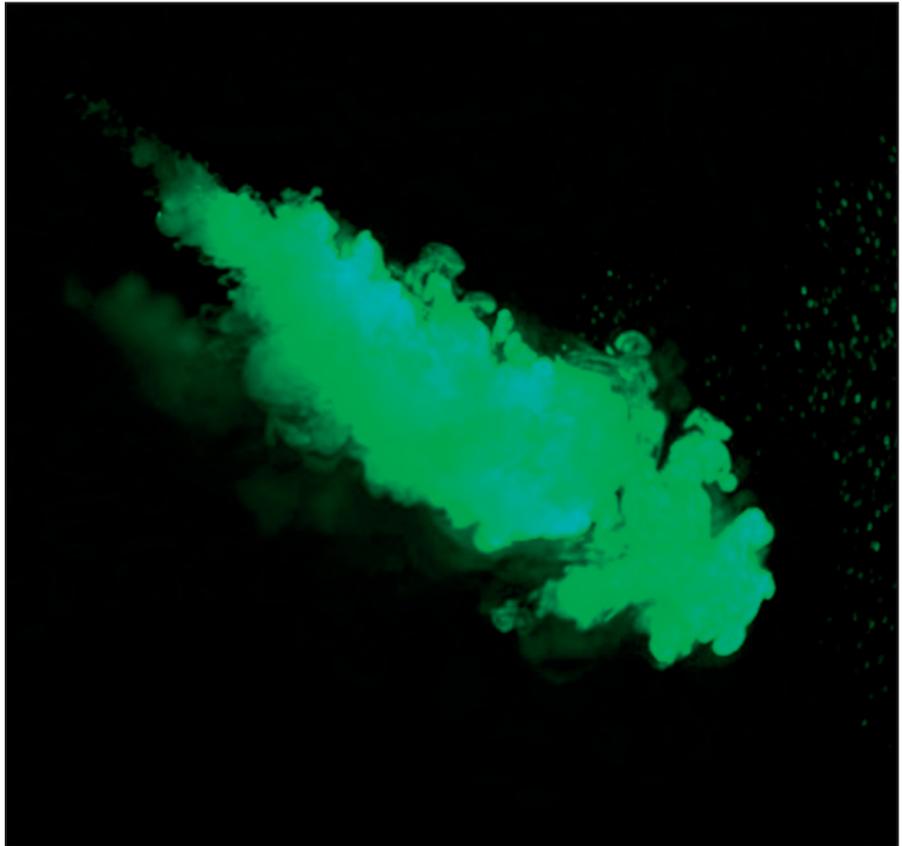
## RESEARCH & DEVELOPMENT

floor. The facility is a valuable tool for conducting hydrodynamic experiments in shallow water environments such as shipping ports, harbours, rivers and coastal regions.

- Circulating Water Channel (Flume Tank): A recirculating open water channel used to study the dynamic motions of surface and underwater vessels, bodies, and appendages such as fishing gear, as well as to study changing geometry and external loads associated with flexible structures such as fishing nets and sea cage nets. Control of dynamic motions of surface and underwater vessels in the channel flow is achieved using a Horizontal Planar Motion Mechanism developed previously by the research partners. The upgrade will result in improvements to the instrumentation system, model-making workshop, and layout of downstairs viewing area.

- Integrated Marine Simulator: Comprising a Shiphandling Simulator with a full-scale ship's bridge and a Ship Operations Simulator with six 'own ship' cubicles, this integrated simulator is used for research and investigation in port development, ship manoeuvring, and improving ship and port safety and efficiency. The capability of the simulator is being enhanced to enable more realistic modelling of bank, swell current and wind effects.

- High Performance Computer: Based on a thirty-two node Beowulf Cluster, this system is used primarily for computational fluid dynamics work and also for supporting the broader needs of the Centre. 



Micro-bubble investigation using laser diagnostics.

**THE NAVAL ARCHITECT**



*Forthcoming Features*

For further information contact:

**Debbi Bonner**

Group Advertisement Manager

Tel: +44 7767 791181 Fax: +44 (0)20 7245 6959

E-mail: [dbonner@rina-org.nl](mailto:dbonner@rina-org.nl)

**JUNE 2007**

- Japanese maritime progress
- Tankers for the 21st century (Including gas tankers)
- Paints and coatings technology
  - Ice Class Ships

Distribution:

**Nor-Shipping 2007**

**IMDS 2007**

**ALPHA SHIP DESIGN**

NAVAL ARCHITECTS | MARINE ENGINEERS | SURVEYORS

Gersonsvej 13  
DK-2900 Hellerup  
Copenhagen  
Denmark

Phone | +45 3940 0485

[alpha@alphashipdesign.com](mailto:alpha@alphashipdesign.com)

[www.alphashipdesign.com](http://www.alphashipdesign.com)

## Softonex builds on low pressure

**LOW-pressure water-based fire extinguishing systems supplier Softonex has improved the efficiency of its local engineroom fire extinguishing system.**

SOFTONEX, which markets the SoftEx range of products, has begun offering local fire applications to handle the fire extinguishing of main engines from a nozzle installation height of over 10metres.

With nozzles placed at a distance from each other of 3metres, water pressure is under 7bar and water consumption is low, at under 2litres/min per m<sup>2</sup>.

Successful simulated ship's engineroom fire suppression tests were conducted at the Fire Technology Laboratory of VTT Technical Research Centre of Finland in November, after which Softonex received classification approvals for the new product from ABS and Germanischer Lloyd, with other classification societies set to follow.

Another recent classification approval came for Softonex's total flooding fire extinguishing system for enginerooms of up to 6000m<sup>3</sup>, according to IMO MSC/Circ.1165 for A category machinery spaces. Here the s.k. SoftDrops mixing ratio is 12%, whereas it is 6% in the extinguishing systems for accommodation areas.

'These are major achievements for us,' said Teuvo Paukku, Softonex technical sales manager. 'The new licenses give the company increased sales



**The SoftEx pump module for a ro-pax vessel, capacity 800lpm/9bar.**

possibilities.' An installation height of 10metres is in most cases enough to be able to install the nozzles and piping above the service systems and rails placed above the engines, resulting in a better arrangement.

The company has 15 staff and annual sales of €3m, including sales from land-based applications. Turnover is undergoing strong expansion.

The Softex fire extinguishing system has a low water feed pressure of 4-7bar resulting in water volumes of 0.5 to 3litres/min per m<sup>2</sup>. According to the company, this results in a simple system that does not need special technology such as special piping couplings, valves and power units. The main piping has a 2inch diameter and the nozzle piping a diameter of 0.5inches. The PN16 rated pipe material is either galvanised steel or stainless steel, according to the clients' specifications.

Softonex supplies fire extinguishing systems for ships' public areas, accommodation areas, machinery spaces as well as car parks and storage areas. The main market of Softonex has until now been Japan, where the Finnish company, through its subsidiary SoftEx Japan Co has a market share over 20%. With the strong Japanese market as a base, it now aims at increasing its markets in South Korea and China. The company has delivered fire extinguishing systems for all types of ships such as bulk carriers, container vessels, VLCC-size and Panamax tankers, LNG carriers, ro-ro vessels, ferries and also for some cruise ship retrofits, the market of the last types boosted by recent IMO requirements.

The most recent ro-pax vessel system references are the local engineroom and accommodation area systems for three vessels built in 2005 and 2006 at Samsung Heavy Industries for Norfolkline, *Maersk Dunkerque*, *Maersk Dover* and *Maersk Delft*. Ⓢ

## Sustainable use of the seas



The School of Marine Science and Technology at Newcastle University is the broadest based in the UK. A degree in Naval

Architecture, Marine Engineering, Offshore Engineering, Small Craft or Marine Biology can lead to a career in one of the many aspects of the marine sector.

Undergraduate study can lead to a B.Eng or M.Eng degree. For those with experience, Masters degrees in a range of disciplines, including marine transport, pipeline engineering, renewable energy and coastal management are available. Study can be full time, or part time in some cases, and options are available for prospective students with different qualifications.

The global nature of the marine sector creates a huge range of career opportunities for graduates – in shipbuilding and repair, in ports and shipping operations, in classification and Government regulatory bodies. With emphasis on sustainable development and respecting the environment, there is a bright future.

**For further information contact the School of Marine Science and Technology at Newcastle University on Tel: +44 (0)191 222 6718, Fax: +44 (0)191 222 5491, e-mail: [marine@ncl.ac.uk](mailto:marine@ncl.ac.uk) or visit: [www.ncl.ac.uk/marine](http://www.ncl.ac.uk/marine)**

STATE OF THE ART TECHNOLOGY



**VETH-Z-DRIVE**  
RUDDER PROPELLERS

**VETH MOTOREN SPEEDS YOUR PERFORMANCE**

For more information  
about our products and  
services visit our website  
[www.veth-motoren.com](http://www.veth-motoren.com)

VETH

MOTOREN BV

THE LEADER AMONG BOWTHRUSTERS



**VETH-JET**  
BOWTHRUSTERS

P.O. BOX 53 - 3350 AB PAPENDRECHT - HOLLAND  
PHONE (+31) 78 615 22 66 - FAX (+31) 78 641 11 69

## Cobelfret adds ConRo to the mix

**THE ConRo concept is pivotal to the next stage of investment in the Cobelfret fleet, writes David Tinsley.**

CLOSELY following the commissioning of the 49,200gt *Pauline*, reckoned to be the largest pure freight ro-ro ferry currently trading within European waters, Belgian shipping and logistics group Cobelfret extended its ConRo (container/ro-ro) vessel build programme at Flensburger Schiffbau-Gesellschaft.

*Pauline* and newly completed sistership *Yasmine*, each combining the flexibility for 3904 lane-metres of ro-ro freight or 848TEU containers, represent a major injection of capacity and capability on the southern North Sea trade. Dubbed Humbermax ships, the pair has been allocated to service between Zeebrugge and the owner's terminal at North Killingholme, near Immingham.

The ConRo concept is also pivotal to the next stage of investment in the Cobelfret fleet, by way of a series of smaller, but equally versatile vessels suited to the wide mix of cargo and freight units transported on the company's shortsea network.

The recent contractual commitment to two newbuilds of the ConRo220 type, offering a ro-ro intake corresponding to just over 2900 lane-metres, has made for a class of six in hand at Flensburg. The first four in the series were originally booked in the slightly smaller ConRo200 version, to give a 2600 lane-metre freight load, but the specification was subsequently upped to ConRo220 parameters, so that all six newbuilds will be common in design. The lead ship is expected to make her debut at the end of 2008, and the fifth



The ConRo220 is a stern-loading three-decker, incorporating fixed internal ramps to feed cargo from the main deck to the upper deck and tanktop lower hold.

and sixth additions to the orderbook take the delivery schedule into early 2011. An ultimate series of up to 10 is envisaged.

Whereas the ConRo848/3900 design type as encapsulated in the 21.7-knot *Pauline* employs two MaK 12M43 main engines producing a total of 21,600kW, the ConRo220 has been specified at a service speed of 18.5knots, using a single such prime mover of 10,800kW. *Pauline's* considerable payload ability is the product of five fixed ro-ro decks and one platform deck, resulting in a very high-sided vessel at 203m overall and 31m breadth. The ConRo220 breed is altogether different in profile, including bridge aft rather than forward, and incorporates three freight decks within main dimensions of 195.4m x 26.2m.

The ConRo220 is a stern-loading three-decker, incorporating fixed internal ramps to feed cargo from the main deck to the upper deck and tanktop lower hold. Headroom availability throughout is such that all decks will offer the capability to load double-stacked rolltrailers

or cassettes, as well as road trailers and also the special SECU containers used by forestry goods producer Stora Enso.

The main deck's clear headroom of 7.4m is 0.4m greater than that of the two other freight levels, and provides scope for the retrofitting of hoistable car decks. Lane width is 2.97m in general, and cargo distribution is 549 lane-metres on the tanktop, 1102 lane-m on the main deck and 1256 lane-m on the upper deck, including the area below the raised deckhouse, to give a total 2907 lane-m capacity, corresponding to some 217 gooseneck rolltrailers.

To rotate and better control the vessel when manoeuvring at tight berths and in fast-flowing tideways, a bow thruster of about 1250kW and stern tunnel unit of some 900kW have been written into the specification.

In the meantime, *Pauline* and *Yasmine* have brought new scale economies to the North Sea freight traffic. Each embodies five fixed ro-ro decks and one platform deck, wherein trailers and containers can be carried on four of the decks. All ro-ro handling is effected by way of the stern, and the 3904 lane-metre cargo capacity equates to about 258 trailers of 14.2m length, together with 656 cars in dedicated areas. The design alternatively provides for 848TEU containers on four of the freight decks, plus 656 cars. In practice, various permutations will apply, the common factor being the ro-ro mode of loading and discharge.

Besides Cobelfret's ConRo220 series, the German yard's current workload includes two 3750 lane-metre trailerships for Turkish operator UN RoRo, three 160m diesel-electric double-enders, and a 130m conventional ferry for Canada's BC Ferries.

The modest size of FSG's premises at the head of Flensburg fjord belies its prolific output, and its standing among the top echelon of builders of large ro-ros worldwide. A strategic focus on rendering higher added-value in design is complemented by characteristic German attention to work organisation and productivity, so that the company retains competitiveness in the face of increasing market inroads by eastern Asian yards. The extent to which FSG has been able to apply serial or batch production clearly has a positive bearing on the economics of the endeavour as a whole. 

### TECHNICAL PARTICULARS PAULINE/YASMINE CONRO 848/3900 TYPE

Length, o.a.....	203.00m
Length, b.p.....	190.42m
Breadth, moulded.....	31.00m
Draught, scantling.....	7.80m
Corresponding deadweight.....	16,600dwt
Draught, design.....	7.40m
Corresp. deadweight.....	14,600dwt
Gross tonnage.....	49,200gt
Container capacity.....	848TEU
Trailer lane-metres.....	3904 lane-m
Trailer capacity.....	258
Car capacity(dedicated).....	656
Main engines.....	2 x 10,800kW
Service speed(85% MCR).....	21.7knots
Class.....	Det Norske Veritas

### TECHNICAL PARTICULARS CONRO 220 TYPE

Length, o.a.....	195.40m
Length, b.p.....	186.22m
Breadth.....	26.20m
Depth, to upper deck.....	18.15m
Depth, to main deck.....	9.65m
Draught, design.....	7.05m
Corresp. deadweight.....	abt 13,375dwt
Draught, scantling.....	7.40m
Corresp. deadweight.....	abt 14,800dwt
Trailer lane-metres.....	abt 2907 lane-m
Rolltrailer capacity.....	217
Main engine.....	1 x 10,800kW
Service speed (@ design draught).....	approx 18.5knots
Class.....	Lloyd's Register

# Plying the Seven Seas



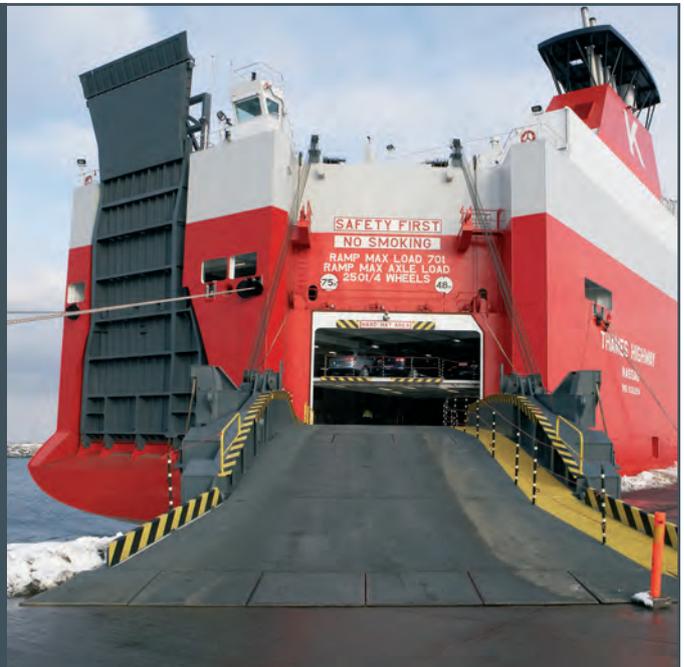
Avda. Beiramar, 2 • 36208 Vigo, Spain  
Tel: +34 986 213 297 • Fax: +34 986 204 415  
astillero@hjbarreras.es • www.hjbarreras.es

 Shipyard  
**BARRERAS**

VIGO - SPAIN



[www.tts-marine.com](http://www.tts-marine.com)



## TTS dry cargo handling

RoRo equipment | side loading systems | hatch covers | equipment for cruise vessels and megayachts  
After-sales service and support



# The Royal Institution of Naval Architects

## DESIGN & OPERATION OF PASSENGER SHIPS

25-26 April 2007, ExCeL, London, UK.

held in conjunction with:



### Second Announcement



The design of Passenger Ships is an area that continues to gain international attention. The changing mix of vessels and capabilities in the world fleet has created a range of new challenges for the Naval Architect. Recent developments in International regulations, such as IMO revised stability standards and the results of the 'Large' Passenger Ship debate at IMO will also have a significant effect on future design.

Recent and proposed vessels in the cruise ship market are setting new records for gross tonnage and passenger capacity. The ferry market is undergoing a change in the face of competition from low cost airlines and the new designs of ferry must be suited to the new economic environment in which they operate.



This conference will bring together Naval Architects, Shipbuilders, Owners, Operators and Regulators to discuss the various issues related to the Design, Construction and Operation of Passenger Ships.

RINA invites papers in all related topics:

- Developments in National and International regulations - effect on design, construction & operation.
- New designs / concepts - continued increase in size and capacity
- Changing markets
- Ship Stability / Survivability
- Propulsion systems and power distribution
- Ship safety - evacuation, emergency management & lifesaving
- Fire safety - fire fighting systems
- Ship security - ISPS, terrorism threat
- Environmental health; disease prevention
- Environmental considerations - cold ironing, reducing air emissions, waste management.
- Other technological developments - bridge systems, HMI designs
- Ship/Shore interface

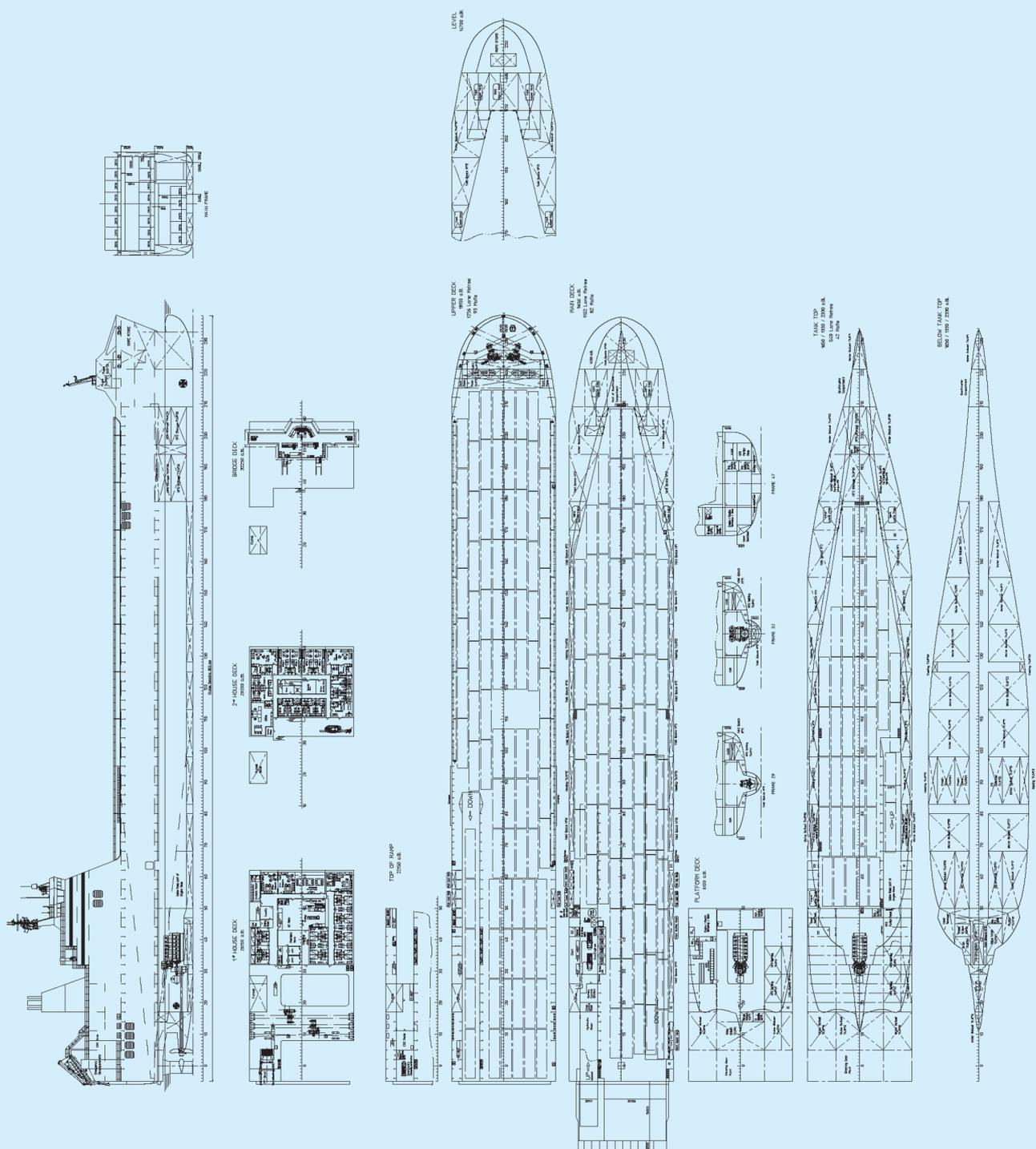


- I wish to receive details on exhibition space and sponsorship opportunities
- I would like to receive a full programme brochure and registration form

Name:	Position:
Company:	
Address:	
	Postcode:
Telephone:	Fax:
Email:	(ICSOT)

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

GA of Flensburg's ConRo220 - all decks will offer the capability to load double-stacked rolltrailers or cassettes, as well as road trailers and also the special SECU containers used by forestry goods producer Stora Enso.



# Stena backs the Superferry

**THE Swedish group is set to introduce ro-pax tonnage of record-breaking capacity.**

WITH a clutch of projects implemented or completed over recent months, Stena Line is pursuing fleet development across a broad front, initially to the particular benefit of North Sea services. The common thread in the various newbuild and jumboisation schemes is scale, including investment in ro-pax tonnage of record-breaking capacity.

While the Swedish group's use of the term 'Superferry' will have new connotations in 2010 as a result of the scheduled delivery of two 6200 lane-metre vessels ordered from Aker Yards, the current lengthening project in Germany involving two of the fleet's modern ro-pax vessels will see an interim development of 'Superferry' status.

In the meantime, the Stena Line service between the Hook of Holland and Killingholme, on south Humberside, is being boosted by two new Seabridger-class ro-pax ferries of 3100 lane-metre capacity from the Fosen yard in Norway. Two further Seabridger vessels ordered in Russia by contractual owner and designer Stena RoRo are understood to have had their specified capacity upped to 4000 lane-metres.

The jumboisation by Lloyd Werft in early 2007 of the 43,400gt *Stena Britannica* and 33,800gt *Stena Hollandica* represents an overall investment of €105m, and signifies a greater concentration of unit capacity on the Harwich/Hook of Holland route in the aftermath of the phase-out of the HSS high-speed catamaran operation. Although distinct in design, length, and capacity, both ships will be elongated to 240m, and will offer a ro-ro intake of 4100 lane-metres and capacity for 900 passengers, including 400 cabins.

Embodying the Seamaster design, the Hyundai-built *Stena Britannica* was introduced in 2003 with a capacity of 3400 lane-m, while *Stena Hollandica* has Spanish origins, having been completed at Cadiz in 2001 by the former Astilleros Espanoles as a ro-pax of 2500 lane-m. Reconstruction by Lloyd Werft has accordingly entailed the preparation of new midship sections of 29m and 52m respectively.

The project is the highest-value rebuild contract ever awarded by Stena Line, and the final vessel length achieved will be the same as



Fosen-delivered *Stena Trader* combines a three-deck layout for 3100 lane-metres of trucks, trailers and other vehicles and units with accommodation for 300 drivers and other passengers.



The *Stena Britannica* jumboisation signifies a greater concentration of unit capacity on the Harwich/Hook of Holland route in the aftermath of the phase-out of the HSS high-speed catamaran operation.

TECHNICAL PARTICULARS	
Stena ro-pax ferries, Aker Yards	
Length, oa.....	240.00m
Breadth.....	32.00m
Gross tonnage.....	62,000gt
Ro-ro capacity.....	5500 lane-m(trailers) plus 700 lane-m(cars)
Passenger capacity.....	1200
Passenger cabins.....	540
Main engines.....	4 x 8000kW
Service speed.....	22knots

that specified for the two 62,000gt newbuilds contracted during November 2006 for delivery from the Aker group's German premises of Aker MTW in the first and third quarters of 2010.

The Harwich/Hook run and the Karlskrona/Gdynia service, linking southern Sweden with Poland, are the two alternatives for the deployment of what look set to become the world's largest ferries. Each vessel will encapsulate 5500m of trailer lanes plus 700m of car lanes, with provision for 1200 passengers, and will be powered by four medium-speed diesels of some 32,000kW combined output to ensure a service speed of 22knots. Should the newbuilds be assigned to the southern North Sea

crossing, the jumboised *Stena Britannica* and *Stena Hollandica* could then be candidates for the Karlskrona/Gdynia operation.

Through its 17-yard organisation and Nordic approach to business, Aker Yards' ability to operate across borders and share competences will be applied in the Stena mega-ferry project through the melding of design know-how from Finland with German construction expertise.

Conceived by Stena RoRo as an efficient form of ro-pax applying 'best practice' in design and operation, and to facilitate subsequent enlargement, the Seabridger class has been introduced at a time of sustained buoyancy in the Anglo-Continental trade. The type as

**TECHNICAL PARTICULARS**  
**Stena Seabridger-class ro-pax ferry**  
**Stena Trader**

Length, oa.....	212.0m
Length, bp.....	194.8m
Breadth.....	26.7m
Depth, to main deck.....	9.3m
Depth, to upper deck.....	15.5m
Draught.....	6.3m
Maximum deadweight.....	c.9000dwt
Freight capacity.....	3100 lane-metres
Passenger capacity.....	300
Main engines.....	2 x 10,800kW
Speed.....	22knots

embodied in the Fosen-delivered *Stena Trader* combines a three-deck layout for 3,100 lane-m of trucks, trailers and other vehicles and units

with accommodation for 300 drivers and other passengers. Second-of-class *Stena Transformer* was expected to be in place by April 2007.

To secure the requisite loading capacity and operating efficiency, Stena RoRo opted for a long, relatively lean hull, at a length overall of 212m and breadth of 26.7m. All cargo is worked over the stern, although the design has been developed to facilitate bow access at both main and upper decks. Jumboisation was seen as achievable at some future stage by incorporating an additional freight deck abaft the accommodation, within the same overall dimensions, and this is presumably the course to be adopted for the envisaged 4000 lane-metre version. In the present configuration, double-stacked containers on rolltrailers and other extra-high units can be transported on the after part of the upper level, the open weatherdeck.

Besides the circa 40% increase in unit capacity compared with the route's earlier mainstays,

*Stena Trader* and consort offer a much higher operating speed of 22knots, allowing the service schedule to be more closely attuned to freight customers' requirements. A twin-engine configuration has been adopted, using two medium-speed MAN B&W 9L48/60B diesels, each producing 10,800kW. To confer the high level of manoeuvrability needed in the Humber and the New Waterway, each ship uses two high-lift flap rudders and two 1600kW Wärtsilä bow thrusters.

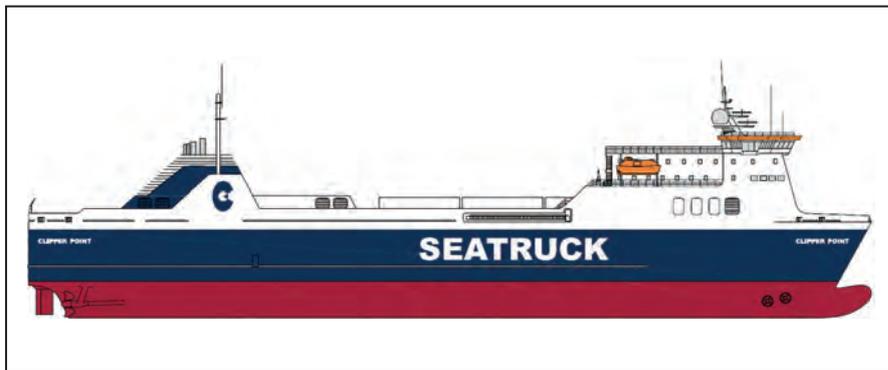
Two further Seabridger newbuilds have been entrusted by Stena RoRo to Baltiyskiy Zavod of St Petersburg, which supplied the hulls of the first two ships of the class delivered by Fosen. Industry reports suggest that the stipulated capacity has subsequently been raised to 4000 lane-metres. The third and fourth Seabridgers are slated for completion in 2008, and options cover an additional pair of newbuilds.

## Seatruck sizes up

**A NEW breed of compact, shallow-draught ro-ro freight carrier is set to make its debut.**

PROMISING a major increase in productivity and capacity on a trade conduit between mainland UK and Northern Ireland, a new breed of compact, shallow-draught ro-ro freight carrier is set to make its debut with Seatruck Ferries. Purpose-designed for the Heysham/Warrenpoint route, the 120 trailer-capacity *Clipper Point* represents the leading edge of a five-ship programme entrusted to the Spanish builder Astilleros de Huelva. She is due to be joined on the service later in the year by second-of-class *Clipper Pace*. Deployment opportunities in various European markets are being examined for the subsequent three vessels, which are scheduled to be handed over during 2008 and 2009.

Designed by Copenhagen technical consultancy Knud E Hansen, *Clipper Point* and *Clipper Pace* embody strategic measurements of 142m maximum length, cargo capacity corresponding to 1800 lane-metres, and full-load draught of 5.2m. The 120 standard trailer intake is more than double that of each of the mainstays of the Irish Sea operation, the 55-unit *Riverdance* and *Moondance*, while the much faster service speed of 22knots will enable the crossing time to be cut from nine hours to 6.5 hours.



*Clipper Point* – the first in a new series of ships destined for the Heysham-Warrenpoint route.

Unusual technical features of the project are the adoption of feathering Wärtsilä controllable pitch propellers (CPPs) and anti-pollution stern-tube seals. Each ship has been specified with a powerful main engine installation comprising two Wärtsilä 46-series diesels of 9240kW apiece. Seatruck plans to have the ships run on just one engine for certain sailings each day, saving fuel while still allowing 17knots to be maintained. Employing feathering

CPPs rather than standard, non-feathering units will reduce drag and minimise fuel consumption when vessels operate on a single shaftline.

Since worn or damaged stern-tube seals are a common problem on short-sea ro-ros, the power system supplier worked with Seatruck to provide a solution using CoastGuard anti-pollution seals. This type of seal offers protection to the shaftlines from the sandy, abrasive water conditions.



Five renowned specialists have combined their experience, knowledge and expertise in security, fire resistance, insulation and climate control. Want to know more about the attractive return on investment it offers?



**MARINE APPLICATIONS**

Jülicher Straße 495, D-52070 Aachen  
 Tel. +49 (0) 241 9667400  
 Fax +49 (0) 241 9667320  
 E-mail: marine@saint-gobain.com  
 Web: www.saint-gobain-marine.com

# The Royal Institution of Naval Architects

## BASIC DRY DOCK TRAINING COURSE

14th - 18th May 2007

By Joe Stiglich

This four-and-a half day course covers the fundamentals and calculations of dry docking. The course begins with the basics and safety concerns, and progresses through all phases of dry docking: preparation, docking, lay period, undocking, and ends with a discussion of Accidents and Incidents.

It's designed to be relevant to Dock Masters, Docking Officers, Engineers, Naval Architects, Port Engineers and others involved in the dry docking of ships and vessels. The course is presented through classroom lectures, student participation in projects and practical application exercises. The course addresses the deck plate level of practical operation needed by the dock operator and the universally accepted mathematical calculations required to carry out operations in accordance with established sound engineering practices.

### Topics to be covered:

- Basic dry docking community terminology
- Calculations
- Safe dry docking procedures
- Lay period
- Undocking evolutions
- Docking Plans
- Docking and undocking conferences
- Hull boards
- Vessel stability
- Incidents/accidents

The Course Leader, Joe Stiglich, is a retired Naval Officer, qualified NAVSEA Docking Officer and holds a Masters Degree from MIT in Naval Architecture and Marine Engineering. He has been responsible for over 250 safe docking and undocking operations. He currently runs a series of conference and training courses for personnel involved in all phase of the drydocking industry and acts as a consultant for ship repair companies.

To register, simply complete all sections of this form and return it with your payment to:  
**THE CONFERENCE DEPT, RINA, 10 UPPER BELGRAVE STREET, LONDON SW1X 8BQ.**  
Tel: +44 (0)20 7201 2401 Fax: +44 (0)20 7259 5912 email: [conference@rina.org.uk](mailto:conference@rina.org.uk)

Name:	Postion:
Company:	
Address:	
	Postcode:
Telephone:	Fax:
Email:	RINA Membership No (if applicable):

Please indicate your preferred method of payment:

I enclose a cheque/Eurocheque for: £ \_\_\_\_\_  
Please send me an invoice for: £ \_\_\_\_\_  
Bank Transfer details enclosed for: £ \_\_\_\_\_  
Please debit my credit card: £ \_\_\_\_\_

Card Number: \_\_\_\_\_

Expiry date: \_\_\_\_\_

Signature: \_\_\_\_\_

Payment must be made in pounds sterling by Eurocheques, cheque drawn on a bank with a UK branch address, credit card (VISA/AMEX/Mastercard) or bank transfer. Please note RINA requires payment *before* the conference date.

**Account Name:** The Royal Institution of Naval Architects

**Account Number:** 10042127 **Account code:** 160016

**Bank address:** Royal Bank of Scotland PLC, Belgravia Branch, 24 Grosvenor Place, London SW1 7HP, UK.

The following charges will be made in the event of a cancellation: £250 if received before 18th April 2007 Cancellations made anytime after that date will not be refunded. Delegates may be substituted in writing subject to the consent of the Conference Organiser.

Registration fee: RINA Members: £880+VAT (Total £1034.00) Non Members: £970+VAT (£1139.75) Group Fee (3 delegates or more): £860+VAT (1010.50)

## Stora Enso takes latest specials on paper

**THE TransPaper-class offers flexible and efficient transport capacity for sto-ro forestry goods and other freight, as well as rolltrailers, road vehicles and trade cars.**

**F**ORESTRY goods producer and shipper Stora Enso has realised an important logistical development through the introduction of a new generation of powerful, heavily ice-strengthened ro-ro vessels linking the northern Baltic with Gothenburg and Luebeck.

The trio of TransPaper-class stern-loaders of 191m was contracted from Aker Yards in Finland to the account of Baltic Container Shipping, under a bareboat charter arrangement with Rederi AB Transatlantic, on the strength of 15-year timecharters from Stora Enso. Transatlantic has also entered into a separate agreement with Stora Enso to use spare capacity for third party cargoes, to be marketed and managed under the guise of TransLumi Line, which is operating the service with the new ships.

The vessels load their base cargo of Stora Enso paper at Kemi and Oulu, in northern Finland. A key element in the establishment and extension of the producer's new logistics system is the use of weather-protected cassettes known as SECUs (Stora Enso Container Units), which are larger than standard containers and can take up to 85t of paper.

While optimised for up to 155 SECU containers on cassettes, the TransPaper-class offers flexible and efficient transport capacity for sto-ro forestry goods and other freight, as well as for rolltrailers, road vehicles and trade cars. The new breed embodies three cargo decks, and is designed to be loaded and unloaded on two levels simultaneously, to expedite port turnaround times. A wire-operated TTS stern ramp/door acts as the cargo bridge between the ship's main deck and the shore terminal, while the upper freight deck is arranged for the landing of a shore-based linkspan.

With the three-vessel series completed by the delivery of *TransTimber* in February 2007, *TransLumi* is maintaining three round-trips per week out of the northernmost Baltic throughout the year, calling at the four ports involved on set days.

Building on experience gained with the innovative S-class ro-ros introduced to the Stora Enso network seven years ago, the new design type is slightly larger, with a correspondingly increased freight intake and provision for the charterer's special SECU units, and is faster and substantially more powerful.



Photo by Dennis Coismann

One of the trio of TransPaper-class stern-loaders of 191m contracted from Aker Yards.

Whereas the S-class vessels were specified with a single, low-speed diesel propulsion engine, two medium-speed prime movers were nominated for each of the new ships in the TransPaper series. A comparatively high operating speed, as well as construction to the highest ice class, IA Super, was a prerequisite of the technical design. Baltic shipping specialists and Finnish industry alike are adept at overcoming the challenges to trade and economic wellbeing imposed by winter navigation and cargo handling in tough northern climes, and the TransPaper series is testament again to such expertise.

Two MAN B&W main engines of the L48/60B type, derated to 9000kW in nine-cylinder format, drive a single Rolls-Royce controllable pitch propeller through a Flender twin-input, single-output gearbox. A high capacity shaft generator is employed, dimensioned to meet the ship's electrical energy requirements at sea and while manoeuvring. Manoeuvrability in restricted channels and at tight berths is enhanced by three 800kW tunnel thrusters, two in the bow and one in the stern. The two auxiliary gensets are of some 1500kW apiece, based on eight-cylinder Wärtsilä engines.

It is understood that a speed of 20knots can be maintained at 80% maximum engine output, and that

an economic service speed of 16knots is obtainable in open-water navigation using just one engine. Installation sizing reflects issues of ice-forcing capability and scheduling dependability, as well as transit speeds, so as to meet the competitive needs of freight generators and shippers through the very difficult winter conditions of the northern Baltic.

Catalytic exhaust emission control, using selective catalytic reduction (SCR) systems from Munters, has been incorporated as one of the measures to reduce the environmental impact of operations with the new ships.

Aker Yards only finalised the newbuild contract at the beginning of January 2005, with an undertaking to deliver the first ship in the autumn of 2006 and have the subsequent vessels ready at dates soon thereafter. The very short order signing-to-delivery timescale has necessitated extensive steelwork subcontracting. The group's Wismar yard built much of the hull of *TransPaper*, which was finished and commissioned from the Rauma yard in Finland, from where second-of-class *TransPulp* was brought into commission. The hull for the third vessel, *TransTimber*, was subcontracted to Gdanska Stocznia Grupa Gdynia of Poland. The three-ship contract was valued at some €150m in total. ☺

## Ice class for Epic

**S**ERIES ro-ro builder Cantieri Navale Visentini of northern Italy has entered into a contract with the UK firm Epic Shipping for three ro-pax ferries. The tonnage will be placed on the timecharter market. Within main dimensions of 186.5m length and 25.6m breadth, each of the vessels will have capacity for 2300 lane-metres of freight plus 195 cars. The passenger intake will vary according to deployment, from a maximum of 880 on short voyages, to 400 for longer routes.

It is understood that one of the 7000dwt newbuilds has been specified to ice class 1A

standard, while the other two will be to ice class 1C requirements. It would appear that the vessels will closely ally with the Visentini 'standard', which is well proven in its various phases of evolution in a number of trading areas around the British Isles and in the Mediterranean. The current generation from Visentini's Donada yard employs twin MAN medium-speed engines for a service speed of around 24knots.

Epic's trio of newbuilds is scheduled to be introduced during 2008 and 2009,

representing a highly competitive delivery timeframe on today's buoyant shipbuilding market. Technical management of the new ships has been entrusted to Meridian Marine Management of Liverpool, which husbands Epic's two existing ro-pax ferries *Pau Casals* and *Blanca del Mar*. The two vessels are chartered by operators in the traffic between mainland Spain and the Balearic Islands, and were delivered in 1998 by the former Spanish shipbuilding organisation Astilleros Espanoles (AESAs). ☺

## High profile reputations

**DANISH designers maintain their reputation for involvement in high profile projects.**

A NEW name in Danish ship design has emerged, after Carl Bro rebranded itself Grontmij|Carl Bro in February, to reflect its takeover by the Dutch engineering group in August 2006.

However, despite the change in identity, one mainstay of the company's ongoing workload continues to be the Diamond Class of dry bulk carriers it designed for Graig (see *The Naval Architect*, March 2007, pp36-37). For the record, 25 Diamond 53, 53,000dwt double hull bulk carriers have so far been delivered, while more than 60 more are on order. Meanwhile, 10 Diamond 34, 34,000dwt Handysize counterparts are on order, with the first due delivery from Vietnamese yard group Vinashin before the year is out. Two ships of this size are also on order at Haida Shipyard, north of Beijing, in a deal that includes options for four more vessels.

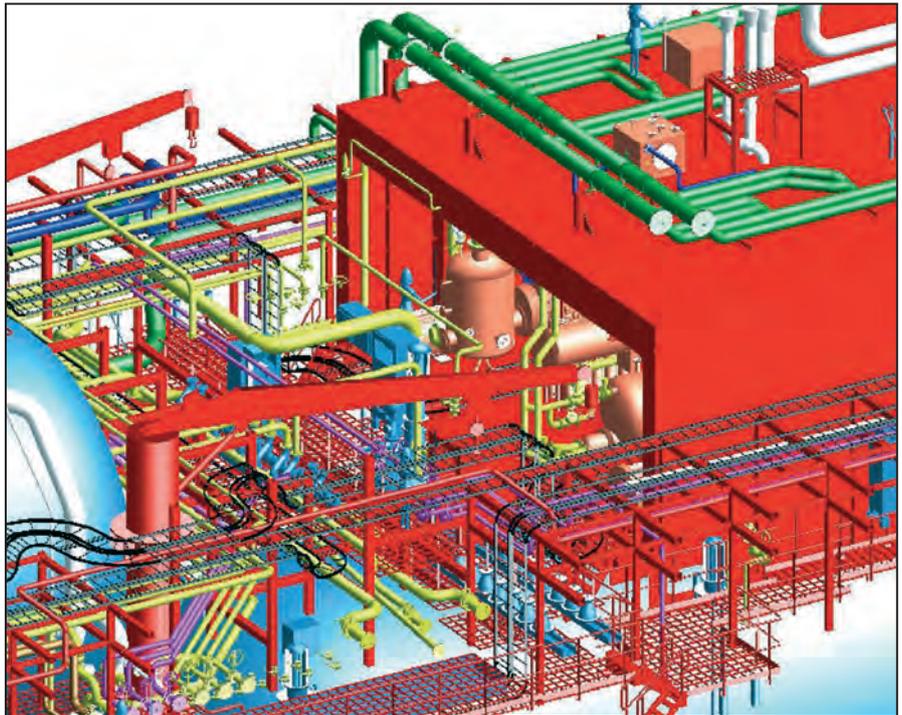
Grontmij|Carl Bro marine department director, Kim Bomholt Nielsen, said that the design of the Diamond class of vessels stood out because the ship had been 'built for purpose'. A little remarked feature of the design had been its hull lines and rudder configuration. Operations of ships in service had shown that where owners with vessels of this size had formerly required tugs to manoeuvre into dock, Diamond 53 ships had been able to dispense with them in many instances.

While other attributes of the Diamond class have been often reported, it should be noted that the design of even this innovative vessel has had to be amended to come into line with common structural rules arrived at by class last year. Mr Nielsen said Carl Bro had 'almost finished' work on the revised design for the Diamond 34 and was continuing to work on the Diamond 53.

Also long delivered has been the small gas carrier design for I M Skaugen, of 10,000m<sup>3</sup> capacity. The design is to Skaugen's 'Multigas' specification, offering the unique capability to carry LNG, in addition to Ethylene and LPG. Skaugen Marine Construction recently placed a latest two ship order, covering US\$31 million, 10,000m<sup>3</sup> capacity units for delivery 2009-2010 in China, bringing to six the number of Multigas ships it has on the books. The latest ships are destined for the Norgas fleet.

Hulls will be built through Skaugen Wuzhou Shipbuilding at the Wuzhou yard, while the cargo plants will be constructed at the Shenghui Gas & Chemical Systems Co that is partly owned by SMC.

Featuring large stainless steel cargo tanks, from an engineering and design viewpoint, the Multigas carriers are truly innovative, by offering increased flexibility and better capabilities in terms of cargo types at a construction price that puts it well ahead of the competition.



Design detail from the containment and cargo handling system to be used aboard I M Skaugen's new generation 'Multigas' ships.

These ice class vessels (E3 Germanischer Lloyd) will have their hulls, rudders, and propellers strengthened.

It is now understood that Skaugen has also commissioned a design for a 12,000m<sup>3</sup> variant of the Multigas ship, although it is not known whether larger sizes still are on the cards.

Also under wraps is a coming design from Grontmij|Carl Bro for two new multi-purpose cargo vessels, one a 3000dwt ship for hazardous goods for Shipcraft and the other a 4600dwt ship for Clipper. The latter is expected to form the basis for an initial order four ships from Vietnam's Vinashin shipyard group. Mr Nielsen said contracts covering the ordering of this tonnage would be done through Grontmij|Carl Bro, with 70% of the design work to be undertaken at its Shanghai satellite operation or through partner company Hengar.

Another area of interest for Grontmij|Carl Bro has been design work to upgrade old tankers with a view to their achieving IMO2 status. From January 2007 a number of chemical products have changed categories from IMO type 3 to type 2. Chemical tankers in category 3 can no longer trade these chemicals without an upgrade. For IMO ships of a certain size with double hulls, Grontmij|Carl Bro points out that rebuilding may not be necessary to achieve type 2 status. It might, for example, only be damage stability which has to be updated and documented due to different requirements.

Mr Nielsen said: 'We have helped several shipowners to upgrade their fleets and have

been quite successful in getting them through the class process. In some cases it has been quite easy to fulfil the new demands.

Fellow Danish design company Knut E Hansen also recently changed hands, in this case becoming part of private company ML Group after a change in strategy by former owners Semcon.

The new parent, also of Denmark, paid SKr10 million to take over the consultancy and its 30 employees, which will work alongside ML Group's offshore and marine design business, whose 100 staff have hitherto focused on ship automation systems. This is likely to mean that Knud E Hansen can offer services it previously had to outsource.

Recently completed projects have included basic and detailed design work for the Stena ro-pax vessel *Stena Britannica* (see pp20-21), by 30m, which added 2000tonnes of steel to the ship, and extended three ro-ro decks, one accommodation deck, and also the aft of the block, as well as calling for upgraded bow thrusters.

Knut E Hansen also developed the tender design and the basic design for *Clipper Point* (see pp21), which is soon to be delivered as the first of three newbuilds and two lengthened newbuilds.

The company is also working on a design for a small, 50m long Sundbussen ferry.

The company's new parentage will encourage its already apparent appetite for opportunities in the offshore market and is understood to be working on a number of pipe layer, platform and drillship projects. In the last case, the designer is following a market trend away

from the upgrading of ageing tonnage and towards larger new tonnage capable of drilling more quickly and more cheaply.

Meanwhile, Alpha Ship Design continues to pursue its specialised passenger vessel markets, with particular emphasis on ro-pax cruiseships.

Among its projects has been the conversion from a former non-Solas Danish domestic ferry into *Africa Mercy*, a hospital ship capable of sailing the high seas, with attendant requirements to install new sprinkler systems, including extra lifeboats and other life saving appliances. The work, underway at A&P Tyne, was originally given to Cammell Laird, but the ship had to be transferred when that company went bust. Work has now been going on for several years, not least because the project has been technically and commercially demanding, and has had to be planned and paced in line with the fund-raising activities of Mercy Ships, the charity which owns the vessel.

Alpha Ship Design has been heavily involved in a management role in the project throughout, sourcing tradesmen and pipe fitters, as well as providing the design itself.

The ship is now due for delivery in the first half of 2007.

In a separate project, also involving a ship set to do 'good works', Alpha Ship Design has been working with evangelical Christian relief organisation Educational Book Exhibits Ltd and its shipping arm OM Ships International, of Germany, covering the €15m conversion

of the 1968-vintage *Logos Hope*, the second of its pair of ferries, to make it available as a floating offshore educational facility in developing countries.

Alpha has designed and planned the entire conversion of the ferry, which as the ro-ro ferry *Norrøna* formerly operated between the Faroe Islands and Denmark under Smyril Line ownership.

Work has included installation of a steel mezzanine deck, a new deck at the aft to support a school, a 500-seat auditorium, a dental clinic, a school, a children's nursery and a bookshop, as well as the replacement of all cabling, piping and ventilation systems (the latter from Imtech), while all cabins are being refurbished and upgraded, to reflect the fact that this is no longer a shortsea ro-ro ferry accommodating people on a short term basis, but a ship required to accommodate entire families for periods of two to four years.

The ship also now features the sprinklers and life-saving arrangements to fulfil Solas requirements.

One of the stand-out aspects of this project is that OM Ships itself took responsibility for the development of a completely new bridge, with all automation systems developed in-house.

Alpha was required to find the yard for the conversion work, selecting the Trogir Brodogradiliste yard in Croatia, although the installation of new generator sets and furnishing is due to be completed in Bremerhaven.

However, Alpha has also been working on other projects, in which commercial interests dictate it can be less forthcoming. Among them is a smaller combined container and bulk carrier design, which has hitherto involved tank tests in Shanghai. The multi-purpose vessel will distinguish itself by featuring a two stroke engine, commanding a lower specific fuel consumption, lower cost maintenance, fewer cylinders and no gears, when compared to other ships of its type.

Alpha Ship Design is also working on a very large cattle carrier design, but declined to offer any more details.

Meanwhile, the designer has also participated in the Safedor project, looking to come up with innovative design based on boosting the safety of ships. Its task was to design a very large cruiseship of over 4000 passenger capacity – for which it came up with two variants: one that matched Solas as it stood and one that 'violated' Solas but looked to meet safety requirements using other means.

'The designs we made were very different to what has been seen before on other passenger ships,' said Niels Prip, Alpha Ship design general manager. 'The vessel we arrived at was a platform with a superstructure, but fitted on top with the lifeboats below an overhanging superstructure. Because we wanted all cabins to be external, we envisaged a [winding] walkway running throughout the superstructure. The ship could take the same number of passengers as the largest afloat, but with all cabins external.'



The VIKING advantage

Visit us at  
Cruise + Ferry  
stand no. C4

## A unique range of flexible evacuation systems for all vessel types and sizes

### All the convenience of a full marine life-saving equipment package

VIKING's choice of product packages and systems are standard or tailor made and certified to the latest requirements.

Our advanced systems provide fast and easy evacuation, exceptional stability and are trusted by crews and passengers worldwide.

- Chute and MiniChutes
- Slides and MiniSlides
- Direct boarding concept
- High capacity liferafts
- Davit launched liferafts

VIKING's complete range of marine life-saving equipment includes mass evacuation systems, liferafts, lifejackets, lifeboats and davits, MOB boats, LSA packages and more.

### A global servicing network is just as important as the products on board

VIKING's products are supported by a network of local experts and 270 authorised servicing stations worldwide. Our servicing includes:

- Evacuation systems
- Liferafts
- Boats and davits
- Lifejackets and immersion suits
- Marine fire-fighting equipment

See our full range of maritime life-saving equipment on [www.VIKINGsafetyshop.com](http://www.VIKINGsafetyshop.com) or contact one of our worldwide offices.



## VIKING LIFE-SAVING EQUIPMENT

Saedding Ringvej 13 · DK-6710 Esbjerg V · Denmark  
Tel +45 76 11 81 00 · Fax +45 76 11 81 01 · [www.VIKING-life.com](http://www.VIKING-life.com)



**Palmsized Teak Miniwheel**  
Diameter=120 mm

**Steering Control Systems**  
**Speed Adaptive Autopilots**  
**First in AZIPOD Control**

EMRI A/S 37A Marielundvej DK-2730 HERLEV Denmark phone +45 44 91 82 04 fax +45 44 91 55 07

*Problems with:*

 **Acoustics?**

 **Noise?**

 **Vibration?**

 **Mechanical failures?**

*We measure, predict and propose a solution!*

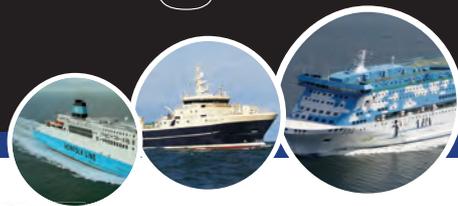


**Ødegaard & Danneskiold-Samsøe A/S**  
Consulting engineers - Noise and vibration control - Machinery Dynamics

Titangade 15 Tel.: +45 3531 1000 ods@lr-ods.com  
DK-2200 Copenhagen N Fax: +45 3531 1001 www.odegaard.dk

Member of the  
Lloyd's Register Group

**DESMI pumps**  
integrate  
knowledge & technology



**DESMI Marine Pumps -**  
**The Natural Choice for high quality pumps**



Vertical in-line centrifugal pumps  
- type NSL & SL



Horizontal gear pumps -  
type ROTAN ED/GP/HD

Cargo pumps - submerged deepwell pumps, booster and horizontal cargo pumps - type DESWELL, DESBOOST and DESCARGO

**DESMI**  
MARINE PUMPS

Tagholm 1 - 9400 Nørresundby - Denmark - Phone: +45 9632 8111 - Fax: +45 9817 5499  
E-mail: marine@desmi.com - web: www.desmi.com

## The rise of the three-way control valve

TEMPERATURE-control specialist Clorius Controls is developing larger capacity three-way control valves (type G3FM-T), designed for regulating fresh water, lubricating oil, and other liquid media.

Ideal for marine installations handling large liquid quantities, its nodular cast iron valves (available in bronze for seawater applications) with stainless steel spindles feature slides for quarter turn operations, for applications such as engine jacket cooling water systems, lubricating oil cooling and central cooling water systems. The valves operate in conjunction with motors, or with a handle for manual operations, for use in conjunction with a pneumatic actuator.

In its engine jacket cooling application, Clorius has worked alongside MAN Diesel to develop the unit's controller, where a sensor positioned at the engine outlet works in a master/slave arrangement with a sensor positioned at the inlet to minimise temperature fluctuations, particularly on start-up, traced to the time it takes for the water in the engine to reach the outlet sensor.

Clorius, which produces some 10,000 valves every year, emphasises the work it has done to minimise the weight of the valves it produces. It claims that its DN400mm (mixing valve capacity 2310m<sup>3</sup>/h) unit, weighing 345kg, is some 40% lighter than its nearest competitor's equivalent.

As ship sizes have increased, so cooling water capacity requirements have risen, with an original DN300mm unit now available as a DN500mm



Gu Zheng, Clorius Controls - China chief representative, presents the DN400 three-way control valve at SMM. Larger capacity valves are now available.

(mixing valve 4000m<sup>3</sup>/h) unit. Clorius reckons to be the only supplier in Europe to have developed valves of such capacity. Furthermore, plans are afoot to evolve a DN600mm version of the valve.

This, the company says, will be the limit for capacity for the foreseeable future, on production cost grounds. It might be noted that even this size would be insufficient for the very largest containerships afloat, of 12,000TEU capacity, where cooling water is handled using twinned butterfly valves.

Clorius, which also lays claim to an 80% market share in terms of worldwide shipboard thermostats installed, producing around 10,000 units a year either as a direct supplier or through OEM arrangements, says it has also witnessed a shift in demand for the way temperatures are controlled onboard ship. The supplier says that there has been a reversal in yard and owner preference for centralised actuator control, as customers realised that any problems with the centralised system had a direct impact on the performance of actuators. While the company is perfectly happy to supply actuators using Interface RS485 communication, it notes that standalone temperature controller sales are once more on the rise.

The company also acknowledges a step change in demand for its self-acting thermostats in recent years. Pneumatic actuators are increasingly being displaced by electric counterparts, which offer superior control capability. The company says that, on entering the Chinese market 14 years ago, all shipyards specified pneumatic-type controls. Today, over 50% of that market prefers electric actuators. 

## Lyngsø's latest in automation

LATEST shipborne automation developments from Hørsholm-based Lyngsø Marine comprise the new 2200 series of modular configurations for either stand-alone or integrated use featuring state-of-the-art displays, designed by parent group SAM Electronics with ergonomic specialists, TNO Human Factors Research Institute (HFRI) in The Netherlands.

The new systems are designed for virtually any shipborne operation extending from propulsion control, engine monitoring and ship management to cargo alarm and control, machinery alarm and monitoring, and emergency shutdown. All are based on common, standardised software and hardware modules which are readily configurable.

The MCS 2200 integrated monitoring and control system, for example, consists of four basic sub-systems supported by outstation, reporting, duty alarm, and system operating devices. Intelligent outstations act as fully independent data processors linked by a redundant system net for data exchange while the duty alarm facility integrates engineer call and alarm functions in addition to the bridge watch alarm system.

Also available, either as part of a total MCS 2200 assembly or as a stand-alone configuration, is the PCS 2200 propulsion



Lyngsø Marine's MCS 2200 integrated monitoring and control system is designed for ships of all types and sizes.

control system for automatic remote control of main engines. Class-approved by all leading societies and licensed by the major main engine manufacturers, systems are designed to support a complete range of possible propulsion configurations. These include single and multiple configurations, fixed and controllable pitch propellers as well as control of clutch, integration of shaft generators and pony motors.

Along with Force Technology and the Danish Technical University, Lyngsø Marine has also been actively involved with development of the Seasense system for onboard monitoring and decision support for management of wave-induced structural loads and ship motions. It includes purpose-designed sensors, mathematical models and processing software interconnected by a type-approved infrastructure. 

## EMRI exerts its quiet control

WITHOUT a service organisation of its own, steering and manoeuvring gear supplier EMRI's presence onboard the world's merchant tonnage is low profile, but nonetheless pervasive.

The auto pilot, track pilot and dynamic positioning joystick developer has been quietly building a presence supplying equipment to what can be seen as former competitors for over 30 years, since managing director J C Nørtoft Thomsen decided to take a low key route to international success.

The company, which saw turnover rise from DKr28m in 2004 to DKr42m last year, will see the number of standard autopilot systems supplied rise from 130 units in 2006 to 150 units in 2007, and is considering its options to grow. Last year, it bought out its transformer subcontractor Dansk-Print Electronics, a move which brought six extra staff, and rented 300m<sup>2</sup> of new storage space.

And, it is the in-house developed software embedded in the hardware supplied, to which the company owes its continuing success.

EMRI-built equipment can be found as part of the packages offered by well-known bridge equipment suppliers such as Kelvin Hughes, Furuno and Sperry Marine, while ABB Azipod and other azimuthing podded propulsors are also controlled using EMRI joysticks and manoeuvring technology, supplied on a subcontractor basis.

EMRI supplies equipment across the merchant marine market, extending from tankers and containerships. In its own right,

it reserves Badged, tailor-made products for the cruiseship, mega yacht and research vessel sectors. Higher profile forthcoming installations will include joystick controls and remote systems connecting the bridge to machinery controls governing manoeuvring aboard the Holland America Line Vista class and Cunard's *Queen Victoria*, both from Fincantieri, as well as the third Freedom-class ship for Royal Caribbean Cruise Lines from Aker Yards. In the case of the Freedom class vessel, manoeuvring control covers two azimuthing podded propulsors, plus one central fixed pod.

The market dictates that EMRI invests in continuous development of its software and its latest product evolution sees it offering additional failsafe capability, in line with new guidelines from Det Norske Veritas. The augmented system is designed to detect sudden movements of the steering gear, and features an audible alarm and a means of identifying the kind of failure that has occurred.

According to Mr Nørtoft Thomsen, DP systems supply is also very much a booming sector, with EMRI able to sell single systems for auxiliary applications into the cruise, ferry and mega yacht markets, as well as tapping into offshore support vessel demand. However, as a company of around 30 staff, EMRI has been careful not to overstretch, limiting its market to five or six joystick DP systems per year and steering clear of the wider market for dual systems covered by International Maritime Organization compliance. Ⓢ

## Sem-Safe system set to spread

DANFOSS is looking to replicate its position in the oil burner nozzle sector by becoming the number one supplier of high pressure water mist nozzles in the world for marine and other applications.

Just over a year ago, it formed a new joint venture Danfoss Semco, in which Danfoss invested 60% of the funds, with Semco Maritime contributing 40%. The joint venture now offers the full range of fire extinguishing solutions, across dry powder, foam and water mist applications.

Currently, most investment is being made in the Sem-Safe water mist systems for the marine market, for which Danfoss supplies the high pressure pumps and nozzles, with research focusing on the development of the smallest possible nozzles to cover the largest area possible. This system forces water through micro-nozzles at very high pressure to create a water mist with what is claimed to be the most effective fire fighting drop size distribution. The extinguishing effects are achieved through heat absorption, and by making the environment inert due to the expansion of water by over 1700 times when it evaporates. The system is also claimed to provide better protection for personnel and

surroundings and minimise potential water damage, because the majority of the water mist evaporates. It is available for both total flooding configurations, or for local applications.

Recent applications of the Sem-Safe system include accommodation protection for four RCCL cruise vessels built at Meyer Werft, Germany and four Stena ferries built at Hyundai and Aesa.

A total flooding system for navy vessels built at Damen and Hyundai was also recently supplied.

Also on the reference list was *Emma Maersk*, which was equipped with CO<sub>2</sub> fire fighting systems for all rooms and cargo holds, with added water-based local protection for the engine rooms.

The sisterships of the world's largest container vessel will be quipped with identical fire fighting equipment.

The ship that emerges from the Genesis Project, for Royal Caribbean Cruise Lines, will also feature a Danfoss Semco CO<sub>2</sub> system in its engine rooms. This complex system will protect 19 different technical rooms and will come complete with 100% spare battery capacity, with enough CO<sub>2</sub> for two releases in the largest room. Ⓢ

## MAN promotes the power of concentration

LAST year, MAN Diesel put into service its first 12-cylinder two-stroke engine for a marine application, in the shape of the 101,000hp K98 unit it delivered to COSCO, gracing *Cosco Guangzhou* - briefly the world's largest containership.

It is significant to note, then, that in looking to future requirements for ever larger containerships, those at MAN Diesel's two stroke development centre in Demark appear to be eschewing the jump to ever greater numbers of cylinders, in favour of an approach designed to maximise power concentration out of as few cylinders as possible.

MAN Diesel's current development programme, in which it is launching engines to Mk9 capability has focused on engines in the 80cm-90cm bore range. It looks, for example, to achieve the same power for a 90cm bore 12-cylinder engine as has hitherto been the case for an Mk6 98cm bore engine.

While there is no theoretical limit as to how big engines can get, practicalities to do with machining, weight, cranes, foundries etc dictate caution. Again, the supplier says it could comfortably supply engines with 14-, 16- and 18-cylinders - and indeed it already has supplied a 24-cylinder two-stroke engine for a land-based application - and that there are no theoretical concerns. However, one consequence of more cylinders is more maintenance. Therefore, it would be 'more convenient' to choose a 12-cylinder engine with a slightly bigger bore and slightly more power than an engine with more cylinders, according to MAN Diesel.

Less fuel oil consumption, emission, dimensions and weight will also yield higher maximum and mean pressure, the supplier says, adding that it is its research and development department that is now putting pressure on sales to boost power, where formerly roles were reversed.

Of course, MAN Diesel is able to offer engines of up to 108cm bore if the demand should arise. The fact is that its Mk7 98 bore, MC engine already develops over 100,00bhp, which the company argues is more compact, but only a few thousand less than the 14-cylinder marine engine offered by its main competitor.

MAN Diesel believes that developments have 'overtaken' its own 108cm bore engine in its present form. The Mk9 programme may mean that, if the Mk9 performance parameters are transplanted to the 98cm bore engine, this may replace the 108cm bore engine cylinder for cylinder.

'Consequently', says MAN Diesel, 'a future large engine does not necessarily have to be bigger than the engines of today, but it may still develop an output which is up to 10%-20%-25% higher.'

Specifically, in its opinion, it would be better to choose a 98cm bore size with 12 cylinders than a slightly smaller engine with 14 cylinders, although it accepts that Mk9 will first make its mark on the 80cm-90cm bore range, with the first 98cm bore engines perhaps five years down the line.

Central here is the fact that a Mk9 108cm bore engine, generating perhaps 130,000bhp would be just too powerful for available propellers to absorb. Ⓢ

## Evacuation systems gain critical mass

**S**ALES for marine evacuation chutes and slides are steadily increasing, reports Viking Life-Saving Equipment, driven by new safety regulations and a shift in shipowner sentiment away from davit launch systems.

As a davit supplier itself, Viking is able to give good grounds for the growing trend. Where davits have a capacity for a maximum of 25 passengers, the liferafts into which evacuation chutes dispatch passengers, for example, can take 100 passengers. Meanwhile, less space is demanded by the chute and liferaft system for installation onboard ship. Fewer crew are also needed to undertake the evacuation process, a factor which is particularly telling aboard smaller ships.

Where davit operations need repeated crane lifts, the evacuation chute operation can also be achieved in 'one pull'. It is activated by pulling a release handle, with a nitrogen pressured cylinder launching liferafts on their sledge, which in turn pulls out the chute, with descent controlled by an automatic hydraulic brake. The evacuation chute is pre-connected to the liferafts and automatically pulled into position when the liferafts are inflated. Full deployment takes only two minutes.

In a landmark contract, Viking is delivering four evacuation chutes per vessel sets to Meyer Werft for the latest 5000 capacity (passengers and crew) Norwegian Cruise Line luxury cruiseships.



Compact installation of the Viking evacuation system aboard *Norwegian Jewel*.

Evacuation chutes were also specified by Tallink for installation aboard the large ro-pax vessel *Galaxy* and by Color Line for *Color Fantasy* and *Color Magic*.

Viking also just delivered two evacuation chutes (2xVEC - 3x100, A-pack) to Meyer Werft for AIDA Cruises *AIDAdiva*.

Smaller scale but also achieving good market penetration is Viking's Evacuation MiniChute, targeting vessels with embarkation heights of

between 5m and 20m. Capable of evacuating 356 people in 30 minutes, the system – like its larger counterpart - features a reinforced Kevlar chute for evacuee protection.

This system was preferred by Transmanche for *Seven Sisters*, by Aliscafi SNAV for *Don Francesco*, by China's SBTf for *Zhong Tie Bo Hai 1 Hao*, and will also be a feature of the added section aboard Stena Line's elongated *Stena Hollandica*. 

**Maritime technology**

**FORCE Technology offers maritime expertise within design studies, towing tank tests, wind tunnel tests and port studies.**

**We offer our value-creating solutions to leading international consultants, ship-owners, and shipping companies. Our expertise covers all kinds of ships and offshore platforms.**

**FORCE Technology's solutions include loading of computers, decision-support tools, and simulators. Further, we assist in training of ship-owners, operators, and maritime training organisations.**

FORCE Technology is an international technological consultancy and service provider.

Our customer base consists of e.g. the energy and process industry, the oil and gas industry, the pharmaceutical and food industry, the maritime industry and the public sector.

We have companies in Denmark, Sweden, Norway, Russia and USA.

FORCE Technology  
 Hjortekærvej 99  
 2800 Kgs. Lyngby  
 Tel. 72 15 77 00  
 force@force.dk  
 www.forcetechnology.com



## G&O Bioreactor beats wastewater standards

THE next generation in technology designed to clean wastewater has arrived, according to Danish specialist Gersten & Olusen (G&O). Its Microbrac Bioreactor offers full treatment for grey and black water and has already been specified for 18 shipboard installations in the short time it has been on the market.

A UV-based system offering complete degradation of organic matter, including fats and grease, it is chemical-free and has been shown to meet and in some cases exceed International Maritime Organization requirements published in 2006 in Annex 26 to Marine Environment Protection Committee resolution 159(55), revising guidelines of effluent standards and performance tests for sewage treatment plants. These revised guidelines are not due to be applied to all equipment installed onboard ship until January 1, 2010.

Furthermore, G&O is confident that any further tightening up of rules could be accommodated through the sizing up of plants.

As well as being approved by Det Norske Veritas, ABS, Lloyd's Register and the US Coast Guard, the equipment is also approved for use on naval vessels under the NATO Industrial Advisory Group.

The 'plug and play' unit itself, which is installed close to the engine space, is constructed using a fixed, polypropylene film matrix design, transferring technology across into the marine sector after 15 years of experience in land-based applications.

In detail, this means that the bacteria cultures are fixed, which yields greater efficiency due to the fact that there is much better contact with the sewage water than is offered by the free swimming bacteria media operating in activated sludge plant. The effluent water coming from the bioreactor is 25mg BOD (biochemical oxygen demand) in absolute value – very clean and exceeding the 'Alaska Bill' requirements – compared to a BOD value close to 50mg in the case of activated sludge plant.

In the case of COD (chemical oxygen demand) results, the new bioreactor exceeds the coming requirements.



G&O's chemical-free Bioreactor has been shown to meet and in some cases exceed IMO revised guidelines of effluent standards not due into force until January 1, 2010.

Where sludge plants require settling chambers to treat grey water, the fixed film matrix means shipyards can bypass that whole process.

Using light as the sterilisation method, as noted, also means no added chemicals, where activated sludge plant uses chlorine, which is not approved in certain locations.

Furthermore, the process time associated with the Bioreactor is 4-5 hours, against 8-10 hours in the case of activated sludge plant.

Polypropylene film offers a 25 year lifetime and its operation does not depend on anything rotating inside the system; nor does it include filters, with all maintenance areas accessible from the outside by crew, and de-sludging facilitated by a pump.

According to G&O general manager Michael Dyrbye Christensen, the last three years

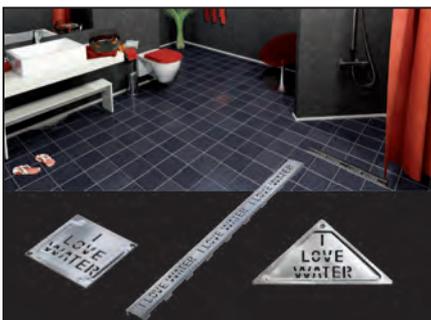
have seen a sea change in owner thinking on sewage plant. Today G&O's client list for the new system includes AP Møller Maersk, the Royal Danish Navy, Lauritzen, and the Dutch Coastguard. 'Curious and serious owners with a long term policy, who want to comply with the new standard and have been put into difficult situations around the world on how they clean their grey water, can be assured that they will stay out of trouble,' he said.

G&O says that the fixed bacteria cultures mean that the volume of the treatment chamber can also be designed 25% smaller.

It has been designed to cover vessel sizes ranging from the smallest in terms of wastewater generation (say six persons) up to those carrying 1500 persons – in the latter case being able to handle 600,000l of wastewater per day. Ⓢ

## Drains need designing too

NEW shapes, new patterns, and new installations are the presiding features of bathroom and restroom flooring supplied by Danish company Blücher.



Blücher, which offers stainless steel sanitary discharge systems for vacuum and gravity systems, and reckons to have supplied sanitary discharge systems for over 900 vessels over the past three decades, is perhaps best known today in the marine setting for its lightweight, easy to assemble EuroPipe drainage pipework system.

The company reports that the visible part of the sanitary discharge systems has been augmented to offer a drain design range comprising both traditional square floor drains, triangular floor drains and slender shower channels. The new

drain types are suitable for installation in corners, along a wall or in the entrance to the shower area. Installed along the wall, Blücher says the new drains fit perfectly into all floor tiling patterns and 'have been developed to meet the highest design aspirations without compromising on function'.

For square and triangular drains and for channels, Blücher has developed a series of grates in a variety of styles, in fact named after various cities, to match any bathroom décor from 'minimalist' through to 'classical', 'trendy' and 'tough'.

Recent contracts include the cruise ship *Freedom of the Seas* and the cruise liner *Queen Mary II*, as well as the luxury yachts *Marlin* (Apoise) and *Platinum*. Ⓢ

The New York drain grate – 'tough and trendy'.

Industry



Wheelmark  
and  
U.S. Coast Guard  
approved



## SikaFloor® Marine

Your global supplier of

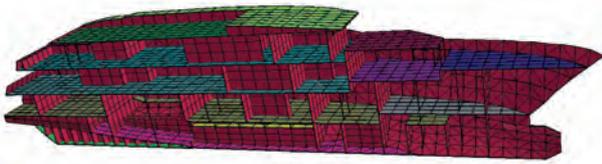
- Customized high performance acoustic flooring solutions
- Easy to install primary deck coverings
- A comprehensive range of structural sealants and adhesives



[www.sika.dk](http://www.sika.dk)



SCANVIBRA



## ship noise & vibration consultancy

ScanVibra provides noise and vibration reduction studies, reviews, analyses and measurement surveys.

Specialist experience and systematic engineering.

[www.scanvibra.com](http://www.scanvibra.com)

Danfoss  
SEMCO  
FIRE PROTECTION



## Fire Fighting at Sea

Danfoss Semeo A/S Fire Protection has considerable expertise within design, production, installation and service of fixed fire fighting systems with Sem-Safe high-pressure water mist for accommodation, deep fat fryer, engine room total flooding and local application systems and with high and low pressure CO<sub>2</sub>, foam and dry chemical powder. We supply both individual systems and complete packages.

[www.danfoss-semco.com](http://www.danfoss-semco.com)



FIRE...3...2...1...0

# The Royal Institution of Naval Architects

## Warship 2007: The Affordable Warship



20 - 21 June 2007, Bath, UK

### Second Notice



This conference, the 27th in RINA's successful Warship series, will look at the 'Affordable Warship'. The conference will be held in Bath on 20-21 June 2007.

The ever increasing cost of warship procurement, upkeep and operations, whilst at the same time meeting the need for ever more capable and sophisticated platforms; a dilemma faced by most navies today. This conference will consider how advances in design, construction and operations can contribute towards lower through-life cost ownership whilst maintaining fleet capability.



RINA invites papers on the following related topics, covering all types of warship:

- Procurement models for warship acquisition
- Cost reduction
- Through life support
- Innovative design
- Designing to cost and capability
- Build in friendliness
- Technology insertion
- Lean manning
- Recoverability
- Management of risk
- Damage control, fire fighting, situation awareness and reconfiguration of systems.
- Innovative support solutions
- Regulation & legislation: concept to disposal



- I wish to receive details on exhibition space and sponsorship opportunities
- I would like to receive a full programme brochure and registration form

Name:	Position:
Company:	
Address:	
	Postcode:
Telephone:	Fax:
Email:	(W2007)

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

## ScanVibra takes the systematic approach

**A Systematic approach and numeric analysis from the basis for refined thinking on noise and vibration**

UNDER ISO 6954-2000 Guidelines for vibration comfort, passenger cabins where vibration values are above 4mm/s and crew accommodation where values exceed 6mm/s are likely to attract adverse comments.

Increasingly, if doubts arise over a vessel's specifications, noise and vibration consultants are being brought in at an early stage in the newbuilding and conversion process, even during pre-contract discussions.

Modelling structure, decks, shell pillars, etc and developing schematic approaches to the way the propeller will 'hit' the hull, for example, allow noise and vibration specialists to simulate noise levels.

Design reviews, analyses and predictions combine to provide minimum risk of unforeseen problems. Bringing consultants in early also means that they are able to establish parameters that it will later be possible to review.

Ulrik M Rasmussen of Danish consultancy ScanVibra said that the numerical approach to noise and vibration offered an accurate means for simulation. As well as offering in house, purpose-developed ShipNP noise prediction software, and monitoring and troubleshooting

capability, branded 'ShipMA', ScanVibra relies on finite element specialised calculations for vibration analysis.

Set up in 2005, ScanVibra's project work has now spanned the luxury yacht, ro-pax vessel, ro-ro ship, containership, tanker, product carrier, offshore vessel, patrol craft and ocean going tug markets.

Its work extends across reduction at source issues (propellers, gearbox selection, engines/soft mountings, enclosure, fans and HVAC systems, and exhausts), to analysis aiming to reduce noise and vibration in receiving spaces (floating accommodation, Visco elastic damping, general insulation and resonance phenomena).

Mr Rasmussen's growing portfolio of work has included the elongation work of two Stena ro-pax vessels at Lloyd Werft in recent months, where he assisted the owner during the yard design phase, commenting on the yard's proposals on structure and sound insulation.

In general, he said ro-pax vessels offered a particular challenge to noise and vibration specialists, just because the huge ventilation capacity installed along the side of the ship in narrow spaces generates external noise levels that some harbour authorities frown upon. Such circumstances require a range of solutions that include the installation of silencers on the ventilators themselves, and careful positioning of noise absorbing screens and plates in the ducting. Ⓜ

## Mega yachts gain from fishery thinking

DENMARK'S Directory of Fisheries is to order a vessel characterised by its low noise, whose attributes are likely to inform builders of larger craft, and in particular megayachts.

Tenders are now out for the 57m long new inspection and oil recovery vessel, building on a design from Knut E Hansen. Its attributes were first seen onboard the smaller *Havørnen*, a 31m long inspection and rescue vessel, whose low noise propulsion system, auxiliary machinery, air-conditioning and accommodation areas mean that it operates at noise levels 8dB-15dB quieter than those strict limits prescribed by the International Maritime Organization.

The construction of both vessels has been informed by thinking from leading noise and vibration specialist Ødegaard & Danneskiold-Samsøe.

When building *Havørnen*, at the North Sea Shipyard in 1996, considerations were given both to sources of noise and the experience of crew expected in the accommodation areas. Thus, the vessel features a slow-running 'oversized' and resiliently-mounted main engine with a high efficiency exhaust silencer, the first gear insulated at the aft, the second gear stage submerged in water, and a low noise traction propeller.

Its diesel generator is also resiliently-mounted and completely enclosed, while the harbour diesel engine is double elastically mounted and in its own highly insulated room. Pumps are also low noise and vibration, being resiliently-mounted.

*Havørnen's* airconditioning units come complete with their own silencers, while accommodation features floating Vicoelastic floors, with additional inner windows in the areas of floating floors, and the wheelhouse features laminated windows.

High insulating bulkheads and perforated plate ceilings dampen noise further, with special glass matting used above the ceiling. Even the consoles in the wheelhouse have been flexibly mounted.

The same thinking will go into the new vessel, which will also be distinguished by hull optimisation looking to minimise flare and will be able to achieve a top speed of 18.5knots.

Small ships and boats present special noise problems, given that crew and accommodation are located close to noise sources, but there is every reason to suppose that the type of attention to detail lavished on vessels like *Havørnen* and its coming counterpart will be transposed to the megayacht market, according to ØDS marketing director Ulrik Danneskiold-Samsøe.

He said that his consultancy was increasingly working with German shipyards on comparable noise and vibration suppression measures as they turned their attention towards megayachts. Ⓜ

## Terrorists set to feel the Force

WELL-known for its industrial processes using flow knowhow, including CFD, its hydrodynamic and aerodynamic expertise, with as many as 30-40 ship tests per year in its sophisticated towing tank, Force Technology has also long prided itself on its simulation capabilities, built on its strong hydrodynamic and aerodynamic expertise.

Christian Schack, Force Technology head of department, hydro and aerodynamics, said that current simulation projects included a new combined 'shooting and sailing' package designed to teach ships' crews how to handle attacks by terrorists or pirates. The software had been evolved through a joint project with security specialist FATS, of Atlanta, and its first commissioning would occur in 2008 for the Police Coast Guard in Singapore.

Developing such a package required in-depth knowledge of ship dynamics, including the modelling of wave, wind, and manual loads. The PCG's fastships were themselves small boats, of 15m-20m in length, which had required the development of a new 'fastship module' which, as well as the more standard features of simulation,

needed to take into account the weight of shipboard gunnery, the effects of recoil, and on-boat calculation of trajectory at speed, in order to establish the degree of realism equivalent to what happens onboard.

Less exotic, perhaps, but just as significant, has been work done to simulate tug operations as they interact with LNG carrier and floating production and storage offshore vessel mooring, as the offshore energy market continues to expand. Here, Force has been working on behalf of Wijsmuller, model testing tug operations to establish its future tug size and number requirements.

As tugs come in close to large ships, Mr Schack explained, they interact with them as they follow in their wake. 'The trick is that we know the phenomenon but we need to model it correctly – the shallow water, banks, ship speed, etc in order to train crew in what they would experience in an LNG terminal tow out. Are we dealing with Voith Schneider, with azimuth stern drives, or rotor tugs? Is three tugs enough? Can we take 2.5m waves? The point is that the terminal operator wants 100% operability. While that is not achievable, our aim is to maximise the operational envelope.' Ⓜ

# Lofting solutions for mid-sized shipyards

PLM Steel Design and Production Preparation is reviewed by Thibaud Colas, Dassault Systems and Edward Popko, IBM Corp.

THE computerised design revolution that has transformed the way modern ships are engineered and built has left one critical area bobbing in its wake: steel work preparation for manufacturing at small and mid-sized shipyards.

Although excellent steel work preparation systems do exist, many are paired with Product Data Management (PDM) systems, an investment that is often beyond the reach of smaller yards.

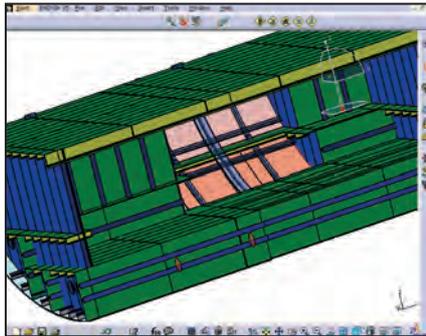
Recognising this gap, Dassault Systèmes has developed its new V5 DELMIA Structure Manufacturing Preparation (SMP) in a configuration for mid-sized yards that is used with CATIA three dimensional structural design applications and does not require additional PDM support. DELMIA SMP and CATIA are components of IBM/Dassault Product Lifecycle Management (PLM) developed by Dassault Systèmes, and part of a series of solutions for shipbuilding addressing equipment and routed systems, general layout, outfitting, electrical, analysis, simulation and visualisation. IBM offers additional Service Oriented Architecture (SOA) infrastructure for shipyards integrating SMP with procurement, Enterprise Resource Planning (ERP) and legacy systems.

Breaking down a ship's structural layout into interim products suitable for each yard's unique equipment lineup and workflow processes, and then applying that information to 3D models to extract fully informed manufacturing documents, is a process known in the shipbuilding industry as lofting or manufacturing preparation. Lofting presents many production challenges.

3D CAD systems, the core design tool at many smaller yards, do a fine job of design and layout but not all capture information about the manufacturing features necessary to actually produce the finished structure. Such systems make no allowance for creating manufacturing features such as attachment lines, margins, fit-up and edge preparation, and do not take into account a shipyard's unique combination of available equipment and preferred work processes.

DELMIA's new structures configuration based on SMP, accommodates all of these yard-specific variables, automating the creation of production steps, manufacturing data and additional manufacturing features necessary to produce interim products for structural assembly and production. In the process, SMP improves work flows, eliminates errors and helps produce a superior product despite increasingly restrictive cost pressures.

When used in conjunction with the structural design and layout tools in CATIA V5, Dassault Systèmes' 3D digital design system, SMP adds all of the appropriate manufacturing features to the original parts and assemblies, directly within the 3D product model. The result is a completely integrated design-to-production model that minimises manual processing and provides interfaces for direct input to enterprise systems such as production planning, ERP and scheduling



Details from V5 DELMIA.

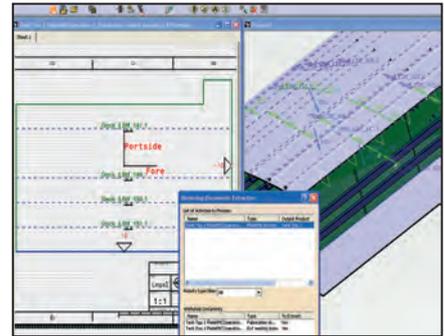


Figure 1 - Structure Manufacturing Preparation (SMP) Drawing Extraction.

## Structure Manufacturing Preparation Highlights

SMP provides the features required to turn a design into a ship:

- Ensures a continuous data stream from design, to manufacturing process, to manufacturing parts, to workshop documents, to CNC input
- Describes manufacturing operations such as 'mark & cut plates and profiles'; 'form plate'; 'bend stiffeners'
- Adds manufacturing features for lifting, cutting, bending or welding parts, among many others
- Visualises work preparation in 3D to support featuring checking while reviewing production
- Generates workshop documents: fabrication sketches, assembly drawing, forming data, templates, pin-jigs, etc
- Extracts CNC machine data: Nesting and cutting data (external contours, cutouts, marking lines, marking texts. DXF support for CNC machines (cutting, line-marking, text-marking etc), profile bending; built-in interface to ALMA plate-cutting application
- Archiving and re-use of common work processes

programs, as well as Computer Numerical Control (CNC) machines, plate and profile cutting/forming machines, and welding workstations, for example.

### Reducing the risk

Structural design is one of the most complex and financially risky steps in shipbuilding, particularly in mid-sized yards. The high number of piece parts and complex configurations managed by mid-sized yards suggest that there are benefits to using basic database technology (even without more sophisticated PDM systems) to insure management of hierarchical blocks, sub-assembly and interim structural products that make them up. SMP does not dictate that a specific database technology be used.

Data management in such a setting can be a nightmare. Critical data often arrives late or is inconsistent because designs have changed, or because the final design does not agree with

the assumptions made in the project-definition stage. But the biggest challenge is that the final structural design does not capture the production information necessary to manufacture it. Even detailed structural assemblies and their bills of material do not indicate how these parts or the smaller sub-assemblies will be fabricated. What's more, the answer to how varies from one yard to another, depending on available equipment and preferred production processes.

Structural designs are not production ready primarily because they do not include manufacturing features that correspond to the required manufacturing processes. Designers think in terms of function. Builders think in terms of manufacturability, and so the two groups approach the challenge from opposite directions. To build a ship requires many features that disappear in the building process – a ring attachment for a large part so it can be lifted by crane, or a bevel to allow room for welds to join

creating seaworthy software

[www.autoship.com](http://www.autoship.com)

- ◎ Stability & Strength Assessment
- ◎ Cargo Management & Load Planning
- ◎ Ship Design & Production
- ◎ World-Wide Service & Support



Why go anywhere else?

autoship.com



Defense

Workboat

Commercial

Offshore

Ferry

Leisure

Robust,  
Supportive,  
Dependable.

202 ft Platform Supply Vessel  
Bender Shipbuilding & Repair Co., Inc., USA  
and Guido Perla & Associates Inc., USA  
Produced with ShipConstructor

**ShipConstructor**<sup>®</sup>

Shipbuilding Software Solutions

[www.ShipConstructor.com](http://www.ShipConstructor.com)

Courtesy General Dynamics Team, Austal Ships Pty. Ltd., Australia and Austal Ships, USA; Bender Shipbuilding & Repair Co., Inc., USA and Guido Perla & Associates Inc., USA; Bodewes Shipyards B.V., The Netherlands; Dubai Drydocks, UAE; Genoa Design International, Canada and Marinette Marine Corp., USA; Vripack Yachting International Naval Architects B.V., The Netherlands.

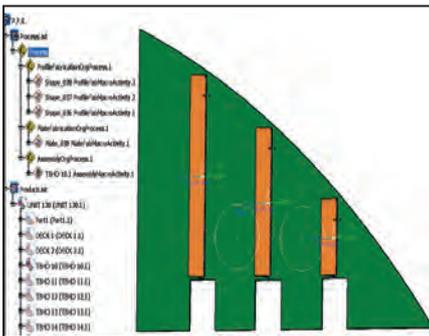


Figure 2 – Reinforced Plate with Design and Production Specification Tree.

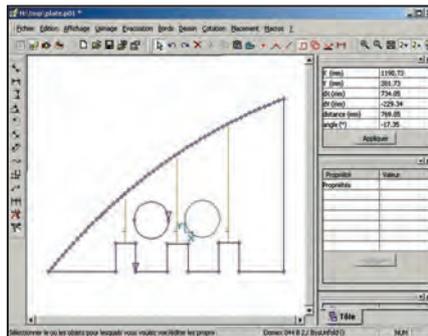


Figure 3 – Reinforced Panel Preparation for ALMA Plate Cutting.

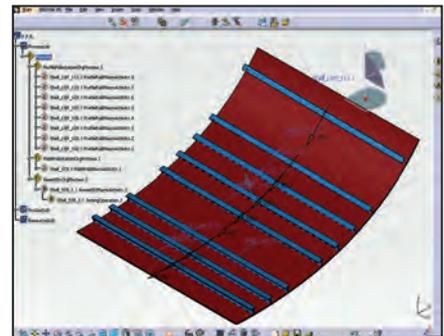


Figure 4 – Curved Plate Preparation.

two pieces of steel. Although such features aren't important to the design of a ship, they are critical to its construction.

Because the goals and needs of design and production are so different, most mid-sized yards have tended to use two separate computer systems – one to design a ship and another to build it. This has created a logistical nightmare, however: the only way to translate data from one system to the other while adding production information is to do it manually. SMP is integrated with CATIA's structural design functions thus design and production preparation is integrated.

With a product as complex as a modern ship, the risk inherent in performing this process manually is gargantuan. Errors will occur, and they generally will not be discovered until late in the production process, when correcting them is most expensive. Such errors can consume much of a yard's potential profit on a job.

Common errors resulting from preparing structure manufacturing documents manually include:

- Inaccurate or late process information for cost estimating and planning
- Discrepancies between the design and the manufacturing documents after manufacturing features are added
- Inadequate lead time for ordering materials and optimising production by grouping similar parts together to minimise steel waste, or grouping similar operations together to make the best use of available equipment
- Data format incompatibility with suppliers and fabricators

Today, however, advanced digital manufacturing techniques in DELMIA allow for a substantially higher level of integration between structural steel design and production. SMP offers a continuous data stream of design-for-production information, starting at preliminary design and extending through detailing and on to manufacturing. SMP includes work preparation tools, 3D visualisation and generation of workshop documents with CNC support, all in one system.

Design and production are such different processes that they may always require two different systems to perform. But SMP builds a bridge between them, making them act like one and eliminating the need for error-prone manual data translation. And because SMP is file-based and can be used with any database management program, integration is easy and straightforward.

**How SMP works**

Structural functional design and structural detail design in CATIA V5 produce a totally integrated view of a ship's layout. SMP supplements this view with work preparation information at the part and sub-assembly level. In many cases, structural systems must be broken down into a series of interim products that reflect the yard's manufacturing equipment and work flow. SMP performs these operations.

Production planners benefit from SMP because it associates manufacturing operations with all parts and subassemblies in the structural design, automating the creation of required manufacturing features. For example, SMP adds marking, opening, forming and edge preparation features for flat plates, profiles for curved plates, and the templates and pin-jigs necessary for manufacturing. SMP also computes and displays roll lines, plate forms, templates, shell templates, sight lines, and the required marking and cutting operations.

Documents and data are generated for each manufacturing operation, including margin fit-up, marking lines, opening preparation, edge preparation and profile bending. Manufacturing features are inserted directly into the product structure tree according to the assembly's Bill of Material, ensuring that the design and production views can be evaluated simultaneously.

The SMP workbench provides an extensive set of digital tools for manufacturing preparation, or lofting. Once a structural design is loaded, SMP tools are used to define manufacturing operations. SMP's general workbenches are:

1. Get Started: This function is used to load design data and populate manufacturing operations according to the assembly structure
2. Edit Manufacturing Operations: This function is used to define needed manufacturing features such as Joining, Marking -Cutting, Plate Forming and Profile Bending
3. Update Parts with Manufacturing Features: This function adds the needed manufacturing features to the ship's design
4. Generate Workshop Documents: This function generates 2D documents for manufacturing

While using the Editing Manufacturing Operations option, the lofting captures what is needed to make the design producible. This includes manufacturing features such as attachment lines, margins, fit-up and edge preparation, as well as the specifics of

manufacturing resources such as cutters, benders and lifting equipment. For plate jigs, information about the number and height of templates, the position of base and sight planes, and pin-jig data document extraction is added.

Finally, SMP automatically generates workshop documents showing attachments to parts and interim products. For example, a drawing might include marking lines, cutout notations, profile markings, margins, bevels, welds, attachment lines, production symbols, reference lines, forming lines and openings. See Figures 1 and 2.

Drawings are managed by work activity and automatically produced for plate-jigs as well as for assembly. Additional drawings and data are produced for plate cutting and nesting – supported by a built-in interface to ALMA, the most widely used plate cutting application – and DXF output for CNC machines.

SMP is used in conjunction with the CATIA V5 Structure Design Solution. Initial structural design, volumes, major zones and bulkheads, deck arrangements, and multi-deck penetrations are defined in the initial functional design phase. Next, the design is detailed within the design volume, making all necessary material assignments: thickness and standard material sizes, as well as the detailing standards to be used throughout, such as profiles, end cuts, holes and cutouts.

A yard also would use CATIA V5 Structural Functional Design application to define a blocking hierarchy and parts-naming convention. The blocking schema defines hierarchical sets of piece parts. Based on this hierarchy and an associated bill-of-material, SMP then adds the related manufacturing operations for every required interim-step product.

Depending on a yard's production processes and equipment, work preparation – in all but the simplest cases – will add manufacturing information to steel parts and assemblies. This might include attachment and reference lines, weld lines, marking plates and profiles, alignment and bending curves, opening preparation, added material or edge preparation.

All of these added features will gradually be removed or obliterated as the downstream manufacturing operations are performed. Because they are not part of the finished ship, they are not part of its design, and must

be added and then removed during the build process. This is the heart of why a product like SMP is necessary in shipbuilding. Creating, reviewing, and editing of these manufacturing features in 3D are key capabilities of SMP.

SMP is process-driven, meaning that manufacturing operations are automatically attached to every interim product once detail design is over and ready to be prepared. SMP defines one operation for each interim product, whether it is a part or an assembly.

Each manufacturing operation defined in SMP describes the manufacturing steps required and the support documents needed. For example, a plate fabrication operation will capture the manufacturing features to be created and relate them to its fabrication documents, which include contour cutting and marking data.

SMP achieves a continuous data stream from design, to process, to workshop documents (and data) by attaching production operations to parts and assemblies during design and detailing. This:

- captures manufacturing data as design takes place
- provides a mechanism for updating manufacturing data as a design evolves, a benefit of process definition
- provides a collaborative decision-support mechanism linking the design, production and fabrication teams

Figure 3 shows a typical reinforced panel. Although the panel meets design and structural requirements, it lacks manufacturing preparation information. DELMIA's SMP automatically adds work preparation information to the panel, as represented by manufacturing operations in the figure on the left. Figure 4 shows the ALMA output for the reinforced panel example.

Curved shell panels typically are more complex to manufacture than flat-plate assemblies. Manufacturing preparation for a curved shell panel will involve activities in at least three different shops: plate fabrication, profile fabrication and assembly. This process involves allowances for joining operations to capture the required welds, and the addition of manufacturing features like margin, fit-up, marking lines and edge preparation. It also involves plate- and profile-forming operations like flattening parameters (side, neutral surface, distortion), curved plate templates (plate jigs), curve length comparisons and roll lines, curved plate templates like plate jigs, the number and heights of templates, and the position of base and sight planes. Figures 4 and 5 show some of these operations for curved shell panels.

SMP is a leading edge application for digital manufacturing and structural steel design. With its release, mid-sized shipyards now have access to an affordable, file-based, and process-centric tool for defining work processes in the context of a specific yard's equipment and established work methods.

SMP adds manufacturing context to structural design models and provides a single product model that integrates both design and production views. With SMP, production planners can now be assured of receiving more accurate product requirements on a timelier basis. SMP also provides the tools necessary to automate work activities, optimise production, associate required documents, and generate drawings and CNC data customised for that specific yard's equipment and work processes.

With SMP, mid-sized yards now have access to the same work preparation advantages enjoyed by their larger, more well-equipped brethren. By lowering the financial and reputational risks inherent in building ships in the modern age, SMP helps to ensure that mid-sized shipyards, a vital link in the shipbuilding ecosystem, will continue to survive and thrive.

SMP can be used in small work team environments or be a component in a larger shipyard PLM strategy. IBM's SOA infrastructure can integrate SMP's design-production capabilities with procurement as well as analysis, ERP and supply chain management systems. Shipyards benefit from SMP because they have a direct link between design and production and this link leads to improved delivery schedules, better cost control, and higher quality assurance.

For further information about PLM solutions for shipbuilding visit:  
[www.ibm.com/solutions/plm](http://www.ibm.com/solutions/plm)  
[www.3ds.com/se/products-solutions/plm-solutions/](http://www.3ds.com/se/products-solutions/plm-solutions/)

*Speed, Strength, Stability.  
 Make waves amongst the competition.*



GRC Ltd is a Software and Naval Architecture consultancy specialising in bespoke software solutions and IT services, as an independent business within the QinetiQ Group. We have supported the UK MoD over the last 15 years both onshore and at sea, whilst working with commercial organisations.

Accessing QinetiQ's vast research and knowledge base broadens the GRC range of advanced marine technology software products, which allows us to deliver innovative solutions worldwide.

To find out how we can make a difference for you, call us on +44 (0) 2392 334 003 or visit [www.grc-ltd.co.uk](http://www.grc-ltd.co.uk)



# ShipConstructor leverages AutoCAD experience

**SHIPCONSTRUCTOR 2006 may have taken the shipbuilding software market by storm, but now, look out for ShipConstructor version 2008.**

IN 2006 ShipConstructor Software Inc, developer of the AutoCAD-based 3D product modelling and production planning software suite ShipConstructor, released its latest software version: ShipConstructor 2006.

SC2006 brought many changes to the shipbuilding software world, the most notable being the Database Driven Relational Object Model (DDROM). DDROM provides what its developer terms 'a quantum leap in the design for production process', giving users flexibility and control by managing complex interactions between associated parts as well as creating transparency and collaboration in the shipbuilding process. Reacting to client needs, the idea of marrying the power of a relational database with parametric functionality, an industry first, was born.

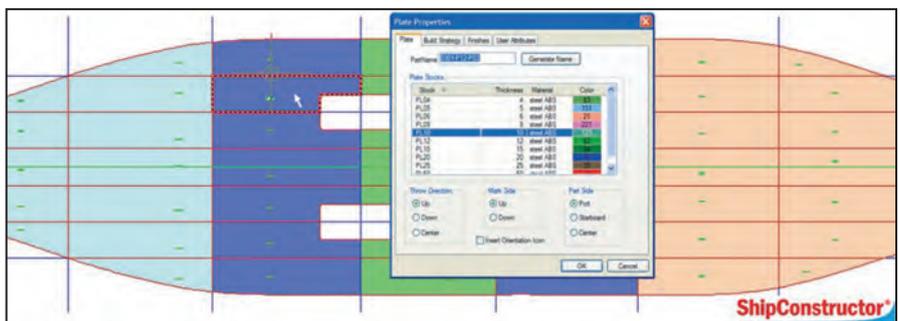
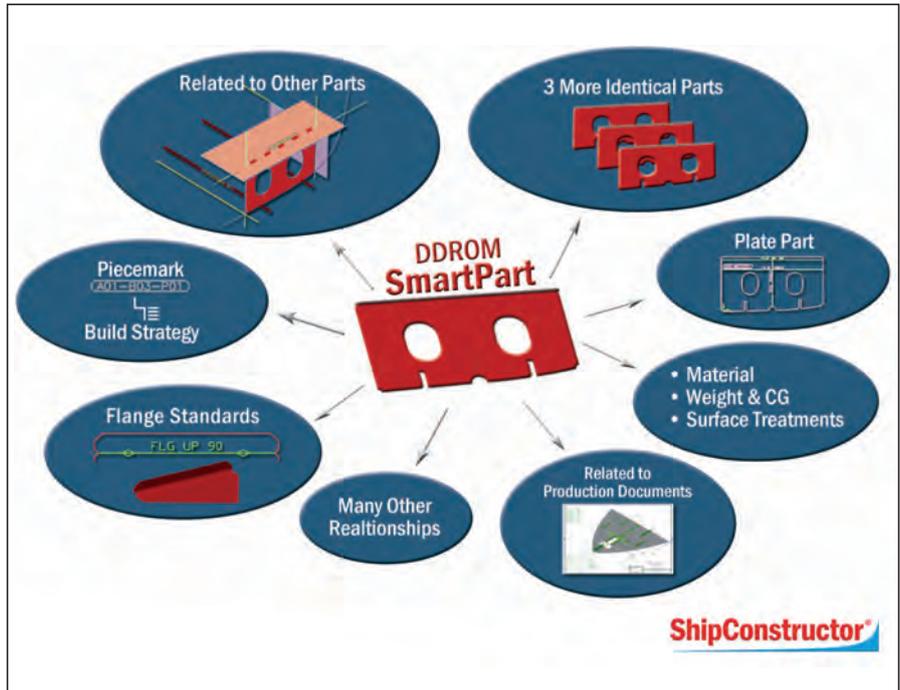
'With DDROM, you can make your parts 'intelligent' - we call them 'SmartParts,' says Darren Larkins, ShipConstructor chief software architect. 'They automatically react to design changes of adjacent parts or pre-defined standards, updating themselves as well as the production drawings.'

The best thing about the SmartParts is that there is no manual programming required, because the user is faced with standard AutoCAD drafting techniques while the smartness is automatically recorded and executed in the database.

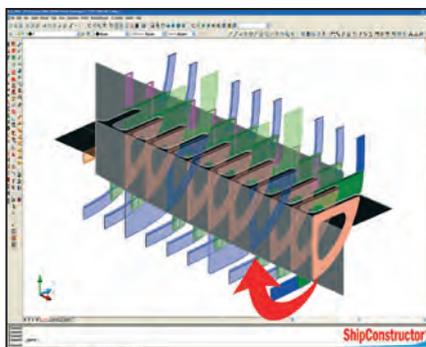
'All geometry is now stored in the database, which enables innovative features such as one-click part definition, the ability to design once and reuse, as well as quick and easy changes on the spot,' says Mr Larkins.

In some ways ShipConstructor reckons to have managed to make relational design as easy as driving a car. This innovative technology brings parametric modelling functionality to ShipConstructor without diminishing the intuitive, natural feel that ShipConstructor is known for. The DDROM does not just reduce the time it takes to finish modelling; it reduces errors that are often introduced when changes are made, resulting in further cost savings. There are many claimed benefits and time saving concepts derived from DDROM technology, which include but are not limited to one-click part definition, replication of designed parts, and on-the-spot design alterations.

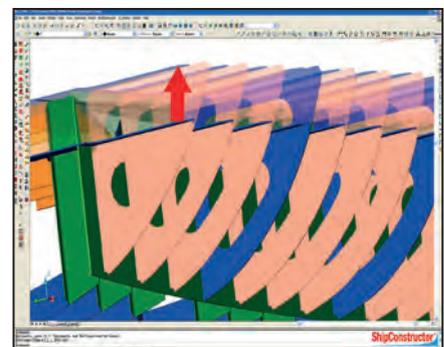
To illustrate this concept, ShipConstructor starts with the waterline for the outline of a deck. The designer draws the lines representing the seams and butts as well as any holes. Then, by simply clicking inside of any 'region' in the drawing and selecting a plate stock to define the part, ShipConstructor automatically generates the toolpath, part name, weight & centre of gravity, and generates the relationships between all entities. Once the parts are defined the user can move any butt or seam and all related parts will be updated instantly.



Creating a part is as simple as clicking within any 'region' defined by the design lines.



Creating multiple frames is as easy as designing one and replicating.



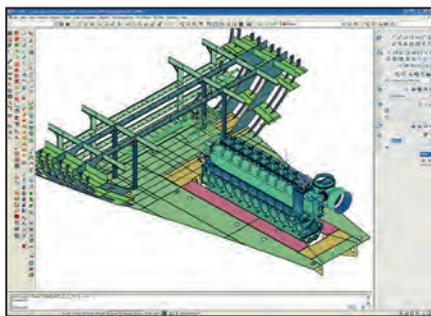
Change to a deck height updates all related frames.

A typical ship design task is designing many frames consisting of parts that are identical in the general design shape, but vary somewhat due to different hull traces. With DDROM the user simply designs one

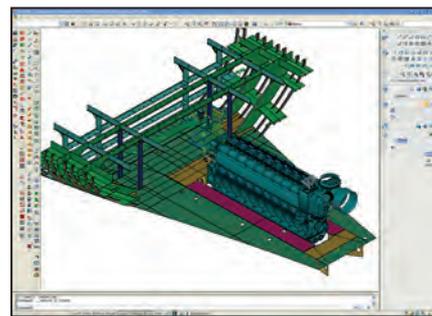
of the frames, then replicates the geometry to the other frames, and exchanges the hull trace. Designing many similar frames now only takes a fraction of the time compared to traditional CAD methods.



SC2006 using Auto CAD 2006.



SC2007 using Auto CAD 2007, conceptual shapemode.



SC2007 using Auto CAD 2007, realistic shademode.

Any drawing (frame, deck, longitudinal) can be simply linked to other drawings, making major design changes easy. Consider the task of moving up a deck by a specified amount, says ShipConstructor. When the deck is moved up all frames and longitudinals linked to the deck will automatically update, compensating for the change in the deck height.

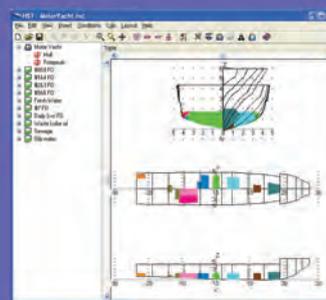
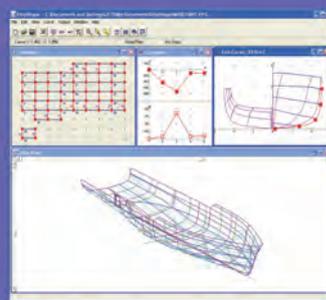
Despite all these updates and improvements made to the existing software, ShipConstructor Software Inc recently announced the decision to release ShipConstructor version 2008 in late spring. The move towards quickly following SC 2006 with the new release of SC 2008 was largely prompted by a choice to provide

users with the option to utilise AutoCAD Versions 2006, 2007, and 2008 with the ShipConstructor software. ShipConstructor relies on AutoCAD technology and leverages AutoCAD experience that already exists in the industry. This reduces the time it takes to migrate to a ShipConstructor solution and simplifies data exchange with other parties.

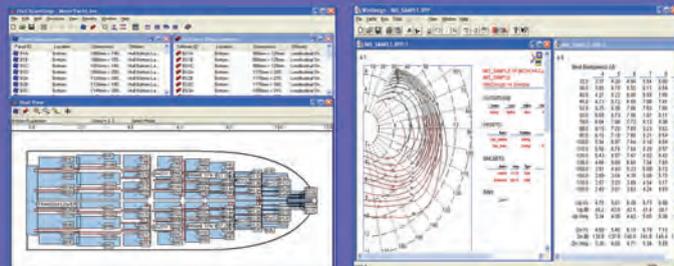
AutoCAD and ShipConstructor combined, continue to allow shipbuilders to access cutting edge technology within an internationally proven system. For example, using the AutoCAD 2007 Walk and Path animation tools, a user is able to identify points of interest within a model, and then create a path, or simply walk past those points to create an animation file that

can then be distributed. The benefits of this process enable users to create the animation using different visual styles or 'shademodes' to obtain the best possible visual effect.

Best of all it is possible to take the client on an 'over the shoulder' tour of the design and expose any flaws early in the design process, (well before any problems occur in the final product). In addition, AutoCAD 2007 and AutoCAD 2008 represent the first major change to AutoCAD 3D graphics capabilities in years. These changes enhance the ShipConstructor experience with faster display performance and significantly higher quality presentation, as well as better 3D modelling and rendering tools, the developer says.



# WOLFSON SOFTWARE



Our software comes with free unlimited technical help direct from the Wolfson Unit's staff, with no maintenance charges beyond the purchase price.

Our range includes:

- Hydrostatics, Stability, Loading & Damage
- Ship Motions & Sea Sickness Prediction
- Powering Prediction & Propeller Design
- Sailing Yacht Performance Prediction
- Data Acquisition & Monitoring
- Hull Design & Lines Fairing
- Onboard Loading
- Hull Scantlings

[www.wolfsonunit.com](http://www.wolfsonunit.com)

WRITTEN BY NAVAL ARCHITECTS FOR NAVAL ARCHITECTS

Wolfson Unit MTIA, University of Southampton, SO17 1BJ, UK  
Tel: +44 (0)23 8058 5044, Email: wumtia@soton.ac.uk

## Collaborative tools for design distribution

THROUGHOUT shipbuilding, common 3D product ship modelling is becoming the preferred means through which designers convey their design intent to builders. Formation Design Systems looks at the consequences for its NavisWorks software.

WHEREAS in the past communication from design to production has been principally by means of traditional 2D engineering drawings, now the common 3D CAD model is the cornerstone of all data for both design and construction purposes.

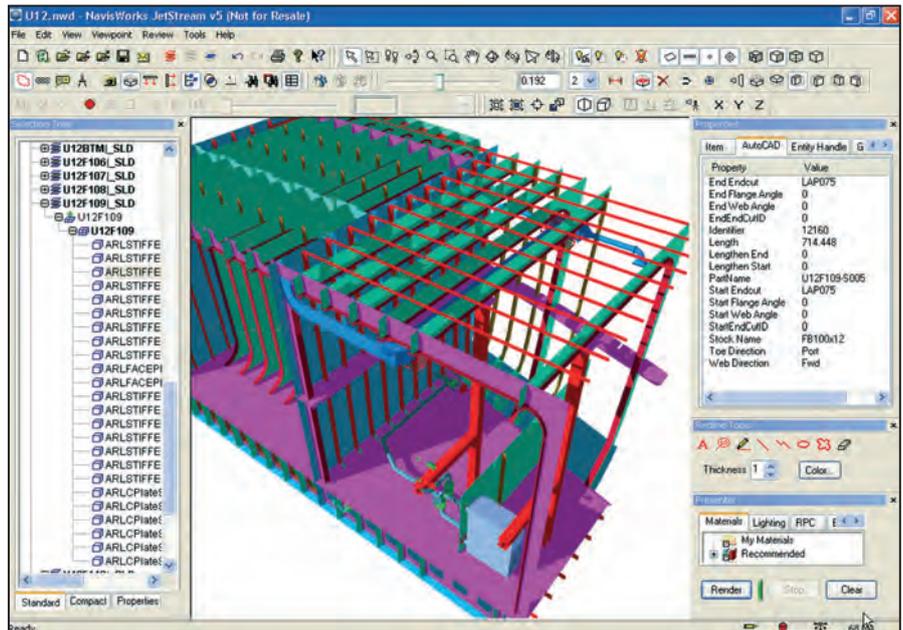
The use of the 3D product model has many ramifications for the way in which design is carried out, how revision control is managed, the type and quantity of production information which is delivered, and how design and production interact with each other.

Shipowners continue to seek a competitive advantage by owning vessels which can perform at higher speed, with improved fuel efficiency and with improved comfort onboard. This increases complexity with a consequent increase in the size and complexity of the design package delivered to production. Continuing to drive down costs and to meet project deadlines in this environment requires adoption of tools which can help manage this complexity.

The use of the common 3D model helps to ensure that various team members are working collaboratively. However, as the complexity of the model increases, performance issues in CAD systems provide a barrier to team members looking at as much of the model as they would like. By utilising a tool like NavisWorks - which is optimised to provide very fast display performance on large models - team members can access a full model without any performance overhead. In addition, the tools within the viewer provide numerous ways to reduce display complexity. This includes slicing through the model, hiding selected areas, using multiple selection criteria to manage visibility, and making items transparent.

In addition to increases in complexity, shipbuilding projects are more frequently being distributed over multiple locations. Whether this is due to the use of an external design agency, or because a shipyard design team is at a remote location, distributed design and production teams are becoming more common in the shipbuilding industry. This trend is only going to increase as yards look to lower wage locations for construction work while leveraging the design teams typically located in higher cost locations.

Communication between the design and production teams does not happen automatically in this situation. Specific steps must be taken to ensure that all participants continue to consult with colleagues early and often. Shipbuilding teams who use NavisWorks software will typically replicate ship models to remote sites periodically. The highly compressed nature of the files means



Detail from NavisWorks, whose developer says the trend for distributed design and production teams in shipbuilding is only going to increase.

this can be done frequently and reliably, and all users will receive the benefits of the higher performance due to the model being on their local network. The facilities for embedding red lines, tags, revision clouds and comments in the model files provide a range of ways for designers to communicate with their production colleagues and vice versa.

It is this close involvement of production with the design process that helps ensure project success. Formation Design Systems says in its experience with the use of shipbuilding software in many projects over many years, the single biggest success factor in the effective use of 3D modelling is early involvement of the production team in the design process.

'While we all subscribe to the notion that production should be involved early, in practice this doesn't always happen,' the company says. 'An unintended consequence of the automated output common with 3D product modelling can be that information is issued to production in larger batches with less intermediate output and so "dark" periods can occur where production staff feel they are out of the loop.'

One way to involve production staff as early as possible is to conduct production planning meetings using the 3D model as the basis for discussion. Using NavisWorks software, Formsys says, design staff can guide a walk-through of the proposed design, while production staff can ask questions about the content and arrangement of the model. Even a relatively incomplete model can be a useful catalyst for discussion at the earliest stages of the design process. During such an inspection, meeting participants can take over navigation through the model (a wireless mouse is ideal

for this) or ask for ad-hoc searches to be performed based on material or system type, or other search criteria.

The early involvement of production should translate into earlier resolution of problems. The benefits of fixing problems earlier rather than later in an engineering project are well documented. Some studies indicate that the cost of fixing a design defect grows by a factor of 10 if it is left to be fixed once production has commenced, rather than fixing it at the design stage.

An earlier view of a 3D model of a ship module can also help production to identify issues relating to their critical path activities. This may include identification of long lead time items, provision for particular skill or equipment availability or material management issues. All of these potential problems can be impacted in a positive way by a more visual approach to planning their work.

For design staff, ensuring that there are no clashes in the model is a fundamental responsibility in their portfolio of work. However, production personnel will be more interested in what clearances are maintained between equipment and structure and between other items. Whether it is envelopes for equipment installation or clearance for welding or fastening, the dimensional aspects of model checking prior to production are important in minimising manhours.

Tools to support clash checking typically scan through the model and identify items whose enclosing spatial envelope interferes with that of another item in the model. A list of clashing items is produced which can then be annotated as clashes are resolved. In addition, clearance measuring tools are used

to measure distances from one item to another. Use of these tools inside NavisWorks Clash module supports all of these functions and also allows a quick link back to the original drawing in the originating CAD system.

Once production commences, access to design data by production personnel is a practical necessity in the transfer of knowledge from design in order for production to complete their task. Common practice is for the design team to periodically issue packages of work to production as various modules are completed. This 'push' of data to production is an appropriate way to control data flow so that only verified, authorised, complete sets of data are issued for construction.

The work package issued to production will typically comprise cut files, assembly and spool drawings, production reports, and arrangement drawings. During day-to-day production planning it may also be desirable for production staff to have 'pull' access to additional supporting information to help them plan and carry out their work. One way this can be achieved is for each production package to include not only the usual CAD drawings, but also supporting 3D NavisWorks models of the same module. This allows the production staff to access this data as required to clarify any issues which may arise.

Some of the tools which can assist include CAD model comparison, layering of multiple

models on top of one another, and clash checking. The Compare tool in NavisWorks allows two CAD models to be compared, object by object, and graphically highlight the differences. Other tools allow one model to be made transparent while the other is displayed as a normal opaque view. Models can also be placed side by side for visual inspection. Tools for searching through the properties attached to the model can be used to find which items have particular properties, either in the original model or in the changed model. If the model changes are stored in a change management or PLM repository, then these same tools can be used for future reference to easily understand past changes.

Despite efforts to standardise on CAD software as much as possible, it is inevitable in any complex project that a range of CAD/CAE tools are going to be used, whether by an in-house design team, external naval architecture consultancy, or by suppliers and sub-contractors.

An alternative to CAD data conversion is to bring the various data sources into a common NavisWorks model. NavisWorks supports a very wide range of CAD systems. This means it can load the data from almost any source and combine this together in one 3D model that the user can inspect and navigate through.

With shipbuilding projects now commonly distributed over a number of sites, having Internet-based access to project data is

becoming the norm. There are many general purpose Internet-based collaboration sites such as Buzzsaw, ProjectSite and others. The 3D NavisWorks model can be smoothly integrated into such environments by way of the plug-in ActiveX control which lets any NavisWorks model to be browsed inside a standard Internet web browser. NavisWorks also includes a full programming interface which allows more IT-savvy organisations to create their own solutions that use the 3D capabilities provided by NavisWorks. This can include links with external databases which in the case of production staff could include material management, project management or ship catalogue applications.

Use of software tools is most effective when as many project participants as possible have access to them. Fortunately, tools like NavisWorks only require a standard PC to allow users to walk through the model, inspect and measure items, do on-the-fly material searches and selectively display and hide zones of interest.

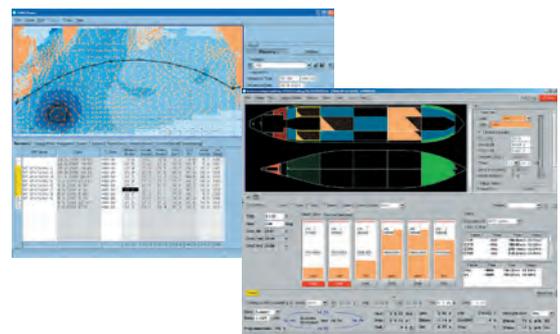
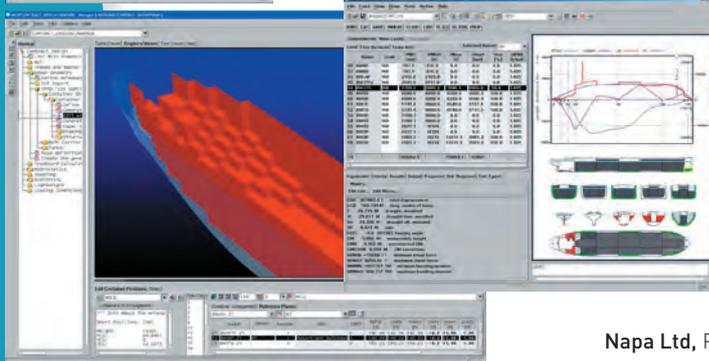
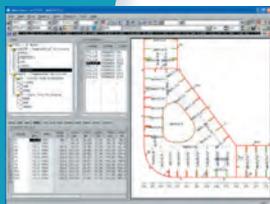
More advanced users can take advantage of the stereoscopic display options to display a true 3D view of the model. Using a stereo projector and low-cost 3D glasses, users can immerse themselves in a more realistic view of the ship model. This allows the creation of a 'design studio' in which design, production, management and the customer can all more clearly visualise the designed vessel, well before commitments to production occur. ☺



## A Single 3D Model for the Entire Lifetime of a Ship

### NAPA software applications for the design and operation of ships:

- NAPA for initial and basic ship design and naval architectural analysis
- NAPA Steel for ship structural design at the early design stages
- Onboard-NAPA for load planning, damage stability analysis and decision support on board ships
- NAPA SPS for ship performance optimization



Napa Ltd, PO Box 322, FI-00151 Helsinki, Finland • Phone +358 9 22 813 1  
E-mail sales@napa.fi • Internet www.napa.fi

New Version

# FORAN

Today's Best Shipbuilding CAD/CAM

**We are ready to cooperate in your business success**

Our vision is to be at the fore front in ship design and production technologies and to provide a first class support service which creates strong synergies with our customers.

[www.foran.es](http://www.foran.es)

[www.sener.es](http://www.sener.es)



**NAVAL ARCHITECTURAL SOFTWARE  
LOADING COMPUTER SOFTWARE**

**PIAS**

The proven and versatile suite of programs for: hydrostatics, hydrodynamics, intact stability, deterministic and probabilistic damage stability (including damage case generator, spilling of cargo for open hopper vessels), longitudinal strength (in waves), speed and power prediction, etc. PIAS is already equipped with the new (2009) probabilistic damage stability regulations.

**PHOTOSHIP**

For reconstructing full or partial lines plans using digital photographs.

**FAIRWAY**

For hull form design, fairing, plate expansions, rendering, free-hand design, hull form transformations, input from DXF, output to a wide variety of formats including DXF, IGES, offset tables, rendered bitmap, WRL file, etc.

**LOCOPIAS**

LOCOPIAS loading software has been modernised to become more intuitive. Compliance to stability and longitudinal strength criteria is now verified through a single mouse-click. The new interface is added to the list of strong points: LOCOPIAS is based on a full hydrostatic model, rather than pre-calculated tables, LOCOPIAS includes loading functions for containers, general cargo, RORO, tanks, (modifiable) grain holds, removable tween decks, cranes, interfaces with tank gauging systems, etc.

**FREE UPDATES AND SUPPORT**

Software support from SARC for free. Users of PIAS, Fairway and LOCOPIAS can freely download the most recent version from our ftp-site. Please visit our website for examples and tutorial.

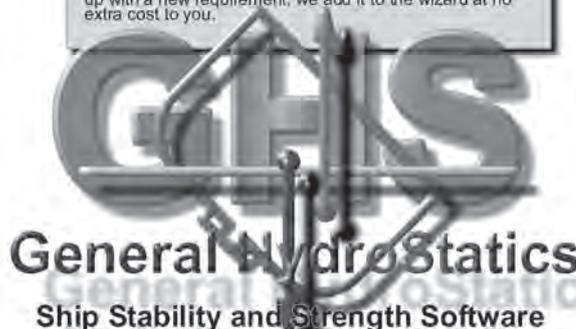
SARC BV  
Brinklaan 109 - I  
1404 GA Bussum  
The Netherlands

Phone +31 35 691 5024  
Fax +31 35 691 8303  
E-mail [sarc@sarc.nl](mailto:sarc@sarc.nl)  
Website [www.sarc.nl](http://www.sarc.nl)

**Attention Naval Architects**

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

**GHS Load Monitor (GLM)** is the onboard stability program which you can create yourself if you are a GHS user. We provide you with the **GLM Configuration Wizard** and the support. You create the GLM for a particular vessel and deliver it to the ship owner as part of your services. **GLM** can be configured for any type of vessel. When you come up with a new requirement, we add it to the wizard at no extra cost to you.



- GHS ..... Full-featured naval architect's system
- GHS Load Monitor (GLM) ..... Onboard configuration
- GHS/Salvage ..... Salvor's system
- BHS ..... Engineer's system



**Creative Systems, Inc.**  
Creators of GHS™

P.O. Box 1910 Port Townsend, WA 98368 USA  
phone: (360) 385-6212 fax: 385-6213  
email: [sales@ghsport.com](mailto:sales@ghsport.com)

[www.ghsport.com](http://www.ghsport.com)

For over three decades the software that naval architects love.

## Latest updates to enhance SARC offering

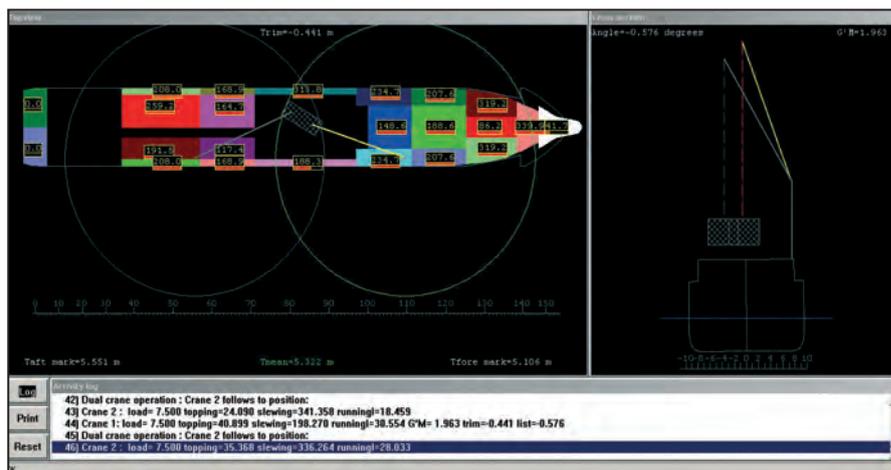
SARC, the Dutch supplier of ship design (PIAS and Fairway) and loading computer (LOCOPIAS) software continues to work to improve its product offerings. The company says that PIAS and Fairway users have been reaping the benefits, as updated software has been made available to them several times each year, free of charge.

Besides updating functionality and offering occasional bug fixes, SARC has also released completely new functions and modules.

Included are: a new oil outflow calculation capability, in line with new Marpol requirements; and probabilistic damage stability calculations that take into account Solas regulations entering into force in 2009. A new PIAS feature specifically designed to meet the latter is the automatic determination of the highest allowable vertical centre of gravity for a particular draft, for which the attained index will equal the required index. Together with existing options that include the generation of damage cases, SARC says it has fully geared up PIAS for the new regulations.

Another new module allows other software to retrieve data from a Fairway model through a direct interface. The 'hull server' (Fairway) will generate the data as requested by the client. 'Clients' will typically be construction software and other software that require hull models.

As a result of the ongoing developments by SARC, PIAS, Fairway, and LOCOPIAS software are receiving growing interest from yards and design offices from within The Netherlands and abroad: Damen Shipyards Gorinchem and The Royal Schelde Shipyard have been using the PIAS



The latest enhancement to the LOCOPIAS loading computer software covers crane operations, allowing tandem lifts where the position of the leading crane determines the correct position of the following crane.

software for intact and damage stability, speed, and power predictions, etc since the late 1980s and early 1990s respectively. Now, both yards have purchased multiple licenses of Fairway software for hull modelling and hull manipulations.

Meanwhile, Hamburg-based Eurolog Marine Engineering has recently purchased both Fairway and PIAS for its hull modelling and design analyses.

LOCOPIAS loading computer software sales figures have also been increasing steadily over

recent years, according to SARC, as the interface has been improved and the functionality increased. The latest module to be developed covers crane operations, allowing tandem lifts where the position of the leading crane determines the correct position of the following crane, taking into account the actual heel and trim for each step in the crane operation. Latest improvements on the interface include enhanced graphics and the reduction of the number of 'text only' screens.

## New features in Autostructure 3.2

AUTOSHIP Systems Corporation of Vancouver, Canada, has announced the forthcoming release of its internal structural design program - Autostructure 3.2.

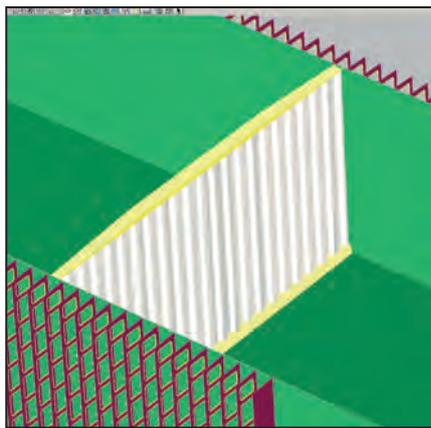
The supplier says 3.2 offers significant new tools and productivity enhancements for the structural engineer.

The starting point for an Autostructure model is a ship model created in Autoship. This contains surfaces defining the hull, decks, and, sometimes, superstructure. From that starting point the Autostructure operator creates internal decks, bulkheads, floors, stiffeners, etc. Each part becomes an entry in the database, to be tracked through the design and manufacturing process.

Many parts designed within Autostructure are cut to fit to the Autoship surfaces. If the Autoship project is subsequently modified, it may be that some of the Autostructure parts no longer fit correctly.

Autostructure 3.2 introduces a facility to detect and correct such problems.

Each time an Autostructure project is loaded, the program examines timestamp data in the Autoship project. If any changes to surfaces are detected, the affected Autostructure parts are marked as invalid, and so are ready to be



Autostructure contains surfaces defining the hull, decks, and, sometimes, superstructure.

regenerated. The part regeneration system in Autostructure can be invoked, immediately or at a later time, to re-cut and otherwise modify the affected parts automatically.

This process is applied not only to directly affected parts, but to others which are secondarily affected.

The part types which are designed entirely within Autostructure are either flat sheets or extrusions. With release 3.2 Autoship says it is introducing 'a major new feature by which curved sheet parts can be introduced into the models'. Any surface in the Autoship project file can be imported into Autostructure and used as a part.

Examples include internal curved decks, stairwell sides, corrugated bulkheads and curved tanks. Once such a part has been created it can be trimmed to other parts and other parts can be trimmed to it. It can have extrusions applied as stiffeners. If the Autoship surface is developable or extruded, the part can be flattened for 2D export to AutoCAD, and for subdivision and nesting in Production Manager.

The accompanying image shows a corrugated bulkhead imported at the early stages of design in a cargo vessel. In Autoship the top and bottom stools were extruded horizontally and the bulkhead itself was extruded vertically. In both cases the profile curves were degree 2 NURBS.

Autostructure is part of the integrated Autoship System that is used worldwide by leading naval architecture offices and shipyards.

## Imaging functionality for flexible shapes

GERMAN software developer and design consultancy Friendship Systems has introduced a new technique to manipulate and vary given geometries independent of their mathematical representation.

The technique is called 'imaging' and has been made available as part of the CAD-CFD integration platform FRIENDSHIP-Framework (see *The Naval Architect* January 2007).

The shapes to be changed – be it for manual adaptation or automated optimisation – may come from any CAD origin and can be made up of B-Spline curves and surfaces, Bézier patches, offsets, panel or grid data and combinations thereof.

Shape variations are treated in terms of images derived from the original BRep entities (boundary representation) which are modified by means of partially parametric techniques. In general, the topology of the shape is maintained in the operation while the images undergo specific three-dimensional transformations, be it local or global. An image – as opposed to a copy – remains associated with its source, ie, the underlying BRep. Changes to the source can also be undertaken and the image follows as defined by the selected transformation.

An exemplary transformation is the cosine-square influence function of prescribed amplitude for a Cartesian shift in x-, y- and/or z-direction. The influence typically extends a certain radius

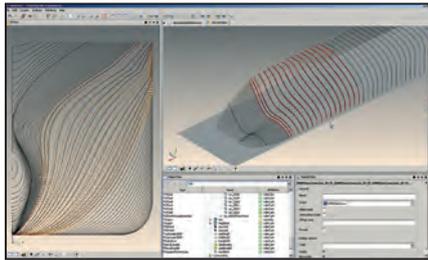


Figure 1. Local modification on forebody offset data for a container carrier.

from a user defined location and fades out smoothly. Beyond the radius of influence no form variations are induced. A hull shape, for instance, gets blister-like modifications as can be seen in Figure 1. Naturally, several transformations can be nicely combined to accommodate complex changes of shape.

Utilising the new imaging functionality in the FRIENDSHIP-Framework the user is largely relieved from comprehending the mathematical details of the underlying surface description. Consequently, Friendship Systems says the new approach complements its fully parametric modelling techniques, which have already been developed and applied successfully for the CFD-based optimisation of ship hull forms.

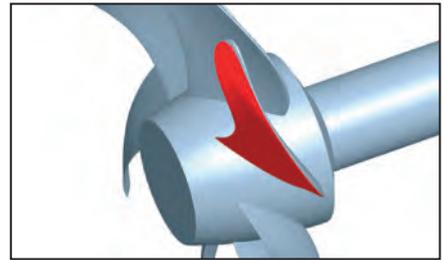


Figure 2. Subtle changes of propeller tip region as realised on B-spline surface representation.

While a fully parametric technique is highly efficient it also requires a task-specific model. The partially parametric approach used for imaging is more generic and enables the naval architect to set up an integrated optimisation chain in just a few hours without the need for parameter identification. Friendship Systems says it views this additional functionality as an important link between traditional CAD techniques, with their high flexibility but reduced comfort in supporting change and advanced parametric techniques, as needed for systematic improvement of functional surfaces such as ships, propellers etc, see Figure 2.

## Developer takes rights for rebranded DELFTship

THE developer of the well-known FREE!ship software, Martijn van Engeland, has taken over the rights of the product from the Delft University of Technology and rebranded the product DELFTship, after founding the new company, DELFTship BV.

The new operation would focus on the development of marine design software, consultancy and other supporting services for the marine industry, Mr Van Engeland said, who was employed at the Delft University in The Netherlands for more than a decade, where he took responsibility for developing both the software and the technology behind DELFTship.

Emphasising that the package featured additional functionality over FREE!ship, the developer said DELFTship was a complete design package for use in the marine industry, characterised by its ability to create any kind of hullform, offering high flexibility, a gentle learning curve and a visual approach to design that could be used for almost any type of floating object. The program is currently in use by both yacht and merchant ship designers.

DELFTship uses subdivision surfaces to model surfaces, which offers claimed advantages over techniques employing NURBS surfaces, such as:

- No need for a rectangular control grid divided into rows and columns.

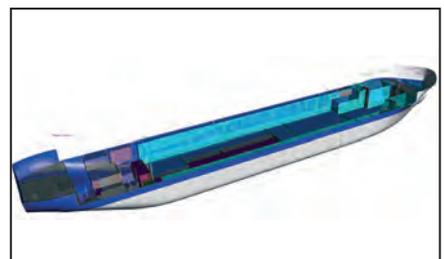
- More freedom in modelling knuckle lines.
- Surfaces can contain holes.
- Even the most complex shapes can be created with just one surface.
- The possibility to insert just one single control point for local refinement of the control mesh.

All hydrostatic calculations are carried out using surface integrals, resulting in a more accurate assessment of hydrostatic properties when compared to the more traditional method of integrating cross section areas, especially when calculating at large angles of heel or trim.

As well as the assessment of general hydrostatic properties the program also allows the assessment and calculation of:

- Tracking of critical points with key markers and downflooding points supported
- Cross curves
- Load cases
- Wind silhouette and wind moment calculations
- Tank modelling
- Tank sounding tables

Other innovative features incorporated into the program to aid the designer when developing a hull surface include:



DELFTship offers a complete design package for use in the marine industry.

- Gaussian curvature, zebra and developability shading to represent the curvature of the hull in 3D
- Layers for hiding and viewing different portions of the hull form during modelling
- Colour shaded lines plans for presentation purposes and exportable lines plans to CAD for further development and use
- Realtime feedback of longitudinal area and hydrostatic values during modelling

The basic version is for anyone to download and use and available at the DELFTShip website ([www.delftship.net](http://www.delftship.net)). A professional version complete with additional extensions is available for the commercial user.

# The Royal Institution of Naval Architects

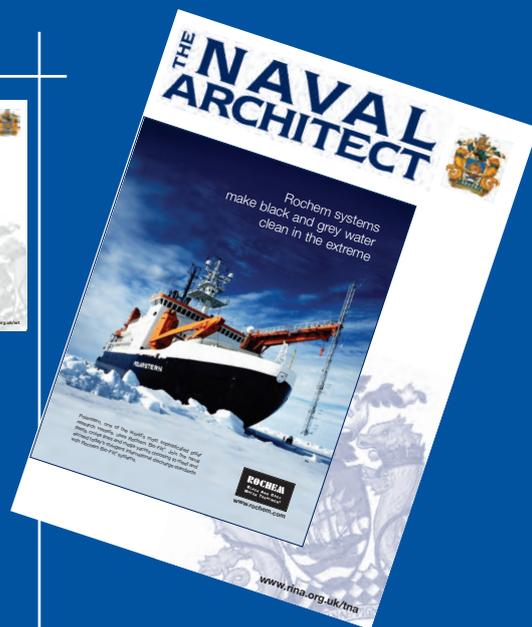
## SUBSCRIBE TO ANY OF OUR JOURNALS

### THE NAVAL ARCHITECT

Published 10 times a year

- Providing up-to-date technical information on commercial ship design, construction and equipment
- Regular reports on centres of shipbuilding activity worldwide
- Comprehensive, technical descriptions of the latest newbuildings
- News, views, rules & regulations, technology, offshore, CAD/CAM, innovations
- Includes the bi-monthly publication, *WARSHIP TECHNOLOGY*
- Plus quarterly publication, *OFFSHORE MARINE TECHNOLOGY*

2007 SUBSCRIPTION  
UK £110 Eur £115 OVS £125 Ref: J6



### SHIP & BOAT INTERNATIONAL

Published 6 times a year

- Provides up-to-date technical information on commercial small craft/small ship design, construction and operation
- Covers a comprehensive range of vessel types from 5m up to 100m in length, including fast ferries, workboats, fishing vessels, patrol boats, pilot boats, tugs and offshore vessels
- Regular features on propulsion technology, new marine equipment, construction materials and CAD/CAM
- Special regular regional reports and electronic features by well-known industry figures

2007 SUBSCRIPTION  
UK £84 EUR £89 OVS £100 Ref: J7

### SHIPREPAIR AND CONVERSION TECHNOLOGY

Published quarterly

- In depth coverage of all aspects of shiprepair and conversion work
- Includes technical descriptions of major conversion projects worldwide
- Regular regional surveys on the major shiprepair centres
- Developments in shipboard and shipyard equipment technology
- Contract news, appointments, industry views, new regulations

2007 SUBSCRIPTION  
UK £37 Eur £42 OVS £47 Ref: J8



The Marketing Dept, RINA, 10 Upper Belgrave Street, London SW1X 8BQ  
Tel: +44 (0) 207 235 4622 Fax: +44 (0) 207 259 5912  
Email: [subscriptions@rina.org.uk](mailto:subscriptions@rina.org.uk)

# The flooring tests that may be flawed

**CONFUSION** surrounds International Maritime Organization regulations on marine floor coverings, argues Stéphane Lévêque, global transit development manager, Altro Transflor.

**S**AFETY at sea has been maintained and improved over the years by the systematic introduction of new materials, construction methods, carefully formulated regulations and improved testing procedures. Regulations introduced and monitored by the International Maritime Organization (IMO) have been instrumental in improving the safety of crews, passengers, and the ships themselves, but the effects of improved testing procedures have not always been universally recognised throughout the shipbuilding and shipowning industries. Consequently, it has been possible for products to be specified for marine use when supported by obsolete test certificates or Marine Equipment Directive (MED) accreditations that are inappropriate for their intended applications.

Safety at sea is a very emotive issue and it is the responsibility of every specifier and ship operator to ensure all products destined for marine installation are fully supported by the latest relevant test results and paperwork. Accepting without question that a product meets the latest IMO safety standards is not good enough; extreme vigilance is required to ensure absolute compliance of products fitted onboard ships.

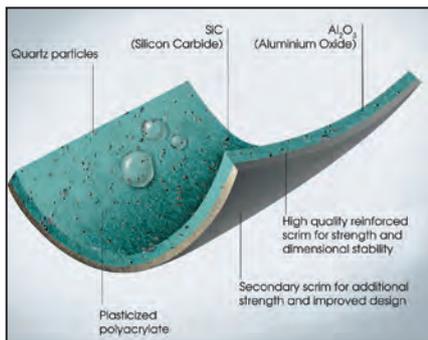
Article 12 of the Council Directives 96/98 EC on Marine Equipment states: 'After the installation evaluation by that ship's flag State, administration of that equipment shall be permitted when operational onboard performance tests are required by international instruments for safety and/or pollution-prevention purposes.' For instance, in the UK, the Maritime & Coastguard Agency (MCA) will carry out inspections and verify whether products onboard all conform to legislation.

## Outdated test methods

Every flooring product for marine use should be tested and approved under IMO's FTP Code for flammability (Part 2) and smoke/toxicity (Part 5). Low risk passenger/crew areas could be subject to Part 5 only under the FTP Code, while flooring in main passenger areas such as corridors, must be fully FTP compliant (Parts 2 and 5).

Having passed FTP tests, the product is subjected to MED tests to gain the MED wheel mark of compliance. This process is in two parts – Schedule B covering the product, and either Schedule F relating to the product batch or Schedules D or E that cover the manufacturing systems and processes employed. Full MED compliance is given if both Schedule B and Schedule F or Schedules D or E are achieved and if a Declaration of Conformity is provided by the product's supplier and kept onboard for inspection.

However, there is evidence to suspect that genuine certificates held for some marine flooring products are based on outdated methods of testing.



**Profile of the new slip-resistant Gallium flooring.**

When the current IMO tests were introduced in 1999, products could be subjected to either the gravimetric or instrumental test as part of the toxicity requirements for Part 2 of the FTP Code. However, gravimetric testing was later withdrawn as an approved testing method when its standard of accuracy was found to be unreliable.

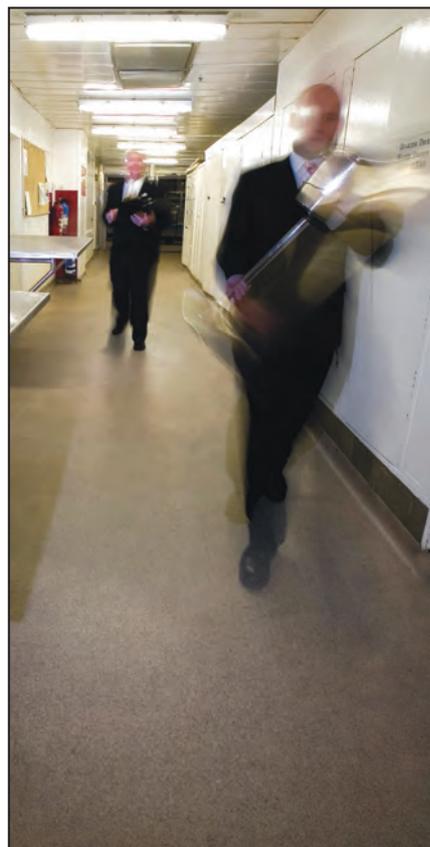
Although gravimetric testing was withdrawn, the associated certificates were never recalled and some flooring products granted IMO and MED approval as a result of these tests still retain their certification to this day. As no retests were ever requested, some manufacturers, if unaware of this situation or ignoring the revised requirements, will still claim approval and use the MED wheel mark, despite the fact their products have not passed the current test. Such is the confusion generated by this situation that any product needs to be closely checked for MED and IMO compliance before it is specified for shipboard use.

Article 13.3 of the Council Directives 96/98 EC on Marine Equipment states: 'Where a non-complying piece of equipment bears the [wheel] mark, the appropriate measures shall be taken by the Member State, which has authority over whomsoever affixed the mark; that Member State shall inform the Commission and the other Member States of the measures it has taken.' This means any non-complying products will be removed immediately from the ship and delisted.

Some 80% of the world fleet now recognises the MED and adopts the FTP Code. MED compliance is legally binding in Europe and USA (under the Mutual Recognition Agreement) and is widely enforced across the world. Although accepting IMO and MED standards, some governments do not always take adequate or effective measures to enforce them so this is yet another reason to check whether products comply.

However, although both manufacturers and ship operators have been prosecuted for the installation of non-compliant products, some are still taking risks. Consequently, in the event of a fire, a ship operator can face severe penalties if found to have been negligent in allowing the installation of a non-compliant product.

Any manufacturer claiming IMO and MED approvals for its products should be able to provide



**Gallium flooring onboard Queen Elizabeth 2 - needs to be able to cope with high volumes of traffic and provide a durable surface that remains slip resistant, even in the event of spillages.**

full details of all the tests undertaken to substantiate their claims. Such details should include the date of the test, its type and the manufacturer's levels of accreditation.

Instances of confusion on the part of specifiers and suppliers in the marine industry have long been apparent. This prompted Altro Transflor to embark on a programme to develop and perfect a slip resistant marine safety flooring that is designed specifically to meet the stringent requirements of IMO and MED. The extensive development programme has resulted in Gallium, which was launched in November as the first compliant resilient sheet safety flooring for ships. Gallium has been tested and approved using the instrumental method. Installations of the flooring have already taken place, which can be seen in this newsletter.

Slip resistance is another area where confusion also exists. Slip resistance performance is often based upon test results achieved when the product leaves the factory. In some cases, these claims are based upon a factory finish of the floor, which can be quickly worn away by heavy volumes of foot traffic. However, in keeping with other Altro Transflor products, Gallium has slip-resistant aluminium oxide granules dispersed throughout the depth of the wear layer, ensuring it retains its high level of slip resistance, even after years of continuous heavy foot traffic. 

## Designteam themes in space and time

**THE well-known interior designer explains its thinking in deriving themes for the atrium of P&O Cruises' *Ventura*.**

P&O Cruises' latest ship, *Ventura*, sees architectural and interior design consultancy designteam responsible for the interior design of the main atrium spanning decks 5, 6 and 7, and all spaces leading off the Atrium.

According to the company, which is headed by co-founders and joint chief executives Eric Mouzourides and Frank Symeou: 'In designing our areas on *Ventura*, we have been acutely aware of two factors: firstly, this ship will represent a brand with a long heritage based on quality maritime travel, and secondly, it is a ship destined for the British cruise market of the twenty-first century. These two factors, one looking back in time and the other looking forward, have been the guiding principles that have influenced our designs for this project.'

In developing the concepts for these areas, the company focused primarily on the atrium as this will be the first impression received by passengers on embarkation, and its strong theme influences the areas around it.

The brief given to designteam by P&O was to design a 'gateway' on to the ship. The resulting theme from the designer's perspective is for the atrium to 'become both the physical gateway to the ship and the metaphorical gateway to a voyage of exploration and discovery'.

The design of the Atrium is dominated by four huge black granite arches which span the three decks, and act as compass points through which passengers access the rest of the ship. The arches are clad in star galaxy black granite, in which the heaviness of the stone is lifted by copper coloured flecks which catch the light to glittering effect.

Leading on from the symbolic context of the granite arches, designteam evolved the idea of the atrium having dimensions 'in both space and time', leading to the elliptical design of the two staircases which join the three decks of the staircases.

The curving shape of the staircases are envisaged as 'representing the path of the sun', with the colours used on each of the three decks reflecting the progression of time through the day: golden tones of sunrise on deck 5, neutral daylight colours on deck 6, and a scarlet and copper palette representing sunset on deck 7.

The ceiling of the Atrium features a glass art piece consisting of fused layers of textured glass, which are then backlit with colour changing light.

Lighting, in fact, is an essential aspect of the designteam concept for the atrium, the designer having incorporated programmable lighting both in the ceiling and on the balcony fronts, so that ambient lighting can be adjusted throughout the day to complement the 'progression of time' theme.



Atrium onboard *Ventura*, themed to depict movement through space and time.

To balance the range of hard finishes in the atrium, softness is introduced in the full height vertical sheer curtains adjacent to the panoramic lifts. The copper colour of the fabric is designed to add to the warmth and harmony of the space, echoing in the glints of the granite and in the bespoke oval rug at the centre of the floor.

Designteam says it faced a challenge in incorporating all of the elements required to make the atrium function successfully on all required levels. 'The atrium is very much a multi-functional space: embarkation and reception area, meeting place, social venue, information and booking centre, access point to the ship's retail outlets, library and internet facilities and art gallery, and general hub of the ship,' says the company.

'In addition to these functions, P&O requires use of the atrium to host its spectacular live shows and displays, requiring the implementation of technical facilities such as strategically positioned concealed winches and theatrical lighting, which of course had to be coordinated with the house lighting for the space. As designers, it is our remit to ensure that such requirements are accommodated seamlessly into the overall design and operation of the space.'

The colours of the Atrium strongly influence the areas that surround it; a good example of this is The Red Bar, a cocktail venue on Deck 7. This space has been designed in the warm sunset colours of the Atrium's evening spectrum.

Very different in design is the Italian style coffee bar, Tazzino, on deck 5. This has a very contemporary feel, with an earthy

colour palette of brown, taupe and orange. The modern furniture selected for the space includes a banquette seat which has been moulded from the laminated wall panel and incorporates an illuminated recessed feature mirror. A dominant feature of Tazzino is the bar itself: gently curving, with its black marble worktop and front cladding of black and gold leaf effect laminate, it sets an elegant tone for the space.

Cyb@study, the internet café on deck 5, is one of P&O's signature spaces and offers internet access and printing facilities in a comfortable setting. The circular shape of the room is emphasised in the ceiling design and bespoke carpet design. The furniture is contemporary, with a slightly retro feel introduced by the rounded corners and stainless steel trim on the furniture panels. Here, designteam specified the Eames office chair for this room, promoting both comfort and style.

Also located off the Atrium on deck 5, the Art Gallery is a lengthy space, punctuated by a series of paired black granite arches which make reference to their much larger counterparts in the Atrium. Between each pair of arches, a glass display case allows three-dimensional artwork to be exhibited.

The predominantly light finishes in the textured vinyl wall covering, the peripheral stone flooring and the leather upholstery is contrasted with the grise marble tiled floor that runs along the 'spine' of the gallery. This dark, highly veined marble is also used in the skirting and the monolithic art plinths that stand to attention at each arch. Viewing is facilitated by the band of daylight-corrected lighting that runs along the central part of the gallery ceiling. ☺

# The Royal Institution of Naval Architects

## DESIGN & CONSTRUCTION OF VESSELS OPERATING IN LOW TEMPERATURE ENVIRONMENTS

30 - 31 May 2007, RINA Headquarters, London, UK

### Second Notice



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.

RINA invites papers on the following related topics:



- Materials, Welds and Coatings
- Hull Design, Construction and Equipment
- Vessel Systems and Machinery
- Safety Systems
- Specific Vessel Requirements
- Crew Considerations / Human Factors
- Vessel Operations
- Cargo Considerations
- Classification

I wish to receive details on exhibition space and sponsorship opportunities

I would like to receive a full programme brochure and registration form

Name:	Position:
Company:	
Address:	
	Postcode:
Telephone:	Fax:
Email:	(W2004)

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

## HVAC testbed to beat the best

WHILE cruiseships and offshore installations now welcome large numbers of passengers or employees in all parts of the world, outside conditions can be extreme. But, the average passenger or employee will at all times request a high-level of comfort in the air-conditioning, good air quality and a safe indoor environment

To get to the bottom of satisfying such needs, HVAC testing facilities at Finland's Halton Marine have been augmented by the addition of 'Seaview' – a complete installation including two cruiseship/offshore cabins and one corridor that offer yards, owners, HVAC system suppliers, consulting engineers, and designers the opportunity to test and verify different types of air-conditioning solutions in real-life conditions.

Halton Marine said it was not aware of any equivalent complete cabin air-conditioning laboratory built inside a factory. The facility includes a fully automatic monitoring system for energy consumption, comfort and safety by continuous measurement, ethernet and LON communication systems, an air handling unit and filtration system, plus insulated ducting with different types of dampers and silencer.

In addition, it runs through safety equipment for HVAC installation, its own diffusion system, terminal units integrated in different cabin architecture, balcony doors with high-efficiency and standard glasses, latest lighting technology, and high-quality furniture.

Halton says the installation will be used to provide knowledge and oversight eg for:

- Heat-load management via a suitable choice of insulation, glass illumination, lighting
- Selection of different HVAC systems attached to the cabin integration
- Architecture
- Automation & control for better adjustment linked to passenger/user requirements
- Simple human interface for the passenger on the different services offered onboard through Ethernet technology; television, telephone, newspaper, hotel management, reservations for excursions and air conditioning settings
- Smoke evacuation in case of fire alarm



Halton laboratories – unmatched, according to the company.

A corridor at Seaview – close to the real thing for HVAC purposes.



The company said that the laboratory had been built not only to test and verify the HVAC but to open discussion and to discover the best ideas that can be implemented now and in the future.

Halton Marine said it offered several options to test and verify different types of air-conditioning solutions.

Seaview consists of a fully automatic monitoring system for energy consumption, comfort and safety by continuous measurement. Different types of terminal units, supply and exhaust products are integrated in cabin architecture. Remote control and monitoring of cabin air-condition operates in LON or Ethernet network.

Halton Marine said it also offered computational fluid dynamics (CFD) simulation services for optimising ventilation system functions. With CFD it was possible to simulate heat transfer, temperatures, velocities and comfort in the room. 

## Wellness on the largest scale

THE largest 'wellness centre' at sea is claimed by the Costa Crociere vessel *Concordia*, which features the Samsara spa.

On this ship, all treatment rooms overlook an interior 'Winter Garden', for which Somec SpA developed a special glazing, notable for its technical and aesthetic attributes.

Mullions and transoms have been conceived with the aim to reduce the structure weight (being the winter garden placed in the upper decks), to reduce the visual impact and optimise the indoor lighting, achieving what is termed a 'light but resistant structure'.

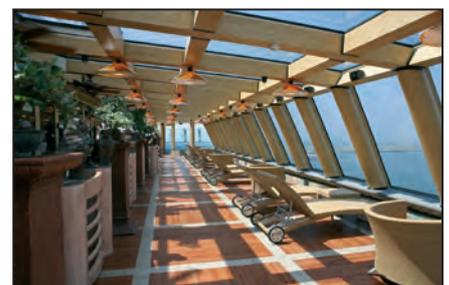
The structure is composed of mullions and transoms made of a special reinforced, but lighter

than steel aluminium alloy, resistant to corrosion. Connections to ship hull have used high resistance steel, galvanised so as to be insulated from the aluminium mullions.

The glass, both for the perimeter and roofing structures, has been laminated and tempered, to an 8mm plus 8mm thickness.

The supplier says natural ventilation of the room is achieved by inserting motorised dormer-windows on the roof. With the structure certified by RINa, Somec emphasised that it had worked

closely with Fincantieri to achieve an accurate definition of the prow area, using 3-D modelling in its structural calculations and the drawings. 



Overlooking the Winter Garden .

# MSC reaches for Zenith

**S**OUTHAMPTON-based MSC's latest project sees the turnkey marine outfitting company heading to Nassau in the Bahamas to undertake an extensive refurbishment for Celebrity Cruises' ship *Zenith*.

The cruiseship, launched in 1992, is owned by Royal Caribbean Cruises Ltd. Slightly larger than sister ship *Horizon*, which MSC worked on 18 months ago, *Zenith* has been deployed in the Caribbean and North/South America. Once completed, the converted vessel will operate within Europe as part of the Pullman Tours cruise brand.

As part of the refurbishment, due to take three and a half weeks, the 1374 capacity cruiseship will be drydocked at Grand Bahamas Ship Yard in April, using MSC staff to complete the project. Taking outline designs from the client, and creating highly detailed production specification plans, MSC is refurbishing and upgrading the entire pool deck including the pools, Grill Bar, Windsurf Café, Salon, Gymnasium and Jacuzzis. The deck is receiving a significant upgrade, including joinery, teak decking, stainless steel and steel modifications, marble, soft furnishings and electrical works.



Celebrity Cruise Ship *Zenith* is due an upgrade.

Chris Rogers, MSC operations director said: 'Initial work involved taking RCCL's artist's design impressions and turning them into production and manufacturing plans.

'The scale of the work is wide reaching. The Windsurf Café will have new flooring, servery counter and soft furnishings. Modifications to the pool include teak and marble cladding

plus new shower area, while the Grill Bar will receive a brand new 'facelift' with new back bar and teak cladding. The logistics of the project are a key priority in ensuring that materials are delivered on time through one of the busiest container shipping ports on the west coast of America, in order to meet the project deadlines.'

## SIGNIFICANT SHIPS OF 2006

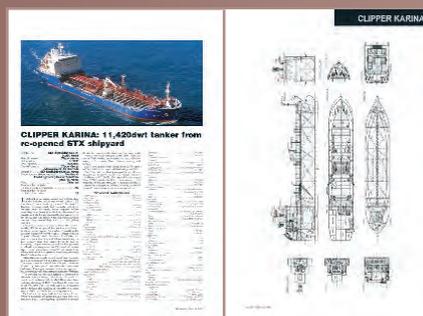
AVAILABLE IN PRINTED OR CD-ROM FORMAT

A publication of  
The Royal Institution of Naval Architects

The Royal Institution of Naval Architects published the 17th edition of its annual *Significant Ships* series in February 2007. Produced in our usual technically-orientated style, *Significant Ships of 2006* presents approximately 50 of the most innovative and important commercial designs delivered during the year by shipyards worldwide. Emphasis is placed on newbuildings over 100m in length, although some significant smaller cargo ships, fast ferries and offshore vessels have been considered, including a cross-section of ship types, with each vessel being either representative of its type or singularly significant. Each ship presentation comprises of a concise technical description, extensive tabular principal particulars including major equipment suppliers, detailed general arrangement plans and a colour ship photograph.

Non-member £46 (RINA member £40)  
Or Order a set:  
One copy of Significant Ships 2006  
& one copy of Significant Small Ships 2006  
price £61.00 (RINA member £52)

OUT NOW



Newbuildings include:

*Norilskiy Nickel, Pauline, Freedom of the Seas, FS Charlotte, TIMCA, Clipper Karina, Emma Maersk, Finnstar, Eton, Crystal Diamond, Gotlandia II, plus many more*

When ordering please advise if printed or CD ROM format is required, contact :

The Marketing Department,  
RINA, 10 Upper Belgrave Street, London, SW1X 8BQ, UK. Tel:+44 (0)20 7235 4622 Fax +44 (0)20 7259 5912  
E-mail: publications@rina.org.uk Website: www.rina.org.uk

## Mivan works from bistro to bar

MIVAN is finalising preparations for a three week fit-out for client Lloyd Werft Shipyard in Bremerhaven, Germany on the new *Ocean Village 2* vessel. The contract includes refit to the base camp area, marquee bistro, bar & casino, and atrium & shops areas.

*Ocean Village 2* will make its inaugural Mediterranean cruise this month, operating under Carnival UK management.

The latest project is part of a series of high profile works for the Northern Ireland-based ship refurbishment specialist. Late last year, working for client Cunard at the Blohm & Voss shipyard in Hamburg, Mivan completed the re-fit to *Queen Mary 2* over a seven-day period. Working in the Britannia Restaurant area, Mivan helped to create a separate club dining area within the main dining room. The company said that the cruiseship outfitting market remained an important niche sector for Mivan Interiors going forward as part of its overall strategy.

Stephen Mills, Mivan business development manager, said, 'We have a number of other projects lined up for 2007 and look forward to a buoyant 2008 in the cruiseship sector.'

Current Mivan cruiseship clients include Carnival, P&O Cruises, Royal Caribbean International and Princess Cruises.



*Ocean Village 2*, now featuring refitted bistro, bar, casino, atrium, and shop areas.

## Infotainment broadens its appeal

'INFOTAINMENT' systems are not only coming to be seen as must have items onboard the world's luxury vessels.

Scandinavian Micro Systems recently installed its ScanDisplay guest infotainment systems onboard *Queen Mary 2* and reports that equipment will also be installed on a series of cruiseships for Princess Cruises. But, also on the books, are three Finlines ferries plying the Finland-Germany route.

In its full form, touch screen terminals located in public areas provide cruisers with maps of their route, deck plans, officer identification, safety information, seating areas and other service information, but also tap into bridge systems to deliver weather forecasts.

The Finlines installations, onboard *Finnstar*, *Finnmaid* and *Europalink* are smaller in scale than their cruiseship counterparts. SMS president Oddbjorn Steinsland said: 'We knew there would be a great market for ScanDisplay within the ferry, cargo and super yacht industry only if we could design a system that would be affordable. So we made a tremendous investment into the research and development of CruiseMonitor, our smallest system.'

For ferry passengers, the system offers ships itinerary and position, up to date messages from the bridge telling them sailed and remaining distances, weather and other features.



The ScanDisplay guest infotainment system allows passengers to learn about the ship, services available, their routing, and weather.

# The Royal Institution of Naval Architects

## SAFEDOR

Design, Operation &  
Regulation for Safety

7-8 May 2007, Renaissance Hotel, Brussels



SAFEDOR (Design, Operation and Regulation for Safety) is about to complete the first half of its four year programme. To mark this event, partners of SAFEDOR will present the latest results at a public conference at the Renaissance Hotel Brussels on 7 and 8 May 2007. The event will provide an excellent opportunity to familiarise engineers with the principles underlying risk-based ship design and approval, and to discuss early applications.

Risk-based approaches in the maritime industry started with the concept of probabilistic damage stability, were widely applied within the offshore sector and are now being adapted and more and more utilized within the shipping sector. The SAFEDOR approach focuses on risk-based design and risk-based 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 tackles the new philosophy in theory and praxis. Results of development activities comprise the process for risk-based design along with a novel decision-making concept and advanced tools to predict the safety performance of a ship in extreme or accidental conditions. In parallel, practical application has resulted in eight innovative ship designs and concepts for safety-critical technology. The modernisation of the regulatory framework is the second pillar of SAFEDOR and results comprise a draft process for risk-based ship and system approval along with acceptance criteria at top and function level.

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.

For further information and registration details,  
please visit [www.rina.org.uk/safedor](http://www.rina.org.uk/safedor)

If you have any questions regarding this event, please contact Sally Thomas on:

Tel: +44 (0)20 7235 4622

Fax: +44 (0)20 7259 5912

Email: [safedor@rina.org.uk](mailto:safedor@rina.org.uk)

Websites: [www.safedor.org](http://www.safedor.org) and [www.rina.org.uk/safedor](http://www.rina.org.uk/safedor)

**Tognum prepares for stock market**

TOGNUM, the large diesel engine supplier whose portfolio includes marine engines supplied by MTU Friedrichshafen, is evaluating an initial public offering for its stocks. A decision will be made by the management and the supervisory board later this year.

Its sales totalled €2.5 billion in 2006, and chief executive Volker Heuer said he felt that the company was now fit for the capital market. The firm's workers council has also supported the move, expressing the belief that a stock market listing would continue to grow the company, in turn securing jobs.

Contact: *Tognum GmbH, Maybachplatz 1, 88045 Friedrichshafen, Germany.*  
Tel: +49 7541 9091. Fax: +49 7541 9097.  
[www.tognum.com](http://www.tognum.com)

**MacGregor strengthens presence in Vietnam**

MACGREGOR has established a new joint venture with Vietnamese shipbuilding group Vinashin, designed to strengthen its cooperation with one of the world's fastest emerging industry players.

Cargotec Corp subsidiary MacGregor said the joint venture had been established as part of Vinashin's plan to have approximately 60%-70% of ships' main equipment localised by 2010, creating a good platform for development of Vietnam's shipbuilding industry.

MacGregor Vinashin Marine Equipment Co has been established in Haiphong, with Vinashin holding 51% and MacGregor taking the remaining 49%.

Preparatory work for designing and building a new joint venture factory has been going on for some time. Lay-out of the area and the main principles for the workshops have been agreed, as well as main equipment required for the factory. Construction is expected to start during spring this year and the factory is scheduled to be up-and-running in about one year from then.

Initially, the new MacGregor-Vinashin plant will be a purpose-built hatch cover factory focusing on cost-efficient manufacture of hatch covers to shipyards within Vietnam.

The next phase of investment will include building-up the facilities to cater for the production and assembly of marine cranes, as well as the production of ro-ro equipment.

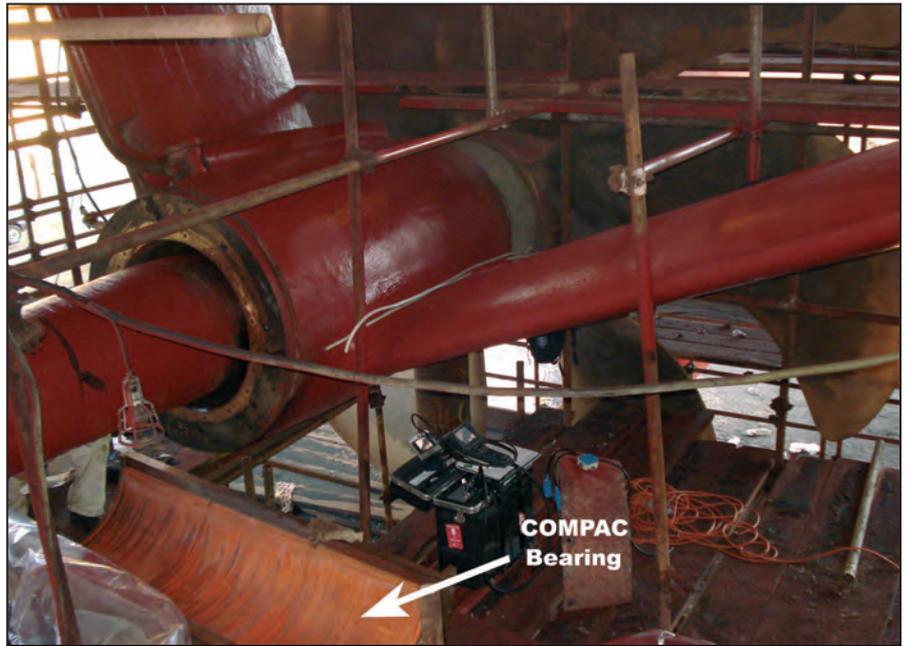
Contact: *Markku Mattila, General Manager, Dry Cargo Division, MacGregor (FIN) Oy.*  
Tel: +358 2 4121 301.  
Fax: +358 2 4121 267.  
E-mail: [markku.mattila@macgregor-group.com](mailto:markku.mattila@macgregor-group.com)

**Thordon's tenth in a row**

THE latest 116,000gt cruiseship for Princess Cruises, to be built at Fincantieri's Monfalcone Shipyard in Italy, for delivery in 2008, will again feature Thordon seawater lubricated Compac propeller shaft bearing systems.

The Compac tapered key bearing system is similar to those supplied by Thordon to the nine other Princess/P&O Cruises ships.

'Seawater is pumped from the sea chest to the stern tube and strut bearings, and exits from the bearing to the sea (there is no aft seal and no oil). The COMPAC tapered key system allows



Thordon COMPAC bearing removed, inspected and re-installed without shaft withdrawal at the recent eight year dry-docking of *Grand Princess* at Fincantieri Palermo Shipyard, Italy.

inspection of the bearing and shaft journal without withdrawing the shaft from the ship,' said John Shaw, technical director, Thordon Bearings.

Currently over 500 ships are operating with pollution-free Compac propeller shaft bearings.

Contact: *Craig Carter, marketing manager, Thordon Bearings Inc, 3225 Mainway Drive, Burlington, Ontario L7M 1A6, Canada.*  
Tel: +1 (905) 335 1440.  
Fax: +1 (905) 335 4033.

E-mail: [craigc@thomson-gordon.com](mailto:craigc@thomson-gordon.com)  
[www.thordonbearings.com](http://www.thordonbearings.com)

**Cat gets lean**

A NEW methodology has been implemented at manufacturing locations worldwide by Caterpillar Marine Power Systems. The manufacturer of Cat and MaK marine engines has introduced the Caterpillar Production System (CPS) to improve quality, safety, and speed standards.

Operations will now be carried out utilising consistent processes throughout the entire production chain, and the intention is for customers to benefit from expanded production capacity and reduced lead times.

The CPS system is designed to eliminate idle time, rework, and excess inventory, and is claimed to enable each facility to handle customers' orders in the safest, fastest, and most reliable way.

The Kiel engine centre in Germany was reorganised using CPS methodologies to streamline the assembly process. Investment has been made on new machining equipment for finishing cylinder crankcases, cylinder heads, and connecting rods, along with necessary operator training. Its Rostock centre absorbed the assembly of MaK M 32 C V-type engines for propulsion and genset applications, intended to extend production capacity.

The Guangdong facility, China, has had its assembly line, test beds, and quality control operations upgraded. The addition of the M 25

engine production there has increased its capacity and brought manufacturing closer to the growing number of Asian shipyards.

Contact: *Marketing support, Caterpillar Marine Power Systems, 24157 Kiel, Germany.*  
Tel: +49 431 3995 01.  
Fax: +49 431 3995 3328.  
[www.cat-marine.com](http://www.cat-marine.com)

**ClassNK adds maintenance software tool**

An important recent addition to ClassNK's online services has come in the shape of PrimeShip-HULLCare, an information-based support system for hull maintenance.

The new offering uses detailed information routinely collected through classification surveys and is accessible through the Internet 24 hours a day, 7 days a week. PrimeShip-HULLCare offers shipowners easy access to all the survey data collected at each survey, to facilitate more effective ship maintenance. The Society expects this service will contribute to improved medium and long term safety.

In addition to the basic Internet service, a 3-dimensional modelling service is also available. ClassNK will produce the 3D model at the request of the shipowner and develop the model complete with the maintenance information such as thickness measurement data, photos, and repair plans. Detailed class survey data for individual ships is provided to the users in digital format and includes thickness measurement data, photographs resulting from the class surveys, repair drawings, Condition Assessment Scheme (CAS) reports, and the requirements of hold frame replacement for the individual bulk carries (IACS UR S31).

According to ClassNK, one great advantage of 3D modelling is that it offers a very easy grasp of ship structure. Various survey data can be added to the model and users can easily understand the ship's current condition at a glance. In the models,

the colour of excessively corroded plates will change to a deeper colour. Photos are also added to the model and users are said to be only a click away from reviewing the actual condition of the structure member. Strength assessments based on current thickness data can also be carried out.

Contact: Administration Center, Nippon Kaiji Kyokai, 4-7 Kioi-cho, Chiyoda-ku, Tokyo 102-8567, Japan.  
Tel: +81 3 3230 1201.  
Fax: +81 3 5226 2012.  
E-mail: [bnd@classnk.or.jp](mailto:bnd@classnk.or.jp)  
[www.classnk.or.jp](http://www.classnk.or.jp)

**New valve controllers**

AMOT has introduced an updated model of its stand-alone electric PID valve controllers. Superseding the 8071C, model 8071D universal panel-mount controller and model 8072D wall mounting control panel incorporate the controller and two solid state relays in a splash-proof enclosure. These devices were developed for use



AMOT electric PID valve controller.

with the AMOT G series temperature control valves, often used in marine operations.

The products feature two logic level valve control outputs, and user-configurable digital filtering. Two set points and complete parameter sets may be programmed and selected internally or externally. Two alarm outputs are fitted, while electrical connections are via cage clamp terminals for wires up to 1.5mm, plus the wall mounted control panel is pre-wired with all external connections.

The input sensing range is selectable, usually at 0°C to 120°C, maximum range -200°C to +850°C. Input accuracies are within 0.05% using RTDs, 0.25% with thermocouples and 0.1% for 4mA – 20mA signals.

Contact: Paula Halpin, AMOT, Western Way, Bury St Edmunds, Suffolk IP33 3SZ, UK.  
Tel: +44 (0) 1284 762222.  
Fax: +44 (0) 1284 760256.  
E-mail: [info@amot.com](mailto:info@amot.com)  
[www.amot.com](http://www.amot.com)

**Mooring guardian angel**

ABRASION-resistant, easily positioned and replaced are all characteristics claimed for the new removable protective sleeve from Gleistein Ropes. Christened 'PowerGuard', the new product from the German rope maker is claimed to be particularly effective in spliced eyes and wherever damaging sharp or rough edges may be encountered, whether ashore or aboard. PowerGuard is designed to protect the mooring lines of larger vessels.

Even the strongest rope can be damaged and weakened by a sharp edge. To help avoid this, Gleistein Ropes has developed the PowerGuard removable protective sleeve; a finely woven and rubberised polyester which surrounds the rope like a cuff. A wide and extra strong Velcro fastening system keeps PowerGuard in place, assisted by four eyelets with securing lines.

PowerGuard is available in the lengths 0.5m, 1.0m, 1.5m and 2.0m. It is suitable for mooring lines of 24mm, 32mm, 40mm, and 48mm in diameter.

Contact: Thomas Schlätzer, Geo Gleistein & Sohn, Heidlerchenstrasse 7, 28777 Bremen, Germany.  
Tel: +49 (0) 421 69049 31.  
E-mail: [schlaetzer@gleistein.com](mailto:schlaetzer@gleistein.com)

**Luxury power for SAM**

SAM Electronics has been awarded a major contract to supply and install 15MW diesel-electric propulsion systems aboard two 32,000gt ultra-luxury cruise vessels under construction at T Mariotti in Genoa, due for delivery to Carnival Corp subsidiary Seabourn Cruise Line.

These 649ft long vessels will feature 225 luxury suites and are scheduled to enter service one apiece in the Spring of 2009 and 2010.

SAM said the contract represented the continuation of its close relationship with the shipbuilder to provide advanced diesel-electric propulsion systems and podded propulsors for new generation cruiseships.

Contact: SAM Electronics GmbH, Behringstrasse 120, 22763 Hamburg, Germany. Tel: +49 40 8825 0.  
Fax: +49 40 8825 4000.  
[www.sam-electronics.de](http://www.sam-electronics.de)

**Voith restructuring**

VOITH Turbo Marine has undergone restructuring and since the beginning of the year has been trading as Voith Turbo Schneider Propulsion GmbH & Co KG. The name change reflects Voith's ambition to continue to grow and innovate.

Jens-Erk Bartels will continue as a member of the management board at Voith Turbo Schneider Propulsion GmbH & Co KG.

Contact: Voith Turbo Scheider Propulsion GmbH & Co KG, Alexanderstrasse 18, 89522 Heidenheim, Germany.  
Tel: +49 7321 37 2594.  
Fax: +49 7321 37 7105.  
E-mail: [vspmarine@voith.com](mailto:vspmarine@voith.com)  
[www.voithturbo.com/marine](http://www.voithturbo.com/marine)

**Voyage data recorder retrofit**

FORTY voyage data recorders (VDRs) from Rutter Technologies will be retrofitted into BC Ferries' existing fleet over the next two years. In association with Radio Holland, the Rutter VDR-100G2 model will record and store audio, instrument, and navigation data in a pressure resistant water-tight capsule.

This design is said to provide a rich playback context which provides a clear and accurate record of the circumstances leading up to a marine incident or event. Regulations stipulate

that certain classes of international travelling vessels carry VDRs, however, the VDR is also now seen as providing invaluable safety management information to domestic ferry operations.

BC Ferries is one of the largest domestic ferry services in the world, and their decision to install VDRs on all of their vessels makes this the single largest voluntary installation of VDRs to date.

Contact: Rutter Technologies Inc, 70 Brookfield Road, St John's, NL, Canada A1E 3T9.  
Tel: +1 709 368 4213.  
Fax: +1 709 368 1337.  
E-mail: [info@ruttertech.com](mailto:info@ruttertech.com)  
[www.ruttertech.com](http://www.ruttertech.com)

**Shiny weld solution**

A NEW technique to keep welds clean while welding, quite inexpensively, has been launched by UK-based Huntingdon Fusion Techniques, for ships piping, fabricated from stainless steels, reactive alloys, nickel alloys, nimonics, and titanium.

The company says that by adding a lightweight component called a 'trailing shield' to a Tig/Gtaw welding torch, the weld stays under a protective argon gas shroud, while the hot, welded joint is cooling so that the heated metal does not oxidize on contact with air.

Trailing shields are available for any diameter of pipe, vessel or tank, etc and they also come in flat format for welding sheets or plates made of the alloys and materials mentioned above.

Replaceable silicon rubber seals are used on the sides of the trailing shields to prevent the protective argon gas from escaping.

Each trailing shield is delivered with a variable diameter connector so that it can fit any size of Tig/Gtaw/Paw welding torch whether for manual or mechanised welding.

Contact: Huntingdon Fusion Techniques Limited, Stukeley Meadow, Burry Port, Carmarthenshire SA16 OBU, UK.  
Tel: +44 1554 836836.  
Fax: +44 1554 836837.  
E-mail: [hft@huntingdonfusion.com](mailto:hft@huntingdonfusion.com)  
[www.huntingdonfusion.com](http://www.huntingdonfusion.com)

**HertelCKT is born**

Hertel Marine Services and CKT Projects have completed their merger under the new banner HertelCKT.

In October 2005 Hertel Marine Services took over CKT Projects as part of its strategy to expand its activities and know-how. Now, CKT Projects have all been integrated. HertelCKT, of The Netherlands, offers architectural outfitting and insulation on naval & merchant vessels and offshore installations, to the design and fabrication of accommodation modules and containerised solutions. It has offices in the United Kingdom, United Arab Emirates, Lithuania, Romania and China (Shanghai).

Contact: Head office, Reeweg 20, 3088 KA Rotterdam, PO Box 55005, 3008 EA, Rotterdam Harbour no: 2410.  
Tel: +31 10 299 3 555.  
E-mail: [info@hertelckt.com](mailto:info@hertelckt.com)  
[www.hertelckt.com](http://www.hertelckt.com)



# Australian Maritime College

Australia's National Centre for Maritime Education, Training and Research

AMC, Australia's national centre for maritime education, training and research, provides courses and programs from certificate to PhD levels ([www.amc.edu.au](http://www.amc.edu.au)). In 2008, AMC is scheduled to become an Institute of the University of Tasmania. AMC is seeking to expand and strengthen its already outstanding international reputation in the field of maritime hydrodynamics. We seek to appoint senior lecturers and post-doctoral researchers who will enhance the research and teaching within the Department of Maritime Engineering and the Australian Maritime Hydrodynamics Research Centre (AMHRC) ([www.amhrc.edu.au](http://www.amhrc.edu.au)), both of which are located on AMC's campus at Launceston, Northern Tasmania.

Maritime Engineering offers a suite of specialist engineering degrees in Naval Architecture, Ocean Engineering, Marine and Offshore Systems, and MPhil/PhD degrees by research. AMC also operates an extensive suite of research facilities including a 100m long towing tank, model test basin, cavitation tunnel, flume tank and an integrated ship handling simulator. AMC is currently constructing a new national facility for cavitation research designed and equipped for modelling cavitating/turbulent flow physics.

## Lecturer/Senior Lecturer in Ocean Engineering

### Two Positions

The appointee will have an excellent research potential to significantly add to the research output of AMC's maritime hydrodynamics facilities. He/She will teach ocean and offshore engineering subjects to undergraduate engineering students as well as supervise honours and postgraduate research students. Applicants should preferably possess a PhD in ocean/offshore engineering. Experience in the ocean/offshore industry would be an advantage. The positions are continuing, fulltime. [www.amc.edu.au/engineering](http://www.amc.edu.au/engineering); [www.amc.edu.au/research?mode=about](http://www.amc.edu.au/research?mode=about)

## Postdoctoral Research Fellows

### Four Positions

The appointee will have an excellent research potential for the nominated position. He/She will work within the AMHRC group of researchers, using AMC's array of physical and/or numerical models to design, write proposals for, conduct, report on and publish the results of research at an excellent international standard. Applicants must possess a PhD. The positions are for two to three years, to be negotiated. The four positions are the following:

- **DSTO Fluid Dynamics Research Fellow** – Investigate the performance and development of naval and high speed craft including the investigation of flow about surface and underwater vehicles and their propulsion and control equipment. Conduct experimental investigations that may involve the study of hydro-elasticity, hydro-acoustics, turbulence and multiphase flows, including cavitation. This position is sponsored by Australia's Defence Scientific and Technology Organisation. [www.amc.edu.au/research/cavitation.tunnel](http://www.amc.edu.au/research/cavitation.tunnel)
- **Numerical Modeller** – Computer modelling of waves, tides and currents for the determination of a wide ranging set of coastal and oceanic processes including determination of waves and water levels for design, sediment transport, as well as the movement of pollutants, larvae and invasive species. Numerical modelling experience is essential. Experience with linux and Matlab would be an advantage.
- **Maritime Hydrodynamics and Ocean Technology Research Fellow(s)** (*two positions*) – Experimental, field and/or theoretical investigations of one or more of the following: underwater vehicles including sensors, missions and equipment; ocean environmental engineering and monitoring; motions and loads on ocean vessels including slamming and manoeuvring, calm water performance, all aspects of high performance yachts, and the motions, loadings and performance of offshore structures and equipment. <http://www.amc.edu.au/research/towing.tank>; <http://www.amc.edu.au/research/model.test.basin>

Commensurate with qualifications and experience, a competitive salary package will be negotiated with the successful candidates, including 17% superannuation and the potential for a market loading. AMC offers excellent employment benefits, including reimbursement of reasonable relocation expenses and a pleasant working environment. For further information about the lecturing positions contact Associate Professor Norman Lawrence, +61 3 6335 4779 or [N.Lawrence@amc.edu.au](mailto:N.Lawrence@amc.edu.au), for the postdoctoral position in fluid dynamics contact Dr Paul Brandner, +61 3 6335 4832 or [P.Brandner@amc.edu.au](mailto:P.Brandner@amc.edu.au), for the numerical modelling position contact Professor Tom Hardy, +61 6335 4713 or [T.Hardy@amc.edu.au](mailto:T.Hardy@amc.edu.au), and for the postdoctoral position in maritime hydrodynamics and ocean technology contact Professor Neil Bose, [N.Bose@amc.edu.au](mailto:N.Bose@amc.edu.au), or Gregor Macfarlane, +61 3 6335 4880, [G.Macfarlane@amc.edu.au](mailto:G.Macfarlane@amc.edu.au)

A guide for applicants, information about terms of employment, copies of the duty statements and selection criteria for these positions can be obtained from Positions Vacant at [www.amc.edu.au](http://www.amc.edu.au), by sending an e-mail to [Job.Apps@amc.edu.au](mailto:Job.Apps@amc.edu.au), or by contacting Kelli on +61 3 6335 4715. Applications including Curriculum Vitae and a statement addressing the selection criteria plus the names and addresses of at least two referees should be forwarded by 27 April 2007 to **The Manager, Human Resources (Applications), Australian Maritime College, PO Box 986, Launceston, Tasmania Australia 7250.**

Review of applicants will start on 30 April 2007 and applications will be accepted until the positions are filled.

AMC is an equal opportunity employer.

**company:** Bilfinger Berger Nigeria GmbH  
**branch:** building construction  
**location:** Nigeria  
**experience:** minimum 5 years  
**job title:** **Marine Manager, Plot 1**



**description** For a foreign assignment we are searching a **Marine Manager** for our Nigerian subsidiary Julius Berger Nigeria PLC (JBN). JBN is the biggest construction company in Nigeria which controls a fleet of approx. 200 swimming units (towboats, dredger, barges and boats) to supply their building sides.

**KEY RESPONSABILITIES**

- To manage the JBN Shipyard Plot 1 including general steel construction
- To coordinate the repair and maintenance works of the existing fleet as required plus new construction
- To be in charge of other JB ship building & repair facilities if required and requested

**required skills** The ideal candidate will have a degree in Marine / Mechanical Engineering. Minimum 5 years previous experience in leading/managerial position of a shipyard, preferably specialized in construction of small vessels like tugs and similar vessels. Should be familiar with all other 'usual' standard requirements, e.g. contracts english, MS office, CAD etc.

**interested?** Please send your application to:  
Bilfinger Berger Nigeria GmbH Z/P – International Services  
Gustav-Nachtigal Straße 3  
65189 Wiesbaden

**or to** tobias.weber@bilfinger.de

**You will find further information on our homepage [www.bilfinger.de](http://www.bilfinger.de)**



**University  
of Southampton**

**School of Engineering Sciences**

**Research Engineer in the Wolfson  
Unit for Marine Technology and  
Industrial Aerodynamics**

£24,402 - £30,013 pa Ref: 0894-07-E

The Wolfson Unit M.T.I.A, a division in the School of Engineering Sciences, seeks to recruit a naval architect/engineer to join its team offering a diverse range of consultancy services to the marine industry.

The Wolfson Unit specialises in towing tank and wind tunnel testing of yachts and small commercial vessels and is seeking a graduate in naval architecture, or similar; to assist the existing team. You will prepare models for testing, assist in conducting the experimental work and in processing data.

Details of the consultancy services offered by the Wolfson Unit can be found on our website at [www.wumtia.com](http://www.wumtia.com) Potential applicants may direct informal enquiries by email to [wumtia@soton.ac.uk](mailto:wumtia@soton.ac.uk) or by telephone: +44 (0)23 8058 5044.

**To apply online visit [www.jobs.soton.ac.uk](http://www.jobs.soton.ac.uk)**

**Alternatively telephone 023 8059 2750.**

**The closing date for this position is 16 April 2007 at 12pm. Please quote reference number 0894-07-E on all correspondence.**

[www.jobs.soton.ac.uk](http://www.jobs.soton.ac.uk)



**CRUISE + FERRY 2007**

Excel, London

The Royal Institution of Naval Architects  
will be exhibiting on

**STAND E41**

We look forward to welcoming you  
to our stand  
April 24-26

*See you there!*

Mustang Marine (Wales) Ltd.(incorporating Ocean Dynamics International Ltd.) is a commercial boat builder based in Pembrokeshire. We specialise in the construction of pilot boats, small passenger vessels and RIBs in steel and aluminium.

#### GRADUATE NAVAL ARCHITECT

We are seeking a graduate naval architect to work on new-build projects in our busy design office. Applicants should already hold or be in their final year of study for an appropriate Bachelor's or Master's degree from a recognised university. Proficiency in 3-D hull and structure modelling and in the application of integrated hull design and stability packages would be desirable

#### MARINE PROJECT MANAGER

We wish to recruit a manager to take responsibility for new-build projects from contract stage through to completion. Applicants should have a sound understanding of boat design and metal boat building practice together with a minimum of five years relevant experience.

Salaries will be negotiable  
For further details please contact:  
Kevin Lewis on 01646 681117 or  
email kevin@mustangmarine.com



# Careers in the Marine Industry

**Naval Architect** London £35-45k

With proven design experience in the marine industry candidates will have a strong design background and ideally have experience on vessels in the 50-200 metre market.

**Naval Architect** West Midlands £22-25k

Required for a leading manufacturer of motor yachts and cruisers. Candidates will be competent in stability assessment and the preparation of weight estimates.

**Design Appraisal/Lead Naval Architect** Aberdeen £65k

Required to join the Offshore division of a leading Classification society. Work involves structural design appraisal/plan approval and consultancy services for offshore floating units of all types. Candidates should be degree qualified or equivalent.

**Naval Architect/Structural Engineer** Aberdeen £30-40K

Experience in Structural Analysis of Marine/Offshore structures is required. Familiarity with 3D beam analysis, seafastenings and lifting spools would be highly beneficial. Naval Architecture/Structural analysis software experience (AutoCAD, Microstation, Staad) is advantageous.

specialist recruitment to the offshore & marine industry

e: [marine@matchtech.com](mailto:marine@matchtech.com)  
w: [www.matchtech.com](http://www.matchtech.com)  
t: 01489 898160

**matchtech**  
GROUP PLC

1450 Parkway, Solent Business Park, Fareham, Hants PO15 7AF

## FACT, NOT FICTION

## THE NAVAL ARCHITECT



ABC audited circulation 11,312  
January - December 2006

IF YOUR **NEXT** ADVERTISING SCHEDULE INCLUDES TITLES  
THAT **AREN'T AUDITED** FOR CIRCULATION.....ask.... **WHY?**

### Naval Architectural Recruitment

#### Aberdeen

Busy Oil capital of Europe currently has new numerous career opportunities with a selection of the industry's most desirable projects with exciting companies.

These companies include operators, contractors and design houses with industry leading salaries. Staff up to £65K and contract rates up to £50p/hour.

Call Now

#### Up to £50,000

#### Consultant Naval Architect

Our client is looking for an experienced Naval Architect. The position combines field surveying and Accident Investigation work. You should be familiar with structural analysis and damage stability software packages and be willing to travel to vessel casualties at short notice.

London

#### Up to £35,000

#### Naval Architect

This is an exciting chance to join a leading specialist consultancy. You should have a good knowledge of structural design and analysis and an interest in hydrodynamics/ship manoeuvring. Experience with Classification Societies/shipyards is advantageous.

South Coast

#### Jobs in China



#### Newbuild surveyors

Call for more information

Expat £££

**faststream**  
marine recruitment

t: +44 (0)2380 334444 e: [marine@faststream.co.uk](mailto:marine@faststream.co.uk) [www.faststream.co.uk/na](http://www.faststream.co.uk/na)  
Nationwide & International Contract and Permanent jobs online



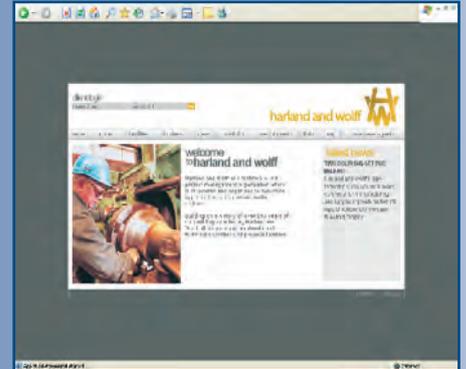
# marine web directory



[www.veth-motoren.com](http://www.veth-motoren.com)



[www.icepronav.ro](http://www.icepronav.ro)



[www.harland-wolff.com](http://www.harland-wolff.com)



[www.bctq.com](http://www.bctq.com)



[www.hamworthy.com](http://www.hamworthy.com)



[www.bmt.org](http://www.bmt.org)



[www.jaure.com](http://www.jaure.com)



[www.b-hepworth.com](http://www.b-hepworth.com)



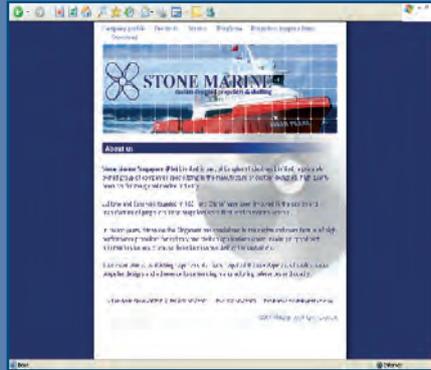
[www.malinmarine.com](http://www.malinmarine.com)

[www.rina.org.uk/tna](http://www.rina.org.uk/tna)

# marine web directory



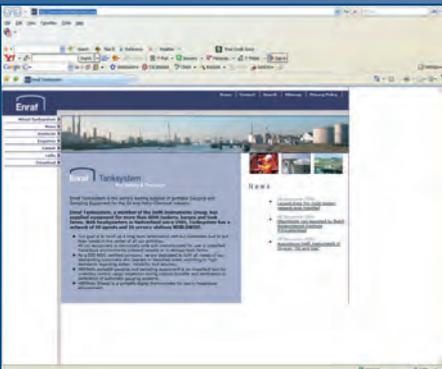
[www.napa.fi](http://www.napa.fi)



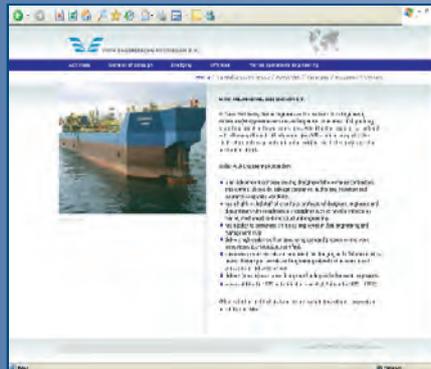
[www.stonemarine.com.sg](http://www.stonemarine.com.sg)



[www.bakkersliedrecht.com](http://www.bakkersliedrecht.com)



[www.enrafttanksystem.com](http://www.enrafttanksystem.com)



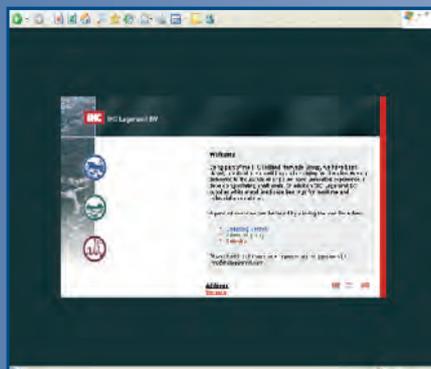
[www.vuykgron.nl](http://www.vuykgron.nl)



[www.grc-ltd.co.uk](http://www.grc-ltd.co.uk)



<http://pbcf.motech.co.jp>



[www.ihclagersmit.com](http://www.ihclagersmit.com)



[www.giroeng.com](http://www.giroeng.com)

[www.rina.org.uk/tna](http://www.rina.org.uk/tna)

# professional directory

## BAE SYSTEMS

## DESIGN SERVICES

### Whole Lifecycle Marine Consultancy

- Naval Architecture
- Marine Engineering
- Ship Design
- Human Factors
- Safety Management
- Requirements Engineering
- Litigation & Expert Witness
- Acoustic, IR & RCS Signatures
- Engineering Dynamics & Simulation
- Supportability Engineering

### Customer Solutions & Support

South Street, Scotstoun  
Glasgow, G14 0XN  
United Kingdom

Telephone +44 (0) 141 957 2453  
Fax +44 (0) 141 957 2328  
Email [keith.figg@baesystems.com](mailto:keith.figg@baesystems.com)

### Ship design software, loading software, Engineering support

#### PIAS:

Intact and damage stability, automated probabilistic damage stability (generation of damages, optimisation of damage boundaries, etc.), stability for open hopper vessels (DR67), grain stability, speed and power predictions, propellor calculations, manoeuvring calculations, etc.

#### FAIRWAY

Hull design and fairing, plate expansions, hull transformation, solid modeling and boolean operations, conversions of hull data, etc.

#### LOCOPIAS

Software for on-board stability and strength calculations including damage stability, torsion, interfacing with tank gauge systems, multiple loading options, etc.

SARC BV  
Brinklaan 109-1  
1404 GA Bussum  
The Netherlands



[www.sarc.nl](http://www.sarc.nl)  
[sarc@sarc.nl](mailto:sarc@sarc.nl)  
t: +31 35 6915024  
f: +31 35 6918303

## ShipmoPC

### Seakeeping Predictions Software

Advanced ship motion analysis,  
comprehensive reporting



BMT Fleet Technology Limited  
Tel: 1 613 592-2830 E-mail: [fleet@fleetech.com](mailto:fleet@fleetech.com) Website: [www.fleetech.com](http://www.fleetech.com)



# GHS

Onboard Version Available!

## General HydroStatics

Ship Stability, Strength and Salvage Software



**Creative Systems, Inc.**

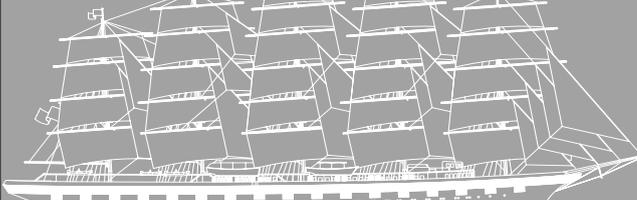
Creators of GHS

P.O. Box 1910 Port Townsend, WA 98368 USA  
phone: (360) 385-6212 fax: (360) 385-6213  
email: [sales@ghsport.com](mailto:sales@ghsport.com)  
[www.ghsport.com/ghs](http://www.ghsport.com/ghs)

## MCFARLANE - SHIPDESIGN

Ship Design - Naval Architecture - Marine Engineering

Passenger Ships Commercial Yachts



Le Panorama C D - 57 rue Grimaldi - 98000 MONACO  
tel +377 97 70 69 26 - fax +377 97 70 69 27  
[robert@mcfarlane-shipdesign.mc](mailto:robert@mcfarlane-shipdesign.mc) [www.mcfarlane-shipdesign.mc](http://www.mcfarlane-shipdesign.mc)



## ROBIN A WILLIAMS & Co Ltd

Watson House, 2 Cora Street  
Barry, Vale of Glamorgan  
CF63 4EP, United Kingdom

Tel: (01446) 739127  
Fax: (01446) 732945  
e-mail: [robin@rawcoltd.fsnet.co.uk](mailto:robin@rawcoltd.fsnet.co.uk)



## KEEL MARINE LTD

MARINE CONSULTANTS, DESIGNERS AND SURVEYORS

Ridgeway Office Park,  
Unit 6-8,  
Bedford Road, Petersfield  
Hants, GU32 3QF, UK  
T: (01730) 268889  
F: (01730) 269361  
E: [office@keelmarine.com](mailto:office@keelmarine.com)  
[www.keelmarine.com](http://www.keelmarine.com)

## Malin Marine Consultants Ltd

naval architects & heavy lift specialists



- Heavy Lift and Transportation Specialists
- Naval Architecture
- Structural Analysis
- Motion Response Analysis
- Bespoke Software Solutions
- Marine Procedures
- CAD Services

17 Sandyford Place, Glasgow G3 7NB  
Tel: 0141 243 2242 Fax: 0141 226 5501

[info@malinmarine.com](mailto:info@malinmarine.com)  
[www.malinmarine.com](http://www.malinmarine.com)



## Kerstholt

Teakdecksystems BV

P.O. box 54 - 8064 ZH - Zwartsluis - The Netherlands  
Tel. +31 38-3867677 fax: +31 38-3867728

[www.kerstholt-teakdecks.com](http://www.kerstholt-teakdecks.com)  
[info@kerstholt-teakdecks.com](mailto:info@kerstholt-teakdecks.com)

# professional directory

**COST EFFECTIVE DESIGN & PRODUCTION  
ENGINEERING SERVICES**



**Fred Black, Engineering Manager**

Email: fredb@harland-woff.com

Mobile: 07967589830

Queen's Island, Belfast, BT3 9DU

Tel: +44 (0)28 9045 8456

Fax: +44 (0)28 9045 8515

www.Harland-Wolff.com



**Harland and Wolff  
Heavy Industries Ltd**



**Group  
Icepronav**



→ Full Design Capabilities (Basic, Class, Detail & Prod Info)

→ Full Range of Hydrodynamic Testing and Consulting

→ Latest CAD-CAM Solutions; Europe's largest Tribon user

40 years Service to Shipbuilding and Offshore Engineering

International Contract Engineering

offices in Oslo, Hamburg, Douglas, Newcastle & Galati

19A, Portului Street, Galati 80025, ROMANIA,

Phone: +40 236 415965, Facsimile: +40 236 417836,

E-mail: icepronav@icepronav.ro, Website: www.icedesign.info

## WOLFSON UNIT

FOR MARINE TECHNOLOGY & INDUSTRIAL AERODYNAMICS

- Model tests in towing tank and wind tunnel
- Wide range of PC based marine software
- Bureau service and stability booklets
- Trials data acquisition and onboard analysis
- Expert witness on technical issues
- Innovative research to customers world wide
- Full consultancy service at competitive rates

University of Southampton, Southampton, SO17 1BJ, UK

Tel: +44 (0)23 8058 5044

Fax: +44 (0)23 8067 1532

www.soton.ac.uk/~wumtia e-mail: wumtia@soton.ac.uk



**SAFETY AT SEA LTD**

Naval Architects - Specialist Services

www.safety-at-sea.co.uk

Tel (main): +44 (0)141 572 5570

Fax: +44 (0)141 572 5590

E-mail: enquiries@safety-at-sea.co.uk

280 St Vincent Street

Glasgow, G2 5RL,

United Kingdom.

### The Royal Institution of Naval Architects

*The Naval Architect*

Chinese-language edition

Twice each year, *The Naval Architect* is translated into Chinese-language, for a further distribution to more than 7000 Shanghai SNAME members and also to 500 members of the Shanghai Association of Shipbuilding Industries. Advertisements in the Chinese-language edition are offered FREE OF CHARGE, including translation, to those advertisers participating in the regular February and September issues.

To reach these key decision-makers, book your advertisement space now by contacting:

Debbi Bonner, dbonner@rina.org.nl

**Tired of bearing problems?  
Then try Vesconite Rudder  
and Stern Tube Bearings**

No swell. Low friction. Long Life.

- ABS, Lloyds, DNV etc. approved

Call for Free Design Manual



Tel.: +27 82 853 1434

marine@vesconite.com

www.vesconite.com



## BURNES CORLETT - THREE QUAYS

THE MARITIME CONSULTANTS

www.bctq.com

Ship Design - Naval Architecture - Marine Engineering - Surveying - Expert Legal & Casualty Investigation Services

### MARINE DESIGN, NAVAL ARCHITECTURE & ENGINEERING SERVICES

London

t: +44 (0)20 7929 2299

f: +44 (0)20 7929 1650

e: enquiries@bctq.com

Southampton

t: +44 (0)23 8033 9449

f: +44 (0)23 8033 9440

e: info@bctq.com

Newcastle

t: +44 (0)191 217 3660

f: +44 (0)191 217 3838

e: service@bctq.com

### EXPERT SERVICES DIVISION

London

t: +44 (0)20 7621 2943

f: +44 (0)20 7929 4167

e: london@bctq.com

Isle of Man

t: +44 (0)1624 815110

f: +44 (0)1624 815113

e: iom@bctq.com

### MARINE SURVEY SERVICES

London

t: +44 (0)20 7621 2953

f: +44 (0)20 7929 1655

e: surveys@bctq.com

# RINA Publications



## A selection from the RINA bookshop

Please note all prices include postage & packaging

### BUSINESS FUNDAMENTALS FOR ENGINEERS

By Professor Chengxi Kuo FRINA Ref: BFE01  
This book deals with essential business topics, so often treated in a specialised and lengthy way, as related to practical engineering situations. Eight chapters cover: business and the engineer; fundamental elements of business; markets; management; money; manpower; case examples; and application. This volume provides engineering students and practising engineers with an affective and well-integrated introduction to business.  
Member price: UK £26.00 EUR £27.00 OVS £31.00  
Non-Member price: UK £27.00 EUR £28.00 OVS £32.00

### DRYDOCKING & SHIPBOARD MAINTENANCE

A Guide For Industry - First Edition - Ref: DRYD  
The need for shipboard maintenance in an age of the principles of International Safety Management (ISM) has never been more important. If the industry is to operate at all it must be within the safety guidelines. Many shipboard tasks fall inside the planned maintenance programmes which can be conducted on a day to day basis but many of the annual tasks required to operate ships tend to accumulate and can only be catered for within a docking scenario. Over 100 Photographs - Numerous diagrams and check lists. Listing of Dry Dock operations, handling facilities, main ship builders and repair yards, International listing of countries with Dry Docking and Ship Repair facilities.  
Member price: UK £37.00 EUR £42.00 OVS £46.00  
Non-Member price: UK £40.00 EUR £45.00 OVS £49.00

### FATIGUE ANALYSIS OF SHIP STRUCTURES

By S. Petinof Ref: FASS  
The author discusses in detail the fundamentals and recent advances in fatigue analysis with special emphasis on crack mechanics and fatigue design of structural details. Chapters: Behavior of materials under alternating loads; Crack initiation; Crack propagation; Applications of fatigue analysis; Appendices. The book is for engineers, research staff, professors and graduates engaged in fatigue preventing design and survey, fatigue studies of materials and structures, planning repair and maintenance, and strength standard development.  
Member price: UK £95.00 EUR £95.00 OVS £95.00  
Non-Member price: UK £100.00 EUR £100.00 OVS £100.00

### FULLY REFRIGERATED LPG CARRIERS

By Syd Harris FRINA Ref: FRLPG  
This new publication, claimed by the author, gas shipping consultant Syd Harris, as unique, provides the first comprehensive study of the design and development of fully refrigerated LPG carriers. It spans a period from the challenging and exciting refrigeration breakthrough in the late 1950's to the present day, having been written from a naval architecture's point of view and by a man who has spent his whole working life in the gas sector.  
Member price: UK £70.00 EUR £77.00 OVS £84.00  
Non-Member price: UK £75.00 EUR £82.00 OVS £89.00

### FIFTY YEARS A SHIPBUILDER

By Patrick G Martin FRINA FimarEST Ref: FYSB  
Having pursued the science of mapmaking, his earliest excursion abroad took him to the interior of Newfoundland as explorer and surveyor. Returning to Scotland, he was debarred from his intended entry to the Royal Navy, due to colour blindness, but instead devoted the rest of his working life to Naval Architecture and Marine Engineering. After serving his time as apprentice in a Scottish shipyard, he spent 7 years' seafaring as an Engineer in the liners of Alfred Holt & Company of Liverpool mainly on the China Coast. Appointed Assistant Naval Architect with the same company in 1956, he later became Chief Naval Architect at Verolme Cork Dockyard (1960-1984), and finally a design consultant, principally in India, Singapore and Australia. This book tells the story of his fifty years as a shipbuilder.  
Member price: UK £19.45 EUR £21.83 OVS £25.80  
Non-Member price: UK £21.45 EUR £23.80 OVS £27.80

### MERCHANT SHIP NAVAL ARCHITECTURE

By Dr DA Taylor FRINA & Dr Alan ST Tang MRINA Ref: MNSA  
This new and up-to-date book defines a ship and its parts, the methods used in calculating the areas and volumes of ships hulls (with worked examples), followed by chapters on Buoyancy, Stability and Trim; Ships and the Sea; Structural Strength; and Resistance, featuring the use of model testing and its relationship to full scale ships. It also features Propellers and Propulsion Manoeuvring and Motion Control; and Vibration, each of which is described from the first principles through to various formulas used in necessary calculations.  
Member price: UK £33.50 EUR £34.50 OVS £36.50  
Non-Member price: UK £36.50 EUR £37.50 OVS £39.50

### MULTI-HULL SHIPS

By V. Dubrovsky FRINA, A. Lyakhovitsky Ref: MHS  
Catamarans, SWATH, and other multi-hull ships are among the dynamically progressing types of marine vessels both in terms of performance and production growth. This progress has been accompanied by a remarkable growth in the number of technical publications. Although these publications, scattered over many sources, decades, and languages, constitute a great database they cannot fulfill the demand for a comprehensive state-of-the-art reference book. This monograph satisfies such demand. For multi-hull ships it is what "Principles of Naval Architecture" (PNA) is for traditional ships.  
Member price: UK £191.00 EUR £191.00 OVS £191.00  
Non-Member price: UK £201.00 EUR £201.00 OVS £201.00

### SEAKEEPING: SHIP BEHAVIOUR IN ROUGH WEATHER

(Second Edition)  
By Dr A R J M Lloyd FEng FRINA Ref: SEA01  
Comprehensive revised account of waves, ship motions, trials, model testing, probability formulae, roll stabilisation, added resistance, slamming, deck wetness, propeller emergence, human factors, seakeeping criteria, operational effectiveness and the effect of hull form and size on seakeeping. Worked examples and design recommendations.  
Member price: UK £48.50 EUR £51.00 OVS £59.00  
Non-Member price: UK £50.50 EUR £53.00 OVS £61.00

### SHIP KNOWLEDGE - A MODERN ENCYCLOPAEDIA

Third Edition  
By K Van Dokkum Ref: SHKN  
This is the 3rd edition of Klaas Van Dokkum's clear and detailed examination of modern ship building and seamanship, fully illustrated in full colour. Eminently suitable for maritime students and those employed in shipping, shipbuilding and related fields. Includes chapters on law and regulation, construction, anchor and mooring gear, engine room, propulsion and steering gear, electrical installations, maintenance, docking safety and stability, etc.  
Member price: UK £50.00 EUR £51.00 OVS £57.00  
Non-Member price: UK £54.00 EUR £54.00 OVS £61.00

### SHIPS WITH OUTRIGGERS

By V. Dubrovsky FRINA Ref: SHWO  
This new book is focused specifically on a multi-hull-ship type having one or more small hulls, called outriggers, connected to a much larger main hull of any form. This book is kind of a supplement to MULTI-HULL SHIPS by Dubrovsky & Lyakhovitsky (MHS). Like MHS, the new "Ships with Outriggers" provides detailed technical discussions of arrangements, hydrostatics, propulsion and seakeeping in calm and rough seas, maneuvering, strength and design of these ships, assuming that the reader is generally familiar with the background or can find it in MHS.  
Member price: UK £68.00 EUR £68.00 OVS £68.00  
Non-Member price: UK £71.00 EUR £71.00 OVS £71.00

When purchased with Multi-Hull Ships  
£25 RINA member £23 + p&p for MHS only.

### SHIPS AND SCIENCE The Birth of Naval Architecture in the Scientific Revolution.

1600-1800, By Larrie D. Ferreiro MRINA Ref: SSBNA  
The first book to portray the birth of naval architecture as an integral part of the Scientific Revolution, examining its development and application across the major shipbuilding nations of Europe. Naval architecture was born in the mountains of Peru, in the mind of a French astronomer named Pierre Bouguer who never built a ship in his life. So writes Larrie Ferreiro at the beginning of this pioneering work on the science of naval architecture.  
Member price UK £29.35 EUR £ 38.70 OVS £40.90  
Non Member price UK £33.65 EUR £42.70 OVS £44.90

### SIGNIFICANT SHIPS OF 2006

By John Lingwood MRINA Ref: SIG06  
One of RINA's most popular publications, Significant Ships has been published annually every February since 1990 and presents in one volume approximately 50 of the best commercial designs, completed by shipyards worldwide in the preceding year. Emphasis is placed on newbuildings over 100m in length, although some significant smaller cargo ships, fast ferries and offshore vessels may also be considered. Concise technical information, general arrangement plans and a colour illustration of each ship. Individual copies or a set from 1993-2006 can be purchased.  
Members price: UK £40 EUR £40 OVS £40  
Non-Members price: UK £46 EUR £46 OVS £46

### SMALL WATERPLANE AREA SHIPS

By V. Dubrovsky, K. Matveev, S. Sutulo Ref: SWAS  
Small waterplane area (SWA) ships, like other multi-hull ships, are relatively novel in the marine industry. Statistical databases and practical experience for designing these ships are sporadic and spread in scattered publications. The book presents the basic information required for designing the SWA ships encompassing the first principles and a bulk of necessary databases both developed by the authors and available in the public domain, collected under a single cover. This is an extension to the book Multi-Hull Ships providing new and significantly extended knowledge for practical design and demonstrating great potentials for future applications of SWA ships.  
Member price: UK £78 EUR £78 OVS £78  
Non Members price UK £88 EUR £88 OVS £88

### BOOKSHOP ANNOUNCEMENT

Please note you will receive a 10% discount if you order any book from Elsevier through the following link on our website:

<http://www.rina.org.uk> click on publications, then books, then on the Elsevier icon. Please note you do not have to register to receive the eNEWS to receive your discount.

A selection of books available includes: An Introduction To Naval Architecture, Basic Ship Theory, Contemporary Ideas on Ship Stability, Practical Ship Design, Practical Ship Hydrodynamics, Safety and Security at Sea, plus many more.

For a full book list please contact the Publications department on: Tel: +44 (0)20 7235 4622, e-mail: [publications@rina.org.uk](mailto:publications@rina.org.uk) or visit our website at <http://www.rina.org.uk>

## Journals

### THE NAVAL ARCHITECT

Published 10 times a year

- Providing up-to-date technical information on commercial ship design, construction and equipment.
- Regular reports on centres of shipbuilding activity worldwide.
- Comprehensive, technical descriptions of the latest newbuildings.
- News, views, rules & regulations, technology, CAD/CAM, innovations.
- Includes the bi-monthly publication **WARSHIP TECHNOLOGY**

2007 SUBSCRIPTION  
UK: £110 Europe: £115 Overseas: £125 Ref: J6

### SHIP & BOAT INTERNATIONAL

Published 6 times a year

- In depth coverage of small craft/small ship design, building & technology.
- Specialist sections include: fast ferries, tugs, salvage & offshore, patrol & paramilitary craft, coastal & inland waterway vessels, pilot boats, propulsion and transmissions.
- Advances in construction materials, electronics, marine equipment.
- Contract news and the latest market developments.

2007 SUBSCRIPTION  
UK: £84 Europe: £89 Overseas: £100 Ref: J7

### SHIPREPAIR

Published Quarterly

- In depth coverage of all aspects of shiprepair and conversion work and comprehensive technical descriptions of major conversion projects.
- Regular regional surveys on the major shiprepair centres.
- Developments in shipboard and shipyard equipment technology.
- Contract news, appointments, industry views, new regulations.

2007 SUBSCRIPTION  
UK: £37 Europe: £42 Overseas: £47 Ref: J8

## Transactions

Prices are inclusive of postage and packaging

### TRANSACTIONS PART A (IJME) PART B (IJSCT) & ANNUAL REPORT

Members Volumes 149 (2007) Price per volume £48 Ref BV07

Non-Members Volumes 149 (2007)

Price per volume £120 Ref BV0149

### INTERNATIONAL JOURNAL OF MARITIME ENGINEERING (IJME)

2007 Members Part Ref: IJME07 Set Ref: ST07 Part A1 Part A2 Part A3 Part A4 Set  
£9 £9 £9 £9 £30

Non-Members Part Ref: IJME07 Set Ref: ST107 Part A1 Part A2 Part A3 Part A4 Set  
£18 £18 £18 £18 £60

### INTERNATIONAL JOURNAL OF SMALL CRAFT TECHNOLOGY (IJSCT)

2007 Members Part Ref: IJSCT07 Set Ref: SS07 Part B1 Part B2 Set  
£9 £9 £18

Non-Members Part Ref: IJSCT07 Set SS107 Part B1 Part B2 Set  
£18 £18 £32

For further information on previous editions please contact the Publications department on: Tel: +44 (0) 20 7235 4622, Email: [publications@rina.org.uk](mailto:publications@rina.org.uk) or Website: <http://www.rina.org.uk>

# RINA Publications

## Conference Proceedings and Papers



The papers from recent RINA Conferences are now available on CD ROM, if the CD ROM format is required please add CD after the reference number.

		<i>Non-Members</i>	<i>Members</i>
2007	<b>Human Factors in Ship Design, Safety &amp; Operation</b> Ref: HF07	£120	£100
	<b>Historic Ships</b> Ref: HIST07	£120	£100
2006	<b>Developments in Classification &amp; International Regulations</b> Ref: DCIR07	£120	£100
	<b>High Speed Craft-ACV, Wigs &amp; Hydrofoils</b> Ref: HS06	£115	£95
	<b>ICSOT 2006: Design, Construction &amp; Operation of Gas Carriers and Offshore Systems</b> Ref: ICSOT06	£115	£95
	<b>Warship 2006 - Future Surface Warships</b> Ref: WS06	£115	£95
	<b>Education, Training &amp; Continuing Professional Development of Engineers in the Maritime Industry</b> Ref: CPD06	£115	£95
	<b>International Symposium on Marine Design</b> Ref: MD06	£115	£95
	<b>Advanced Marine Materials &amp; Coatings</b> Ref: AMM06	£115	£95
	<b>Learning from Marine Incidents 3</b> Ref: MI06	£115	£95
	<b>Safety Regulations &amp; Naval Class II</b> Ref: SR05	£115	£95
	<b>Design and Operation of Bulk Carriers</b> Ref: BC05	£115	£95
2005	<b>Heavy Transport &amp; Lift</b> Ref: HEA05	£115	£95
	<b>Warship 2005: Naval Submarines 8</b> Ref: WS05	£115	£95
	<b>Recycling of Ships &amp; Other Marine Structures</b> Ref: RCY05	£115	£95
	<b>Fishing Vessels, Fishing Technology &amp; Fisheries</b> Ref: FIS05	£115	£95
	<b>CFD Technology in Ship Hydrodynamics</b> Ref: CFD05	£115	£95
	<b>Human Factors in Design Safety &amp; Operation</b> Ref: HF05	£115	£95
	<b>Design &amp; Operation for Abnormal Conditions 111</b> Ref: AC05	£115	£95
	<b>High Speed Craft</b> Ref: HS04	£115	£95
	<b>European Shipbuilding, Repair &amp; Conversion the Future</b> Ref: EV04	£115	£95
	<b>Small Craft Regulations</b> Ref: SC04	£115	£95
2004	<b>Design &amp; Operation of Gas Carriers</b> Ref: GAS04	£115	£95
	<b>Warship 2004 - Littoral Warfare &amp; Expeditionary Force</b> Ref: WS04	£115	£95
	<b>Waterjet Propulsion 4</b> Ref: WP02	£115	£95
	<b>Design &amp; Operation of Trimaran Ships</b> Ref: TRI04	£115	£95
	<b>SURV 6: Surveillance, Pilot &amp; Rescue Craft</b> Ref: SUR04	£115	£95
	<b>Design &amp; Operation of Double Hull Tankers</b> Ref: DHT04	£115	£95
	<b>Drydocks Launching &amp; Shiplift</b> Ref: DRY03	£115	£95
	<b>Advanced Marine Materials: Technology &amp; Application</b> Ref: AMM03	£115	£95
	<b>The Modern Yacht</b> Ref: TMY03	£115	£95
	<b>Warship 2003: Airpower at Sea</b> Ref: WS03	£125	£105
2003	<b>Design &amp; Operation of Container Ships</b> Ref: CONT03	£115	£95
	<b>Passenger Ship Safety</b> Ref: PASS03	£115	£95
	<b>CFD 2003: CFD Technology in Ship Hydrodynamics</b> Ref: CFD03	£115	£95
	<b>High Speed Craft Technology &amp; Operation</b> Ref: HS02	£115	£95
	<b>Safety Regulations and Naval Class</b> Ref: SR02	£125	£105
	<b>Human Factors in Ship Design &amp; Operation</b> Ref: HF02	£115	£95
	<b>High Performance Yacht Design</b> Ref: YA02 (CD Rom only)	£100	£80
	<b>Formal Safety Assessment</b> Ref: SA02	£115	£95
	<b>Ship Design &amp; Operation For Environmental Sustainability</b> Ref: ES02	£115	£95

**Payment Details:** Payments must be made in pounds sterling to RINA by sterling cheque drawn on a UK bank, International Money Order or Credit Card, we accept Visa, Mastercard, or AMEX.

I enclose a cheque/for \_\_\_\_\_ payable to RINA.

Please charge my Credit Card No:

Expiry date: \_\_\_\_/\_\_\_\_ Security code: \_\_\_\_\_ Signature: \_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Country: \_\_\_\_\_ Postcode: \_\_\_\_\_

Tel: \_\_\_\_\_ Fax: \_\_\_\_\_ Email: \_\_\_\_\_

Please allow 30 days for dispatch and delivery. Post to:

The Marketing Department, RINA, 10 Upper Belgrave Street, London SW1X 8BQ, UK.

Tel: +44 (0)20 7235 4622 or Fax: +44 (0)20 7259 5912.

### ORDER FORM

*Please send me the following:*

<small>REF:NA/APR</small>		
REFERENCE	QUANTITY	PRICE
<b>TOTAL:</b>		

**April 11-13, 2007: Fundamentals of Contract and Change Management for Ship Construction, Repair, and Design, course,** London, UK. Contact: Conference Department, RINA, 10 Upper Belgrave Street, London SW1X 8BQ, UK.  
Tel: +44 20 7235 4622.  
Fax: +44 20 7245 5912.  
E-mail: conference@rina.org.uk

**April 24-25, 2007: Safety at Sea and Marine Equipment Exhibition 2007, international exhibition,** Brighton, UK. Contact: Nigel Dickson, maritime events division, Lloyd's Register – Fairplay, Lombard House, 3 Princess Way, Redhill, Surrey RH1 1UP, UK.  
Tel: +44 1737 379105. Fax: +44 1737 379001.  
E-mail: nigel.dickson@lrfairplay.com

**April 24-26, 2007: Cruise and Ferry 2007, international exhibition and conference, Excel,** London, UK. Contact: Lloyd's List Events, London, UK. Tel: +44 207 7017 4406.  
E-mail: alex.vonstempel@informa.com  
www.cruiseandferryex.com

**April 25, 2007: Annual Dinner, Royal Institution of Naval Architects,** London, UK. Contact: The Chief Executive, RINA, 10 Upper Belgrave Street, London SW1X 8BQ, UK.  
Tel: +44 20 7235 4622.  
Fax: +44 20 7259 5912. E-mail: hq@rina.org.uk

**April 25-26, 2007: Design and Operation of Passenger Ships, international conference,** London, UK. Contact: Conference Department, RINA, 10 Upper Belgrave Street, London SW1X 8BQ, UK. Tel: +44 20 7235 4622.  
Fax: +44 20 7259 5912.  
E-mail: conference@rina.org.uk

**April 25-29, 2007: Europort Eurasia, international exhibition and conference,** Istanbul, Turkey. Contact: NTSR, Ekinciler Cad, Ertürk Sok, M. Özçelik İş Merkezi, No:5 Kat: 3, 34810 Kavacak, İstanbul, Turkey.  
Tel: +90 216 425 63 00. Fax: +90 216 425 63 02.  
E-mail: info@ntsr.com.tr

**May 7-8, 2007: Safedor midterm conference,** Brussels, Belgium. Contact: Conference Department, RINA, 10 Upper Belgrave Street, London SW1X 8BQ, UK.  
Tel: +44 20 7235 4622.  
Fax: +44 20 7259 5912.  
E-mail: conference@rina.org.uk

**May 14-18, 2007: Basic Dry Dock Training, course,** London, UK. Contact: Conference Department, RINA, 10 Upper Belgrave Street, London SW1X 8BQ, UK.  
Tel: +44 20 7235 4622.  
Fax: +44 20 7259 5912.  
E-mail: conference@rina.org.uk

**May 21-24, 2007: CIMAC 2007, international conference,** Vienna, Austria. Contact: CIMAC Central Secretariat, Lyoner Strasse 18, D-60528 Frankfurt am Main, Germany.  
Tel: +49 69 6603 1567.  
Fax: +49 69 6603 1566.  
E-mail: cimac@vdma.org

**May 30-31, 2007: Design and Construction of Vessels Operating in Low Temperature Environments, course,** London, UK. Contact: Conference Department, RINA, 10 Upper Belgrave Street, London SW1X 8BQ, UK.  
Tel: +44 20 7235 4622.  
Fax: +44 20 7259 5912.  
E-mail: conference@rina.org.uk

**June 12-14, 2007: Seawork International, exhibition and conference,** Southampton, UK. Contact: Seawork International, The Old Mill, Lower Quay, Fareham, Hampshire PO16 0RA, UK.  
Tel: +44 1329 820485.  
Fax: +44 1329 825330.  
E-mail: info@seawork.com www.seawork.com

**June 12-15, 2007: NorShipping, exhibition,** Lillestrøm, Norway. Contact: Norway Trade Fairs, PO Box 75, Nesgata 1/3, N-2001 Lillestrøm Norway.  
Tel: +47 66 93 91 00.  
Fax: +47 66 93 91 01.  
www.messe.no

**June 20-21, 2007: Warship 2007, conference,** Bath, UK. Contact: Conference Department, RINA, 10 Upper Belgrave Street, London SW1X 8BQ, UK.  
Tel: +44 20 7235 4622.  
Fax: +44 20 7259 5912.  
E-mail: conference@rina.org.uk

**June 29 – July 3, 2007: IMDS 2007, international conference,** St Petersburg, Russia. Contact: Morskoy Salon JSC, 168, Leninsky Av, PO Box 3, St Petersburg 196191, Russia.  
Tel: +7 (812) 449 0260.  
Fax: +7 (812) 370 9061.  
E-mail: info@navalshow.ru

**October 1-5, 2007: PRADS 2007, international conference,** Houston, Texas, USA. Contact: Dr Ge (George) Wang, ABS Corporate Technology, 16855 Northchase Drive, Houston, Texas, 77060 USA. Tel: +1 281 877 5785.  
Fax: +1 281 877 5945.  
E-mail: prads2007@eagle.org

## ADVERTISERS' INDEX

If you would like to receive further information on the advertisers featured within *The Naval Architect*, please contact **Debbi Bonner**, Group Advertisement Manager, [dbonner@rina-org.nl](mailto:dbonner@rina-org.nl), quoting the relevant enquiry numbers listed below.

Client	page	enquiry	Client	page	enquiry
ABB Turbo Systems	1	D01	IHC Lagersmit BV	8	D20
ABS	6/7	D02	Matchtech Group Plc	57	-
Alpha Ship Design	14	D03	Mustang Marine	57	-
Astillero Barreras	17	D04	Napa OY	41	D21
Australian Maritime College	55	-	Odegaard & Danneskiold Samsøe ApS	26	D22
Autoship Systems Corporation	35	D05	SARC BV	42	D23
Bilfinger Berger Nigeria GmbH	56	D06	Scan Vibra	31	D24
Creative Systems	42	D07	Schiffko GmbH	12	D25
Cruise & Ferry 2007	IBC	D08	Seatrade Europe 2007	2	D26
Desmi AS	26	D09	Semco Marine AS	31	D27
EMRI AS	26	D10	Sener Ingeniería Sistemas	42	D28
Enraf Tanksystem SA	12	D11	ShipConstructor Software Inc	35	D29
Faststream Recruitment	57	-	Sika Danmark AS	31	D30
Force Technology	29	D12	TTS Marine ASA	17	D31
Germanischer Lloyd	IFC	D13	The Nautical Institute	8	D32
Giro Engineering Ltd	9	D14	University of Southampton	56	-
Graphics Research Corp	37	D15	University of Newcastle	15	-
Hamworthy Plc	5	D16	Veth Motoren BV	15	D33
Kinon Aachen GmbH	21	D17	Viking Life Saving Equipment	25	D34
Lloyd's Register	OBC	D18	Wolfson Unit	39	D35
MacGregor (fin) OY	FC	D19			



**24-26 April 2007**  
**ExCeL London**



# THE MEETING PLACE

## FOR THE PASSENGER SHIPPING INDUSTRY

### Representatives from the following companies are attending Cruise + Ferry 2007



- Adfecto Design
- Aker Finnyards
- AS Tallink
- Asia Cruises
- Beacon
- BMT Fleet Technology Ltd
- BP Shipping
- BP Marine
- Brax Shipping
- Bureau Veritas - Marine
- Caledonian Maritime Assets
- Carnival Corporate Shipbuilding
- Carnival Corporation & PLC
- Carnival Cruise Lines
- Celebrity Cruises
- Color Line
- Costa Crociere
- Cruise Europe
- Cruise Ventures Inc
- De Jorio Design International
- designteam
- Dover Harbour Board
- easyCruise
- Fincantieri
- Fred Olsen Cruise Lines
- Grimaldi
- Hapag Lloyd Cruises
- Hebridean International Cruises
- Hurtigruten
- iisii Software
- Inspace Design
- International Maritime Security
- Island Cruises
- Joseph Farcus Architect
- Lindholm Cruise Service
- Leith Cruise Berth Development
- Lloyd Werft
- Maritime & Coastguard Agency (MCA)
- Marintek e-maritime
- Merchant Navy Training Board
- Meyer Werft
- Ministry of Defence
- Norwegian Cruise Lines
- P&O Ferries
- P&O Cruises
- P&O Princess
- Peter Deilmann Cruises
- QinetiQ
- RCCL
- Regent Seven Seas Cruises
- Roger Kendrick Cruising Entertainment
- RPW Design
- Safinah
- Saga Shipping
- SeaFrance
- Silversea Cruises
- SMC Design
- Steam Packet Company
- Stena Line
- Superfast Ferries/Attica Group
- The Cruise Store
- Thompson Cruises
- Tillberg Design
- TNF Interiors
- TraffGo HT GmbH
- V Ships Leisure
- V Ships Marine Services
- Viking Recruitment
- Wightlink Ferries

AND Many More...

**Make sure you join them at the leading passenger shipping event of the year!**

**Pre-register now for Free Entry saving you £20!**  
[www.cruiseferryex.com](http://www.cruiseferryex.com)

**To find out more visit [www.cruiseferryex.com](http://www.cruiseferryex.com) or call +44 (0) 20 7017 4406**

Organised by

**Lloyd's List events**

Official Informa Media Partner

**CRUISE INTERNATIONAL** **Lloyd's List**

Supporting Organisations



RINA



British Contract Furnishing Association



CHARTERED SOCIETY OF DESIGNERS





Leading technology

Future-proof designs

Safety regulations

Passengers

Professional  
competence

Fuel consumption

**Availability matters**

Noise and vibration

Environment

High value

Reputation

Security

**Life** is easier when you keep to a timetable. We help ferry owners and operators get their customers safely to destinations around the world without delay – helped by better control of classification and maintenance schedules. Together, we'll improve your availability **matters**.

LIFE MATTERS

[www.lr.org](http://www.lr.org)

Lloyd's  
Register

Services are provided by members of the Lloyd's Register Group. Lloyd's Register is an exempt charity under the UK Charities Act 1993.