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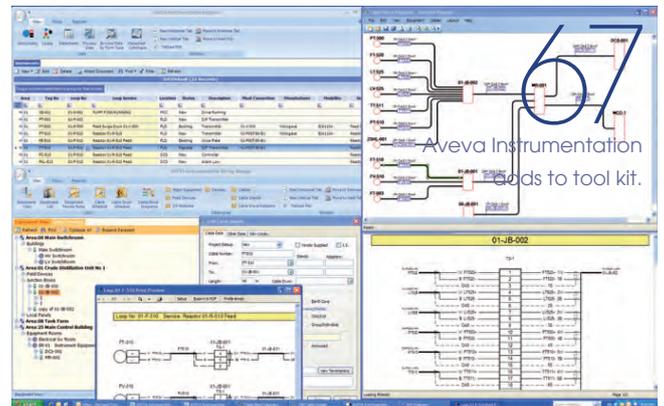
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### On-line Edition

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



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## Green eyed monster raises its ugly head

Shipping luminaries must drop their persecution complex and focus on the essential process of limiting the industry's environmental impact.

According to the Korean Register of Shipping (KRS) the shipping and maritime industry is the least polluting industry of all the transport sectors, though it is unclear whether this includes ports or not.

This may or may not be true, but it does appear that when environmental issues are raised those from the shipping industry can be heard to say, 'not us we're not the worst polluters.'

Again according to KRS shipping has suffered from a poor public image because: "The public is often bombarded with televised images of ships breaking in half and spewing oil in the most pristine areas of the earth".

Pollution of the atmosphere and seas alike is a global problem. It affects Asia, Europe, Australasia, Africa and the Americas in equal measure. Pollution does not discriminate between producers. Melting ice caps will not flood only the energy or airline industry, it affects us all in equal measure.

It is, therefore, very important that the industry understands, as KRS obviously does notwithstanding their above comments, that: "It is not important which sector of transport is to be blamed the most".

It is more important, explain KRS: "that all industries should work together to reduce greenhouse gases (GHG) either using the technology already available or by developing new technology as a matter of urgency because we owe it to the next generation."

It is a universal truth that we all face the destruction of the life-support system on earth. The planet itself will remain and

will recover from our excesses, but will our children and future generations be able to enjoy it.

Once the maritime industry has grasped this truth it can begin to change as an industry and to play its part in defending the planet. Some maritime companies are now responding, others are more ponderous in their approach.

KRS and other companies have been working closely with shipyards, shipping companies, manufacturers, research institutes and academic circles to develop and use technology relating to reduction of GHG from ships.

Efficiencies are available and must be used to reduce all the harmful emissions and the maritime industry, just like all other industries, must embrace the changes that are inevitably heading their way.

Recession is often a period of change. This economic crisis is no different, many yards are looking to replace shipbuilding with the subsidies and government funding attached to the building of windmills for providing green energy.

Other yards are looking to design emission free ships, there are proposals for carbon capture and fuel cell powered vessels. The industry is moving forward, but shipping, and in fairness many other industries and national leaderships, have been slow to respond.

The Copenhagen climate change conference in December this year could be another wake up call for the industry, but it is not one that it should rail against many of those companies producing new

cleaner technology will give a boost to the maritime economy.

Instead of railing against these changes those in the shipping industry should turn their ire against the political leadership which stands alone as chief obstacle to making rapid and meaningful headway on these issues.

Sources at the International Maritime Organization have said that while that organisation stands ready with a raft of new regulations to improve shipping's greenhouse footprint it cannot do so without the backing from politicians around the world.

Yvo de Boer, the executive secretary of the United Nations Framework Convention on Climate Change, claimed earlier this year that the maritime industry, globally, produced as much GHG as Germany. Even if this is not a true reflection the actual amount is a distraction. Shipping is one industry among many that produces too much GHG and it must change.

Mr de Boer insists that shipping will be forced to change following its failure to voluntarily meet its Kyoto obligations. This too is an irrelevance. Shipping and other industries need to change because the survival of those living on the planet depends on that change.

It is time for the industry to quit hiding behind flimsy declarations such as 'shipping is the least polluting transport' and that 'shipping is too important because all commerce depends on it'. It is time to grasp the nettle, For all our sakes. *NA*

## Newbuildings

## First dredger-twin launched

Royal Boskalis' latest trailing suction hopper dredger (TSHD), the 137m *Gateway* was launched at the IHC Merwede Offshore & Marine yard in Hardinxveld-Giessendam, The Netherlands at the end of September.

The yard signed the deal to design and build two sister dredgers in November 2007 and, unusually, both vessels are now under construction at the same time in two different IHC Merwede yards. The twin dredger is being built at the Kinderdijk yard where it will be launched in February 2010.

The keel for the *Gateway* was laid in February this year and the completion of the vessel is expected in the first quarter of next year. The dredgers will have a 12,000m<sup>3</sup> hopper capacity and a suction pipe of 1200mm in diameter. The ships will have a maximum dredging depth of 62m and will have accommodation for 24 crew and a top speed of 15.4knots.



The launch of Royal Boskalis' latest dredger, the *Gateway*, on 26 September.

## Classification

## Crack prevention guide published

Preventing the next Napoli is the aim of Japanese class society ClassNK which has announced the release of written procedures that will ensure that any cracks will be dealt with early on.

Guidelines on Brittle Crack Arrest Design is a technical reference guide that is designed to help owners prevent cracks occurring and to arrest the development of cracks that have appeared.

"It is essential that effective measures be taken to

ensure that brittle cracks which may lead to breakage of the hull do not occur. At the same time, it is also vitally important to adopt measures to arrest the propagation of brittle cracks in the event that any such cracks to occur," said a ClassNK statement.

In 2007 the society established a brittle crack research committee that was comprised of shipbuilders, steel manufacturers, universities, and research institutes. This committee studied the development of brittle cracks and how they behaved while developing strategies to meet the challenge of these potentially catastrophic structural failures.

The study was conducted with a very large containership as the reference vessel and used large scale model testing and computer analysis to understand how the cracks occurred and behaved.

The society said it is "currently proceeding with further research and development aimed at enhancing the structural integrity of large and ultra large container carriers as part of its ongoing efforts to realise ever-greater safety and reduced environmental loads at sea".

The guidelines are available for downloading from the ClassNK website <http://www.classnk.or.jp>.

## Air pollution

## SOx scrubber class approved

Neste Oil Shipping of Finland received a compliance certificate from Norwegian class society, DNV and Germany's Germanischer Lloyd for its product tanker, the *MT Suula* which became the first vessel to be fitted with an exhaust gas cleansing system.

The two-year project was a joint operation with DNV and Neste collaborating with Wärtsilä, the Aker Yard and Metso Power.

Wärtsilä said that tests on the four cylinder engine were performed with both high sulphur (3.4%) and low sulphur (1.5%) heavy fuel oil, and they confirmed that the scrubber system removes SOx from the exhaust gases.

In addition the engine maker said that SOx emission measurements were part of the certification process. "They demonstrated a sulphur dioxide removal efficiency exceeding 99% in all operating conditions, even when using high sulphur fuel. This high level of efficiency was consistent throughout the load range and with all fuels. The efficiency of nitrogen oxides removal was 3-7%. The removal of particulate matter was in the range of 30-60%. The approvals covered also the safety of the installation, as well as the performance."

"Despite its environmental advantages, low sulphur fuel is not always readily available and can



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cost more than other fuel oils, so the technological advances made on the *Suula* are a welcome addition to the anti-pollution toolbox available to the shipping industry," said DNV project leader, Angelo Tossio.

He added, "The certification demonstrates that ship operators may in the future have the option of using traditional fuel oils, rather than low-sulphur fuels, when voyaging in designated sensitive areas such as the North Sea".

#### Software

## OCTOPUS-Office 6 gets orders

Octopus has received orders for its latest OCTOPUS-Office 6 from Dutch companies Bluewater Energy Services, Nordic Heavylift and Vuyk Engineering, and German operator SAL Shipping, and the Belgian Ghent University.

OCTOPUS-Office is a hydrodynamic analysis programme for the calculation of sea-keeping characteristics for ships and other floating structures, with or without forward speed. It will be used by customers to calculate voyage-specific design accelerations based on historical weather. OCTOPUS-Office can also be used to define the response criteria for OCTOPUS-Onboard.

#### Software

## Jotron launches C-Loading

Jotron Consultas has recently launched its latest C-Loading for loading systems, in which all calculations are based on a 3D geometric model of the hull and inner structure.

C-Loading is a modular software consisting of a wide range of function modules, which can be assembled together with great flexibility. The modularity yields a loading computer solution which can then be tailored to the needs and requirements of each particular vessel type.

"The main objective of the software was to develop an easy-to-use loading computer system, but still feature advanced functionality. Users familiar with previous versions of Consultas loading computers will recognise its typical user interface.

Experienced Consultas users will be able to start working with the new version directly without user training, while the more un-experienced users will quickly familiarise themselves with the various functions guided by C-Loading's intuitive user interface", says Mr Bjørn Nygård, naval architect and

head of loading computer dept, Jotron Consultas.

The final version of C-Loading was released in June this year and received type approval from Det Norske Veritas (DNV) on 14 August, confirming C-Loading use for calculations and the control of loading conditions for strength, intact stability and damage stability onboard tanker vessels.

Jotron Consultas has also received an order from its first vessel for C-Loading to the FDPSSO, dynamic producer floating, drilling production storage and offloading vessel. The owner and operator is Petroserv S.A, Brasil.

Several other orders that include two chemical tankers under construction at TVK in Turkey for the Italian owner Finbeta SpA are scheduled for delivery this autumn and next year.

#### Environment

## MGO battle is joined

The introduction of low sulphur fuels could pose a viscosity problem for some owners who may have to use a marine gas oil (MGO) cooler to maintain fuel at the optimum temperature.

Greener fuels will be introduced by regulation within the EU from January next year and in the USA by January 2012. These new regulations will require owners to use fuel with a sulphur content of 0.1% or under. And the California Air Resources Board will further adopt a 39km limit from the coast outwards where the use of low sulphur fuel will be required.

This fuel, according to a class society expert, often has a lower viscosity than heavy fuel oil.

Maintaining MGO at the correct temperature is critical because the fuel will not atomise in the required manner if it is either too hot or too cold, said the class society. Storage and movement of fuels between tanks could see the temperatures rise and so, to keep temperatures at an optimum level, new MGO coolers are being marketed in Korea that can be fitted to help maintain viscosity at around 2cST at 40°C, the approved viscosity by engine maker Man Diesel.

Not all owners will need to fit MGO coolers, said the class society, but many will and as yet there are few on the market. Two of these are produced by Korean companies, DongHwa Entec and Hi Air both based close to Busan.

Dong-Kyu Choi, senior managing director at Hi Air Korea Ltd, told The Naval Architect, "Hyundai was our first order and that unit has already been delivered, but since then we have had many enquiries and questions".

The unit costs around US\$50,000 to install, compared to a US\$20,000 fine that could be imposed

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by US authorities for sulphur pollution, and so Mr Choi says that the company is expecting more orders for the unit.

Hi Air manufactures air conditioning and ventilation systems for ships, normally cargo vessels, but the company is branching out into cruise ships too. "We have to develop the cruise equipment, the way it looks must be acceptable, the levels of noise must be lower and the control systems must allow passengers to use the systems", said Mr Choi.

MGO cooling systems operate in a similar way to air conditioning and as such it is a reasonably small step from producing air conditioning to fuel coolers.

Thomas Kim, DongHwa Entec's manager for the Marine Division's technical marketing team, said, "the technology used in the MGO cooler is well known, but it has to be adapted for use on board ships".

#### Propulsion

## More than just a MAN diesel

In line with its stated policy of improving "total propulsive efficiency" by 8-10% within the next five years engine manufacturer MAN Diesel has said it is now offering larger controllable pitch (CP) propellers.

MAN said it is responding to demand for larger CP propellers by introducing two new hub sizes, the VBS2080 with a 2080mm hub and the VBS2240 with a hub that is 2240mm in diameter. These hub sizes that support propellers of over 8m in diameter and around the 30,000kw range are normally the reserve of con-ro vessels, shuttle tankers or special ice class ships, said the company.

In a statement MAN maintained that if the company was involved at an early part of the process: "Propeller efficiency improvements and bollard-pull increases of (respectively) 5-7% and 8-12% can be attained compared to a standard, conventional, CP propeller solution."

Retrofit CP propellers offered even greater cost savings with efficiencies of up to 12.5% reported the company.

MAN said the Alpha series of hubs not only offer reliability and low wear rates but they are serviceable from the aft with no dismantling required.

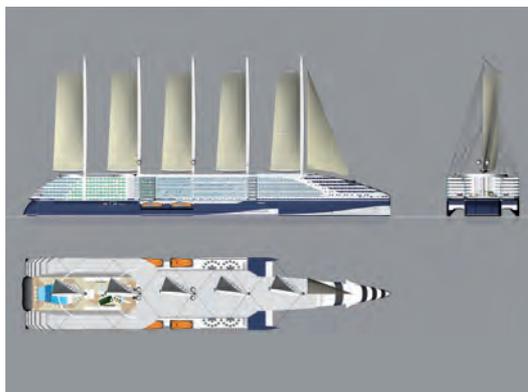
#### Cruising

## Green cruises ride winds of change

Environmentally friendly cruising took a step closer with the unveiling of STX France's new concept vessel



*EOSEAS* under full sail. The vessel is designed to cut emissions by 50%.



Plan of the *EOSEAS* displaying its innovative hull design.

the *EOSEAS*, which includes an LNG power plant for driving a propeller and to provide the hotel with energy.

Additional power will be derived from the 20,000m<sup>2</sup> semi-rigid sails that will be tested at Auckland University. Other elements of the design include an air lubricated central hull that was optimised using the towing tank facilities belonging to the French Navy and a double skin superstructure that improves insulation.

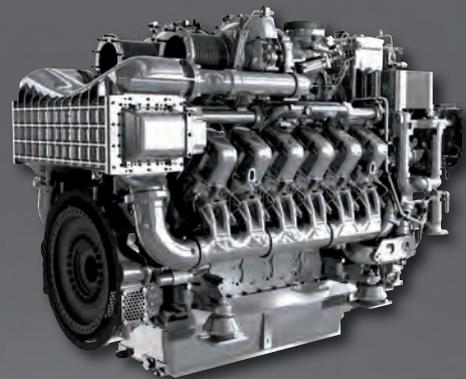
The *EOSEAS*, which was designed in collaboration with naval architects Stirling Design International (SDI) based in Nantes, France, will sport tanks similar to those fitted to LNG carriers and the propeller will include a pre-swirl nozzle that will allow it to achieve the "highest efficiency available today" said the company.

"Passengers on board *EOSEAS* are always in communication with the sea. The pleasure of wind propelled cruising is a unique experience that can be achieved with a minimal carbon footprint compared to today's cruising vessels," said SDI.

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## Engines

## MAN introduces Cut-off System

MAN Diesel has developed a turbocharger cut-out system that improves main-engine performance during low-load operations, to meet demand for running large container vessels on varying loads.

MAN Diesel's Turbocharger Cut-Out System will lower main-engine fuel-oil consumption and improve performance during low-load operations. The system includes two, pneumatically operated cut-out valves placed at the turbine inlet and compressor outlet.

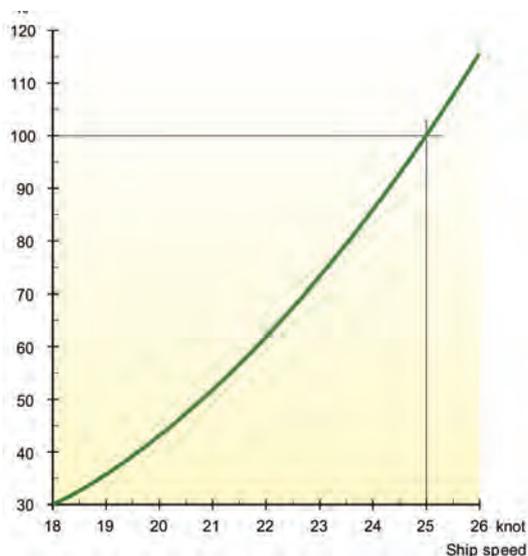
Installation of the Turbocharger Cut-Out System requires little time and with the right planning, off-hire can be avoided, installation during voyages can be carried out by a MAN PrimeServ installation team.

On engines with three turbochargers, one turbocharger cut-out enables operation at loads from 20% to 66% MCR, delivering: an expected SFOC reduction of 5g/kWh and a 0.25 bar increase in scavenge-air pressure. At 25% power an expected SFOC reduction of 3g/kWh and a 0.52 bar increase in scavenge air pressure at 50% power turbine-out temperature drops up to 30°C.

Engines with four turbochargers and one turbocharger cut-out enables operation at loads from 20% to 74% MCR, delivering: an SFOC reduction of 6g/kWh per 0.15 bar increase in scavenge-air pressure at 25% power an SFOC reduction of 5g/kWh per 0.41 bar increase in scavenge-air pressure at 50% power turbine-out temperature drop of up to 50°C.

For engines with less than three turbochargers, MAN Diesel PrimeServ recommends a solution with variable turbine inlets.

Relative propulsion power versus ship speed: here, 25knots refers to 100% relative propulsion power. A reduction of 5knots will result in a requirement of 41% propulsion power.



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## Ancillary equipment

## Kistler senses harsh environments

Kistler Instruments has introduced three new ranges of high performance, pressure sensors that use a patented double lip sealing method to eliminate the need for an O-ring seal to ensure accuracy and reliability where extremely high temperature, vibration and shock are likely.

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The three ranges consist of absolute (Type 4260A), gauge (Type 4262A) and differential (4264A) with an accuracy of up to 0.05% FS and long-term stability of 0.1% FS per year. Every sensor is fully tested over both pressure and temperature ranges to ensure compliance with the appropriate specification. This calibration data, traceable to ISO 17025, is available.

A wide range of electrical and pressure connections are available and ATEX zoned hazardous area types can be supplied to order. Pressure ranges from 1 to 350barA for the 4260A, 0 to 35barG for the 4262A and 0.1 to 10barD for the uni-directional 4264A and  $\pm 0.1$  to  $\pm 1$ barD for the bi-directional 4264D. All have EMC, reverse polarity, power supply regulation and short circuit protection as standard and display exceptional linearity, hysteresis and repeatability characteristics.

The new piezoresistive pressure sensors have been designed to withstand harsh operating conditions where extremes of temperature, vibration and shock are likely to be present.

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Ancillary equipment

## Jumbo sets new record

Jumbo Shipping has set a new tandem heavy-lift record, set by the *Jumbo Jubilee*. During the crane tests of Jumbo's latest J-class vessel at the Huisman yard in Schiedam, a ballasted pontoon was lifted out of the water in tandem by the two 900tonne mast cranes. A load of 1980tonnes, 10% on top of the combined safe working load (SWL) of the cranes, was required to obtain a Lloyds Register Certificate of Compliance. During the test it appeared that the testload had a record breaking weight of 1992tonnes: the heaviest load ever lifted by a heavy-lift transport ship said Jumbo Shipping. Earlier that week, both cranes performed a full 360deg swing with a load of 990tonnes. The ship was ballasted to a four degree heel angle, in order to test the cranes under all the circumstances they could encounter during their lifetime.

*Jumbo Jubilee* is the fourth J-class vessel in the Jumbo fleet of 14 in-house designed heavy-lift vessels and has been delivered. After final commissioning, the vessel will set sail for Brazil.

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Ancillary equipment

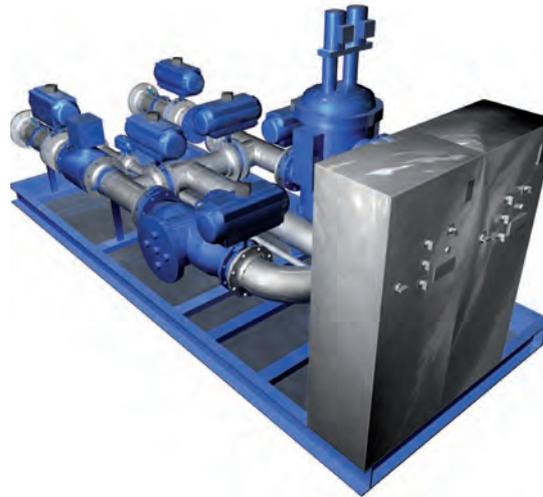
## Auramarine ballasts market

Auramarine Ltd, a manufacturer of heavy fuel oil supply systems and other auxiliary units for marine and power station engines has announced that it will be applying its experience in liquid flows to the ballast water treatment sector.

Auramarine has released its Auramarine Crystal Ballast, ballast water treatment system (BWTS). The system is said to be energy-efficient, compact and easy to install. Auramarine's system is based on utilising UV-C radiation.

Additionally, Auramarine's solution does not affect the time required for ballasting or de-ballasting operations, or increase the duration of port calls.

The Auramarine Crystal Ballast is currently applying for type approval, with promising results in testing. It is expected that the first system type approvals and final products will reach the market in the second half of 2010.



Auramarine breaks in to ballast water market with Auramarine Crystal Ballast.

**Contact** Auramarine Ltd, P.O. Box 849, FIN - 20101 Turku, Finland.

**Tel** +358 204 86 5030

**Fax** +358 204 86 5031

**www**.auramarine.com

Software

## ShipConstructor's new dealer

ShipConstructor Software Inc. (SSI) has announced the addition of a new dealer in Portugal, Spain and Africa with, Vera Navis. Vera Navis will offer ShipConstructor sales, support & training.

Vera Navis is headquartered in Lisbon and is managed by naval architects Luis Batista and Pedro Antunes. The long-time European ShipConstructor representative, DS&T / NDAR, is a partner in this company.

Mr Batista and Mr Antunes will offer ship design and specialised engineering services. They have practical experience with all ShipConstructor modules and are now fully approved to offer ShipConstructor sales, support and training in Portuguese, Spanish and English.

"In these challenging economic times, companies are looking at ways to improve productivity," says Michael Viala, ShipConstructor's sales & marketing manager. "Vera Navis will help spread the advantages of our software to shipyards and design firms involved in commercial or military projects. We are delighted that Vera Navis will enhance our company's presence in Southwest Europe, North Africa and Portuguese-speaking African countries."

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Safety

## ESAB looks safety in the face

ESAB has recently launched the Filtair range of disposable face masks. The Filtair series has been developed to improve the comfort of disposable respirators, whilst maintaining an excellent face fit.

Colour coding of the range simplifies identification when varying levels of protection may be required.

The mesh shell supports the filter media and prevents collapse onto the face and the preformed nose bridge provides a comfortable fit eliminating constant adjustment.

The filters use the latest filter technology to promote low breathing resistance and are approved to EN149:2001, including the 120mg load test.

The Filtair is available as a pre-moulded and a flat version. Both ranges come with or without valves depending on the user preference. All the masks are fitted with buckle fastening which also allows the wearer to adjust the straps accordingly.

Also adding to the release of safety products is the latest design of ADF (auto darkening filter) welding helmet, the Origo-Tech, with improved optical quality. It comes in a choice of yellow or black designs, finished in high gloss paint for durability.

The lightweight helmet is fitted with a nine-13 variable shade ADF, made from tough A801 material, will allow for position welding,

Filtair disposable face masks use latest filter technology.



with greater comfort and reduced fatigue for the welder.

Origo-Tech offers full-face protection to the chin, throat and head area providing complete coverage against sparks, heat and radiation. The helmet is designed with a flat top brow that allows for easy put downs, and helps reduce scratching of the outer lens.

The Origo-Tech helmet's extremely reliable ADF filter is powered by solar cell technology, which means it is always active, with no need to switch on and off, or to charge batteries.

The light seal cradle shuts out any welding arc light and also introduces a convex curve to the front spatter lens, to provide extra security and strength, as well as a healthy air gap for the ADF.

The headgear offers a choice of four position settings, to guarantee the wearer a perfect fit across the head area. The large rear adjustment knob is designed to be easily adjusted while wearing thick welding gauntlets. A rear pivot pad allows for the perfect head fit, and is adaptable to all head shapes.

**Contact** ESAB, Hanover House, Queensgate, Britannia Road, Waltham Cross, Hertfordshire, EN8 7TF, UK.

**Tel** +44 800 3893152

**Fax** +44 1992 788053

**E-mail** info@esab.co.uk

**www**.esab.co.uk

Ancillary equipment

## Solar Solve expands

Solar Solve has expanded its business into the window wipers field to create a new company, Wiper Solve Marine.

Following exactly the same principles that made Solar Solve Marine, owners John and Julie Lightfoot, intend to ensure their new company is at least as successful and hopefully even more so.

The latest straight line wiper, pantograph wiper and clear view screen will all come under the WIPASOLV trade name and also a highly intelligent programmable controller under the CONTROLASOLV trade name.

John Lightfoot, chairman of both companies commented: "These new products have been a long time coming and have taken quite a while to develop but we are all extremely confident that they will be very successful by the end of the six month launch programme."

**Contact** Solar Solve Marine, 3a, Tyne Dock East Side, South Shields, NE33 5SQ, UK.

**Tel** +44 191 454 8595

**Fax** +44 191 454 8692

**E-mail** info@solasolv.com

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Shipbuilding

## Keel laid for first P&O Ferry

The keel of a ferry to be built for P&O Ferries, hull number NB1367, was laid at STX Europe, Rauma on 25 August, 2009. The vessel is the first of the two ferries scheduled for delivery from Rauma shipyard in 2010 and 2011.

When completed, this vessel will be the largest ferry in the English Channel. This means a 49,000 GT vessel with the length of 212m and having 3746 lane-metres of vehicle space. There will be space for more than 180 freight vehicles and, additionally, for up to 195 tourist vehicles. The vessels will be capable of carrying up to 1750 passengers.

The ferries will be as environmentally friendly as possible, offering significant advances in fuel efficiency through a hydro-dynamically efficient hull form that will optimise vessel performance with minimum fuel consumption. The latest technologies of the industry will be applied both in design and construction of the vessel. Special attention will be paid to safety aspects and environmental friendliness.

**Contact** STX Europe, P.O. Box 453 Skøyen, N-0213 OSLO, Norway.

**Tel** + 47 21 02 15 00

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**E-mail** info@stxeurope.com

**www** stxeurope.com



Jabsco launches latest electric flush toilet.

Ancillary equipment

## Jabsco goes electric

ITT Jabsco has developed its latest low power consuming electric toilet, designed specifically to replace an existing Jabsco Manual Toilet. The Lite Flush Electric Toilet has the same footprint, fixing points and hose attachments as the manual toilet making installation quick and straight forward.

The Lite Flush Electric Toilet is compact and light weight, no heavier than the Manual Toilet at 11kilos, with

Under construction, the first vessel for P&O ferries.





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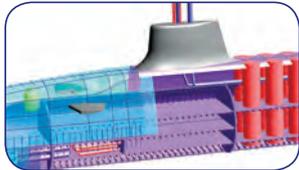
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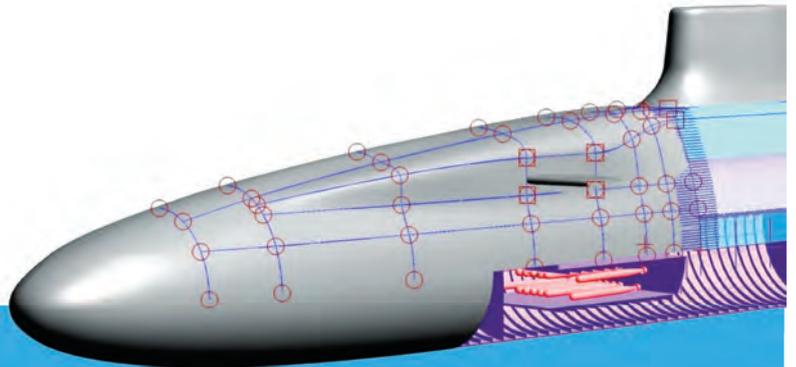
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**Tel** +44 1992 450145.

**Fax** +44 1992 467132.

**www**.jabsconews.com

Shipbuilding

## Medi Paestum delivered

Mitsui Engineering & Shipbuilding Co., Ltd., (MES) has announced the delivery of its latest vessel *Medi Paestum*.

The 56,000dwt type bulk carrier was completed and delivered at its Tamano Works on 1 September, 2009 to Helios Navigation Inc., Liberia.

*Medi Paestum* is a handy-max bulk carrier with a cargo hold capacity over 70,000m<sup>3</sup> and also marks the 90th ship of its series.

The vessel is 189.99m in length overall with a length between perpendiculars of 182m. The breadth of the vessel is 32.26m and has a depth of 17.90m, with a gross tonnage of 31,229tonnes. The vessel is powered by a Mitsui-MAN B&W diesel engine 6S50MCC and has a service speed of 14.5knots.

The vessel has five cargo holds and four cargo handling cranes. In order to load various kinds of cargo, the vessel has been designed to have enough tank top strength, for those tanks beneath the cargo holds, to handle any cargo and to be suitable for efficient cargo handling.

The size of hatch opening is the largest for this type of vessel in terms of both length and width with each cargo hold having a sufficient clear length in order to load long pipes. *Medi Paestum* has been designed in accordance with IACS URS25 so that loading flexibility has been secured and structural safety has been improved.

**Contact** Mitsui 3-16, Nihonbashi 1-chome, Chuo-ku, Tokyo 103-0027, Japan.

**Tel** +81 3 5202 3147

**Fax** +81 3502 3064

**www**.mes.co.jp

Lifesaving

## Schat-Harding branches out

Schat-Harding is expanding its global service network with the opening of its Italian office and service station in Livorno, Italy. It will be a branch office of Umoe Schat-Harding (USH) Spain and will be managed by Enrico Venezia, who has extensive experience with lifeboat servicing, and has until recently been based in Miami servicing cruise vessels.

"There is a very strong base of Italian owners who are safety conscious, and of course the Italian ports get a lot of cruise calls," explains David Bradley, executive vice-president and head of Schat-Harding's service division. "It makes good sense to have a stronger presence in Italy and we expect to expand from two to seven service engineers in Italy in the next few months."

Contact details for the Italian office are: Umoe Schat-Harding S.L., Via Delle Cateratte 92/4, 57122 Livorno (LI), Italy. E-mail serviceITALY@schat-harding.com.

**Contact** Umoe Schat-Harding AS, 5470 Rosendal, Norway.

**Tel** +47 53 48 36 00

**Fax** +47 53 48 36 01

**www**.schat-harding.com

Ancillary equipment

## Coupling up in Germany

UK specialist pipe coupling manufacturer Teekay Couplings Ltd has opened its recently launched German

Left to right - Ian Webb, Joint MD, Teekay and Klaus Reimers.





To find out how FleetBroadband helps the Marianne Schulte and NYK Antares save fuel and time, stow away or watch the movie at [inmarsat.com/fuel](http://inmarsat.com/fuel)

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operation Teekay Rohrkupplungen GmbH in Ratingen, near Düsseldorf, Germany.

The new company will, according to joint MD Ian Webb, meet the expanding business potential throughout North and Central Europe including Germany, Austria and Scandinavia; developing the business in five key sectors; marine, water, civil engineering, building services and industrial.

Headed by MD, Klaus Reimers the new company will include a logistics team with nearby warehouse facilities offering rack, re-box and distribution services.

The complete product range will be available, including market leading products such as the Axilock-FP range which complies with IACS and VdS requirements.

The German company is expected to achieve a turnover of 100,000 couplings in its first 12 months.

A major cruise vessel builder in Germany is currently using 50,000 couplings per year. Teekay Couplings Ltd has been selected by BAE Systems to supply Axilock-FP couplings for the Type 45 Anti Air Warfare Destroyer Project, the backbone of the UK Royal Navy's future air defence capability.

**Contact** Teekay Couplings Ltd., Disraeli House, 12 Aylesbury End, Old, Beaconsfield, Buckinghamshire, HP9 1LW, UK.

**Tel** +44 1494 679500

**Fax** +44 1494 679505

**E-mail** info@teekaycouplings.com

**www**.teekaycouplings.com

#### Interiors

## Trimline dresses Azura

Southampton-based Trimline has secured another major order for soft furnishings to be fitted onto P&O Cruises' newest superliner to be built for the British market, *Azura*.

The 116,000tonnes *Azura* is being built at Fincantieri's Monfalcone shipyard near Trieste in Italy and will enter service next spring with over 20,000 items of soft furnishings manufactured by Trimline for its passenger and crew cabins.

Trimline was initially contracted to fit out state rooms on Cunard's *Queen Mary 2*, and this was followed by a further major project to provide similar fittings for P&O Cruises' *Ventura*, which entered service last year. The *Azura* will see Trimline start manufacturing the furnishings next month.

"The *Azura* project is another massive success for us in winning this type of work against fierce

international competition," explained Trimline sales and marketing director Mike Oliver. "We have until early next year to complete the manufacture and we will then have a team in the yard completing installation. We are also hopeful of securing further work on the ship as she completes her fit out."

The project will see Trimline make more than 4000 bed throws, some 3000 valances, more than 4000 scatter cushions and over 5000 pairs of curtains. Some 21,000m of fabric will be used.

The furnishings will be placed in 1557 passenger state rooms and over 600 crew cabins. Once on site in Monfalcone, Trimline personnel will also fit curtain tracks in each of the rooms.

"It will be a considerable task to ship out all the furnishings, but we have gained experience on the Cunard and P&O Cruises ships that we have worked on," added Mike Oliver.

**Contact** Trimline Limited, Trimline House, Paget Street, Southampton, SO14 5GN, UK.

**Tel** +44 23 8033 4242

**Fax** +44 23 8033 4235

**E-mail** enquiries@trimline.co.uk

**www**.trimline.co.uk

#### Shipbuilding

## Wilhelmsen gets contract

Wilhelmsen Marine Engineering has won an order from Meyer Werft in Germany to finalise the cruise ship *AIDAblu* and two new cruise vessels, NB689 (unnamed) and NB690 (unnamed) being built for the German cruise operator, AIDA Cruises.

Under the terms of the deal, Wilhelmsen Marine Engineering's subsidiary, Wilhelmsen Callenberg Fläkt will deliver heating, ventilation and air conditioning (HVAC) systems and related engineering services. The order has an estimated value of €10.4million.

The latest contract with Meyer Werft is very significant, says Mikael Ströby, Wilhelmsen Marine Engineering's director for the new building and cruise segments: "It confirms that we are also competitive in today's tighter market and can meet the exacting demands of leading shipbuilders and operators alike."

**Contact** Wilhelmsen Marine Engineering, PO Box 754, SE-451 63 Uddevalla, Sweden.

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# Hybrid hull will meet all luxury yacht speed needs

Luxury yachts often operate at lower speeds, but their hulls are designed to meet the needs of a fast moving vessel. Van Oossanen & Associates says it has brought the benefits of two hull forms together to develop the Fast Displacement Hull Form.

In recent years, the design of luxury motor yachts has focused on ever-higher speeds. Design briefs often state speeds that would require traditional “displacement”-type motor yachts to be pushed over the hull speed into, or just over, the primary resistance hump, to the semi-displacement regime.

To obtain semi-displacement speeds, owners and yards almost automatically think of a hard chine hull form (basically derived from a planing hull form) to achieve good performance at the maximum speed. However, a hull well designed for a speed of, say, 25 or 30 knots is often not very efficient at running at 13 knots. In reality, most of these yachts hardly ever run at top speed, but mostly operate at a much lower cruising speed. This is much more economical and comfortable. For vessels with a large variation in operating profile, the behaviour and performance of the yacht over the entire speed range must be taken into account.

From numerous experiments and calculations it is found that there are merits in deviating from a “traditional” displacement or semi-displacement hull form to a hybrid concept, here entitled the “Fast Displacement Hull Form”.

## Fast Displacement Hull Form

The Fast Displacement Hull Form (FDHF), as developed by Van Oossanen & Associates b.v. (VOA), is aimed at semi-displacement vessels that need to achieve a good over-all performance rather than only achieving optimum performance at maximum speed. The FDHF displays resistance values at both displacement and semi-displacement speeds, that are lower than those of well-designed conventional semi-displacement vessels. This results in an improved economic efficiency and less environmental impact in terms of engine-emissions.

The FDHF concept is based on a round bilge hull form with integrated spray rails in

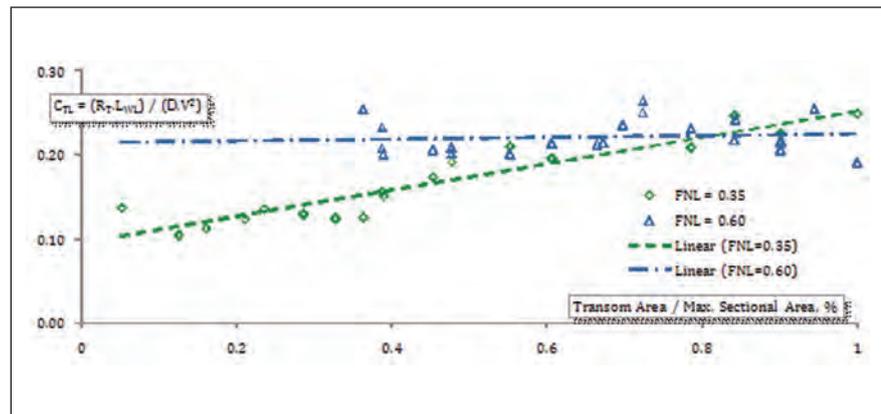


Figure 1. Dependency of resistance on the immersed transom area at FNL = 0.35 and 0.60.

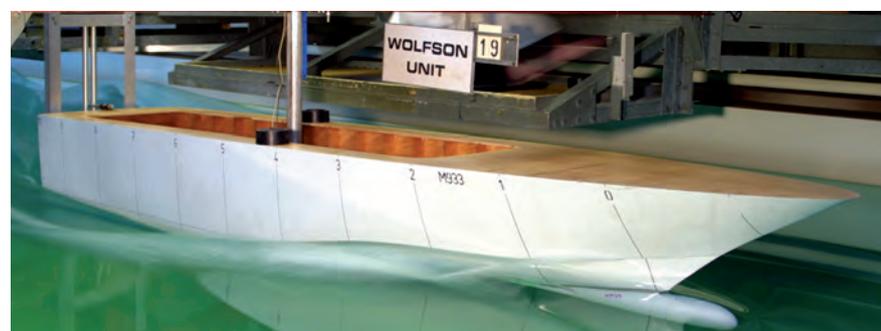


Figure 2. Model at a Froude Number of 0.55 without bulbous bow (top) and with bulbous bow (bottom).

the forebody, a small immersed transom area, dynamic trim control and a bulbous bow. A number of yachts have already been built

with some features of this concept, resulting in good, well-performing and pleasantly behaving vessels, over the entire speed range.

# The Royal Institution of Naval Architects

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### Second Notice



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RINA's next international conference covering historic ships, building on previous successful events, will explore the technical issues involved in the preservation, restoration and replication of historic vessels, including large passenger ships, warships, coastal & inland craft.

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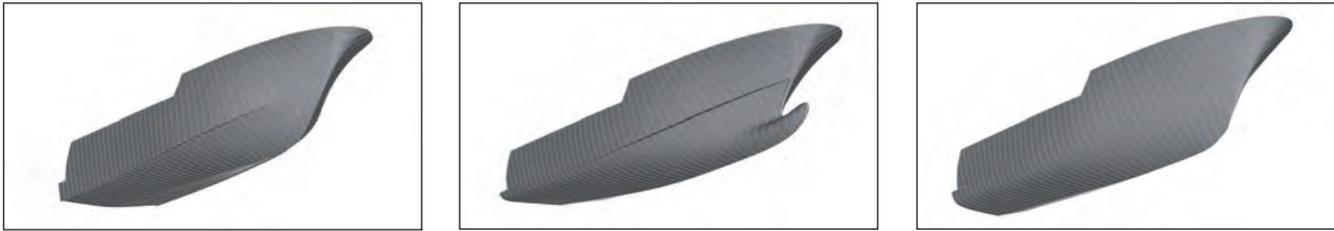


Figure 3. Compared hull forms: the hard-chine semi-displacement vessel (left), the equivalent FDHF (middle) and the corresponding NPL Hull (right).

Significant research has been carried out regarding the advantages and disadvantages of round bilge and hard chine hull forms. From a calm-water resistance point of view, hard chine hulls are to be preferred only for a Froude Number (FNL) of over 0.75. This conclusion is drawn from a comparison of a large number of model series, where the NPL series stands out from a resistance point of view.

From a seakeeping point of view, round bilge hulls are supposed to be superior at displacement speeds, but at semi-displacement speeds there is no consensus about which hull form is superior. The influence of main dimensions such as slenderness ratio, length to beam ratio etc. have a far more significant influence on seakeeping than the actual section shape.

Semi-displacement yachts often have a large immersed transom area (typically well over 50% of the maximum sectional area) in order to assure a low dynamic

trim around the primary resistance hump and in the semi-displacement speed range, where it reduces resistance significantly.

At lower (cruising) speeds however, when the transom has not run dry (as is usually the case for these yachts), the submerged transom causes a large portion of the total resistance of the yacht at those speeds. In Figure 1, the Telfer Coefficient  $C_{TL}^1$  is plotted on the basis of the relative immersed transom area for a number of displacement and semi-displacement models tested, for  $F_{NL} = 0.35$  (cruising speeds) and 0.60. It can be seen that the transom area is a very dominant factor in the resistance at cruising speeds, but hardly so at the higher Froude Number.

When applying a small immersed transom area, additional means to provide lift in the aft part of the hull is needed. An interceptor is found to be very effective for this cause. In the primary resistance hump and at semi-displacement speeds, a resistance reduction of about 7 to 10%

is often achieved.

Spray rails, above certain speeds, provide additional lift in the forward part of the hull and break the spray sheet of the bow wave. They are practical in keeping the deck dry.

The bulbous bow has been a common feature on displacement hull forms since the 1960s. Although at first difficult to design, nowadays, by means of computational fluid dynamics (CFD) optimisation methods, the naval architect has a much better grasp on the optimum hydrodynamic shape of a bulbous bow. Typical gains in resistance are around 15% in the displacement speed range.

Bulbous bows are commonly used up to the hull speed or slightly over. Experiments carried out by VOA indicate that bulbous bows can also be applied at semi-displacement speeds. Recent tests, see Figure 2, have shown that applying a bulbous bow can be effective at Froude Numbers of over 0.60.

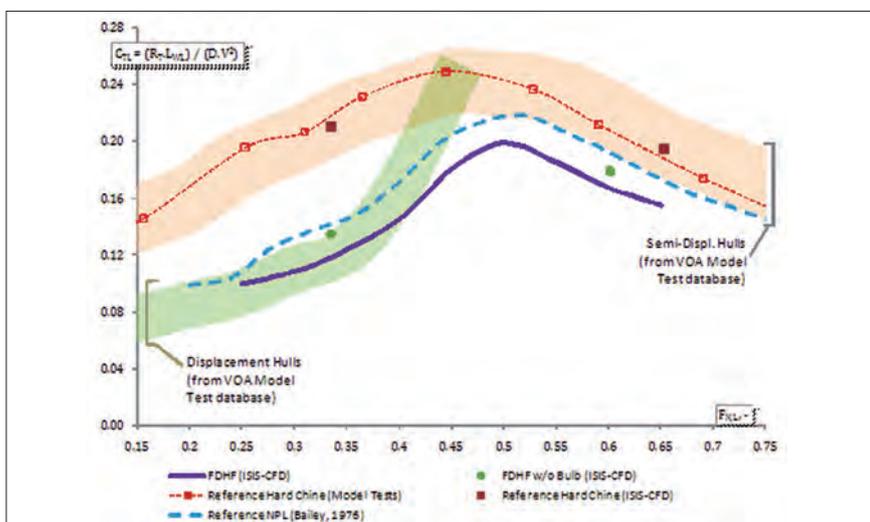
### Resistance Analysis

As an example, the design of a semi-displacement yacht, 275tonnes and 45m in length overall, has been adopted. The speed range is from a 13knot (cruising speeds) to 24knots (maximum speed).

Hard-chine semi-displacement hull forms, of which tank test data are available, as well as the equivalent hull form from the NPL series, are selected as reference hulls. These hull forms have the same length, length-beam ratio and length-displacement ratio. In Figure 3, an impression of the hull forms is given.

Figure 4 shows  $C_{TL}$  curves for various hull forms. For the FDHF and the reference hard chine hull, CFD calculations have been carried out using ISIS-CFD, developed by Ecole

Figure 4.  $C_{TL}$  curves for typical displacement and semi-displacement hulls, the FDHF and the reference hard chine and NPL hull.



# RINA – LLOYDS REGISTER EDUCATIONAL TRUST SHIP SAFETY AWARDS

Nominations are invited for the 2009 RINA - Lloyds Register Educational Trust Ship Safety Awards.  
Entries close 31st December 2009

## The RINA- Lloyds Register Educational Trust Ship Safety Awards

recognise recent innovations or developments which have led to an improvement of safety at sea, or which have the potential to do so.

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

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

There are separate categories for universities and industry. An Award of £1500 is made in each of the categories and will be presented at the 2010 RINA Annual Dinner.

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



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The Royal Institution of Naval Architects  
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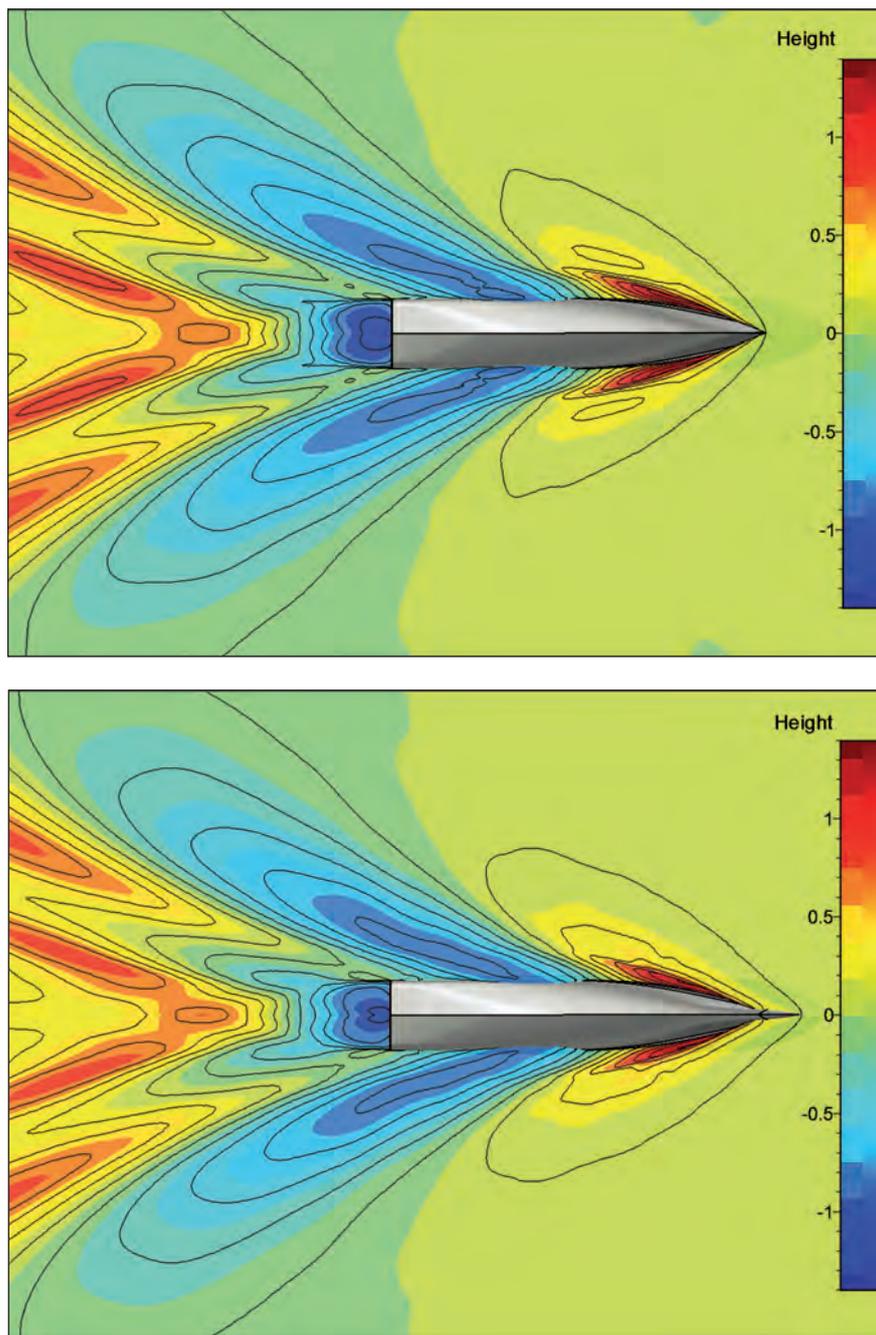


Figure 5. Comparison of wave elevations for the FDHF, without bulbous bow (left) and with bulbous bow (below left) at  $F_{NL} = 0.60$ .

develop a yacht with a similar stability range as the equivalent hard chine yacht, an 8% increase in beam of the FDHF is necessary. This is particularly due to the “weak” bilges of the FDHF, causing a reduction in the metacentric radius at moderate angles of heel.

Another practical consideration may be that, as the FDHF has a rather slender forebody, less interior space is available for accommodation. This might also lead to an increase in beam of the FDHF.

To quantify a widening of the FDHF in terms of resistance, additional CFD calculations have been carried out. A widening of 8%, showed only a marginal increase in resistance (by about 1.5%) at  $F_{NL} = 0.6$ . The same observation is made for the NPL series, where a similar increase in beam results in a 0.7% resistance increase.

### Conclusions and perspective

The concept of the Fast Displacement Hull Form is favourable from a resistance point of view. At displacement speeds resistance values of the FDHF are comparable to displacement yachts and show a major improvement relative to typical semi-displacement motor yachts.

Currently, the design of a 28knot, 65m motor yacht, fully to the FDHF concept, is underway. Future work scheduled to be carried out will most likely lead to further improvements in resistance values for the FDHF. **NA**

Centrale de Nantes and made available by Numeca.

At cruising speeds, it can be seen that the FDHF performs equal to the typical displacement hull form, but is significantly better than the average semi-displacement hull form with 40% less hull resistance. At a speed corresponding to  $F_{NL} = 0.6$ , the FDHF has over 15% less drag than the equivalent Hard Chine hull.

CFD results for the FDHF without bulbous bow are also shown. A resistance reduction of over 12% is found around

the cruising speed and about 8% at  $F_{NL} = 0.60$ , see Figure 5.

Trial predictions made for the reference hard chine vessel and the equivalent FDHF, show that the FDHF improves top speed by almost 2knots and improves the range at the cruising speed by over 1500 nautical miles, see Figure 6.

### Practical considerations

It is well-known that a round bilge hull has a lower initial stability than a comparable hard chine hull. Stability analyses indicate that, in order to

1. In order to compare the resistance of various types of hull forms of various lengths and displacements, the so-called Telfer Coefficient,  $C_{TL}$ , is found to be a convenient method.

$$C_{TL} = (Rt/\Delta)/(V/\sqrt{LWL})^2$$

### References:

Perry van Oossanen, Justus Heimann, et.al. (2009). ‘Hull Form Design for the Displacement to Semi-Displacement Speed Range’. RINA, FAST 2009.

Perry van Oossanen, naval architect, Van Oossanen & Associates by

Costerweg 1F, Wageningen, The Netherlands. [www.oossanen.nl](http://www.oossanen.nl).

# EUROPORT 2009

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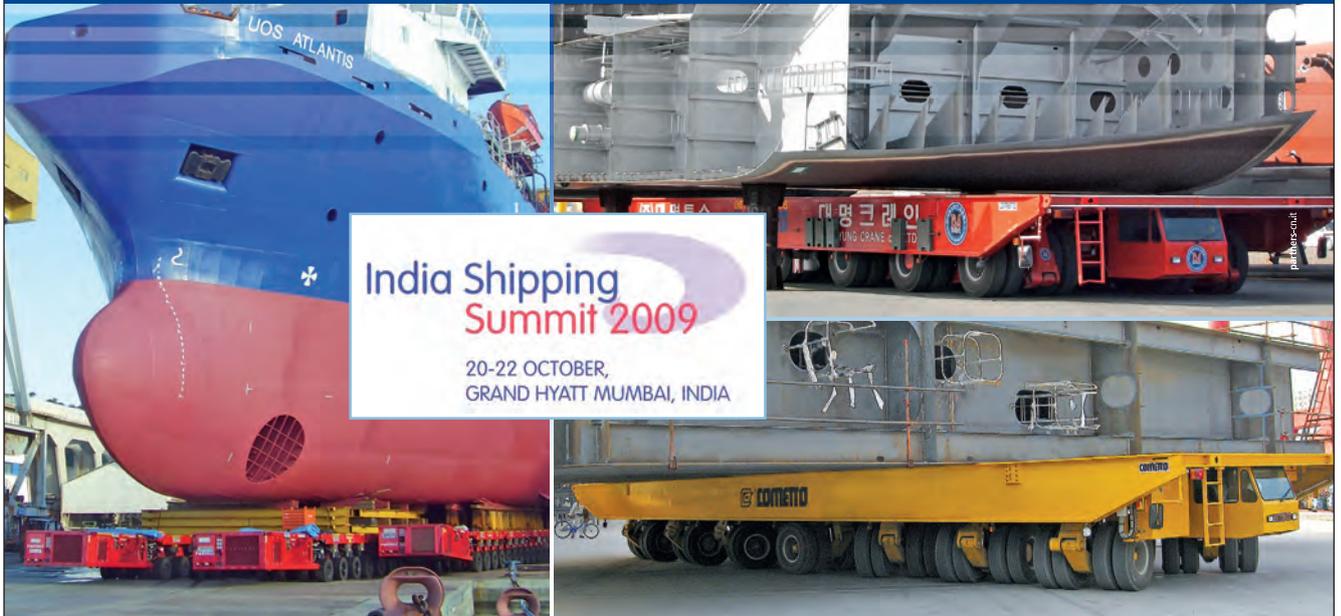
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# The *W*orld Superyacht Awards

## Young Designer of the Year 2010

A prestigious award for talented young superyacht designers is to be awarded at the  
Boat International Media 2010 World Superyacht Awards

The Royal Institution of Naval Architects, the Boat International Media and Camper & Nicholsons International invite entries for the 2010 World Superyacht Young Designer Award competition.

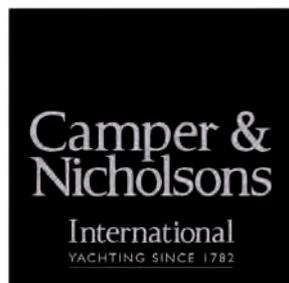
Introduced with great success in 2008, the World Superyacht Young Designer Award competition provides a showcase for young designers to demonstrate their ability and talents, and encourages the development of the next generation of superyacht designers.

The World Superyacht Young Designer Award will be presented to the winner of the competition at the World Superyacht Awards ceremony in May 2010, at which the remarkable ingenuity and innovation demanded in the design, engineering and construction of the world's finest luxury yachts is demonstrated, and is the most obvious place for new designer talent to be recognised and celebrated.

### The Competition

The competition is open to anyone who is studying for a degree or vocational qualification in a subject relating to yacht or small craft design, or anyone who has already graduated within three years of the closing date for entries, which is 31 January 2010.

The 2008 and 2009 competition saw many entries from all over the world, as far afield as NZ and China, as well as from all over Europe. RINA's CEO Trevor Blakeley is proud that RINA is continuing to support this award for young designers: 'The superyacht industry is one of the most successful sectors of the maritime industry, and owes much of that success to the work



of its designers who provide that unique combination of form and function, which is the modern superyacht.'

### The Award

The World Superyacht Young Designer Award will be presented to the young designer who produces the best concept design for a superyacht. The entries will be judged by a group of leading world-class designers selected by the Royal Institution of Naval Architects and Boat International Media. The winner of the Award will receive a prize of €5,000 and will be invited to receive the award at the renowned World Superyacht Awards ceremony.

### The sponsor

The Award is organised by the Royal Institution of Naval Architects and Boat International Media, and is sponsored by Camper and Nicholsons International: 'Following the joint Camper & Nicholsons International - Boat International initiative three years ago to reward the work of yacht

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

The closing date for entries is 31 Jan 2010. If you are interested in submitting an entry or would like more information, contact Giuseppe Gigantesco, E-mail: [ggigantesco@rina.org.uk](mailto:ggigantesco@rina.org.uk), Tel: +44 (0)20 7235 4622

The Royal Institution of Naval Architects, 10 Upper Belgrave Street, London, SW1X 8BQ The rules for the competition can be viewed at [www.rina.org.uk/wsyaward](http://www.rina.org.uk/wsyaward)

also occurs on a moored ship adjacent to a berth, when an ebb tide is flowing.

Whether the vessel is moving ahead at speed or is a static ship in an ebb tide, it can be observed that draft changes take place compared to the vessel that is stationary floating in water of zero current speed.

When an ebb tide is present there are changes in the constant for each positive value of the ebb tide speed. Average values for an ebb tide is 4knots. In some cases it can be up to 6knots, after heavy rain or when snows thaw.

It means that a person undertaking a draft survey will overestimate the mean bodily sinkage leading to a discrepancy in the constant prediction. Over the period of one year, for a ship-owner anxious not to overload his vessel, this could amount to an important and significant loss of earnings.

The plimsoll line could be submerged simply due to the effects of an ebb tide, and not because of overloading a vessel.

Three vessels have been chose to illustrate the change in cargo deadweight constant and maximum ship squats relating to ebb tide speeds. They are:

1. Molasses tanker in laden condition.  
See Table 1.
2. Molasses tanker in light condition.  
See Table 1.
3. 2090dwt ro-ro vessel.  
See Table 1.
4. 100,000dwt very large crude Carrier (VLCC).  
See Table 1.

There are 13 variables, as outlined in Table 1, connected with the estimation of Cargo deadweight Constant in an Ebb Tide. They are:

**Notes regarding Table 1.**

The first 6 out of 17 columns give General Particulars relating to each of the selected vessels.

In Column 7, the  $C_b = (W/\text{density}) / (L \times b \times T)$

In Column 9, the width of influence =  $\{7.04 / (C_b)^{0.85}\} \times b$  metres.

In Column 10, B = (gangplank gap, shore to shipside) +  $(0.50 \times b) + (0.50 \times \text{width of influence})$ .

If the width of river water is less than this B, use actual width of river for predicting the blockage factor.

In Column 12, S = the blockage Factor.

In Column 13, the  $K_c = 5.74 \times S^{0.76}$

In Column 14, the  $K_{mbs} = 1 - 20(0.700 - \text{ship's actual } C_b)^2$

In Column 17, 'W error' is the change in displacement due to Ebb Tide speed being positive. It is the cargo deadweight constant modified only for ebb tide speed.

**Tables and Graphs.**

Table 2 gives the Cargo deadweight constants or changes in displacement for the four ship conditions. Range of tide speeds are from 0 to 5knots. Figures 2a and 2b graphically show the data contained in Table 2.

Table 3 gives the maximum squats for the four ship conditions. Range off Tide speeds are from 0 to 5knots. Figures 3 graphically show the data contained in Table 3.

**Formulae.**

The Global formula for change in displacement is:

$$K_c \times K_{mbs} \times (\text{max squat in open water in}$$

cms @ H/T of 1.10)  $\times$  TPC tonnes.

The change in Displacement for each ship condition reduces to:

Ship 1.....displacement change =  $15.56 \times (V_T)^2$  .....tonnes.....see Figure 2a.

Ship 2.....displacement change =  $13.25 \times (V_T)^2$  .....tonnes.....see Figure 2a.

Ship 3.....displacement changer =  $14.22 \times (V_T)^2$  .....tonnes.....see Figure 2b.

Ship 4.....displacement change =  $83.50 \times (V_T)^2$  .....tonnes.....see Figure 2b.

The Global formula for maximum squat is:  
 $K_c \times (\text{maximum squat in open water @ H/T of 1.10})$  metres.

The maximum squat for each ship condition reduces to:

Ship 1.....max squat =  $0.0094 \times (V_T)^2$  .....metres.....see Figure 3.

Ship 2.....max squat =  $0.0081 \times (V_T)^2$  .....metres.....see Figure 3.

Ship 3.....max squat =  $0.0069 \times (V_T)^2$  .....metres.....see Figure 3.

Ship 4.....max squat =  $0.0122 \times (V_T)^2$  .....metres.....see Figure 3.

When moored, if a vessel is on even keel and the Ebb Tide is approaching the vessel's Bow, then:

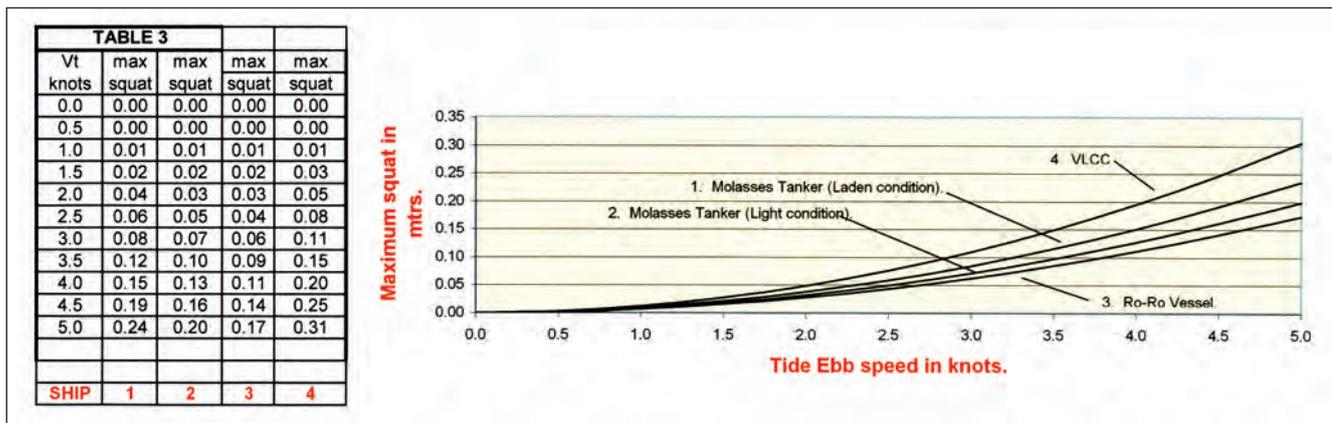
When  $C_b > 0.700$ , Max squat will occur at the bow. ship trims by the bow.

When  $C_b < 0.700$ , Max squat will occur at the stern. ship trims by the stern.

When  $C_b$  is very close to 0.700, max squat will occur at the bow, amidships and the stern. There will be no trim component in the squat value.

When moored, if a vessel is on an even keel and the ebb tide is approaching the vessel's Stern, then:

Maximum squats against tidal ebb speed.



# The Royal Institution of Naval Architects

## MARINE & OFFSHORE COMPOSITES

3-4 February 2010, London, UK

First Notice & Call for Papers



This conference will explore recent and future composite developments for the marine and offshore industry, looking at not only their application in piping and secondary structures (grating, handrails, cable trays, etc) but also increasingly for large scale primary structure. Recent changes in SOLAS and other regulation away from prescriptive rules has opened the door for composites to be more widely used in the maritime sector. These developments brings new challenges in terms of large scale production issues, structural integrity, fatigue resistance, load transfer to metal structures, fire safety, etc.

In order to maximize the potential for weight and cost savings that composites can offer, a detailed design of laminate specification is required to make the most efficient structure, whilst maintaining design safety and minimising the chance for problems in production. An ever widening choice of resins, fibres and cores, are available, the decision of which to use, where and what production method to employ adds to the complication of finding the optimum design solution.

RINA invites papers from material manufacturers and suppliers, designers, builders, class societies, repairers, and regulators, on all aspects of marine and offshore composites, including, but not exclusive to:

- New materials; high modulus fibres, fibre-metal composites, organic materials
- Design experience & procedures
- New production processes
- Deriving laminate specifications
- Minimising errors in production
- Resins and Cores
- Interaction with metal structures - load transfer and corrosion
- Recycling of old composites

[www.rina.org.uk/composites2010](http://www.rina.org.uk/composites2010)

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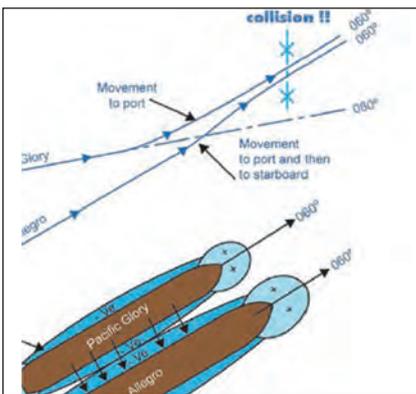
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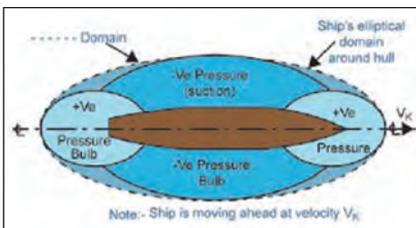
The Freedom of the Seas, the world's largest cruise liner at 154,000gt, the size of the vessel and its squat can increase the possibility of grounding.

When  $C_b > 0.700$ , Max squat will occur at the Stern. Ship trims by the Stern.  
 When  $C_b < 0.700$ , Max squat will occur at the bow. Ship trims by the bow.  
 When  $C_b$  is very close to 0.700, Max squat will occur at the Bow, amidships and the Stern. There will be no trim component

A collision between the *Pacific Glory* and the *Allegro* on 27 October 1970 the vessels were drawn together after the ships came too close.



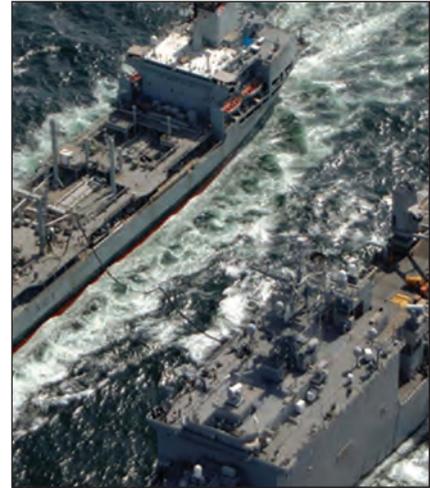
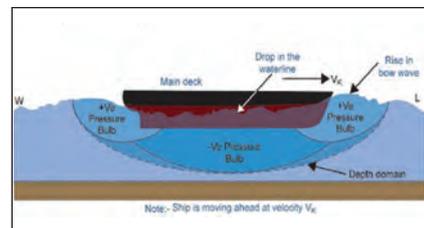
Pressure bulbs around a moving vessel.



in the squat value.  
 When moored, if a vessel is trimming by the Bow or by the Stern, and an Ebb Tide is present, then maximum squat will occur under the larger static end draft. The Dynamic trim will always be added to the static trim. This is why it is advisable to have the moored ship on even keel when ebb tide is zero.

**Conclusions:**

- With an ebb tide present, there are false drafts forward and aft. These false drafts give an over-estimation of ship displacement.
- The cargo deadweight constant can be quite appreciable, especially for the higher ebb tide speeds of 5knots in shallow water conditions. Note for the VLCC for a tidal speed of 3knots it was 752tonnes and at 5knots it was 2088tonnes.
- Of all the variables, the width of the gangplank (shore to shipside) makes



A replenishment at sea manoeuvre in the Persian Gulf, in February 2006

negligible difference in the preceding calculations.

- As H/T becomes less, the ship is more and more in shallow conditions. This leads to greater values for the cargo deadweight constant. It also leads to greater squats. Perhaps even causing the moored vessel to go aground in the silt and mud adjacent to a jetty!!
- Effects of mooring lines, side fenders and gangplanks etc will have some bearing on the final magnitudes derived. Nevertheless, this mathematical treatise has shown that there is a strong case for including tidal speed within a draft survey. **NA**

**References.**

Capt W J Dibble & Capt P Mitchell, *Draught Surveys*, published by MID-C 1994.  
*Significant ships of 2008* RINA annual publication, from 2005 to 2008.  
 Dr CB Barrass Ship, *Squat and Interaction* published by Witherby Seamanship International Ltd Sept 2009.  
 Dr C B Barrass FRINA. International Maritime Consultant.  
[www.ship-squat.com](http://www.ship-squat.com)

Excessive squat causing grounding of a fine form vessel.



# Joining forces for Aluminium

Aluminium can be a lightweight alternative to steel because it is more easily worked, making it quicker and cheaper to use.

Sapa has presented, at the Lightweight Marine Structures (LIWEM) conference earlier this month, an overview of aluminium panel concepts, characteristics and applications in relation to aluminium extrusions and friction stir weld (FSW) joined panels.

## Introduction

Stiffened plates are found in many types of structures ranging from trains on land, to helicopter decks on offshore platforms, to ships travelling the world's oceans. Demands on low weight for such structures occur depending on the application. In general, anything that moves or is moved benefits from an economical point of view by having low weight. For trains and ships it may relate to the cost of fuel consumed over the life time of the structure.

## Material properties and semi fabricated products

For structural purposes in marine applications EN-AW-5000 (AlMg) and EN-AW-6000 (AlMgSi) alloys are typically used. EN-AW-5000 alloys obtain strength by work hardening and are mostly supplied as plate and sheet products. EN-AW-6000

	EN-AW-6005A	EN-AW-6082
Density	2700 [kg/m <sup>3</sup> ]	2700 [kg/m <sup>3</sup> ]
Rp02	200 – 225 [N/mm <sup>2</sup> ]	250 – 260 [N/mm <sup>2</sup> ]
Rm	250 – 270 N/mm <sup>2</sup>	290 – 310 N/mm <sup>2</sup>
A5	8 %	8 – 10 %
E	70000 N/mm <sup>2</sup>	70000 N/mm <sup>2</sup>
Thermal expansion	23x10 <sup>-6</sup>	23x10 <sup>-6</sup>
Thermal conductivity	190 [W/m°C]	190 [W/m°C]

Table 1. Physical properties for extruded EN-AW-6000 alloys used in panel applications (3). Strength values vary depending on thickness and shape (solid, hollow).

alloys are hardened by aging and mostly used in extruded applications.

The physical properties for the most frequently used, extruded aluminium alloys, in the T6 condition are given in Table 1.

Aluminium structures weigh typically about half of their steel counterparts' weight. Variation occurs depending on design and application.

Extrusions come in a limitless variety of size and length. The freedom of designing a cross section to fit a certain function is a strong argument as fabrication costs can be eliminated in the

design stage. This is a different approach compared to designing a structure by using standard sections.

Extrusion die cost is fairly low, so dies are often made to do short production runs when prototyping. When the section is satisfactory production is done in the same die.

Large extrusions, with billet diameter exceeding 12 inches (28mm), are used in structures as primary beams. The die cost increases significantly for such extrusions. The minimal thickness in large extrusions sometime exceeds what is necessary from a design point



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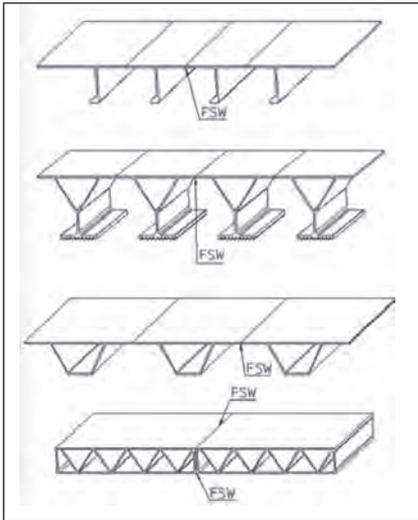


Figure 1. Various panel concepts.

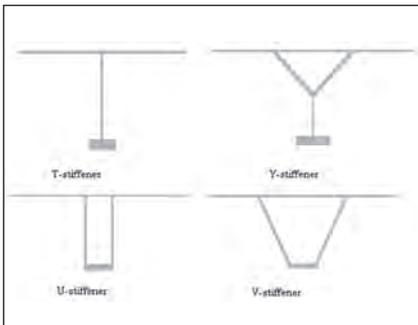


Figure 2. Stiffener geometries with various degree of torsion stiffness.

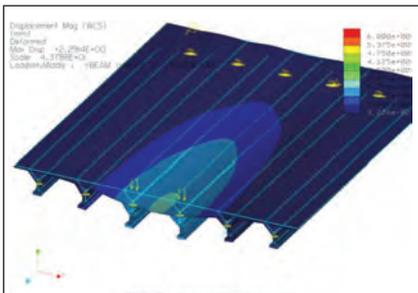


Figure 3. FEM analysis of concentrated load on deck panel. In this case Y-stiffeners. Same case for various stiffeners shown in Table.

of view. In some applications it makes more sense to join a number of smaller extrusions.

### Panel types and characteristics

The application, load conditions and boundary conditions, along with cost decide which panel concept is most appropriate. In the simple case where the

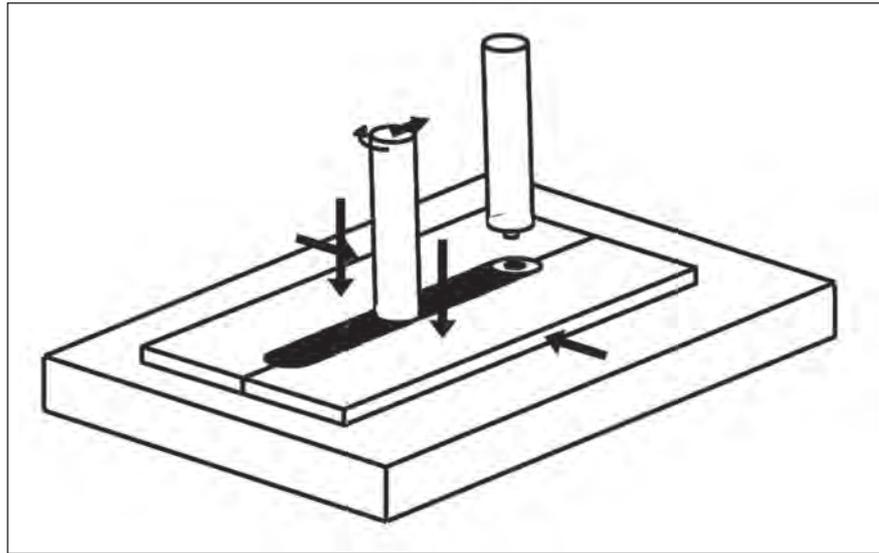


Figure 4. Principle for Friction Stir Welding. Extrusion based panels allow for integration of function unmatched by sheet or plate based panels as the extrusions may include tracks or similar for fastening equipment.

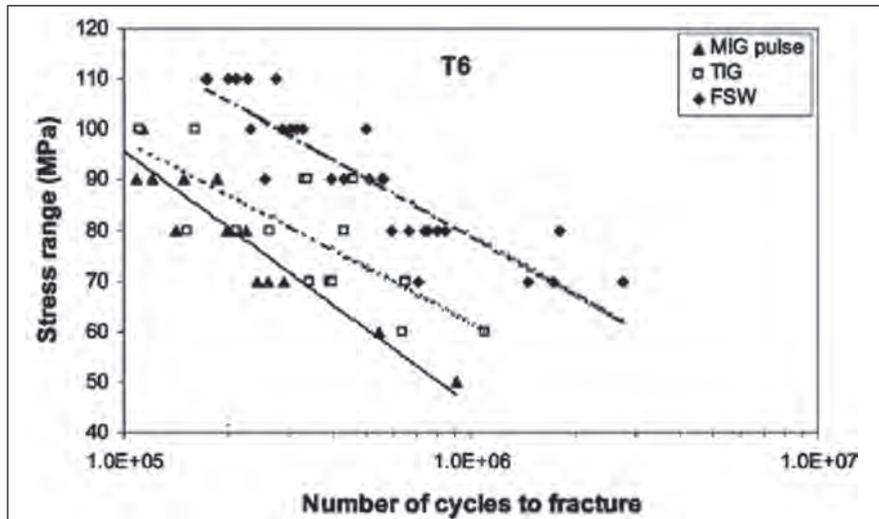


Figure 5. Comparison of fatigue analysis for different welds.

panel is subject to uniform, distributed load, a single skin solution with stiffeners (L-, T shaped) is an efficient solution. On the other hand in a situation where the dominant load is a concentrated force, a double skin solution or single skin panel with hollow stiffeners is often more efficient, c.f. figure 1.

To illustrate the influence of stiffener geometry on panel behavior, a small study was conducted. Four panels were analysed. The panel dimensions were identical. Four types of extrusions/stiffeners were used; T-, Y-, U-, and V formed, c.f. figure 2. The top flanges of the extrusions are identical, the

inertia is identical, and the section area identical except for the T-section which was slightly lower. The load, a concentrated load to simulate a car wheel, is applied at the centre of the panel and is identical in all four cases.

Results are given in Table 2, which illustrate the influence of torsion stiffness on deflection. Deflection decreased as torsion stiffness increased.

The extrusion process enables the incorporation of function in the cross section. This may be edge preparation for MIG welding or tracks for fastening things. It is possible to create solid or

# The Royal Institution of Naval Architects

## Air Cushion Vehicles & Surface Effect Craft

17 - 18 November 2009

### Second Notice



As part of the celebrations marking 50 years since the launch of the SRN-1, the UK's first hovercraft, RINA will be running another of its successful conferences on the subject of hovercraft and surface effect craft. This will not only be an opportunity to look back on 50 years of development, but more importantly a chance to look forward to the current and future developments in the field.

The conference will also cover the latest developments in design, manufacture and operation of surface effect craft.



The merits of such vehicles over other marine vessels are becoming increasingly clear especially with the new problems related to climate change, rising global sea levels and major natural disasters. This diversification of roles brings new challenges for both designers and operators.

RINA invites papers relating to both Surface Effect Craft and Air Cushion Vehicles, covering all aspects of Design, Operation, Development and Regulation.



The conference programme is now available to download at [www.rina.org.uk/ACVandsurfaceeffectcraft](http://www.rina.org.uk/ACVandsurfaceeffectcraft)

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Figure 6. Aluminium deck displaying L-Stiffeners.



Figure 7. shows double skin panels typically used in heavy vehicle decks and train floors.

Table 2. Behaviour of stiffened plate subject to concentrated load. Panel dimensions, section area, and inertia similar for all cases. Deflection measured at same point.

Stiffener type	Relative deflection
T	1.00
Y	0.78
U	0.72
V	0.67

hollow cross sections depending on the need.

In applications where the panel is subject to concentrated loads, such as tyre loads, there are local areas, where stress concentration may give rise to fatigue. One such area is the intersection between a flange and web in a deck panel. In plate structures this may determine the minimal dimensions for flange and plate. In an extrusion based structure it is possible to strengthen the intersection locally by increasing the corner radius.

The bulk of the flange and web can be kept to a minimum thus eliminating unnecessary weight.

### Joining methods

In panel applications for large structures i.e. ships and trains, the majority of the joints are welded. MIG welding is a common method. - friction stir welding, (FSW), [1], [3] is another method used in panel production. FSW is a solid state joining method with less heat input than MIG, thus resulting in less distortion. FSW provides higher joint strength and ductility than MIG welding, c.f. Table 3. If joining is done in T4 condition and heat treated afterwards then strength in the heat affected zone is equal to that of parent material.

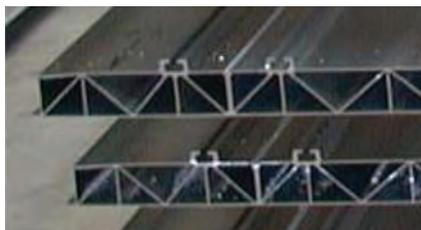


Figure 8. FSW panel used in hoist deck. Single skin deck with hollow stiffeners integrated in the extrusions.

Fatigue properties for FSW joints are equal to and often better than that for other methods, c.f. figure 5.

Mechanical joining is used in various designs and situations. In trains, mechanical fasteners such as Huck Bolts are used to join prefabricated panels into car structures. The absence of heat input provides better overall handling of tolerances. Holes for the bolts are made in the fabrication process, often by CNC milling which provides the necessary accuracy in tolerance.

### Production aspects

Part of the value of using prefabricated aluminium panels is realised in production of the panels and assembling them into the final structure. This includes typically welding, cutting, machining as well as handling and fitting.

Cutting and machining aluminium is generally faster and less labour intensive than in steel. Typical cutting speeds for wrought aluminium are 3-5 times faster than that for steel depending on quality. Tool lifetime is generally longer for cutting aluminium.

FSW panels have in general small distortion. In some cases typical distortion in 12 x 3m panels have been measured at below 10mm for FSW panels.

		Yield strength [MPa]	Tensile strength [MPa]
Base material parallel to press direction	T6,	291	303
Base material transv. to press direction	T6,	286	301
FSW T6	“	160	254
FSW T6 and aged	“	274	300
Base material T4	“	149	260
FSW T4	“	138	244
FSW T4 and aged	“	285	310

Table 3. Static strength of parent material and FSW welded material (3).

Extrusion width has influence on panel properties and cost. It is possible to produce thinner walls in smaller extrusions and by producing in a moderate size extrusion press. Large extrusions (> 12 inch billet diameter) call in general for thicker walls, higher start costs, and higher die cost. The increased cost for more joints may well be eliminated by lower die, material and extrusion costs.

### Application

Top decks of modern cruise vessels are typically constructed in aluminium, c.f. figure 6. Decks are designed with L-stiffeners integrated in the extrusion. Transverse stiffeners are mounted at the same plant as FSW joining.

The hoist deck is built up of hollow extrusions joined by FSW, c.f. figure 8. The deck is secured to a steel primary structure by screw joints.

### Conclusions

Aluminium is an excellent material for low weight panel type structures. The

combination of strength, low weight, corrosion resistance and formability make it suitable for ship type structures. By using extrusions joined by FSW it is possible to produce efficient designs tailored to specific needs. **NA**

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# Shipbuilding: the state of the art

Spring is just around the corner according to the public statements of some Korean yards, but their gloomy countenance and their plans for diversification into the offshore and green energy markets suggest the yards themselves are not entirely convinced that winter is drawing to a close.

As the optimism derived from the reinvigorated economic landscape evolves from a depressed global economy, following the financial crisis, maritime industry experts in South Korea are gripped by a pessimistic outlook as they acknowledge their star is on the wane.

Recession, like winter, is the period when the old order is laid to rest, but that is quickly followed by spring and the optimism of renewal.

Economic spring, however, will see a new dawn for a new order and the major financial crises of the type endured over the past year is having a significant effect on the shipbuilding industry. Just as the leading shipbuilding mantle was passed from Europe and the USA to post-war Japan and from Japan to South Korea in the 1980s and 90s the Koreans must pass on the accolade again, this time to the Chinese.

Though this is not a view that would receive any public backing, it is accepted by industry insiders that the shipbuilding world is entering a period of recession, whose scope and depth will surpass that of the wider global economy.

Past excesses in new ship ordering has seen every major maritime sector over-tonnaged and, while shipbuilders are continuing to build orders due to be delivered this year and next, there are virtually no newbuild orders beyond 2010.

Daewoo Shipbuilding and Marine Engineering (DSME) said that it had orders from Attica Enterprises in Greece for two ro-pax vessels and that it had some enquiries for con-ro, chemical tankers and wind turbine installation vessels, but there had been no confirmed orders, beyond the two Attica ships.

Samsung confirmed that 2009 had seen just a single LNG FPSO ordered in February this year, other major yards, including Korea's biggest yard Hyundai Heavy Industries, said they were experiencing similar difficulties. Small and medium sized shipbuilders claimed



Tugs tow two new builds out of Korea's Daewoo Shipbuilding and Marine Engineering yard.

they were in a different market and that they were not experiencing the same difficulties as their larger counterparts.

Although it may be true that the market for small and medium sized vessels had not been hit as hard as larger ship markets, it seems that the larger yards could be more resilient than their smaller cousins.

Many of the small to medium sized yards were said to be at risk and it is in these yards that most of the changing industry topography is expected to take place in South Korea.

One senior Shipyard executive, who did not want to be named, said that a number of smaller yards were "on life support". He said that banks had issued refund guarantees for newbuilding projects and were unwilling to allow the yards where these ships were being constructed to fail as they ran into liquidity problems.

However, when the projects were completed the bank's support for these yards would inevitably end and this would cause the financial collapse of the yard as it is unable

to pay for labour and other costs.

He said that at least half of South Korea's 30 or so yards were in financial difficulties with "two or three yards facing real trouble, they are in hospital with a serious illness, but they are not dead yet". There was an air of inevitability in his demeanour as he said that the number of yards, and hence the shipbuilding capacity, needed to be cut.

Another yard executive emphasised the point: "Middle sized and small yards will either go out of business or be merged and this difficult market will continue until the second quarter of 2010," he said. Although the good news is that he believed the market had now reached its nadir, although he went on to say that the container market boom was unlikely to return for another 10-15 years.

SLS was named as one of the yards said to be at risk and one of the possible reasons for this is the refusal by Glenda International Shipping, a joint venture between the Italian D'Amico Group and Glencore Group, to accept delivery of two 51,000dwt product tankers.



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Fabio Tagliabia, technical director at D'Amico, explained that the late delivery of the vessels meant that Glenda was entitled to cancel its order and demand repayment of all money paid, in this case around US\$60million for the two vessels. "The bank will pay the refund guarantee, but it will ultimately reclaim that money from the yard", said Mr Tagliabia.

He went on to say that the company expects that two further ships of this type will also be late and that the company will reclaim similar amounts from the yard for these vessels too.

Another yard, Daehan Shipbuilding reportedly accepted a US\$127million bail out plan from the Korean Development Bank (KDB) in the spring. The money was part of a rescue plan that would also see the company delay the redemption of debt and accept a US\$57.22million emergency fund from KDB.

Daehan is thought to have run into difficulty following the cancellation of two orders for 170,000dwt bulk carriers, thought to have been for Golden Ocean Group Ltd.

Larger yards that have "over-stretched" their investments could also be in some difficulty if their route to cash was to dry up. Such a scenario could happen if a yard that has taken the down payments on a raft of new orders, typically around 20% of the total vessel price, and invests that money elsewhere in the belief that with further new orders on the way funds will be available for

the building materials needed to pay for the initial project.

A yard that operated in this way would need to maintain its orderbook so that it could meet its earlier commitments, should the orders fail to materialise then the flow of cash could be stymied possibly with serious consequences for the stability yard.

New ship orders have now effectively ended and yards could find that after the current orders are fulfilled, by about the end of 2010, they will need to look for other avenues to maintain their business.

Most of the larger yards are looking to the offshore market and wind energy markets to replace their shipbuilding business in the short term at least. "China's increase in shipbuilding capability means that there is an overcapacity in the sector globally," said Sung-Mo Yoo vice president basic design and engineering team at Daewoo Shipbuilding and Marine Engineering (DSME). "But the Chinese are not in the offshore sector yet," he added.

DSME is also looking to diversify its shipbuilding to include more complex designs including LNG carriers, con-ro ships and wind turbine installation vessels. Mr Sung-ho also confirmed that the company was in negotiations to buy a 20% stake in the Brazilian owner Odebrecht who could order two to three FPSO vessels. In addition there could be a further eight FPSO orders from another Brazilian operator, Petrobras.

Samsung Heavy Industries is looking to diversify in order to beat the economic crisis.

DSME is also offering a number of upgrades to existing designs that will give greater operating efficiency to owners. One such device is the pre-swirl stator, which effectively is a set of four fins, three on the port side and one on the starboard that regulates the flow of water into the propeller, taking into account the direction of water swirl. Mr Sung-ho said that the pre-swirl stator can make between three and five percent energy savings. However, he admitted the device "was more efficient in calm seas".

One of these devices has been fitted to a Greek-owned VLCC, *Kristen*, and a second vessel, a CMA CGM boxship, will also be fitted with a pre-swirl stator.

Samsung said the company was taking a number of measures to help it through the recession. This included the designing of new vessels and entering new markets. Marketing manager Guensub Kim said the yard had designed a 16,000TEU container vessel and it was developing designs for LNG powered ro-pax ships, though the company was reluctant to reveal any details said Mr Kim.

In addition Samsung had developed a new system of shipbuilding over the past few years that would see it use mega-blocks, to construct vessels. Instead of building ships by welding between 150 and 200 blocks together Samsung says it will construct fewer blocks, 10 or 11, thereby reducing the time and, therefore, labour costs.

A further reduction in the company's wage bill was sought through the cutting of overtime work.

Like many other yards Samsung was also looking to diversify into the offshore and green energy markets, though Mr Kim said that the company believed that the shipbuilding market would see small increases in demand for ships in every sector from late 2010 to early 2011.

That optimism, however, appears to have been derived from the apparent recovery of the global markets rather than a detailed analysis of the various shipping sectors. Samsung may consider revising this forecast if next year starts as poorly as 2009. **NA**



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# Engine rooms need re-design says HHI

Meeting the challenges set by regulators is never easy, but in the case of nitrogen oxide (NOx) emissions meeting the new rules could pose a particular challenge as already congested engine rooms need more equipment to meet the standards. Hyundai Heavy Industries is working on a solution.

Crowded engine rooms are becoming a problem to design and build said JT Kim, vice president of Hyundai Heavy Industries' (HHI) Engine and Machinery Division. He believes that owners and designers need to completely re-design the compartments just to accommodate all the new equipment that is required to meet environmental legislation.

Mr Kim explains that the International Maritime Organization's (IMO) NOx emission controls have so far been relatively straight forward.

Tier 1 rules called for a maximum of 17g/Kw limits these were met by January 2001. Tier 2 regulations require NOx emissions to be reduced by 15.5-21.8%, depending on the engine's operating parameters, and will be adopted by January 2011 and, Mr Kim said, new engines produced at HHI already meet this standard.

Most stringent rules, however, are reserved for the Tier 3 rules which seek to reduce NOx emissions by 80% of Tier 1 levels by 2016. "Tier 3 is the most challenging, we have started development on this, but it will need external equipment [external to the engine, but within the engine room] to meet this regulation", explained Mr Kim.

Engine rooms are now so crowded with equipment that is designed to prevent pollution such as sea water scrubbers that reduces particulate matter from exhaust gases and charge air moisturisers which cools the combustion process in the cylinder thereby reducing NOx emissions.

Fitting all this equipment into an engine room is proving challenging and HHI is now attempting to meet this challenge in order that their engines will meet the Tier 3 regulations when they adopted.

"We are looking at producing a hybrid system, a sea water scrubber and charge air moisturiser combined into one unit," said

Mr Kim.

A further difficulty could be meeting Sulphur Oxide (SOx) regulations because

"We are looking at producing a hybrid system, a seawater scrubber and charge air moisturiser combined into one unit"



JT Kim.

fuels have different sulphur levels, according to Mr Kim. "Larger ships can separate fuels out using different tanks, but smaller vessels may only have one tank and so they will have to mix the fuels", he added. *NA*

Aerial view of Hyundai Heavy Industries' engine division.



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# Kogas takes aim at GTT's LNG monopoly

In an effort to restore the LNG industry's dented reputation and to offer an alternative to owners building LNG tankers Kogas has undertaken the task of transferring the technology it uses to transport the gas over land to ships.

Membrane cargo containment systems for LNG tankers are supplied entirely by the French company Gaztransport & Technigaz (GTT), however, some shipbuilders and operators have become increasingly uneasy in using these systems.

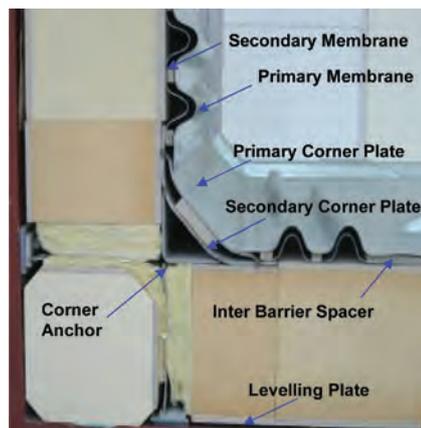
One company complained that the royalty fees paid to GTT were too high, up to 5% of the total cost of the containment system, and that this was making the total outlay for a LNG carrier disproportionately high.

Solving the sloshing difficulties experienced by tankers fitted with GTT's membrane system will be uppermost in the Kogas' collective mind as they test their new system, the KC-1 containment system (See Sloshing pg 36 NA Sept 2009). According to Korean maritime sources tests on a small "feeder vessel" were due to take place next year, but the tests have had to be postponed due to technological problems.

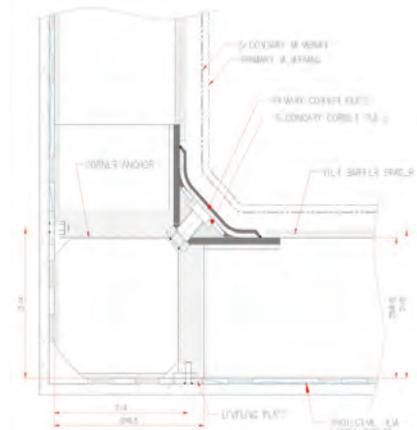
As a result of the cost and sloshing issues Kogas, the Korean Gas Corporation, which has experience in transporting LNG on land, set its research and development division the task of designing a containment system for seaborne tankers. Work began in the early part of this century with the construction of a land-based 1300m<sup>3</sup> tank in which tests on the insulation and membrane material have been carried out.

Kogas' Dr YM Yang, a project leader, said that further testing of the shipborne membrane had begun in July at the company's Incheon LNG centre and were due to continue through to December this year.

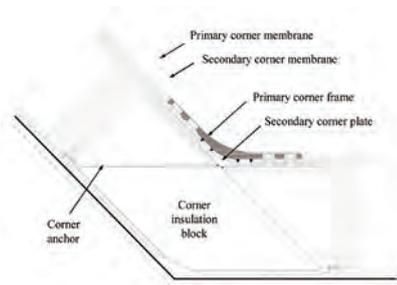
Dr Yang, however, acknowledged that the materials used in the KC-1 system were similar to those used by GTT in the MKIII membrane. Essentially the Kogas containment system uses a 1.5mm stainless steel type S304L barrier with i-grade polyurethane foam (PUF-i) insulation.



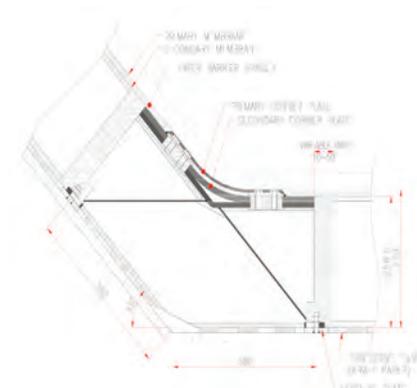
Corner anchor of the KC-1 membrane.



90deg corner part.



Section of 135deg corner of KC-1 membrane.



135deg corner part.

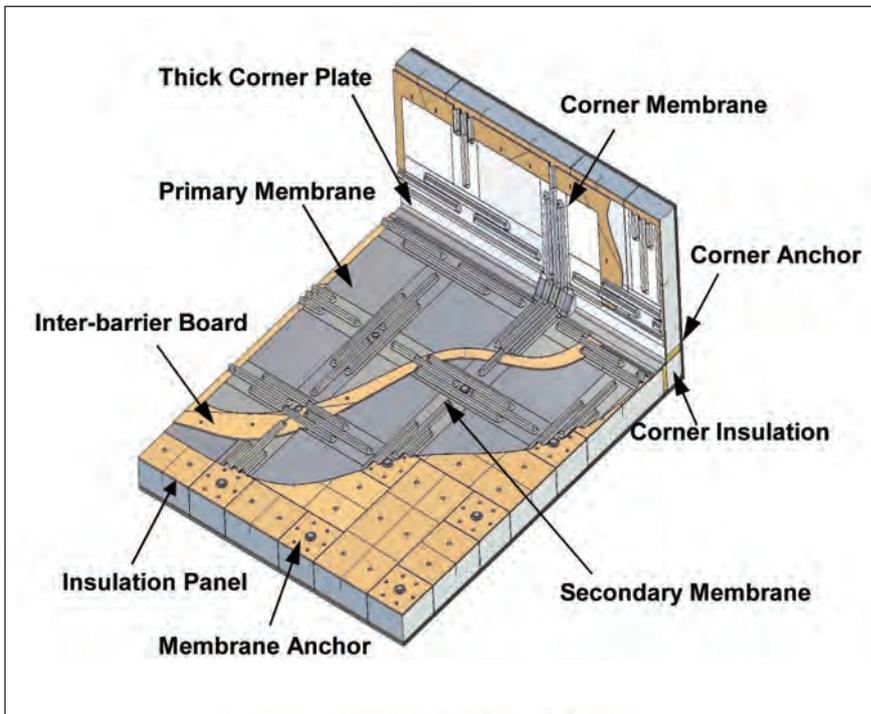
This compares to 1.2mm stainless steel for the MKIII which also uses reinforced PUF (R-PUF).

A 250m<sup>3</sup> mock up of a ship section had been built at Kogas' Incheon site and "fatigue testing on the new membrane has started and so far the results have been quite good", explained Dr Yang. He added that sloshing tests were not yet possible as the mock up was a static tank, but a small scale vessel will be fitted with the membrane for testing in the future.

Kogas will, however, have to overcome the sloshing problems that have dogged the GTT cargo containment membranes, on and off, for the last 30 years. GTT had thought it had solved the sloshing conundrum in the 1990s only for it to resurface in both the MKIII and NO96 systems two years ago.

Difficulties arising from the design of GTT's MKIII and NO96 systems have seen vessels entering drydock only to discover damaged pumps and indentations in the membrane caused by cargo sloshing. Damage has been relatively slight, but owners are concerned that the weakened membrane could deteriorate further under operational conditions and are spending several million dollars to effect repairs.

According to Kogas: "The basic concept of the KC-1 system is; (1) to minimise the effect on the insulation system by the hull and primary barrier deformation and (2) to provide liquid and gas tightness at both primary and secondary barriers. For these purposes, the insulation panels are



Cross section of the KC-1 membrane.

not bonded to the inner hull and the load bearing mastic is used only for levelling the irregular surfaces of the inner hull for the installation of the insulation panels.”

In effect the KC-1 system uses the same technology as the GTT membrane systems although with a different configuration. It may be that Kogas has solved the sloshing conundrum or that sloshing issues could arise only after the design has been fitted to a full scale vessel. Sloshing pressures have proved unpredictable and difficult to recreate under controlled testing regimes.

GTT’s experience in the field has been a case in point, a company executive has admitted that the recent occurrences of sloshing damage to both the MKIII and NO96 systems had taken GTT by surprise, they had believed that the sloshing

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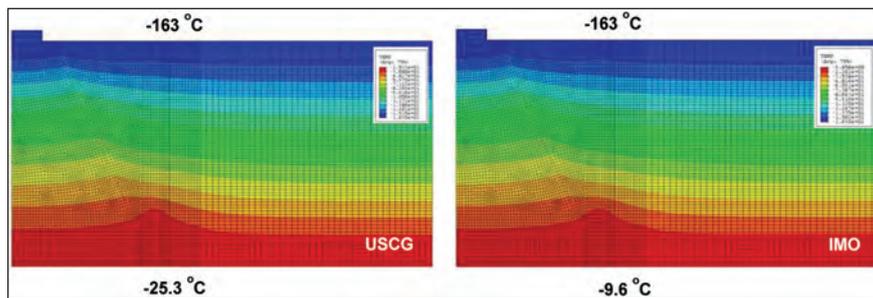
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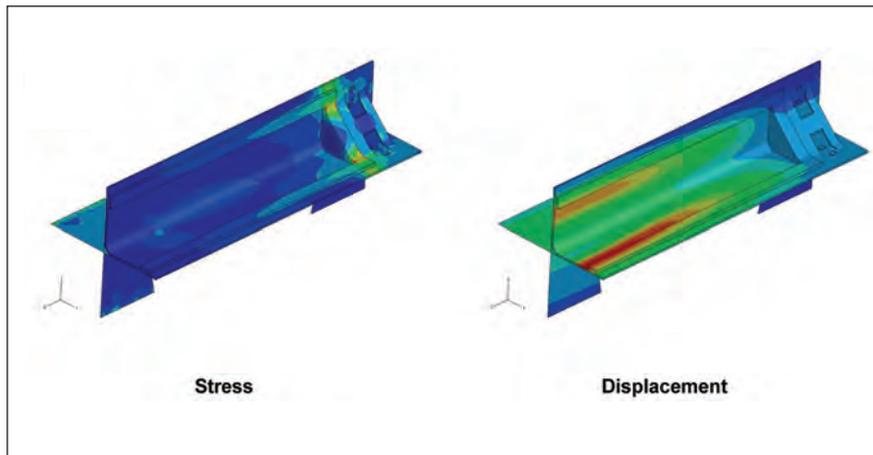
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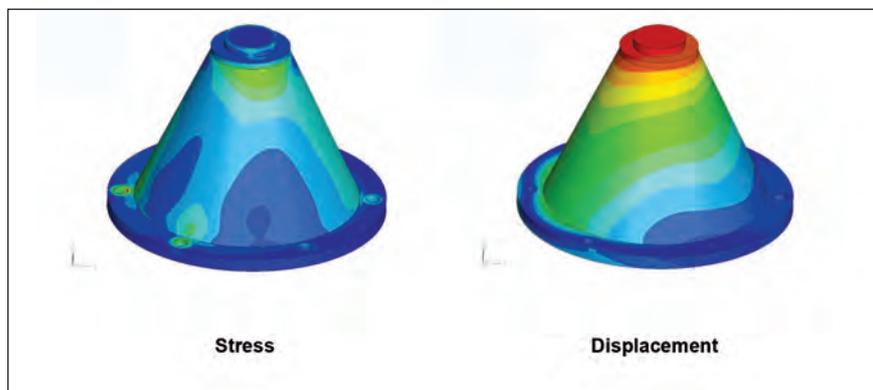
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membrane system through the movement of gas in the tanks. Three vessels fitted with the MKIII system were found to have suffered damage in this way.

One Korean shipbuilder, however, told *The Naval Architect* that it no longer: “recommended GTT’s MKIII system to owners as the secondary barrier was very weak”. Owners were said to be very worried about the “bonding of the secondary barrier in particular”, said the executive source.

It has also emerged that the NO96 system, also designed and built by GTT, is experiencing difficulties with sloshing damage. This was discovered following the drydocking of a three-year old Teekay vessel, *Catalunya Spirit*, which was found to have indentations in the primary invar barrier and the perlite insulation boxes.

As the pressure grows on industries throughout the globe to operate cleaner operations and to drastically reduce the greenhouse gas emissions that their activities create the increased use of LNG is expected. That means that there is a requirement for the shipping industry to meet the demand from its customers for safe, clean and economic vessels to meet this challenge.

Most industry observers and participants believe that one way to achieve this goal is to introduce competition for GTT in the membrane containment system manufacturing industry. Competition, however, does not always necessarily lead to innovation and reducing costs, while welcome for owners, may eventually prove to be a misplaced target. *NA*

difficulties had been solved through partial filling some 10 years earlier.

The France based company now says

that pressure on corrugations in the MKIII system were to blame for sloshing damage that caused deformations to the

## Nano technology, the flexible performer

**P**aint manufacturer KCC has said that its nano-based paint so comprehensively outperforms conventional paints that owners will save on costs in the long term.

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International Maritime Organization Performance Standards for Protective Coatings and the new paints lasted up to 15 years compared to conventional paint which had an effective operational span of five years.

KCC said that nano technology can be

particularly useful in important areas of a ship, such as a ballast tank, because these tanks experience movement in the metal which cracks the paint. With nano paint the sub-atomic particles are said to be packed closely together offering a significantly higher performance. *NA*

# “Killing two birds with one stone” is maritime dilemma says KRS

Changing priorities in shipping and the global economic downturn will see the Korean shipping industry reform into a specialist builder of green powered vessels while major yards look to diversify into the renewable energy industry.

According to the Korean Register of Ships (KRS) the maritime industry must build the most efficient ships at the least cost. Of course this is nothing new, but the definitions are changing. In the past the efficiency was all about operating at the least cost, that is the vessel travelled as far as possible for as little money as possible.

New regulations in a pollution conscious world mean that while the general principle remains the same the definitions of efficiency have changed. In the future the maritime terrain may well change again as more regulations alter the landscape and the definition of economic or efficient ships may change accordingly.

“Presently our industry is faced with a dilemma of having to ‘kill two birds with one stone’ – i.e., building the most economical ships with least amount of green house gas (GHG) emissions. However, building the most efficient ships leads to the reduction in operational costs, but it also means higher construction costs,” said Kim Mann-Eung KRS director and chief of energy and the environmental business centre.

The future, however, may hold different ideas on what is considered economical. That is, there is no guarantee that the way in which profits are realised today will hold true in the future – e.g., provision of incentives to ships with lower emissions, adoption of carbon tax policies and other environmental legislation that will safeguard both the marine environment and the atmosphere.

The very fact that Korean shipbuilding yards and shipping companies have been showing a keen interest and carrying out a number of research projects for building high-efficiency ships with lower emissions, despite the financial squeeze arising from recent economic downturn, is a reflection of how the whole industry is reacting to



Kim Mann-Eung - Director and Chief of energy and the environmental business centre.

the energy efficiency initiatives, said KRS senior vice president Kim Tae-woo.

Discussions on the best methods of reducing GHG emissions from ships have been taking place within the international Maritime Organization (IMO), but ultimately the way to reduce fuel consumption is to build ships with better efficiency.

There are basically two ways of going about this either through long-term investment and research such as the development of new types of ship, with highly efficient internal combustion engines, etc or a short-term solution would be to modify existing ships to make them more efficient by reusing existing heat energy, or by applying renewable energy technology or through carbon capture technology to make them cleaner.

KRS, like other class societies, is looking into various ways that existing technology can be applied to ships already in operation. In fact the recent appointment of Kim Mann-Eung as the director, chief of energy and environmental business centre is testament to the commitment that the

society has to cleaner shipping.

“As a part of this effort, we are discussing feasible methods for the reduction of fuel consumption with shipowners. We have also drawn up a medium and long-term road map for all these areas of development and we are progressing it on a step-by-step basis,” explained Mr Kim.

This collaborative effort and the research and development attached to it is backed by the shipyards, academics and government in the form of funding that will see more sophisticated designs and cleaner ships in the future including fuel cell powered vessels.

Whether the Koreans will build the majority of this new breed of ships seems unlikely as KRS admits the Korean yards are all looking for new markets as the recession bites and almost all of the major yards, in common with many around the world, are looking to renewable energy production to fill the gap left by the battered shipping industry.

Daewoo Shipping and Marine Engineering has reportedly bought a US wind energy company and Samsung, and Hyundai Heavy Industries have said they would look to diversify into this field.

“Korean yards are well placed to easily switch from shipbuilding to wind or renewable energy plant manufacture,” said Mr Kim Tae-woo. However, he pointed out that there was a danger for the yards that they would move from a situation where there is an oversupply of shipbuilding capacity to an oversupply of wind energy building capacity.

He said: “Korean yards believe that only three or four yards will survive in this market”.

Offices of the Korean Register of Shipping in Daejeon, Korea.

In developing a strategy that purports to “killing two birds with one stone” designing cleaner and more economical ships, the shipbuilding industry in Korea appears set to leave the way clear for China to become the major builder of the standard type vessels.

Yards in Korea will focus on more sophisticated designs and renewable energy. However, the shipyards’ global rush to develop new markets has all focused on this one industry, renewable energy, that government funds are being pledged to develop.

In this way the yards will not so much kill two birds, but will have to settle for just one the goose that laid the golden egg. *NA*



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# Daegu development stalls as STX Enpaco feels the pinch

Funding shortfall postpones building of major element of the STX Enpaco factory even though the rest of the plant opened for business earlier this year.

**B**uilding work at STX Enpaco's new plant in Daegu has stopped before the precision casting plant has been built as the economic recession takes a hit at another Korean major.

The Daegu development will build turbochargers and other precision machinery and parts for the shipbuilding industry, though Wan – Seok Kim, assistant manager of the STX Enpaco's business team in Gyeongsangnam-do, near Busan, admits that 90% of the company's business is conducted with its sister organisation that builds ships, STX Shipbuilding.

Mr Kim said: "The economic crisis has meant that we have failed to land orders and that in turn means we have not had the resources to complete the plant, therefore, its completion has been delayed". Though there is no indication when the building work will resume, Mr Kim said that the precision parts will have to be imported from Europe or bought in from other parts of Korea.

Orders for parts have collapsed by 30-40% on 2008 figures while sales have diminished by 10%, but that figure will most likely worsen as new ship orders have dried up further along the construction chain.

As a result STX Enpaco is looking to use its expertise in another field and like many others in the shipping industry they are turning their attentions to the lucrative green energy market. Mr Kim explains that their expertise and machinery can be relatively easily turned to casting parts for wind turbines. Again, however, he acknowledges that the "green business is already very competitive".

Perhaps paradoxically, given the extent of the recession globally and particularly in the shipping sector, skilled STX has employed a further 1500 staff. "Our CEO sees a crisis as a good opportunity to employ skilled staff,"



The STX Enpaco plant, near Busan.



Manufacturing at STX Enpaco's plant, near Busan.

explains Mr Kim.

A forward thinking plan, but a risky

route to choose when trying to navigate a company's path through a crisis. **NA**

# Cranfield University's mega-wave tool identifies loading pinch points

Designing in protection for ships and offshore structures from extreme wave impacts has been made easier through the development of the university's unique Wave-X computational tool.

Cranfield University in the UK has recently completed the development and demonstration of an analysis tool called Wave-X, capable of predicting the response of ships and offshore structures to extreme ocean wave loading.

The structural damage and loading caused by large ocean waves on ships and offshore structures has been of interest to naval architects for many years. Whilst there are many empirical methods and experimental techniques to understand and predict such structural loading, until now no technique has been available that can do this from first principles without significant approximations in the physics.

Cranfield University has applied the techniques of Smooth Particle Hydrodynamics (SPH) to produce a representative computational model of ocean waves interacting with structures. Wave-X accurately simulates the following important features of this problem:

- The non-linear behaviour of extreme waves, including breaking
- The response of a floating structure to very large waves
- The interaction of water particles with the structure and
- The response of the structure to the fluid loading including large structural deformations and non-linear material behaviour (including plasticity, damage and failure).

Together these features form a time-dependent and highly non-linear problem.

The explicit finite element (FE) method is the established method for simulating the

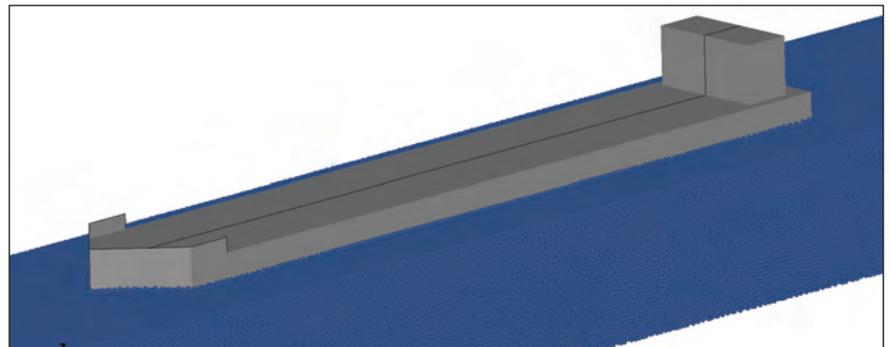


Figure 1: View of ship model at start of transient simulation.

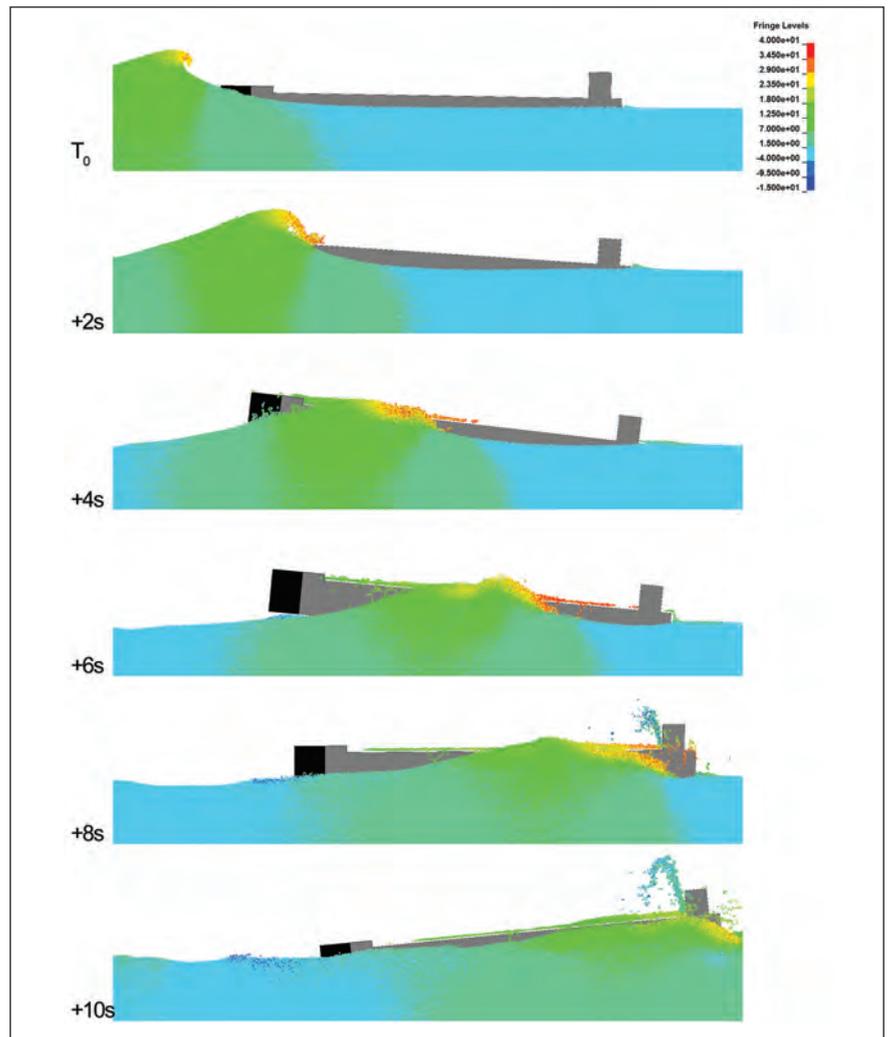


Figure 2: Sequence showing interaction of extreme wave with ship model. Side view with water coloured by horizontal (x) velocity (ms-1).

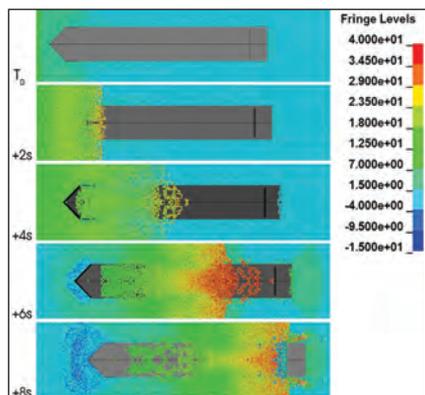


Figure 3: Sequence showing interaction of extreme wave with ship model. Top view with water coloured by horizontal (x) velocity (ms<sup>-1</sup>).

crash and impact response of structures and is implemented in numerous commercial and development codes. This approach is well-suited to modelling the structural

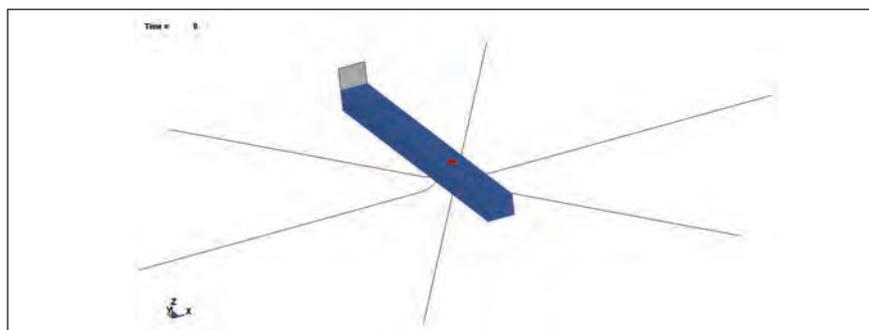


Figure 4: View of complete buoy model at start of transient simulation.

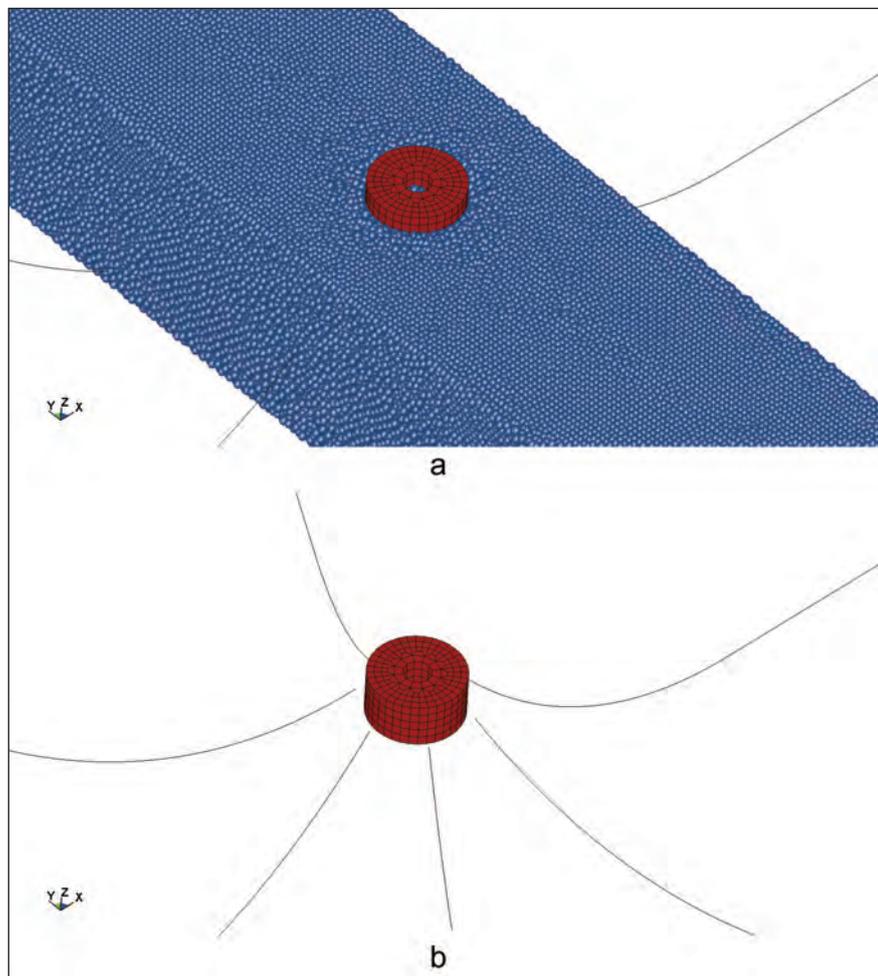
response to fluid loading. However, due to the well-known problems with mesh-tangling, this method was found to be inappropriate for modelling the fluid.

Professor Rade Vignjevic, whose team led the development work of this tool said: “in order to simulate the structural response to extreme wave loading, the FE method had to be coupled with another method appropriate

for modelling the fluid behaviour. We opted for the Smoothed Particle Hydrodynamics (SPH) method to model the fluid behaviour as it can be easily and reliably coupled with the non-linear FE method.”

Development and verification work led to a computational tool that can reliably simulate the correct behaviour of a floating body in large waves; the prediction of

Figure 5: a) Detail view of model in region of buoy. b) Detail view of buoy and cables with water removed.



### Example Simulation 1: Shipping Tanker

This simulation represents the first stage in modelling extreme wave interaction with a deformable ship model. At this stage the ship model is entirely rigid with highly simplified geometry, fig 1. The model is based on a medium sized tanker, with length 180m, beam 27.25m, draft 11.4 m and an overall mass of 57.5 k tonne. The water depth used is 28.5 m.

In the analysis shown a single extreme wave, approximately 28m in height, impacts on an initially stationary ship, the wave shape breaks as it arrives at the bow of the ship before travelling along the length of the hull, fig 2.

The simulation shows the water on deck running ahead of the main wave before impacting on the superstructure, figs. 2 and 3. The results show physically realistic behaviour. The simulation can produce data on wave particle velocities and impact pressures to help designers.

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### Example Simulation 2: Offshore Buoy

This example demonstrates the capability to perform a 3D simulation of wave interaction with a floating body. The problem consists of a 400tonne cylindrical oil off-loading buoy with an outer diameter of 12m, moored to the sea bed with 6 mooring lines.

A segment of the ocean with waves is modelled to represent a domain 430.5m long by 36m wide and 28.5m deep. The six mooring lines are each represented by 200 truss elements with the appropriate mass and stiffness properties. The mooring lines do not interact with the water in this simulation. The cable interaction with the water is ignored in the simulation by excluding the nodes of the cable elements from the search for contact neighbours.

The state of the model at the start of the transient simulation is shown in fig 4, whilst a detailed view of the buoy and mooring lines is shown in fig 5. Simulation results for the buoy responding to a shallow water wave of 12m height are shown in fig 6. Physically realistic behaviour of the buoy is observed, and the simulation predicts the flow of water over the top of the buoy as the wave passes.

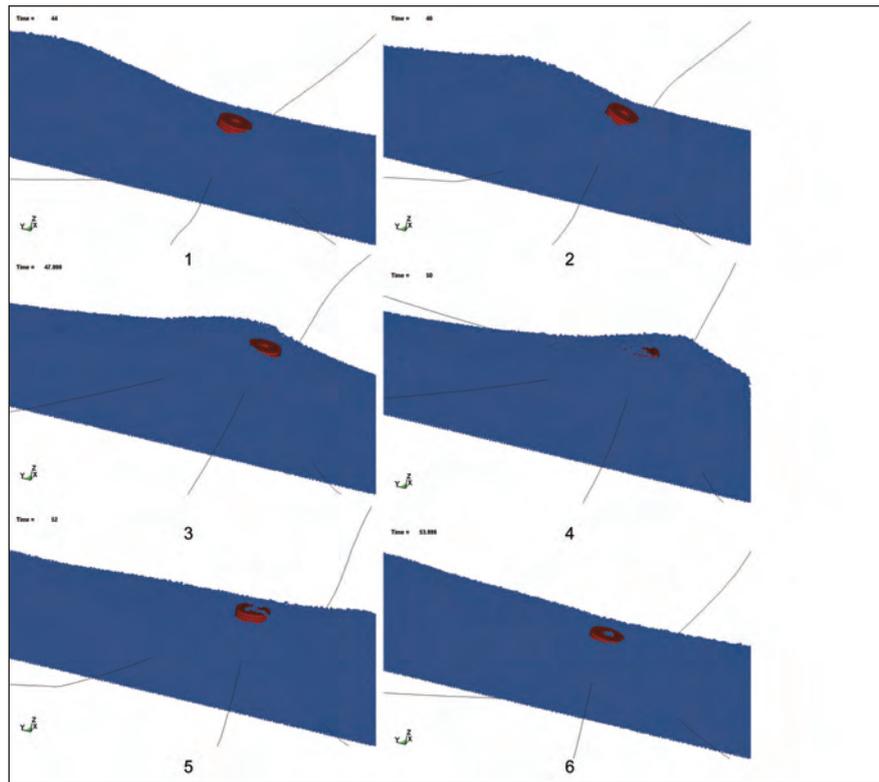


Figure 6: Sequence showing the interaction of a 12m high wave with a moored buoy. The wave overtopping that can be seen in images 4 and 5. The time interval between the images is approximately two seconds, with the initial image at 44 seconds and the final image at 53 seconds.

structural collapse under water loading and; representative 3D behaviour of wave interactions with a floating body.

Previous work at Cranfield University has developed and demonstrated a contact algorithm for coupling meshless and finite element discretisations, allowing complex interactions in three dimensional simulations to be carried out. A primary application of this method was the simulation of helicopters crashing onto water and it has also been demonstrated for the impact of rigid and deformable structures on water. Traditionally, work in this area has focused on

the impact of aerospace structures. However, the appointment of Professor Minoo Patel FREng, FRINA as Cranfield's new head of the School of Engineering led to collaboration with Professor Vignjevic's team to extend this approach to wave loading on ships and offshore structures.

Cranfield University discovered that the simulation of wave loading required significantly more complex initial and boundary conditions for the water component than was required for the impact of a structure on water that they had carried out previously. Professor Vignjevic explains: "At the start of the simulation the problem must be under static equilibrium. If not, the initial behaviour of the model will be governed by this lack of equilibrium, potentially obscuring the behaviour of interest."

Therefore, the initial equilibrium must be determined for:

- Pressure vs. depth in the water
- Initial contact forces between structure and water.

This is particularly critical for floating bodies. The pressure-depth in the water can be determined analytically for a given

equation of state. It is therefore possible to determine the correct initial density for each particle. It is not possible to analytically determine the initial contact forces due to their non-linear dependence on the relative positions of the SPH particles and FE nodes. Consequently it is necessary to perform a static solution of the initial model to determine the initial state of the transient problem.

The first of its kind, this technique and software programme is able to work with floating structures of all types and sizes. The engineering team at Cranfield University is able to carry out modelling of bespoke designs to allow naval architects to predict how such designs would respond under the impact of extreme wave loads. Wave-X can be used to predict water particle motions in the vicinity of the structure as well as the dynamic wave pressures exerted by the fluid on the structure. This information can be used not only for structural design, but also to design the hull shape to reduce the dynamic pressures applied to the hull and superstructure.

For further information, please visit [www.cranfield.ac.uk/soe/wave-x](http://www.cranfield.ac.uk/soe/wave-x). **NA**

# Fatigue analysis gets automated

Further development in the area of an automatic fatigue analysis tool for structural parts has been analysed by Seong-Jin Yoo, Won-June Lee, and Heung-Won Suh, of Daewoo Shipbuilding & Marine Engineering Co., Ltd., South Korea.

The fatigue life assessment of structural parts of a ship or an offshore unit using finite element analysis (FEA) has been an important aspect in order to meet the various design rules and requirements of classification societies and ship owners. To estimate the stress concentration in the local feature, it is required to model the target structural part in detail and to generate a fine mesh the size of a part thickness.

When creating the fatigue analysis model, the detailed geometry of a target structural part is defined by a coarse mesh and then a local fine mesh that is modelled based on the coarse mesh and the detailed target geometry. Due to the complexity of the detailed geometry of target structural parts, most of the fatigue analysis models are modelled manually at present.

The typical type of structural parts needed to be analysed is limited for each shipyard. The typical structural parts are modelled via the parametric modelling technique, so various types and sizes of structural parts are modelled automatically. A local fine mesh is generated according to

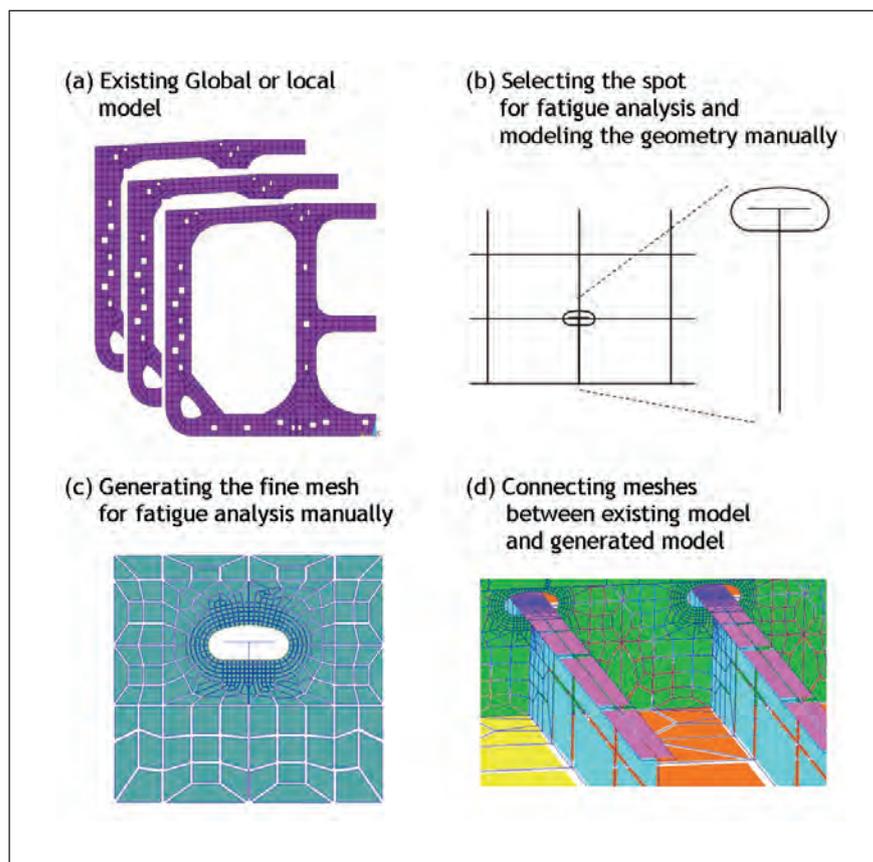
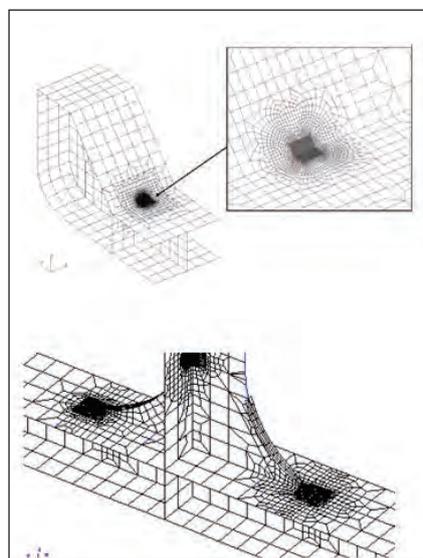


Figure 2.

Figure 1. Examples of fatigue analysis models.



the feature of geometry and the location of a hot spot. The introduced method has been implemented and tested in the field. To reflect the field knowledge and expertise of the analysis experts, it is captured and incorporated in the implemented system. Time required for fatigue analysis modelling decreases about 50% for each typical structural part using the system.

## Manual modelling

To meet the design requirements of classification societies and ship's owners, especially shipowners that claim severe fatigue analysis for a new type of ship or offshore unit, like a FPSO (Floating, Production, Storage and Off-loading vessel),

a quality fatigue tool is not available that fulfils a need of the field, which encourages development of in-house fatigue tools.

A general fatigue analysis procedure for structural parts of a ship is shown in Figure 2.

A coarse mesh which represents the detailed geometry of a target structural part is modelled manually for fatigue analysis. (Figure 2(a), (b)).

A coarse mesh in the vicinity of geometry of interest is erased and a fine mesh whose size is equal to the plate thickness is modelled. (Figure 2(c)).

A fine mesh and a coarse mesh are connected. (Figure 2(d)).

The fatigue analysis model should

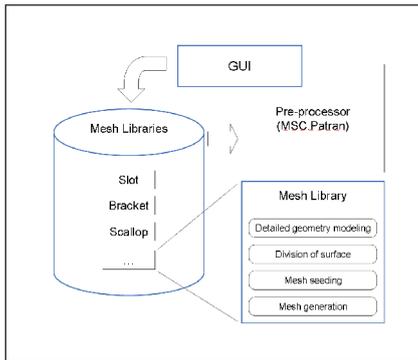


Figure 3. System Architecture.

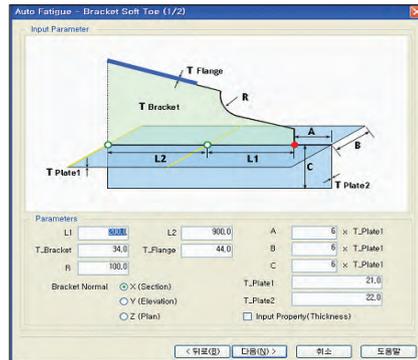


Figure 4. Geometric model generated via parametric modelling.

be modelled in detail around the target structural part, in which the size of mesh should be equal in size of a plate thickness to estimate stress concentration in the local feature. To comply with this rule, the fatigue analysis model is still modelled in the old-fashioned way, i.e. manually. Manual modelling of fatigue analysis takes a lot of time as the spots of interest are so many in a ship. We find that structural parts to be analysed can be categorised by nature in several typical types for a shipyard.

An in-house modelling system which analyses a fatigue of slot and longitudinal stiffener[2] has been used in Daewoo Shipbuilding and Marine Engineering, Co., Ltd, (DSME). Based on this system, a fatigue analysis module for typical structural parts has been implemented. An automatic generation method of the fatigue analysis model for typical structural parts is introduced in to this study.

### System architecture

Figure 3 shows the architecture of the system. For each typical structural part, a mesh library that includes detailed geometry modelling, surface division, mesh seeding and mesh generation is constructed by considering the feature. The mesh library is implemented by using PCL (Patran Command Language) which runs in the MSC.Patran environment. Regarding detailed geometry modelling, various sizes of typical structural part are generated via parametric modelling technique.

### Mesh library

A mesh library generates points to create the exact feature of a part first. The points are used to define curves and candidate nodes in the next step.

In Figure 5, the upper feature of a slot consists of three arcs which have different radii. It is difficult to find an intersection point between an arc and a line manually. The intersections are calculated geometrically in an automatic manner.

### Curve generation

Curves are used to define a surface and the boundary of a feature's geometry. Curves are also used for mesh seeding or beam element generation.

### Surface division

Surfaces handled by MSC.Patran for mesh generation are rectangular or triangular surfaces. Better quality mesh is generated by a rectangular surface rather than a triangular surface. The know-how of experienced analysis engineers and rules of classification society should be incorporated in this process.

Surfaces should be divided accordingly in order to satisfy the given conditions. For fatigue analysis, a hot spot that is susceptible to fatigue failure is examined thoroughly. So a mesh around the hot spot is generated in the size of plate thickness to make a fine mesh. Therefore, a surface around the hot spot should be divided in a small size for a fine mesh. A surface is divided in large sizes the farther it is from the hot spot.

Figure 8 shows meshes generated from the divided surfaces, which confirm that a fine mesh is generated around a hot spot.

### Mesh Seeding

Size and shape of a mesh is decided by "mesh seed" in the MSC.Patran. A mesh around a hot spot should be generated

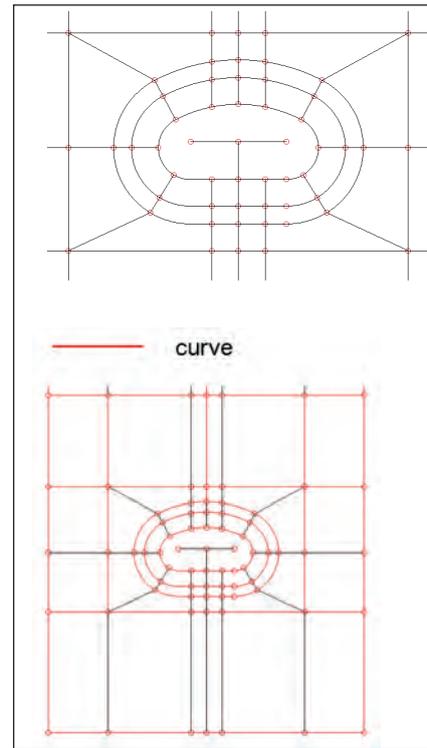


Figure 5. Example of point generation of a slot.

finely in accordance with the feature geometry and the location. A curve that encloses a hot spot is seeded in the interval of the plate thickness.

### Mesh generation

A mesh around a hot spot should be arranged by considering the feature of a curve for stream of stress according to the field knowledge of analysis experts and rules of classification society.

Figure 9 shows that the result of mesh generation implemented in this paper. A green arrow represents that a mesh is arranged by considering the feature of a curve for stream of stress. A red arrow represents that the larger the size of a mesh is, the farther it is from a hot spot. Hence, a mesh around a hot spot is generated first and then a mesh away from a hot spot is then generated.

A fatigue analysis model for each typical structural part is realised as a software library. Each library implements a whole process of fatigue analysis modelling, detailed geometry modelling, surface division, mesh seeding and mesh generation. Further, this library enables a fatigue analysis model to be easily added or modified.

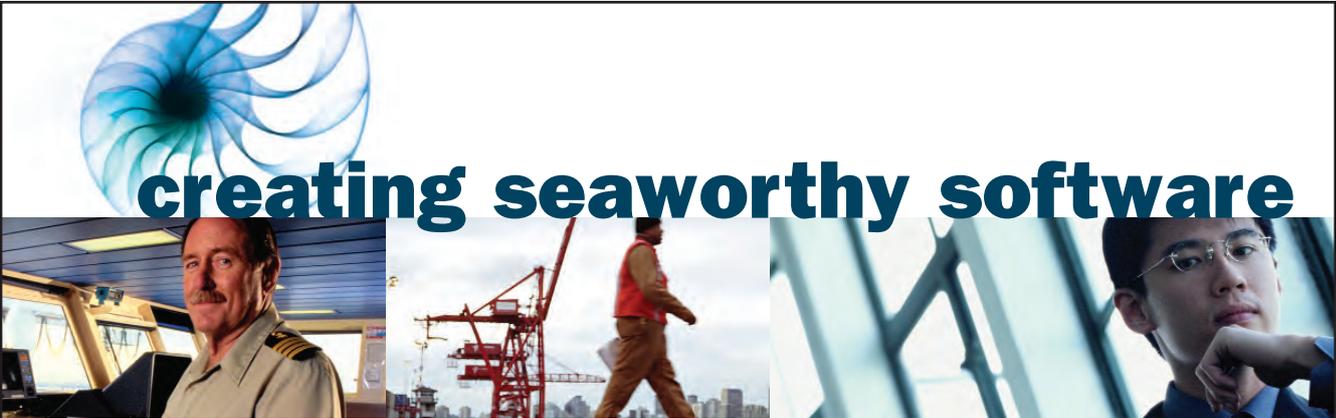
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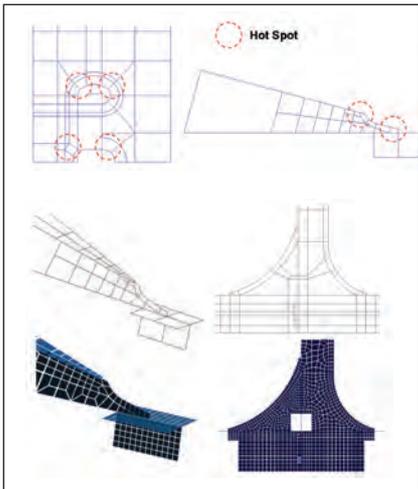


Figure 6. Example of chrome generation.

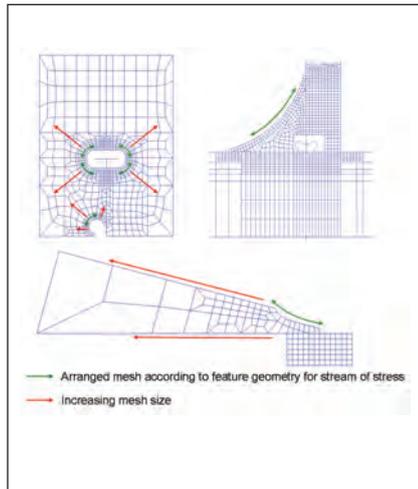


Figure 7. Example of surface dimension.

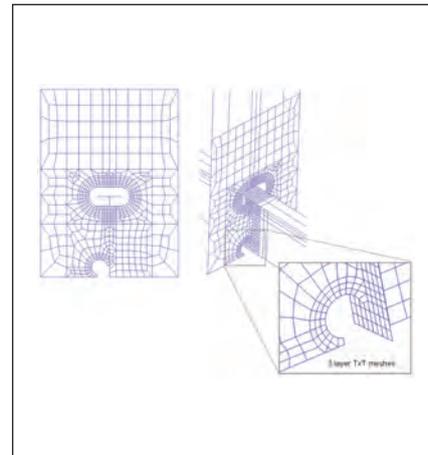


Figure 8. A mesh generated from a divided surface.

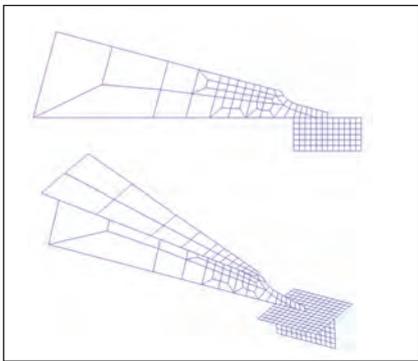


Figure 9.

Figure 10, 11 and 12 represent fatigue analysis models generated by the method introduced to this paper.

## Conclusions

Automatic generation method of the fatigue analysis model for typical structural parts is introduced. The introduced method

is implemented and tested for ship and offshore structure fatigue analysis. The typical structural parts are modelled via the parametric modelling technique, so various sizes of structural parts are modelled automatically. A local fine mesh is generated according to the feature of geometry and the location of a hot spot. To reflect the field knowledge, know-how of the analysis experts are captured and incorporated in the introduced system.

The fatigue analysis modelling time decreases about 50% for each typical structural part using the system introduced in this study. Also, the inexperienced engineer can make the fatigue analysis model more easily. *NA*

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Seong-jin Yoo, assistant research engineer in information technology R&D Team. He is responsible for CAD/CAE interface and Automation of Finite Element Modelling.

Won-June Lee, principal research engineer in information technology R&D Team. He is responsible for the development and implementation of design systems for ship and offshore structure.

Heung-Won Suh, deputy director in information technology R&D Team. He is responsible for the development and implementation of design systems for ship and offshore structure.

Figure 10. The result of fatigue analysis model around slot, long, and scallop.

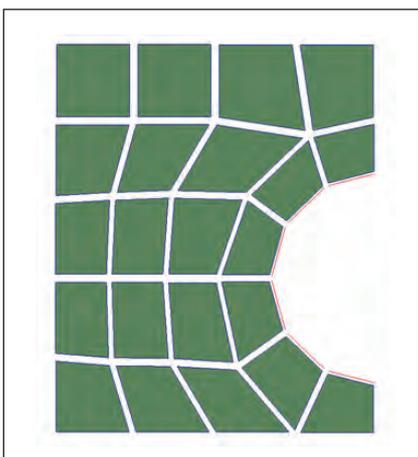


Figure 11. The result of fatigue analysis model of large bracket toe end.

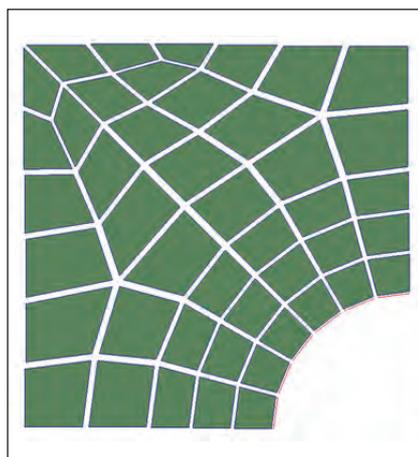
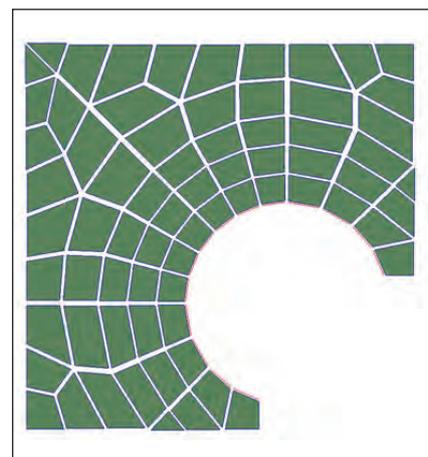


Figure 12. The result of fatigue analysis model of scallops.



# BV and SENER crack ship structure monitoring

Condition assessments of ship structures are notoriously time consuming, but BV and SENER have developed a 3D model that cuts the time and cost of the process.

The EU-funded CAS project (Condition Assessment System), led by Bureau Veritas (BV) SENER, had the purpose of cutting the time and costs to process thickness studies of the structure of a ship in operation, taking advantage of the ship 3D model previously created in a CAD system. This model can be exported through an HCM standard file to the monitoring tools developed by the classification societies.

SENER has exported the FORAN 3D model of *Bahía Uno*, by means of the HCM standard file, to be used by BV for

running 3D model-based monitoring tools. *Bahía Uno*, built in 2004 in Astilleros de Murueta in Spain and classed by BV, is a double-hull tanker supply vessel with a length of 71,01m, a breadth of 15,6m, depth of 7.75m and draught of 5.6m.

The FORAN 3D model of the ship will be used in the monitoring tool developed by BV, which incorporates virtual reality techniques and offers immediate worldwide access. Systematic comparison and consistency checks of measurement campaigns including thickness measurements, visual assessments of

coatings, and visual inspection for cracking, will trigger electronic alerts. Repair decisions and residual lifetime of the structure will be calculated with modern methods of risk-based maintenance modelling. The model can be updated after each measurement campaign.

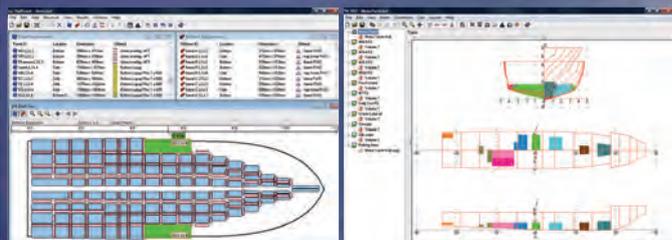
With this test, BV and SENER test the results of the CAS project in a real vessel. This project is expected to speed up the failure monitoring process and repair times with the aim of reducing marine disasters. *NA*



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# LR Launches latest tools

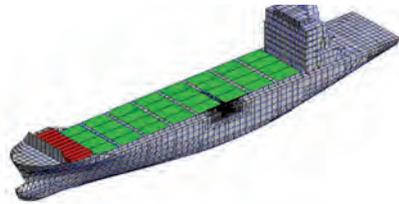
Lloyds Register (LR) has released its latest assessment tools, ShipRight 2009 and RulesCalc 2009.1, for checking compliance against rules and procedures.

ShipRight 2009 is a complete end-to-end assessment tool designed to help minimise dependency on third party applications. The tool includes an optimised ship modeller, procedure-specific loading routines, a finite element (FE) meshing engine, FE solvers and dedicated post processing analysis of results against the ShipRight procedures.

The software supports a wide range of formats for fast and accurate data transfer, from BDF (bulk data files) for meshing, to OP2 binary and PCH files for results. ShipRight 2009 interfaces to third party CAD tools such as Aveva, NAPA and Intergraph SmartMarine are provided through the Lloyd's Register interface toolkit (DIME), that will help accelerate modelling and meshing.

ShipRight has been designed to work with the users' existing process and, therefore, eliminate the need for additional models for classification purposes. ShipRight is also closely integrated with Finite Element Method (FEM) applications as MSC NASTRAN and PATRAN, allowing data to be transferred quickly and accurately, saving time for the user.

The programme provides simplified step-by-step guidance through the roadmap



ShipRight 2009 closely integrated with other FEM packages allows data to be transferred quickly and easily.

wizard, helping users to produce ship models suitable for structural assessment. Automated load case generation and simple and powerful 'wizard' tools provide a high degree of flexibility so that fatigue analysis can be carried out quickly. The system features an automated reporting system that can be easily customised.

The latest addition of the 3D graphics engine will provide much greater control over the FE model display. Structures can be colour coded to suit different parameters. The visible and 'ghost' views, along with the clipping tools, will help users to accurately display problem areas. While detailed analysis and customised views of these areas are provided by the flexible reporting system.

Benefits the user will have from the system are; full FE assessment optimised for ships, full coverage for oil tankers, bulk carriers and container ships, results can be viewed clearly with failure regions targeted quickly, model displays can be manipulated to meet user requirements, includes step-by-step procedural guidance and roadmap, helps save time through accurate and fast data transfer from other FEM tools, complements the established processes within any design office.

Adding to this is the ShipRight fatigue design assessment (FDA) procedure that will provide users with a multi-level evaluation of fatigue performance of structural details. FDA will benefit users in areas of initial design and in-service maintenance that will ensure fatigue durability at critical locations. Currently Lloyd's Register provides ShipRight FDA software as a service only.

## RulesCalc

To coincide with the release of ShipRight 2009, Lloyds Register has also produced its updated version of its initial design process structural assessment tool RulesCalc 2009.

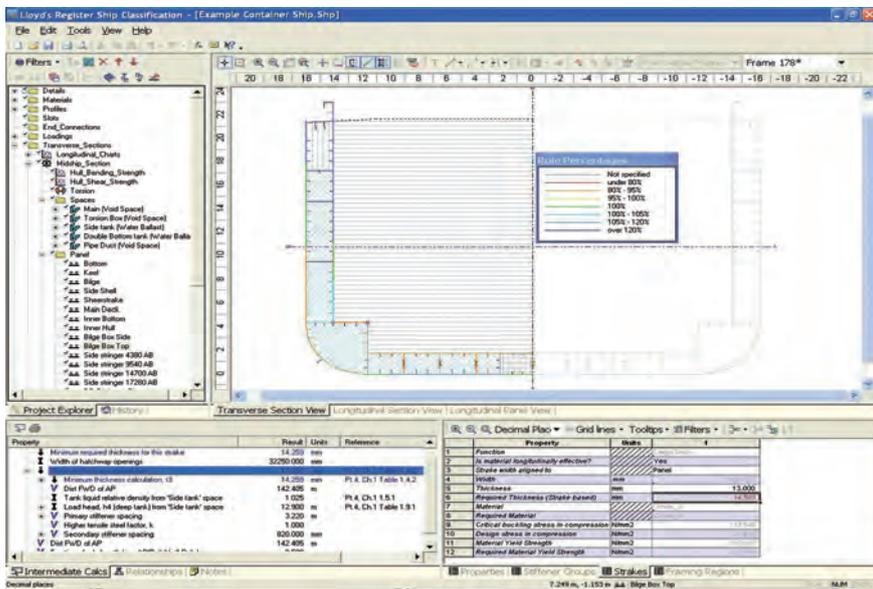
RulesCalc will enable the user to check compliance with both Lloyd's Register's Rules and Regulations for the Classification of ships and the International Association of Classification Societies' (IACS) Common Structural Rules (CSR) for Double Hull Oil Tankers and Bulk Carriers.

Now built on a re-designed and optimised architecture, it will give users rapid calculation results, even when assessing compliance with extensive requirements of the CSR.

RulesCalc is sufficiently flexible to enable design options to be analysed in one programme, allowing quick iterations to be performed to help determine the optimum structural configuration.

One of the principle advantages of RulesCalc is in its transparency of the calculation process. Designers will be able to easily see factors contributing to specific requirements, enabling them to see what adjustments may be necessary to achieve compliance. RuleCalc will enable designers

RulesCalc 2009.1 will give users quicker calculation results.

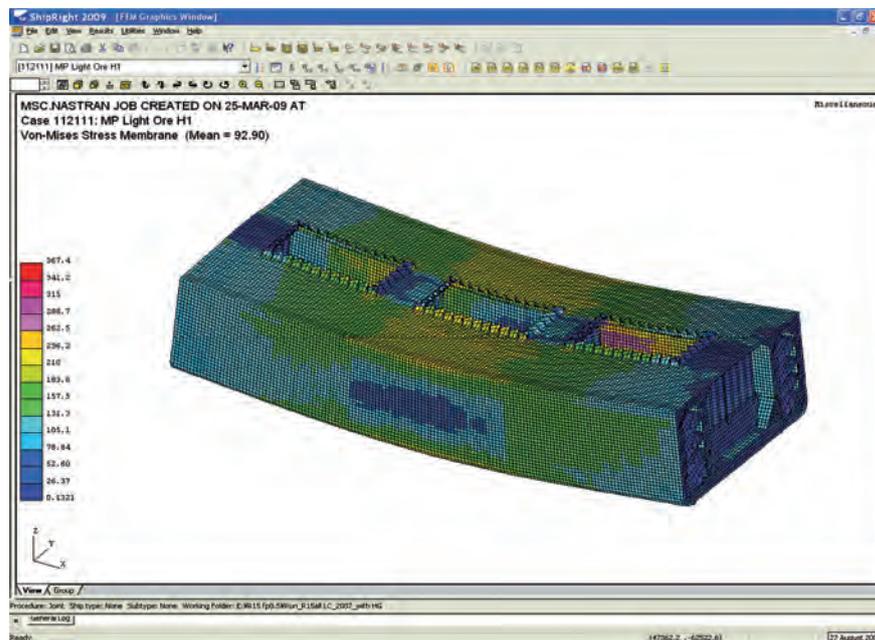


to understand how compliance is calculated, and clearly displays all of the intermediate calculation values. These can be printed out, assisting with auditing or training for those that are unfamiliar with rule requirements. Furthermore, the rules being applied can be viewed directly, without spending time searching in printed editions.

New tools have been added to the software such as ultimate strength and shear flow have been developed for a design's compliance with CSR.

In the latest version of RulesCalc Lloyd's Register has extended the coverage of the CSR to incorporate double-hull oil tankers. It now provides assessment for plates and stiffeners outside the cargo region. A simple 3D definition of the general arrangements and regions of the model can be imported or entered for each vessel. RulesCalc uses the model to calculate space, region and geometry-dependant properties, such as wastage allowances and the required dimensions of spaces.

RulesCalc will also support the CSR for bulk carriers within the cargo region, allowing



ShipRight 2009 allows the user to assess designs through the entire procedure.

for both global strength and local scantling assessments to be carried out.

Data can be imported from industry

standard packages such as NAPA steel, Tribon and AutoCAD at anytime during the design process. *NA*

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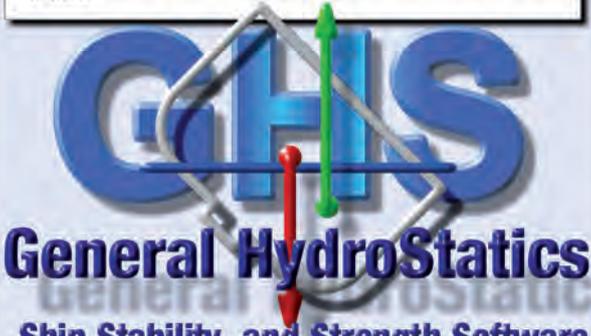
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Version 11.50 ready for 2009

**New probabilistic oil fuel outflow and updated probabilistic damage stability** will be helping GHS users address the latest regulations in 2009. The new, rewritten Part Maker is also included in the 11.50 release. The high priority we give to making our software as clean and reliable as possible will be evident as well as the dozens of minor new features provided in response to user requests.

**GHS Load Monitor (GLM)**, the onboard stability configuration, is also offering several new features. With the GLM-Maker wizard, naval architects enjoy their ability to provide the right combination of features for every type of vessel.



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# CD-Adapco takes a closer look at safety

STAR-CCM+, CD-adapco's flagship computational fluid dynamics (CFD) software package, now includes a Dynamic Free Body Interaction (DFBI) system.

**D**FBFI will allow the fluid induced motion of an object to be predicted in six degrees of freedom, with no additional effort from the user, compared to performing a simple steady state simulation of flow past the same body.

Unlike traditional CFD software, which is typically limited to simulating the motion of a body along some prescribed path, the DFBI model enables engineers to easily simulate the fluid induced movement of a body, for everything from a tanker listing under heavy seas to an aerodynamic body tumbling in free fall.

DFBI is useful for any simulation in which an unrestrained object moves in response to fluid excitation. However, it is particularly useful when combined with powerful free surface modelling capability, to simulate the behaviour of floating vessels such as boats. For large amplitude motions, such as a container ship navigating heavy seas, the DFBI model can be used to simulate wave slamming, capsizing, wave-piercing, water-entry and green water effects.

## DFBI Lifeboat Launching

STAR-CCM+ has been extensively used and validated, to perform simulations of lifeboat launching at full scale and under realistic initial and boundary conditions. Simulations also allow an investigation of the effects of changes in hull shape without having to make a physical model. This makes it possible to investigate a larger range of hull shapes at a variety of launch conditions and finding a design that is acceptable for the expected use.

Lifeboats are an important component of safety measures for the passengers and crew of floating vessels and offshore platforms. They need to be designed so that people on board can be evacuated safely. This requires that: the lifeboat is not damaged during water entry; the lifeboat moves sufficiently far away from the launching point before its own propulsion system is started; and the accelerations experienced by occupants do

not exceed a certain level over a certain period of time. In the past, lifeboat designs have been tested solely by experimental means. In these experiments, pressure is measured at a certain number of locations on the hull, and motion and acceleration is recorded. However, due to a large number of different lifeboat sizes and a large variety of conditions under which they may have to be used, the number of necessary tests becomes unmanageable.

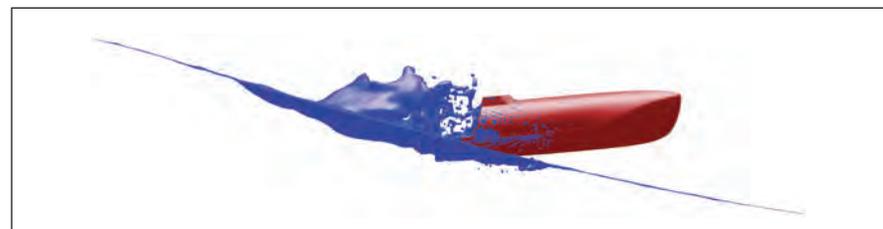
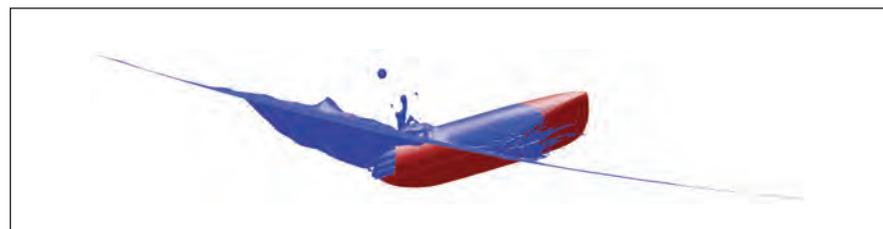
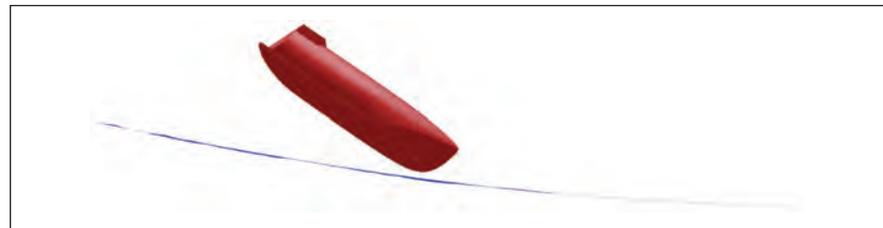
## Contracts

CD-adapco recently added Hyundai Heavy Industries, Co., Ltd. (HHI) to its

client list. The South Korean company has adopted STAR-CCM+ for its fluid-structure interaction analysis of ships in waves. After an extensive evaluation HHI chose CD-adapco's CFD product because of its breadth of applicability and its ability to substantially reduce development timescales when deployed early in the design process.

The American Bureau of Shipping also adds to an extensive list of clients that already includes major classification societies such as Lloyd's Register, Germanischer Lloyd and Det Norske Veritas that use CD-adapco's STAR-CCM+ software. [NA](#)

STAR-CCM+ plays a new role in the lifesaving equipment market.



# Aveva adds new Instrumentation products to Aveva Marine

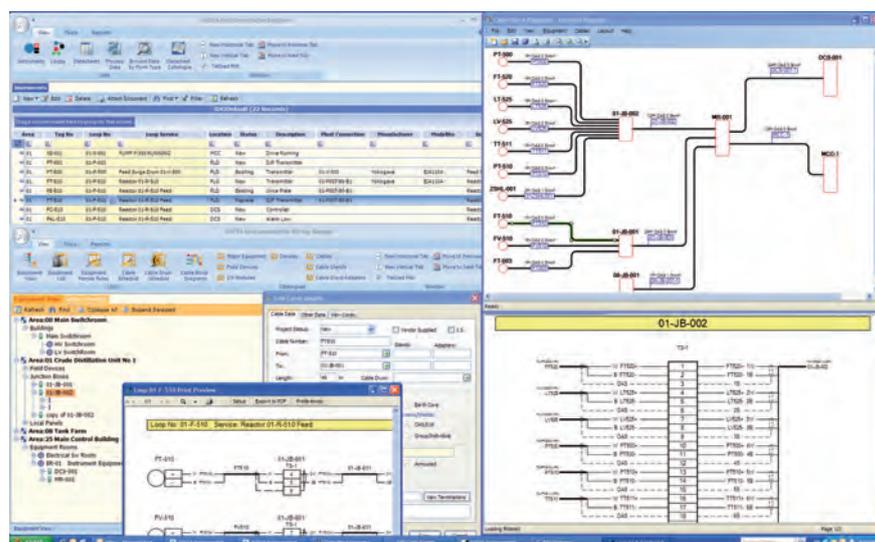
Aveva has presented Intelli-Link, its latest add-on of Aveva Instrumentation. The programme will enable the automatic processing of Piping & Instrumentation Diagrams (P&IDs) created using AutoCAD, to extract data for importing into the project's Instrument Index.

Intelli-Link uses a form of what is known as 'document scraping' to extract information; it exploits the common practice of creating AutoCAD P&IDs by using predefined blocks to represent schematic elements such as sensors, actuators, indicators, equipment, etc. This extra capability comes into its own when dealing with legacy data, or P&IDs created by third parties, giving shipyards valuable extra flexibility, and vessel operators the ability to capture existing 'dumb' schematics into an 'intelligent' form for more effective use and maintenance.

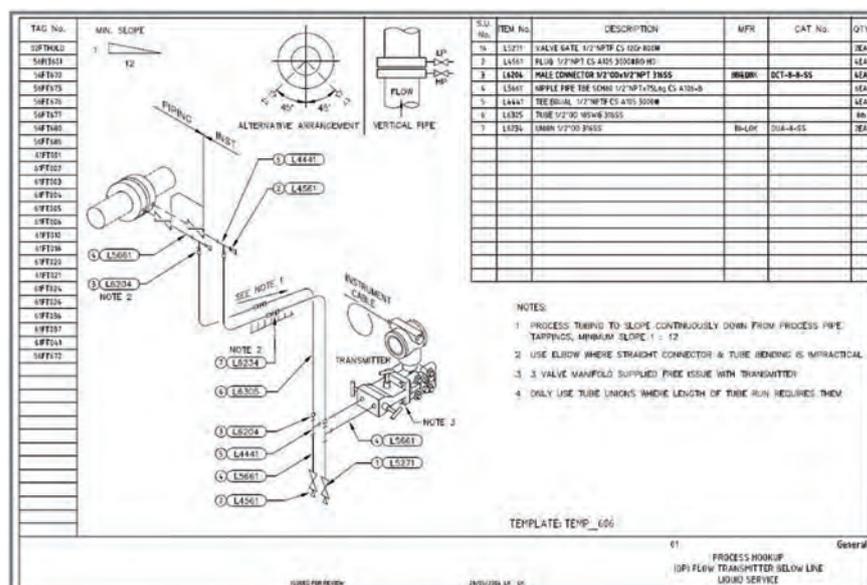
Aveva Instrumentation is the result of an acquisition aimed at further integrating and extending Aveva's technologies. It enables the engineering, design, installation and through-life maintenance and modification of instrumentation and control systems. These can often be overshadowed by the more high-profile CAD/CAM applications, but frequently accounting for the largest proportion of in-service maintenance and upgrade costs. There is, therefore, a need for an instrumentation tool which not only makes initial engineering and design more efficient, and which can form part of an integrated ship design and construction solution, but which can also be used by vessel operators as an easy-to-use, stand-alone application.

Aveva Instrumentation is a stand-alone application for both operators and shipyards that is integrated with Aveva Marine. In a full Aveva deployment, instrumentation data becomes part of the overall project information model and can be exploited by other applications, such as Aveva Global for distributed, multi-site project execution. Ongoing development at Aveva is aimed at steadily increasing both the product's functionality and its integration with other Aveva products.

Aveva Instrumentation comprises three integrated modules for the engineering specification, drawing generation and



A montage of Aveva Instrumentation screenshots, showing its highly graphical interfaces to different types of information.



An example of a fully-detailed hook-up drawing, created in AutoCAD format by AVEVA Instrumentation.

management, and wiring installation design of instrumentation and control systems. These modules share a common SQL database,

providing single-point entry for data and ensuring consistency in its use. So, for example, an update to an item in a project's

Instrument Index, made by a user with the correct access permissions, will automatically be applied to all instances of that item in the project design.

A feature that distinguishes Aveva Instrumentation from other similar products is its intuitive drag-and-drop user interface. In addition, it makes extensive use of spreadsheet-style functions for tabular data and it has Excel import/export capabilities so that data can be used more widely for reporting or sharing. For ease of use and compatibility with existing working methods, drawing functions are AutoCAD-compatible and all reports can be produced in PDF format. These features make it easy to learn and highly productive; early evaluations have shown an increase in users' skills and significant savings in project man-hours.

Production engineering and system installation are well catered for. The Wiring Manager module provides extensive catalogue-driven component selection and rule-based termination for easy design creation. It also generates comprehensive, detailed reports such as cable schedules, Bills of Materials, Input/Output allocations and cable drum schedules. Automatic cable drumming helps minimise material wastage.

Information integrity is essential in any application which frequently handles safety-critical systems. Aveva Instrumentation has robust features to enable this. Key data, such as catalogues and rules, can be provided with secure access control, reflecting industry best practice of separating engineering and design responsibilities. When setting up a new project, a company's default catalogues and wiring rules are copied across to the project, so that they may be customised as necessary without affecting the default versions, or those on other projects. This enables a shipyard to maintain its own preferred catalogues and rules, but be able to meet individual customers' requirements, or to make supply substitutions on a per-project basis.

Aveva has also announced further enhancements to focus on interoperability with the latest release of its Aveva Marine portfolio, which will now offer Aveva's customers extended possibilities for data exchange between various sources.

Aveva Marine users will now be able to integrate P&IDs and schematic diagrams coming from various systems, including the Aveva P&ID solution. Customers will benefit

from this as they will now be able to select their P&ID system from various sources and to integrate P&IDs from other authoring systems into a complete model of their project.

Offering an updated mechanical equipment interface product using the STEP AP203 format will allow Aveva Marine users to easily import mechanical equipment from various sources, generally generic or mechanical CAD systems, and utilise them in the model as any outfitting component equipment models, like main engines, compressors or pumps can now be directly supplied by the manufacturer and placed with great accuracy in the 3D model, reducing the risk of errors.

Finally, more interoperability between plant and marine outfitting will be achieved as data in both databases is now made fully exchangeable. This will allow customers using Aveva's solutions both in the plant and the marine sector to share their models in a much easier way. As an example, FPSO designers and builders will now be able to share the same data model for the outfitting part of the vessel and the top-side. This leads to reduced design time and better consistency between top-side and floating platform design.

Bruce Douglas, vice president marketing and product strategy at Aveva said: "Aveva Marine is an integrated solution for shipbuilders,

ship designers and ship operators. It allows engineers and designers on multiple sites to concurrently create, control and manage change to engineering, design and production data as a project is developed, in the most productive and risk-free way"

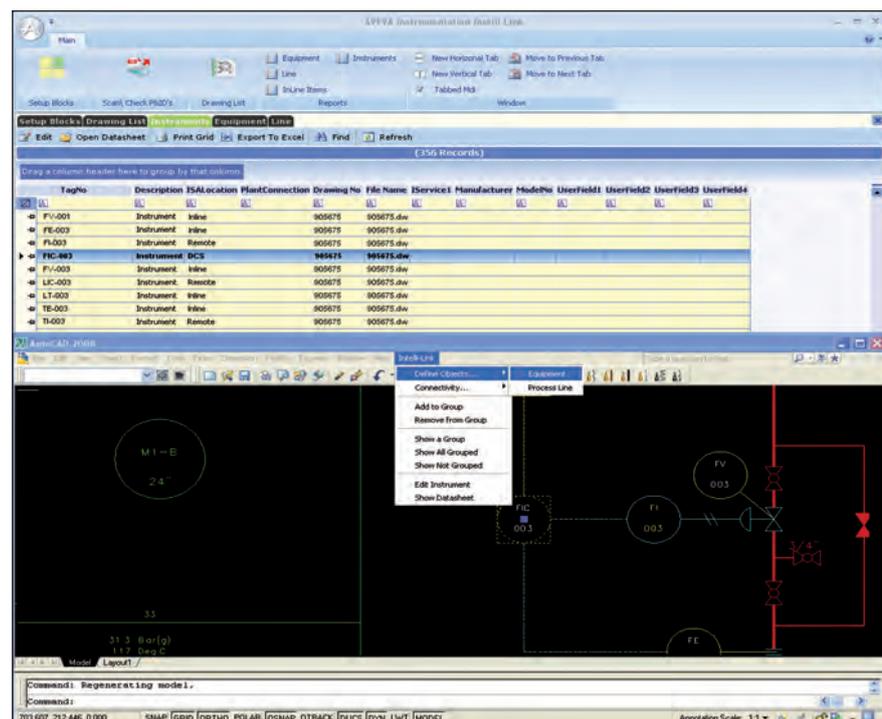
Richard Longdon, CEO of Aveva said: "Earlier this year, we announced the introduction of Aveva Instrumentation and Aveva Diagrams to the Plant and Marine portfolios. These products, plus the latest enhancements, have further strengthened the Aveva Integrated Design and Engineering offer both to our ship operators and shipyard clients.

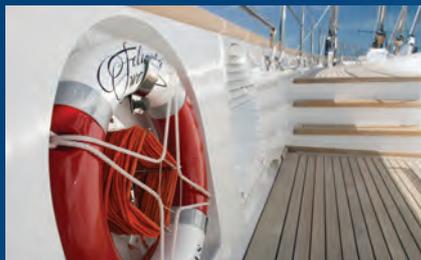
"For ship operators we have an operations information integrity solution that delivers real cost savings. And for ship builders and ship design agents, our integrated project execution solution saves time and money during the project."

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Aveva instrumentation Intelli-Link running within AutoCAD. A selected item in one instrument list is automatically zoomed and highlighted in the drawing window.





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"For Ship Operators we have an operations information integrity solution that delivers real cost savings. And for ship builders and ship design agents, our integrated project execution solution saves time and money during the project." [NA](#)

## Intergraph expands to offshore market

Intergraph has released the latest version of its next-generation 3D design solution with added offshore capabilities.

**S**martMarine 3D 2009 is a step-change in the marketplace. Where competing solutions use two or three different applications which are at best loosely coupled, SmartMarine provides a single environment to model structural, hull, piping, equipment, HVAC and electrical designs, with automated detailing and drawings for offshore and ship design which ensures overall consistency with high speed execution. A 2D drafting system is embedded in SmartMarine 3D 2009 which eliminates the need for third-party drafting applications.

It is a data-centric, rule-driven solution for streamlining design processes while preserving existing data and making it more useable/re-useable over the operation, maintenance and modification life cycle of the device.

SmartMarine 3D 2009's design reuse wizards will allow companies to catalogue their best-in-class design configurations, allowing them to respond more quickly and accurately to proposals and fast track project requests.

The company claims the system will reduce engineering man-hours, improve design quality and consistency, increase data integrity and improve cross-discipline collaboration.

It is a key component of Intergraph's multidiscipline Enterprise portfolio, which provides all the capabilities needed to design and build offshore devices or ships from design to fabrication to operations and maintenance, all in a single integrated environment.

SmartMarine 3D 2009 offers additional offshore-specific functionality:

Rule-Based Joints that govern joint behaviour. For example, a parametric gap between incoming members is defined as part of the rule-based joint. This gap is then maintained by the software as the incoming members change.

Built-Up Members that are defined and modified as a single member, but are actually composed of multiple plates that can be independently fabricated.

Advanced Plate Systems are parametric rule-driven plates that in combination define complex nodal connections. The Advanced Plate Systems update

automatically as the incoming members change. The whole nodal connection can be placed in the catalogue for later reuse. Automated Detailing that trims bounded parts (such as tubes), places end-cuts, places chamfers, welds, and weld bevels automatically based on customisable rules.

"At COSCO Shipyard Group, we have been using SmartMarine 3D in production on numerous offshore projects," said Mr Liang Guoming, deputy general manager, Technical Center, Cosco Shipyard Group. "SmartMarine 3D is helping us achieve greater productivity and higher quality designs. The enhancements included in the newest version will assist us in gaining a further competitive edge during these challenging times."

Gerhard Sallinger, Intergraph process, power and marine president, said: "SmartMarine 3D 2009, with its impressive list of new offshore capabilities, that are not available in any other commercial solution, builds upon our tradition of technical innovation and provides our customers with real value in challenging times." [NA](#)

# A.P Möller lifeboat joint venture launched onto market

Nadiro has launched what it believes to be latest in lifeboat development, as well as a new company in the lifeboat market.

Ship operator A.P.Möller-Maersk and consultant SH Group have jointly formed Nadiro to produce and market the latest in lifeboat design, for a safer lifeboat. The companies were heavily involved in the development of the prototype together with the Odense Steel Shipyard.

The project started at the beginning of January 2008 with a prototype of the boat presented publicly for the first time at a meeting of the International Marine Organization (IMO) in London on 28 May 2009.

While there is no central reporting regarding lifeboat accidents one study completed by the Marine Accident Investigation Branch in the UK revealed 12 fatalities and 87 injuries reported from UK flagged vessels in a 10-year period between 1991 and 2001 making lifeboat accidents the largest single reason for shipboard fatalities. Similarly, the world's largest P&I Club, Gard in Norway, reports 13 fatalities and 87 injuries between 1992 and 2007. Each accident typically costs US\$200,000 to US\$500,000.

The statistics are backed by port state controls exercised by local authorities. In the period between 2004 and 2006 around 10% of all detentions of ships were due to deficiencies in lifesaving appliances making it the second largest reason for port state detentions.

In addition A.P.Möller-Maersk reports from its own fleet that 35 lifeboat incidents have been recorded since 1996, including one fatality. The report that A.P.Möller-Maersk ran covers everything from small cracks in lifeboats through to the one fatality.

The result is that employees are concerned about their safety and often refuse to sit in the boats during testing because of the risks involved. Raising the question 'if lifeboats are unsafe during testing, are they dangerous in live situations?'

Esben Jull Sørensen, managing director, Nadiro comments: "Yes, the ultimate consequence of very unreliable lifeboat systems, especially the hook systems, is that the ship's crew loses faith in the system and refuses to make the test". He went on to



The cover comes off Nadiro's lifeboat development.

say "If then the ship's master decides just to confirm in the ship's papers that a test was made even though it was not done - or it was not done strictly according to the rules, then it has two consequences: The crew will not become familiarised with the system, which is necessary if you need to operate the system safely during an emergency. System deficiencies are less likely to be discovered during the test and proper corrective action will not be carried out."

"the ultimate consequence of very unreliable lifeboat systems, especially the hook systems, is that the ship's crew loses faith in the system and refuses to make the test"

He adds: "The IMO regulations are good, but not the final solution. It is all about winning - or regaining - the confidence of the crew with a reliable system. Because the day the crew will really need the system, they will not make any operational mistakes, nor will the system fail."

While most sea-faring and offshore companies maintain and increase their commitment to providing safe working environments, achieving this has proven difficult when available lifeboat systems have some faults and improvements have been few and far between.

As a result, Mr Nielsen presented his initial ideas and sketches for improving lifeboat safety to colleagues. Then via the A.P.Möller-Maersk Innovation Board he teamed up with Mr Soerensen and approached several different leading lifeboat manufacturers. The companies that they approached all expressed interest in developing a better product, but due to cost being an issue the concept was not adopted. Dedicated to its zero accident goal; A.P.Möller-Maersk, therefore, decided to make its own prototype together with strategic partners.

"This segment has been basically still for the last 30 years, so for the most part no major developments like this have happened," says Mr Esben, managing director, Nadiro. "This way we bypass the system because now we build our own."

The problem that Nadiro addressed in the early stages of development was that a lifeboat is supposed to save lives, not cause deaths or injuries. Answering the question why are people in the maritime and offshore industry continually getting hurt in safety exercises? Bent Nielsen of Maersk Drilling did a study and wrote a wish list and from that he developed a safe lifeboat concept for his fellow seamen.

In 2008 when Mr Nielsen started the project he screened the lifeboat equipment market and looked at the safety statistics and studies

available. At the IMO MSC meeting on the 27 May this year, the P&I Club Gard presented that each year more than 240,000 lifeboat drills are carried out with on-load hooks and “a few of these go wrong”.

Further, it highlights certain factors that cause these failures; lack of maintenance of the release systems (Management), lack of training crew on complicated systems (management), poor design, complicated and unstable hooks. Hook systems vulnerable to effects of lack of maintenance and human error (manufacturer), unclear instructions, complicated posters (manufacturer), macho culture. Not reading instruction books (crew), language problems. Lack of training/skills (crew/management), regulations: Focus was mainly on ease of release. Lack of detailed requirements for protection against accidents (IMO), and lack of action to identify and withdraw approvals for accident prone hooks (flag).

### The system in detail

A.P.Möller-Maersk conducted its own studies that have shown that the hook system, which attaches a boat to a wire and winch that lowers it into the water are the cause of about 80% of recorded accidents. Addressing the need for a safer on-load hook mechanism the Nadiro system uses a specially developed drop-in ball system instead, which uses stainless steel for the ball and aluminium for the rest of the mechanism. Installation of it alone can dramatically lift safety standards and it is patented to be sold separately.

The Drop-In-Ball technology that the lifeboat employs consists of a hollow casing

containing a ball connected to the end of the wire. Due to inclination in the casing the ball is pulled into the casing when the boat is carried by the Drop-In-Ball system. Furthermore, a pawl ensures that the ball cannot fall out when it lies in the casing. As such accidental release is avoided and it is easy to see that the ball is safely attached to the boat in the casing before starting the descent of the boat.

The hydraulic system inside the lifeboat will eject the ball with a hydraulic cylinder as soon as a hydrostatic sensor in the boat confirms that the boat is waterborne, and the boat driver pushes a release button on the control panel, where the status of the system is monitored.

In an emergency a separate hydraulic system with a hand pump can be charged to release the balls on-load after a seal has been broken and a valve has been activated.

The winch includes a disc brake system where speed is electronically controlled in the same way as anti-lock brake systems in modern cars. If this brake fails the oil motor used for hoisting the boat kicks in, as an oil brake introducing redundancy in the braking system. The winch system is placed directly above the boat, which only requires one sheave to route the wire from the winch and to the Drop-In-Balls which decreases wire wear.

When the boat is hoisted a laser sensor ensures that the winch will stop pulling as soon as the boat reaches the stowed position. If that fails oil overflow in the oil motor will prevent the wire from snapping.

The whole system can be controlled either by a hard-wired deck stand or by a remote

control installed on the boat. The remote control uses two-way communication and scans available frequencies for electromagnetic interference before locking in on a selected frequency.

The davit and winch system relies on stored mechanical power in terms of hydraulic oil under pressure which serves to launch the system during black ship. Two separate pressure tanks store double the amount of energy needed for a safe descent. The remote control relies on its own battery connected to the lifeboat's own batteries.

The lifeboat has DNV approval under the EU marine directive with also type approval testing according to circular MSC81(70). Two versions of the boat with different capacities were tested under the existing DNV rules, which were tested with full load for off- and on-load, with heeling and trimming.

### Extra safety feature

The concepts that the lifeboat employs are new to the lifeboat industry, but most of these features are based on existing technology. The remote control used to lower the lifeboat is standard in modern cranes, while the disc brake system used to control the lowering speed is similar to one in a windmill motor. Basic laser measurement technology is taken from the process industry and adapted for this purpose.

### Installation and maintenance

Most metal components are made out of stainless steel to avoid corrosion caused by the harsh sea environment. The entire package includes a 32 person boat (provided by Fassmer of Germany) plus a winch system encapsulated in a container to provide ultimate weather protection. This means that the entire unit can be removed for testing or repairs on shore. Furthermore, the boat will probably never need repainting and the winch system will probably outlive the lifetime of the vessel it is installed on.

In the short term it is expected that the lifeboat launching system will be mainly sold to offshore rigs and tankers. In the long-term Nadiro is expecting the system may make its way onto other vessels like ferries or cruise ships.

Bent Nielsen added that Nadiro received its first order for the system in August 2009. **NA**

Drop-in ball system designed for more efficient release of the lifeboat.





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# Schat-Harding stays ahead of standards

The International Maritime Organization (IMO) has moved to set higher standards for all on-load release hooks, and it is expected to include higher standards for existing lifeboats.

**T**he maritime industry will be set a massive task when the IMO's new lifeboat recommendations are adopted and enter into force. Some 50,000 merchant ships will need to have new DE52 compliant hooks fitted rather than the on-load release hooks currently fitted to most vessels.

Until the recommendations, which cover the hook design, materials and operation, are formally adopted, no-one can be certain what the exact future requirements will be, when they will come into effect and how the backdated requirements will be applied. That will become clear next year when IMO's Maritime Safety Committee meets again.

"We expect the new standards, set out in IMO recommendation DE52, to be adopted in 2010 and to come into force in 2012," explains David Bradley, executive vice president and head of the service division of Schat-Harding. "From that date all new boats will have to have DE52 compliant hooks, and all existing boats with hooks which don't meet certain key standards will have to be rehooked or have existing hooks upgraded at the next drydocking."

Schat-Harding is confident that its LHR hooks now fitted to all new lifeboats and being used for rehooking by forward thinking owners will not need replacing. Schat-Harding is staying ahead of the game by reviewing its current hooks to ensure they exceed likely new standards. "Our KISS hooks exceed the DE52 recommendations and we are now reviewing our LHR range to ensure it does too. We make the safest hooks available, we moved ahead of regulations on this as we totally renewed our hook range two years ago and we support IMO in moves to ensure all hooks meet the highest standards," says Bradley.

## Stinger success

Schat-Harding's latest Fast Rescue Boat, the 6.3m Stinger jet, has passed all its prototype



The LHR12 hook which Schat-Harding introduced ahead of regulation changes now being retrofitted to a number of ships, especially cruise vessels.



The Stinger Fast Rescue Boat undergoing trials.



The FF1200 freefall boat under test.

tests and will now enter production at Qingdao, China. The first Stingers will be supplied in September to Korea's Daewoo yard for an LNG RV vessel. Demand for the craft is expected to be world-wide for both rescue boat and workboat applications.

The Stinger Jet FRB will give rescue crews on ships and offshore units higher speed and safer recovery options in rough seas. It is also suitable for a wide range of tasks including search and rescue, diving support, crew transport and work boat duties. The waterjet propelled boat has a speed of 25 knots and a unique Kullmann-type, double curvature, deep V-hull design provides a soft ride at speed and in rough sea. A bow knuckle maximises effective waterline length and wave piercing. The hull form delivers easy transition from displacement to planing speeds at normal loads, excellent stability and load carrying capability without sacrificing safety or handling.

The Stinger was tested and approved in China to MED and SOLAS standards in the presence of Lloyd's Register and ABS surveyors.

### Higher freefall limit

Lifeboat and davit manufacturer Schat-Harding has completed the first freefall drop with its new design of lifeboat for the offshore sector, the FF1200 which sets new standards for freefall boats.

Schat-Harding, CEO, Ove Roessland said: "We were acutely aware that, in order to satisfy regulations applying to the Norwegian offshore sector, it was necessary to design a completely new lifeboat. Now, after several years of research and development, and the successful completion of high-scale module testing, we have produced what we regard as the safest lifeboat ever developed by Schat-Harding. The first freefall drop of the FF1200 represents the culmination of a

great deal of hard work, and it is something of which everybody at Schat-Harding is very proud. The FF1200 will improve safety levels for all offshore workers."

The 70-person, 33m-drop FF1200, with its streamlined design, is larger and stronger than other freefall lifeboats on the market, and its engine power is three times greater than anything seen in the Norwegian offshore sector over the last 10 years.

Mr Roessland explains: "We have given the FF1200 project a high priority within the company. It was vital for the offshore industry and its workforce that we built a lifeboat which generated confidence in freefall evacuation, and that is what we have done."

Schat-Harding has already received 10 orders for the FF1200 from BP and Talisman Energy. The first craft will be delivered to Talisman's YME development project in third-quarter 2009. *NA*



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# SOLAS updates for 2010

The latest recommendations for the Safety of Life at Sea Convention will specify up to date provisions for safety equipment onboard vessels.

**A**mendments to the International Convention for the Safety of Life at Sea (SOLAS) will see an update in areas of lifeboats, lifejackets and immersion suits, due to come in to effect 1 July 2010.

Amendments to SOLAS Chapter III are aimed at tackling the higher demand for safer operation of lifesaving equipment with higher standards and new testing regulations to be adopted in the regulations.

Amendments to SOLAS Chapter III - Lifesaving appliances and arrangements in Regulation 7 - Personal lifesaving appliances, have added a new requirement for lifejackets for infant's onboard passenger vessels that becomes effective on 1 July 2010 and is applicable in accordance with SOLAS III/1.1, on ships built on or after 1 July 1998, which states:

- For passenger ships on voyages less than 24hours, a number of infant lifejackets equal to at least 2.5% of the number of passengers onboard shall be provided; for passenger ships on voyages 24hours or greater, infant lifejackets shall be provided for each infant onboard.

A further amendment relates to the provision of lifejackets for larger passengers and states that, if the adult lifejackets provided are not designed to fit persons with a chest girth of up to 1750mm, a sufficient number of suitable accessories are to be available onboard to allow them to be secured to such persons.

The amendments to SOLAS Chapter III will be applicable to vessels built after 1 July 1998, but will not immediately effect all lifejackets onboard these ships. If lifejackets are in good condition and are approved according to existing standards, they will not need to be replaced.

The testing requirements of new lifejackets have been changed. In terms of the new Lifesaving Appliance (LSA) codes, all lifejackets must be tested against a standardised Reference Testing Device (RFD), to comply with the international SOLAS regulations.

The amendments include the requirement



New SOLAS amendments tighten up lifejacket safety.

that all lifesaving appliances should withstand in stowage an air temperature range of -30degC to +65degC and personal life-saving appliances should remain operational throughout an air temperature range of -15degC to +40degC. The colour of lifesaving appliances is now specified to be "of international or vivid reddish orange, or a comparably highly visible colour on all parts where this will assist detection at sea". The existing section 2.2 on General requirements for lifejackets is revised and replaced. Further amendments relate to specifications for immersion suits and anti-exposure suits.

Further amendments to hook mechanisms will also be implemented in SOLAS Chapter III, which requires:

- the mechanism shall be designed so that the hook and locking mechanism remains fully closed under any operational conditions until it is deliberately caused to open by means of the operating mechanism.
- for designs utilising a hook tail and cam, the mechanism shall continue to comply with this requirement through a rotation of the cam of up to 45deg in either direction from its locked position;
- the mechanism shall be designed so that, when it is fully reset in the closed position, the weight of the lifeboat does not cause any force to be transmitted to the operating mechanism, which could cause the inadvertent release of the lifeboat;
- locking devices shall be designed so that they can not turn to open due to forces from the hook load;
- if a hydrostatic interlock is provided, it shall automatically reset upon lifting the boat from the water;

- in paragraph 4.4.7.6, the existing subparagraph .2 is replaced by the following: the mechanism shall have two release capabilities: normal (off-load) release capability and on-load release capability
- normal (off-load) release capability shall release the lifeboat when it is waterborne or when there is no load on the hooks, and not require manual separation of the lifting ring or shackle from the jaw of the hook
- on-load release capability shall release the lifeboat with a load on the hooks. This mechanism shall be so arranged as to release the lifeboat under any conditions of loading from no load with the lifeboat waterborne to a load of 1.1 times the total mass of the lifeboat when loaded with its full complement of persons and equipment. This release capability shall be MSC 86/26/Add.2 ANNEX 15 Page 2 I:\MSC\86\26-Add-2.doc adequately protected against accidental or premature use. Adequate protection shall include special mechanical protection not normally required for off-load release, in addition to a danger sign. The release mechanism shall be provided with a hydrostatic interlock unless other means are provided to indicate that the boat is waterborne. To prevent a premature on-load release, on-load operation of the release mechanism shall require deliberate and sustained action or actions by the operator
- in paragraph 4.4.7.6, the existing subparagraph .3 is renumbered as subparagraph .7 and the following new subparagraph .8 is inserted: all components of the hook unit, release handle unit, control cables or mechanical operating links and the fixed structural connections in a lifeboat shall be of corrosion resistant material in the marine environment without the need for coatings or galvanizing. Design and manufacturing tolerances shall be such that anticipated wear throughout the service life of the mechanism shall not adversely affect its proper functioning. Mechanical operating links such as control cables shall be waterproof and shall have no exposed or unprotected areas. **NA**

## Lifeboat launching gets closer inspection

Paris and Tokyo MoU's on Port State Control will be holding a joint inspection campaign on lifeboat launching arrangements from SOLAS chapter III.

The 43 Maritime Authorities of the Paris and the Tokyo Memoranda on Port State Control will begin a joint concentrated inspection campaign with the purpose of ensuring compliance with SOLAS Chapter III - Lifesaving Appliances and Arrangements with regard to lifeboat launching arrangements. This inspection campaign will start 1 September 2009 and be held for 3 months, ending on 30 November 2009.

In practice the concentrated inspection campaign will mean that during every port State control inspection within the Paris and Tokyo MoU regions, the lifeboat launching arrangements, maintenance records and other applicable documentation shall be verified in more detail for compliance with SOLAS Chapter III.

Port State Control Officers (PSCOs) shall use a list of 20 selected items to verify critical areas for the safety of lifeboat launching arrangements, some of which are related to documentation, equipment and familiarisation. For this purpose PSCOs will apply a questionnaire listing a number of items to cover this concentrated inspection. The questionnaire was published on the websites of Paris MoU and Tokyo MoU in the first week of August 2009.

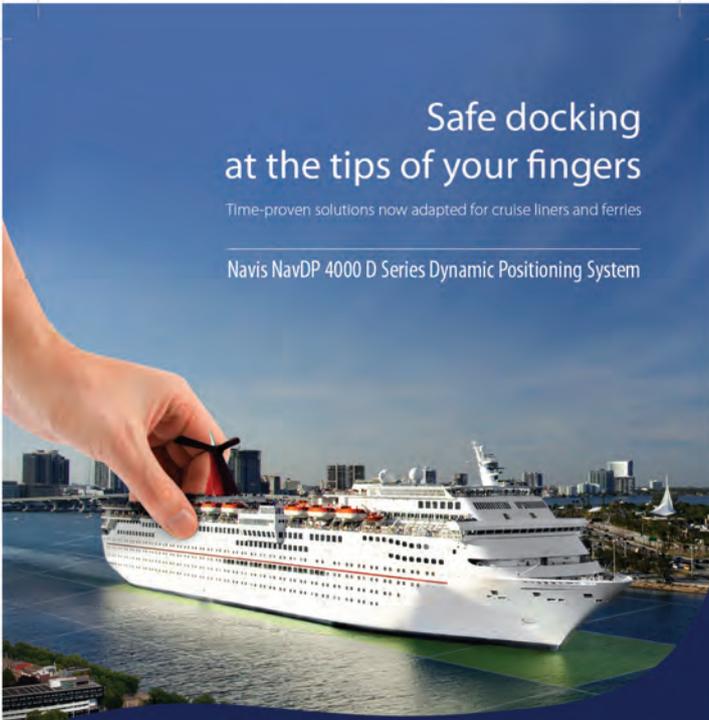
When deficiencies are found, actions by the port State may vary from recording a deficiency and instructing the master to rectify within a certain period to detention of the ship until deficiencies have been rectified.

It is expected that the Paris MoU and Tokyo MoU will carry out approximately 10,000 inspections during the CIC. The results of the campaign will be analysed and findings will be presented to the governing bodies of the MoU's for submission to the International Maritime Organization (IMO).

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# Unitor Seaguard 2010 lifejacket meets regulations

Wilhelmsen Ships Service has launched its latest lifesaving product the Unitor Seaguard 2010 lifejacket.

The latest lifejacket from Wilhelmsen Ships Service (WSS) has been specifically designed to meet the latest regulation SOLAS requirements set by International Maritime Organization (IMO), which are due come in to effect in July 2010, when all lifejackets onboard vessels will need to be replaced with lifejackets that meet the new requirements.

The amendment states: For passenger ships on voyages less than 24hours, a number of infant lifejackets equal to at least 2.5% of the number of passengers onboard shall be provided; for passenger ships voyages 24hours or greater, infant lifejackets shall be provided for each infant onboard.

The Unitor Seaguard 2010 lifejacket has successfully completed tests and meets the latest SOLAS standards and will bear the 'wheelmark' logo conforming to the Marine Equipment Directive, 96/98/EC.

The lifejacket comes in sizes for adults, children and infants and is a compact



The Wilhelmsen Unitor Seaguard 2010 lifejacket designed to meet the new SOLAS regulations.

design allowing the lifejacket to be easily donned and reducing the storage room that it will require onboard vessels.

Dave Evans, product marketing manager lifesaving & survival of Wilhelmsen Ships Service said: "This is a positive development in improving the safety of passengers at sea. We are very pleased that the Unitor range has comfortably outperformed the reference testing models." He added: "We are proud of the fact that the Wilhelmsen Ships Service is one of the first companies to achieve these standards with infant lifejackets."

The Unitor Seaguard 2010 is a single block design which will give it better performance in water, whilst also redirecting waves away from the face. The front of the lifejacket consists of five pieces of foam providing the wearer a better fit around the waist. The lifejacket features buddy line, whistle, adjustable chin strap and retro reflective tape. [NA](#)

## IMO awards two vessels with AUSMEPA certification

AUSMEPA certificates have been presented to Captain Brett Whiteoak, BP Australia Ltd and Andrew Douglas, ASP Ship Management Pty. Ltd. (Australia) for *British Fidelity* and *British Loyalty*, respectively the two latest vessels to be accepted in to the AUSMEPA ship membership scheme.

The presentation of the certificates took place at NatSHIP 09 conference in Sydney with International Maritime Organization (IMO) secretary general Efthimios Mitropoulos presenting the certificates.

Michael Julian, AUSMEPA's executive director, said: "The AUSMEPA Ship Membership Scheme had been introduced to award ships which can demonstrate a high level of safety and marine environment consciousness. 'To fly the AUSMEPA Flag is a sign of quality'," he said.

Both the *British Fidelity* and *British Loyalty* are chemical/oil product tankers operating in the Australian coastal trade; owned by BP Australia Ltd and operated by ASP Ship Management (Australia) Pty. Ltd.

In order for the vessels to be accepted by the AUSMEPA board of ship membership the vessels had to demonstrate a good safe and environmental history, also with two continuous years free of detention under Australia's port State control regime; a USA Coast Guard QUALSHIP 21 Certificate; a Green Award Certificate, and any other internationally recognised certificate or record providing evidence of the ship's quality and safety record.

## Fire plans get better protection

Maritime Progress Ltd has announced the release its Fire & Safety Plan holder on to the market that will offer better protection for fire plans.

The UPVC holder has been designed to meet SOLAS 1972 requirements, which states that all vessels are required to carry at least two fire plans onboard. One must be permanently displayed in an accessible area and one stored in a prominently marked, weather tight holder fixed outside the Deck House. Holders are often located close to a point of access to the vessel for the convenience of shore-based fire-fighting personnel.

Captain Andy Goldsmith MNI, marine technical manager, Maritime Progress Ltd commented on the latest design: "SOLAS Chapter II-2, Regulation 15 requires that a duplicate set of fire control plans is permanently stored in a prominently marked watertight enclosure outside the deckhouse for the assistance of shore-side fire fighting personnel.



Fire plan holder by Maritime Progress Ltd.

The Maritime Progress safety plan holder has been specifically designed to ensure the plan remains both dry and useable if it were required.

It represents a reliable alternative to the Heath Robinson style capped steel tubing used by a number of vessels worldwide.

The holder has a weatherproof screw cap and is 1m long is of sufficient length

to allow storage of an A0 sized plan without the need for folding. The outside diameter of 110mm allows ample room for ease of removal of the plan and the bright red colour ensures it stands out against the majority of backgrounds.

Plastic construction guards against corrosion affecting the threaded cap with the likelihood that the holder will last the life of the ship." [NA](#)

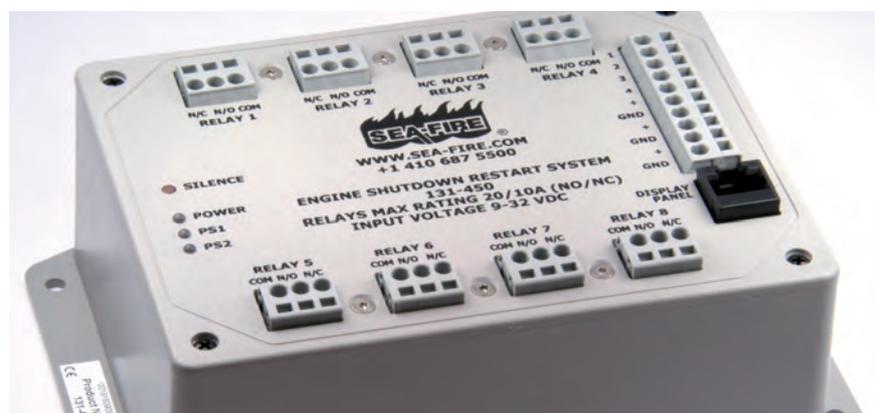
## Sea-fire launches shutdown system

Sea-Fire has launched its latest ESRS Automatic Engine Shutdown System that shuts down running engines, generators and powered ventilation upon discharge of the fire suppression system.

The system is aimed at shutting down operating systems whilst fire suppression systems are discharged onboard a vessel without depleting the extinguishing agent before the fire has been put out.

With two pressure switch inputs, the innovative system is able to utilise spring-cage connectors for fast and simple installation. A new display panel provides plug-n-play via CAT5 cable connections. Multiple display panels can also be easily attached.

Operating between 9-31 VDC, the ESRS is offered in 4, 6 and 8 relay units to shutdown up to eight pieces of equipment. Meeting ISO marine 8846 and CE approval standards, options include fire suppression system, auxiliary zone and



The latest ESRS equipment from Sea-Fire that shuts down operating systems in the event of a fire.

low-pressure monitoring features, as well as high-temperature zone monitoring with

heat sensors. A relay reset timer version is also available. [NA](#)

## LR in check with marine fire safety

Lloyd Register (LR) has produced its *Marine Fire Safety Pocket Checklist* in conjunction with UK P&I Club to address the issue of reducing fire risk at sea and of Port State Control (PSC) detentions.

Lloyd Register and the UK P&I Club have analysed deficiencies found by PSC inspectors in ports worldwide over a three-year period. The checklist has been drawn up from PSC inspector's experiences and observations, from which they have used to develop a reusable checklist aimed at helping crew members pre-empt and manage the risk of fire more effectively.

Ian Wilson, fleet quality manager, Lloyd's Register, commented: "The Marine Fire and Safety Pocket Checklist should help crew members to take responsibility for areas of the ship and operations which can present fire hazards and help remind them of the key areas to monitor. It should also support the vessel's own operational and maintenance procedures and flag state requirements."

Fire's at sea have cost the shipping industry over US\$20 million per annum and is one of the most expensive sources of cargo liability claims. A majority of large cargo fires start in ships' holds, with others originating in the engine room, cargo tanks, accommodation areas and pump rooms. Human error is also responsible for more fires than equipment failure, with shore error a bigger factor than operational mistakes by deck and engineering officers and crew.

It is vital that all certification, documents, records and manuals are up-to-date, valid and available. The booklet lists 30 of these covering the condition, inspection, testing and servicing of the fire safety equipment, fire damage control plans and crew drills.

The booklet highlights that in operational areas, the focus should be on fire dampers and ventilators; fire-fighting equipment and appliances, including fixed extinguisher systems;



Lloyd's Register Marine Fire Safety Pocket Checklist.

pressure fuel lines and ensuring flammable materials are kept separate or insulated from hot surfaces or liquids.

It also highlights that Sprinkler systems and ventilators should be closely checked in accommodation areas, while international shore connection, paint locker protection and ventilators are priorities on deck. In tanks and holds, careful attention should be paid to inert gas (tankers only) and CO<sub>2</sub> systems and to special requirements for dangerous goods.

Further, close attention should be paid to emergency fire pumps, generators, batteries, possible hazards from workshops and the cargo pump room in tankers. Fire drills should be laid down and carried out.

Karl Lumbers, the UK P&I Club's loss prevention director, highlights the hazard of fire for seafarers: "Potential sources for trouble are many and widely dispersed. You cannot pay too much attention to avoiding and pre-empting incidents in the first place. Similarly, officers and crew must be rigorous about the positioning, condition, maintenance, inspection and testing of all appliances. Most important, they should be trained and regularly drilled in their use."

The Marine Fire and Safety Pocket Checklist is being distributed to owners and operators and to UK Club's members. The text is available online on Lloyd's Register website and at [www.ukpandi.com](http://www.ukpandi.com). The Marine Fire Safety Pocket Checklist is the fourth in a series of guides that aim at helping crew and operators comply with international convention requirements. **NA**

means of escape; personal proactive equipment (PPE); and doors, detection equipment and alarms. For engine room and machinery spaces, the

"Fire's at sea have cost the shipping industry over US\$20 million per annum and is one of the most expensive sources of cargo liability claims"

emphasis should be on cleanliness, the condition of fire pumps, emergency quick closing valves and shutdowns, the jacketed piping system for high

# Survitec launches its latest Ark

Survitec has launched the RFD Marin Ark 632 its latest development of marine evacuation systems (MES) with full MED approval.

With passenger and cruise vessels getting larger in beam and in height, the development of the Marin Ark 632 has been designed to handle larger capacity and can carry 632 passengers.

“The development of the 632 MES has come from the way ships are manufactured today with larger beams. With new ship regulation’s coming in to affect the new design is moving with time and safety requirements”, says Barbara Buick, marketing executive, Survitec Group.

The 632 MES features a double helical slide path chutes allowing passengers a natural controlled descent down the spiral slide to the liferaft below. The added bonus of the helical slide is that crew members can ascend the chute to assist other passengers, if it is needed. The liferaft also features a suspended floor in the raft for maximum thermal protection and multiple buoyancy compartments to ensure safety in the toughest sea conditions.

The design of the system when in stowage features the integration of a service winch, in to the stowage unit, which allows for the entire unit to be deposited on to a tug or truck during service periods and eliminating the need for a crane during service.

The compact all-in-one stowage system has a minimum deck footprint, maximising space onboard. The system requires no addition bowing during deployment and is available in symmetric and asymmetric options and come in stowage solutions of tween deck and open deck solutions.

The system is fully inflated and operational within 90seconds of deployment and is fully reversible ensuring that the liferaft inflates upright when deployed.

Survitec has received orders for two systems to Norwegian Epic, Norwegian Cruise Lines, due for delivery January 2010. The orders for two Marin Ark 632 New Generation MES to Norwegian Cruise Lines



Marin Ark 633 series.



Marin Ark in heavy-sea tests.

(NCL) will be installed on the *Norwegian Epic*, currently under construction in France by STX Europe.

*Norwegian Epic* is expected to make its debut in May 2010. NCL has said that it

was impressed by the latest technological advancements that have been made in the Marin Ark 632 New Generation MES system, which will feature on the 150,000tonne 4200passenger Cruise Liner. **NA**

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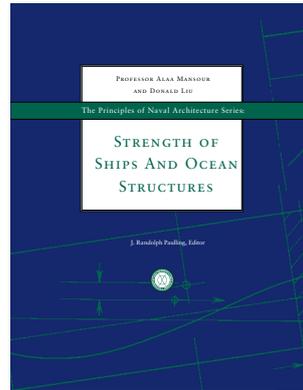
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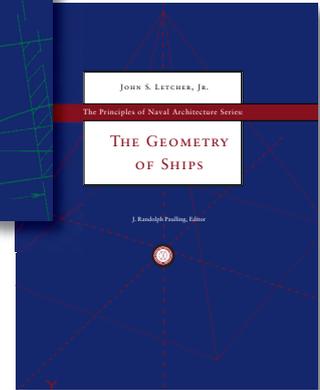
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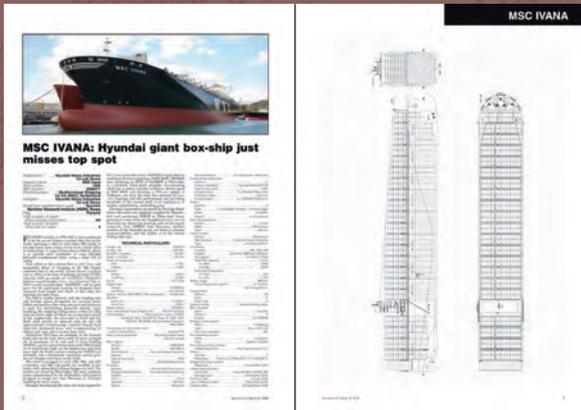
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The Royal Institution of Naval Architects published the 19th edition of its annual Significant Ships series in February 2009. Produced in our usual technically-orientated style, *Significant Ships of 2008* presents approximately 50 of the most innovative 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.

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