1860 -2010

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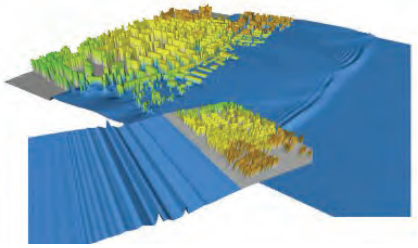

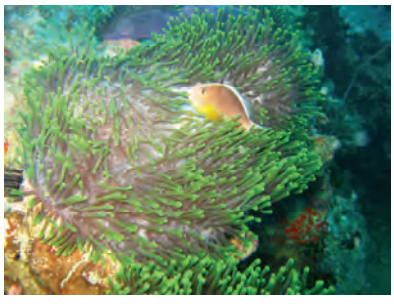

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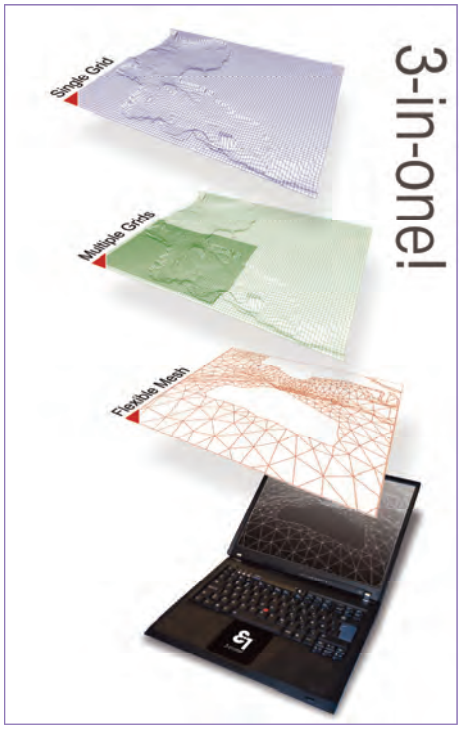

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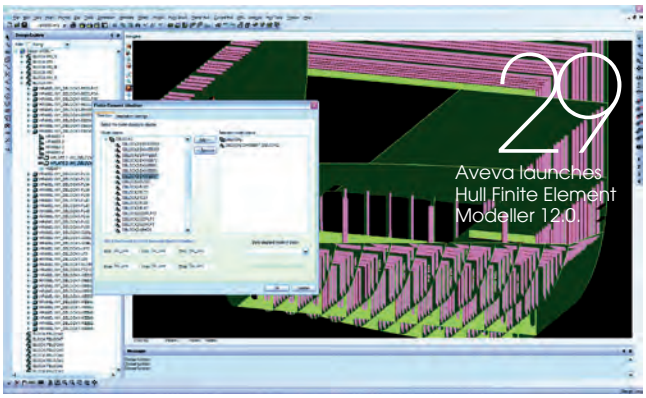

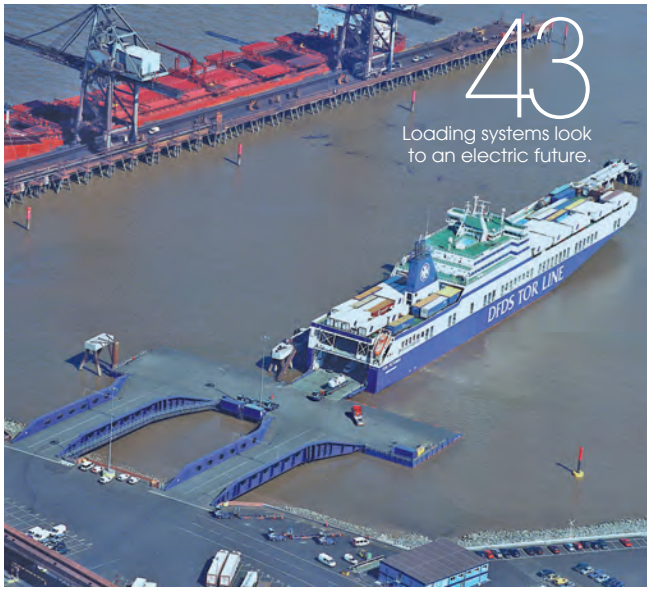

On-line Edition

The Royal Institution of Naval Architects is proud to announce that as of January 2008, *The Naval Architect* journal has gone digital. We are very pleased to inform the maritime industry that each issue will be published online, on the RINA website. Visit www.rina.org.uk/tna and click on the issue cover you wish to view. This means that the entire publication, including all editorials and advertisements in the printed edition, can be seen in digital format and viewed by members, subscribers, and (for a limited time) any other interested individuals worldwide.

Are ro-ro's compromised?

Some 800 people lost their lives as the *Princess of the Stars* ferry capsized in a storm off the coast of Manila in June 2008. Source: Military Sealift Command

On the balance of probabilities most ships are safe, though that may not be the case for some ro-ro vessels in certain instances. But, the fact that new rules leave designers and operators confused and uncertain as to whether a ro-ro ship is safe is an intolerable situation.

Safety is an issue in which there should be no compromise, yet all ship designs are a compromise between safety and the commercial viability of the vessel. All ships have an element of probability built into them, that is, regulators must decide which incidents are so unlikely to happen that there is no need to design safety features into the vessel to protect them from such an improbable event.

The free surface effect of floodwater on the vehicle decks onboard ro-ro ships can render the vessel unstable and is not one of these improbable events. Many lives have been lost from this very eventuality, *Herald of Free Enterprise*, *Estonia* and *al-Salam Boccaccio 98* occurred in 1987, 1994 and 2006 respectively account for around 2500 deaths alone.

Concerns for the design safety of ro-ro vessels in the UK were first raised following the death of 132 passengers following the flooding of the car deck on the UK's second *Princess Victoria* ferry that operated between Stranraer in Scotland and Larne in Ireland.

At the time of its loss in January 1953 the ship was only six years old and was one of the first ro-ro vessels to enter service in the UK. It should have proved to be an early warning signal to the ferry industry that there was a problem that needed to be solved.

Instead many more people have had to die before the regulatory machinery began to move with the introduction of SOLAS in 1974 and amendments in 1988 and 89 following the loss of the *Herald of Free Enterprise*, and SOLAS 95, the Stockholm Agreement, being introduced following the *Estonia* disaster.

The commercial success of the ro-ro design has seen some resistance to change that could affect the profitability of the design. In November 1994, a few weeks after the loss of *Estonia*, *The Naval Architect* editorial read: "In 1988 this Institution issued a public statement that ro-ro ferries of contemporary design were unacceptably vulnerable in that there was a likelihood of rapid capsize should the car deck be flooded."

That warning was repeated in 1989 and 1990 and very often since, however, the conclusion in *The Naval Architect* was that the "one compartment standard for ro-ro ships cannot be justified," and that "a substantially longer time for disembarkation after lethal damage is vital."

Regulation on ro-ro ships came at a comparatively fast pace following the loss of *Estonia* with SOLAS 95 and SOLAS 98 being followed more recently by the SOLAS 2009 regulations which sought to overhaul the design philosophy from deterministic to probabilistic rules.

Are ro-ro ships safer now following this fix in the regulations; one senior maritime professional charged with ro-ro safety told *The Naval Architect* as recently as last month that a ship built to SOLAS 2009 standards can "sustain minor damage in a critical area that could see the loss of the ship". He asked, rhetorically, "Should we do something about that?"

Probabilistic rules, according to the expert mentioned above were not supposed to be prescriptive about protection, the idea was that if the ship met the safety index then it would be safe, no longitudinal barriers were going to be imposed on designers. "There was a resistance to this because there was a feeling that minor damage could cause the loss of ship", so the B/10 rule was added protection.

The fact that many designers remain concerned, as do a number of maritime administrations, reveals that even though there has been much debate and regulation the fundamental problem with the free surface effect on ro-ro vessels remains unresolved. After nearly 50 years in which the problem has been identified and a number of solutions have been put forward, not least by the readers of this magazine, that would prevent the deaths of passengers and crew alike it is nothing short of a scandal that a senior figure should still be moved to ask "should we do something about it?"

Probabilistic rules for ro-ro ships appear to be a compromise too far, a step beyond the acceptable level of risk. Concerns over the regulations must be addressed sooner rather than later in an effort to safeguard life and limb. *NA*

Newbuilding

Viking Line poised to order

Finnish ro-pax operator Viking Line is considering whether to order one or two vessels as replacements for the *Amorella* and *Isabella*. Both ships operate the Turku to Mariehamn / Långnäs–Stockholm route under the Finnish flag.

Both ships were built in the late 1980s and are considered too old to operate under modern regulations. "A lot has changed since 1987 and 1989 when these ships were built," said Michael Backman president and CEO of Viking Line.

Replacement ships will be around 60,000gt, compared to 34,000 and 35,000 respectively for the current vessels on the route.

New ships will cater for close to 3000 passengers and they will be 30% more efficient when they replace the existing ships in around 2013, said Mr Backman.

Viking Line is looking to take advantage of the low cost of newbuildings in the present climate with both Asian and European yards being considered for the one or two ship order. "Yard prices are very good at the moment," Mr Backman confirmed.

However, the company is looking to gain a competitive edge over its main competitors by offering a value added service. "We are looking for a concept that is different, how do we make this [the newbuildings] different from what already exists?" Asked Mr Backman.

Offering quieter transits could be one way with the new vessels giving passengers a quieter ride, particularly in the cabins, and "we throw good parties" confided Mr Backman.

The company is also looking to avoid excessive charges that stem from new environmental regulations soon to be imposed in the Baltic and North Sea regions. The sulphur regulations will see limits imposed on emissions of 0.1% sulphur content in fuel from 2015 which will impose extra costs on the companies operating in environmental control areas.

"We are not against saving the environment", said Mr Backman, "but moving it [cargo] to rubber wheels is not sensible and of course there is not enough [low sulphur] fuel", he added.

Mr Backman went on to say: "Our fuel bill will double [as a result of the sulphur directive] and it will put most cruise and cruise ferry operators in the red." He concluded that the new rules for the Baltic and North Sea would be "good for the south of France and western UK."

Amorella and its partner vessel, *Isabella* operate out of Turku to Stockholm are likely to be retired in 2012 with more modern, cost efficient tonnage, replacing them.

Newbuilding

Marinette wins Arctic order

Fincantieri has announced a new order through its USA subsidiary the Marinette Marine Corporation to build an oceanographic research vessel for the Alaskan University of Fairbanks capable of operating in the Alaska region.

The US$120 million vessel will be built at the Marinette yard in Wisconsin for delivery in 2013 with an operational start-up of 2014. The vessel will be able to operate in ice up to 80cm thick and at 77m long will be able to accommodate up to 26 scientists.

Green shipping

Air lubrication retrofit offered

DK Group which developed its Air Cavity System (ACS) for reducing the fuel use for new vessels has now launched a retrofit kit allowing all ships to benefit from the system (see *The Naval Architect* January 2009 pg 26&27).

The company said that the system can be fitted to at a standard drydocking or at most ship repair yards in 14 days.

Following trials of the ACS system the company said that fuel cost savings of up to 15%, depending on the vessel type, can be made giving the technology a payback time of under two years at current bunker fuel cost levels. The company claims that some vessel types may achieve better payback periods than that.

Ken Bloch Soerensen, the company's recently appointed CEO, said: "One of the key attractions in taking the position of CEO with DK Group was the understanding that ACS could be adapted to exsisting vessels and provide an offering for ship owners and operators that will be hard to turn down given the current market cycle of needing to drive efficiences, high bunker fuel prices, reduction in long term vessel orders and impending environmental legislation."

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Classification Societies

AP Møller in class deals

AP Møller has entered into agreements to extend its survey periods with ABS and to test bio-fuels with Lloyd's Register as the company seeks to cut costs and ensure that it meets future environmental regulations.

In Houston, Texas, AP Møller-Maersk signed a drydocking extension deal with ABS that will see the company's vessels drydocked every seven and a half years, rather than every five years.

An initial 14 containerships from Maersk Line will be covered by this agreement which is part of a pilot programme approved by the Danish Maritime Authority, which allows two underwater inspections before a drydocking. This pilot scheme has also been backed by the Singapore and UK administrations.

Strict conditions have been set for vessels entering the extended drydocking scheme, said the company and entry into the programme is, "restricted to vessels which are less than five years old and the provision expires once the vessel reaches 15 years of age. It requires manufacturer guarantees that the underwater coatings used are designed to last for the extended period, the implementation of an active condition monitoring and preventative maintenance programme and the application of a structured hull inspection system."

ABS said that the 14 vessels entered into the contract will receive the ABS voluntary Hull Inspection and Maintenance Program (HIMP) class notation and will use the ABS Hull Inspection software that has been developed to provide owners with an easy-to-use method for both the ship and shore offices to track the condition of the structure on a compartmentalised basis.

In addition AP Møller-Maersk subsidiary, Maersk Line has entered into a two year testing programme with Lloyd's Register to examine the use of bio-diesel in marine diesel engines.

Collaborators in the biodiesel project are Maersk Line, Maersk Tankers, Maersk Supply Service, Maersk Drilling, Maersk Ship Management, Lloyd's Register's Strategic Research Group, and a consortium of Dutch subcontractors. The project is being part funded by the Dutch government and co-ordinated by Maersk Maritime Technology. Studies will be carried out on board the *Maersk Kalmar*.

Fatty Acid Methyl Esters (FAME), developed from sustainable crops grown in temperate regions and re-used oils will be tested initially using a blend of between five and 7% bio-diesel.

"One of the aims of the tests is to establish the degree to which issues experienced by the automotive industry in the use FAME, will be duplicated onboard ship, in particular the impact on storage stability, handling and its subsequent use in the engine. Where adverse effects are arising it is hoped to find solutions to overcome them." said Kim Tanneberger, specialist of Lloyd's Register's Strategic Research Group.

According to Lloyd's Register FAME has a number of short-comings as a fuel, including:

- storage stability
- adverse reaction of materials to it (acidity, surfactant properties of FAME)
- susceptibility to microbial growth
- adverse effects on instrumentation of the bilge water system
- poor cold flow properties (cloud point and pour point).

Engines

Jüngerhans orders slow steaming kits

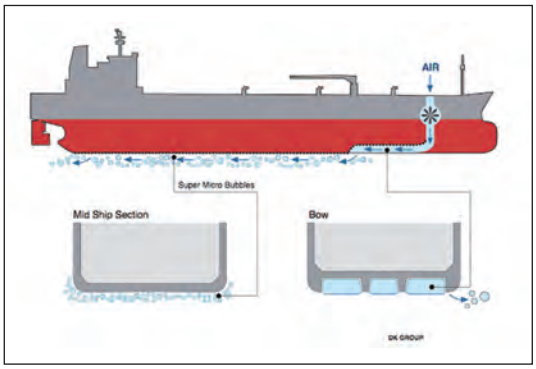
German owner Jüngerhans has signed a contract with Wärtsilä to fit slow steaming upgrades to two of its container vessels. The 1997 built *Klaus J and Helene J* are already fitted with 7-cylinder Wärtsilä RTA62U main engines.

"The Wärtsilä Slow Steaming Upgrade Kits will give these ships considerable flexibility for adapting to the prevailing challenging market conditions. They offer considerable cost savings when slow steaming the ships, while retaining the capability for full speed whenever necessary," comments Mr Herm Jüngerhans, Managing Director, Jüngerhans. "The Slow Steaming Upgrade Kit both extends the load range of the engine for continuous operation, and significantly reduces BSFC (brake specific fuel consumption) in the low-load range," explains Jürgen Gerdes, Director, Services, Wärtsilä in Switzerland.

Wärtsilä added that the upgrade kit also helps shipowners and operators to increase the flexibility of their engines, permitting them to run anywhere from 10% to 100% maximum load without operational restrictions.

"The BSFC figures that can be achieved are strongly dependent on the final NOx emission balances over the entire load range. For ships that must comply with NOx emission regulations, the restrictions imposed will be evaluated and a customised solution offered," said the company.

How ships save fuel using air.



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Ancillary equipment

Halton Marine latest separator

Halton Marine has announced the launch of it latest separator the Halton DSH that is a droplet separator suitable for demanding applications where reliability, easy installation, maintenance and a special design play an important role. The separator vanes are designed to restrict the passage of moisture, salt spray and rainwater e.g. into HVAC systems and engine room intakes.

The Halton DSH is a new generation droplet separator that offers high-performance in demanding conditions such as air intakes in marine and offshore installations, any type of air intakes including landside applications where designed air velocity is high, close to Air Handling Units to collect the condensation from cooling coil.

The Halton droplet separator has been tested according to EN 13030 performance test for louvers subjected to simulated rain. The tests have been made at VTT Technical Research Centre of Finland where the new droplet separator reached the A-Class results.

Contact Halton Marine, Pulttikatu 2, 15700 Lahti, Finland.
Tel +358 20792 200
Fax +358 20792 2060
www.halton.com

Ancillary equipment

OceanSaver gets contract for BMWS

Hyundai Heavy Industries (HHI) and OceanSaver Ballast Water Management Systems have signed a contract for ballast water management systems (BWMS) for three supertankers (VLCCs) on order for Oman Shipping Company (OSC).

The contract is for the supply of OS BWMS 6000 EX onboard three 317,000dwt tankers currently on order at HHI for OSC. The system treats 6000m^3 ballast water per hour.

Following its successful pilot-project on car carrier *Höegh Trooper* in 2005, OceanSaver obtained Type Approval in April 2009.

"We estimate the overall BWMS market to be about US$30 billion from 2010 to 2020. We expect to take a significant market share particularly within the tanker, LNG and chemical sector but also larger tonnage in general" said Stein Foss, OceanSaver MD.

OceanSaver's focus is on the large vessel market representing some 20% of the total numbers, but 40% by value at an estimated US$12 billion.

"We have clearly defined goals which include remaining in the lead and being established as one of the top three suppliers within our selected tonnage. This will secure rapid and sustainable growth over the next years," concluded Mr Foss.

Contact OceanSaver AS, P.O.Box 2087, NO-3003 Drammen, Norway.
Tel +47 32 88 25 00
Fax +47 32 88 25 25
E-mail post@oceansaver.com
www.oceansaver.com

Ancillary equipment

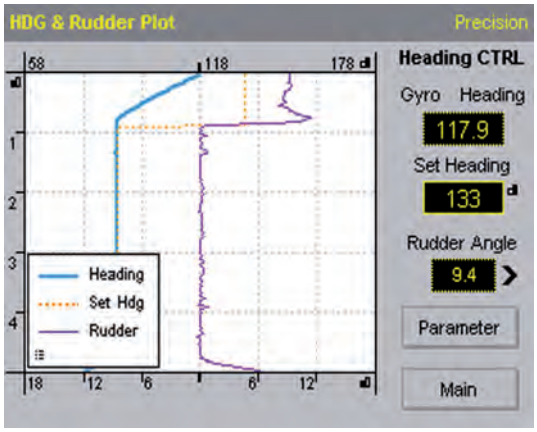
NP 5000 goes on autopilot

Raytheon Anschuetz has announced the release of its NautoPilot 5000 adaptive autopilot series, the successor of its NP 2000 autopilot series.

The NP 5000 is based on the Anschuetz steering algorithms, but will include functions for economic and precise navigation such as an integrated steering performance display and a new course control operation mode.

The autopilot features a large graphical display, which offers six different day and night modes on a touch screen. The screen is designed in line with the colour palettes, that are used for the display systems of Radar, Chart-Radar and electronic chart display and information system (ECDIS). Clearly arranged functions are accessible via push buttons or the touch screen to ensure operation is simple.

Graphical indication of steering performance. The integrated heading and rudder plotter provides effective assistance for optimising the autopilot adjustments for economic steering.



The large display features an integrated heading and rudder plotter, which will provide a graphical indication of heading changes and all used rudder angles. The operator benefits from simple adjustments of the autopilot's settings to gain optimised steering performance.

Another feature of the system is the Eco-Mode, which will provide the automatic adaptation to the current sea-state and weather. The autopilot will continuously adapt to current environmental conditions without a manual change of autopilot parameters.

The NP 5000 autopilot series features up to three possible modes of operation. Besides heading control, the new autopilot maintains the proven track control mode, allowing vessels to steer a pre-planned route automatically.

NP 5000 also has "course control" as a third mode of operation. When steering in this mode, the autopilot will compensate for drift automatically and keep the vessel on the defined course over ground. The graphical display of all NP 5000 autopilots includes an indication of the track deviation and an integrated rudder angle indicator as a backup to the rudder angle indication system.

To further increase safety the NP 5000 autopilot series is available with an integrated acceleration monitor, which provides a warning if a pre-defined cross acceleration limit is exceeded.

The NautoPilot 5000 can be installed as a stand-alone solution or in combination with other bridge navigation systems. Adding benefits such as track control, Conning integration of the autopilot performance data or the display of a "curved heading line" on ECDIS screen. NP 5000 will be available for installations in the third quarter of 2010.

Contact Raytheon Anschuetz GmbH, P. O. Box 1166, D-24100 Kiel, Germany.
Tel +49 431 3019 0
www.raytheon-anschuetz.com

Engines

HHI delivers Tier II engines

MAN Diesel has announced that its first Tier-II compliant MAN B&W engine has finished production at Hyundai Heavy Industries Engine & Machinery Division (HHI-EMD) in Korea and is ready for delivery.

The low-speed, two-stroke MAN B&W 6S50ME-C7 type engine will power a shuttle tanker (hull number 1749), currently under construction by Samsung Heavy Industries Co., Ltd., and ordered by Teekay, global provider of marine services to the oil and gas industry. Ship delivery is planned for July this year.

Under the terms of the contract, the 6S50ME-C7 engine is intended for Teekay's Amundsen class of ships,

The MAN B&W 6S50ME-C7 engine pictured on the testbed at HHI-EMD in January 2010.

the most sophisticated and eco-friendly shuttle tankers ever built. Teekay actively sought for production to meet DNV Clean-Design Notation requirements that comply with the strict, IMO Tier-II emission limits, setting in train the production of the first Tier-II compliant MAN Diesel engine.

Contact MAN Diesel, Teglholmsgade 41, DK-2450 Copenhagen SV, Denmark.
Tel +45-3385 1100
Fax +45-3385 1030
E-mail mandiesel-cph@mandiesel.com
www.manbw.com

Ancillary equipment

Optimax cuts inspection time

Tracer Products has unveiled the Tracerline TP-8690 Optimax 3000, a portable blue light LED fluorescent leak detection flashlight. With its focused beam, the Optimax 3000 will make it easier to find air-conditioning and fluid leaks.

The Optimax 3000 uses super-hi-flux LED technology to deliver 15 times brighter leak detection light than regular LED lamps. Its power equals that of 150watt lamps and has an inspection range of 6.1m or more. Powered by a rechargeable NiMH battery, the unit has an LED lifetime of 50,000 hours.

The torch comes with fluorescence-enhancing glasses and AC battery charger.

Contact Tracer Products, 956 Brush Hollow Road, P.O Box 483, Westbury, New York 11590, USA.
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Just a trim sir?

New ways in which to conserve energy are seemingly touted every day at bemused shipowners and operators, few systems apparently meet the claims made for them. But, every so often a jewel can be seen bobbing around with the flotsam and jetsam.

Saving between 3 and 5% of your annual bunker fuel bill is attractive to any owner or operator, particularly as crude oil prices have continued to recover and are projected to rise further.

Amongst the plethora of fuel conserving appliances has emerged the Dynamic Trimming Assistance (DTA) system that ensures a vessel is sailing at its optimum trim at all times.

Developed by Eniram, of Helsinki, Finland, the system has been tested on Norwegian Cruise lines vessels with the first being *Norwegian Jewel* showing impressive results and the company has now fitted the DTA system to eight of its 11 vessels.

"Having now used Eniram's DTA for some time, we are clearly using less energy to achieve the same speed. The benefit in percentage that we are talking about is a decrease of around 5% in fuel consumption, and this is a conservative estimate," said Captain Bjorn Ove Hansen, Director of Nautical Operations at Norwegian Cruise Line.

Captain Hansen added: "The system is very helpful, especially at night when it is difficult to get a visual of the vessel's movement through the water. One of the great parts of the DTA is that there is almost nothing to learn and very few buttons to press – quite the opposite to many systems that have complicated menus and commands that need to be learned by heart."

Despite the success with a number of trials on cruise vessels and with a single ro-pax ferry and even the beginnings of operations on bulk carriers, Eniram vice president of business development Captain Eero Lehtovaara says the real prize for the system is to attract containerships. "Containerships spend many more days at sea and their annual fuel consumption is huge," said Capt Lehtovaara.

At an installed price of €150,000 per ship the system is comparatively cheap to fit and with savings ranging from US$200,000 to US$300,000/year, giving a payback time of around six months.

A case study on a container vessel carried out by Eniram showed that a 5500TEU post panamax vessel operating 80% of the time had potential fuel savings of 4% or US$400,000/year and a reduction in CO_2 emissions of 3000tonnes/year, said Eniram. In addition the company said that the operator had an "improved awareness and understanding of operations and emissions."

Under these circumstances Eniram estimates that the ship operator will see a

Norwegian Jewel was the first NCL Vessel with Eniram DTA fitted, following this testing the system was fitted fleetwide.

Eniram Dynamic Trimming Assistant

Platform requirements:

Eniram Vessel Management System platform
Two available serial interfaces

Required variables:

Speed over ground
Speed through water
Wind speed and direction
Propulsion power
Tank volumes
Draft
Finn stabilizer position / angle
Shaft generator power

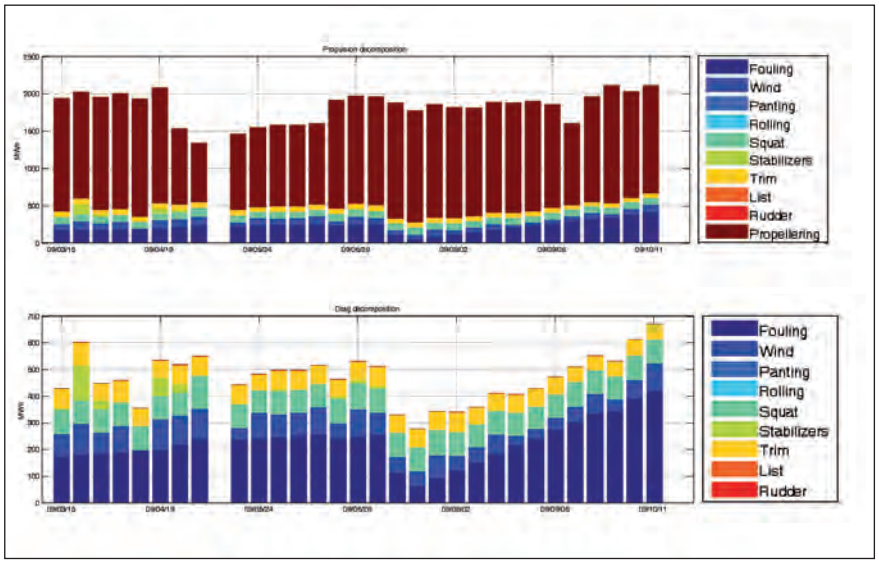
Optional variables:

Depth
Propeller RPM
Sea water temperature
Air temperature
Rate of turn
Heading
Location

Hardware:

Eniram DU -series 15" marine grade monitor with night mode
Two pcs (or more) Eniram AS -series attitude sensors

DTA main view.



Propulsion power decompostion using DTA data.

return on his initial investment after just 6.5 months of operation.

A contract involving a fleet of container vessels has been agreed and will be announced shortly by Eniram and the shipping line concerned. This latest news is more evidence that the system really is regarded by owners as a cost-effective method of saving fuel.

Eniram are hopeful that the system will be bought by the container operator as the benefits of the system become apparent on testing. "Any customer who has tried and tested the system has bought the pack," said Capt Lehtovaara.

The system works through two or more sensors placed at strategic locations on the vessel, the DTA system is integrated to the bridge systems which relay data on navigation, propulsion and attitude to the DTA which analyses the actual trim and conditions and instantly responds with the new trim requirements for the optimum fuel savings.

Other companies have come up with similar solutions to DTA, but according to Capt Lehtovaara, "The big difference between Eniram and other systems is that the DTA operates in real time, there are a couple of companies that are developing a similar system to DTA, but they are a couple of years behind".

Another appealing element of the DTA system is its simplicity with an arrow that points to either red, yellow or green sections that denote the trim of the vessel. The red section shows that the vessel is using more than 5% extra fuel than necessary. The yellow section is an intermediate level and the owner can decide how large this section is. Finally the green area denotes the vessel is sailing at the optimum trim.

If three or more sensors are used the system is so sensitive that it can measure the flexing of the vessel in real time and "We can pinpoint where any cracks will occur," explained Capt Lehtovaara.

In fact the system can do a lot more than just trim the vessel and predict where cracks will appear claims Eniram's VP for sales Henrik Dahl. "We can use the system to look at the resistance of the hull and can see when hull cleaning takes place, we can tell which paint works best and we can offer this information to our customers and they can analyse the figures and make informed decisions," said Mr Dahl.

The Eniram Onshore Analytics and Reporting Services collects data from each of its operational DTA systems and that is fed back through a one-way link via the internet to the company's own data centre. Intelligence from the data centre can be bought for a mere €30,000/year, but consultancy to interpret the data would require an expert's time and that would be a significantly higher cost, said Mr Dahl.

Further savings can be made, however, as the system is rolled out across a fleet and data from the DTA systems is analysed allowing data from ships to be compared on a per voyage basis including data on routing, and weather.

"You can compare similar vessels and different vessels in different situations and that will allow an owner to make long term strategic decisions on fleet composition," explained Mr Dahl.

Graphs showing propulsion records and drag decomposition for a vessel can be seen in figure one above. Detail from the statistics can determine, for example, when a vessel has had its hull cleaned as in the case below, or repainted, and can monitor the effect of changes to engine power, direction and stabiliser use.

In one case Eniram noticed through the vessel attitude sensors that at about 8pm every night on a cruise vessel the trim of the ship changed, with the bow rising out of the water, requiring a change in the vessel attitude. Company experts were puzzled as to why this should happen at the same time every night.

On discussions with the cruise company they discovered that passengers were finishing their evening meals and heading to the theatre for the night's performance at 8pm shifting the weight on the vessel, imperceptibly to those onboard but sufficiently to require a change in the trim of the ship.

Carnival Cruise Lines (CCL) is another company rolling out DTA on its vessels with four ships having already installed the system and plans for installation on a further five ships.

Robert Spicer, vice president of energy conservation at CCL said: "We were looking for ways to reduce the consumption of fuel and, in doing so, reduce both CO_2 emissions and the expense for fuel purchases."

Mr Spicer added that by using DTA CCL expected to make average savings of US$100,000/ship/year, with potential fleet wide cost savings of around US$1 million and reducing carbon emissions by 6000tonnes/year.

However, CCL expects to make even greater savings through using the data analysis over the coming years. Mr Spicer, therefore, concluded: "Like a fine wine, DTA gets better with age… "As more data is collected over the years for a particular ship and hull form, the statistical model in DTA learns. This learning helps to refine the visual feedback to officers, and we expect DTA to continue to add value to our operation for many years to come." *NA*

Widespread backing for Pole Star's anti-pirate technology

As the scourge of piracy shows no sign of abating off the coast of Somalia, leading supplier Pole Star has rolled out its innovative solution to improve response times to piracy incidents. Sandra Speares reports.

Pole star's Ship Security Reporting System (SSRS) uses the mandatory Ship Security Alert System (SSAS) to connect ships that are being attacked by pirates directly to the naval taskforce via naval coordination centres.

The Pole Star software was developed in response to calls from flag states and the European Union (EU) naval taskforce for improved intelligence on the position of vessels and piracy attacks in the Gulf of Aden. Pole Star says that the system will cut the reporting time for attacks from several hours to a matter of minutes.

Although ships are able to send alerts of attacks via the mandatory SSAS, which is installed on around 50,000 vessels, one of the problems with SSAS is that the alerts need to be routed via the company security officer and the flag state.

In cases where companies are not following best management practices or do not have effective round-the-clock monitoring procedures, there may be delays in alerting the naval coordination centres that an attack is in progress, thus reducing the chances of any effective preventative action.

Best management practices were formulated by 11 industry organisations with a view to providing guidelines on the best means of avoiding an attack when in transit through the Gulf of Aden. Early detection is a key element to avoiding an attack or delaying it.

SSRS enhances the SSAS system by ensuring that alerts are sent to the Maritime Security Centre Horn of Africa so they can check that the alert is valid and deploy naval forces accordingly.

The system requires no hardware to be installed and limited software. It costs US$500 per ship per year which is paid by the shipowner who benefits from the reduced risk.

Aside from the time factor, other benefits of the system include certainty that the alert has been automatically routed to the naval coordination centres. It represents a cost effective solution with procedures that can be easily integrated into the ship's security plan.

> "This new system from Pole Star... is an important development towards getting the military help needed before a ship can be successfully boarded and is a major step forward in the battle against the growing piracy problem"

According to Pole Star chief executive David Plumer: "This system is a global extension to the SSAS regulation which gives the master, crew and the company security officer a level of confidence. "They know somebody has got their back. Also it is a major benefit for the flags who can demonstrate they take piracy seriously and that any process failings don't put the ship and crew further at risk."

Other details like the ship's operating speed and freeboard can also be communicated to the authorities using the system. SSRS has received the backing of kidnap and ransom insurers Hiscox.

Commenting on the Pole Star product, marine piracy underwriter Jonathan Gregory said that the best time to foil a pirate attack was before the pirates had managed to board the vessel. "This new system from Pole Star, which we will include free of charge in a marine kidnap and ransom cover is an important development towards getting the military help needed before a ship can be successfully boarded and is a major step forward in the battle against the growing piracy problem."

Hiscox will include at no cost to the insured an annual subscription for the service on all vessels insured with Hiscox for marine piracy cover taken out following the launch of the Pole Star product in January.

Authorities like the Hong Kong Marine Department have backed the use of the system as have flag states like the Marshall Islands and Liberia.

The International Maritime Bureau (IMB) logged 406 instances of piracy and armed robbery in its report for last year. Somali pirates were responsible for 217 of the incidents including 47 hijackings and 867 crew members taken hostage, although the IMB said the attacks continued to be opportunistic in character. It is hoped that innovations like SSRS will serve to reassure seafarers on ships in the danger zone.

The Institute is conducting a survey of the psychological effect of crew members' incarceration by pirates, with the aim of using the results to improve care for seafarers who have been subjected to the trauma of piracy.

Dr Michael Garfinkle at the Institute would like to hear from anyone who can contribute to this vital work. He can be contacted by email at mgarfinkle@seamenschurch.org. *NA*

MasterShip launches XL version

MasterShip has released MasterShip XL that expands on its existing software with a view to saving 25% on production budgets for shipyards.

MasterShip launched its latest software update earlier this year and is using it to work on a yacht design being constructed in The Netherlands. The latest version of CAD software contains a more logical menu and enhanced default templates in addition to new functionalities in dynamic parts, drawing units, production parts and welding compensation functions.

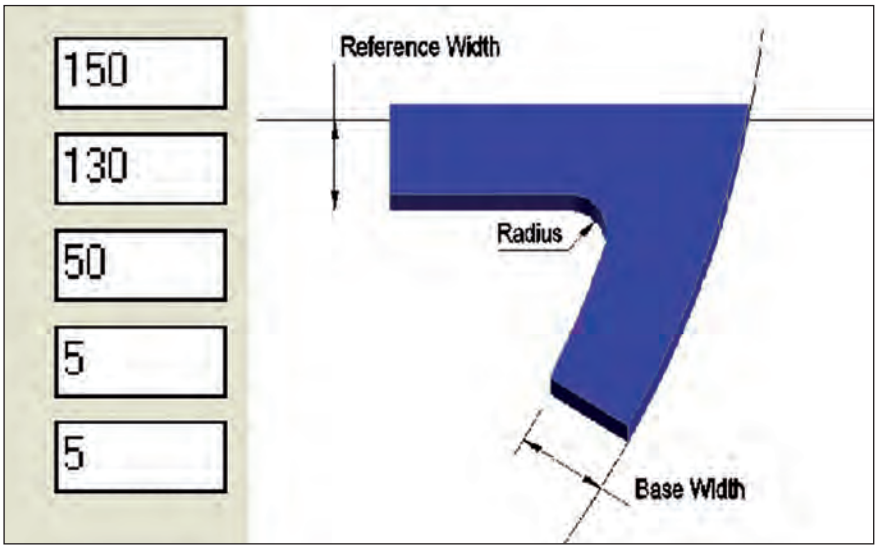
The dynamic parts facility included in the update will increase efficiency and design speed, say MasterShip. The action of filling in a template with project parameters, 3D solid parts and stiffeners can now be created in one action. The parts and stiffeners can then be copied to a range of other frame, longitudinal- or waterline drawings and change the design's shape according to the drawing room as well as the shop floor.

"The advantage of the software is that assigning plate parts to different production units can also be communicated to the yard and the cutting yard," says Hendrik Jan Loonen. Project manager, MasterShip.

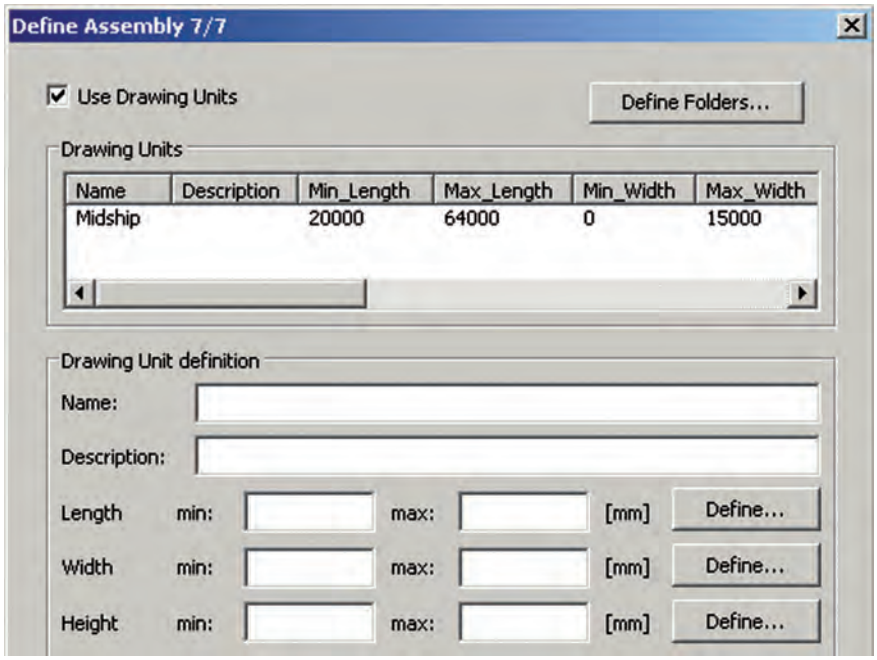
Adding to this the drawing unit will cover the volume of a ship and will give project managers the opportunity to divide the ship's assembly into multiple parts. Being able to assign and subdivide engineering tasks between different departments or several locations will mean that there will be no need for later integration.

Currently, MasterShip is working on a yacht design, which is under construction in The Netherlands. For this MasterShip has used its latest XL version that has shown some interesting results.

"The yacht design that we are working on has shown that production is 25% faster than the original working methods," says Mr Loonen. "This project has taken just over two months to this stage, whereas normally you would be looking at three months," he added.



Example of dynamic part.



Drawing units cover a volume of the ship and make it easy to divide the engineering into several packages.

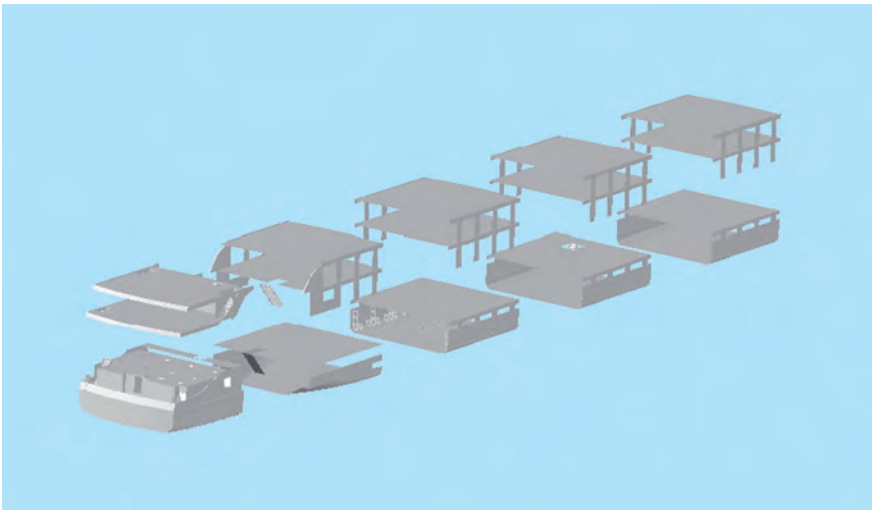
Logistics in a shipyard means that every part of a vessel needs to have ground space planned for it to be able to be moved during construction of the vessel, but bottlenecks in yards do still happen. MasterShip says that its latest version allows for 'parts' of the vessel to be split up at the planning stage through

the production units facility that allows the project managers to use these functions to plan all ship production activities including the assembly sequence on the shop floor, therefore, making construction planning easier.

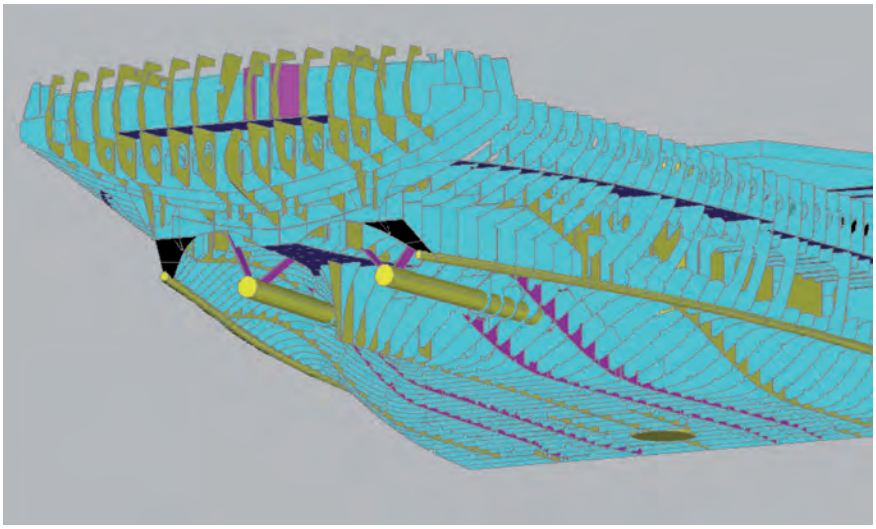
MasterShip has been involved in designing two of the sections of the yacht with the shipyard designing the other sections. MasterShip has highlighted this as an advantage of the software, as it has made the process more efficient for both shipyard and designers.

MasterShip is looking to move on to larger projects in the future, with further savings being made on production budgets. Mr Loonen believes that it is possible to make bigger savings with larger ships due to their design. "It depends on the construction, but larger vessels that have a similar construction will make the process quicker. Its is the more complex ships and small vessels like yachts that will not show such a high saving, but even on this yacht project that we are working on at the moment, we have managed to reduce the budget by 25%," says Mr Loonen.

He added that the yacht currently under construction is the main project that MasterShip is currently working on, with the possibility to try out larger projects in December, "Depending on the market", he said. *NA*

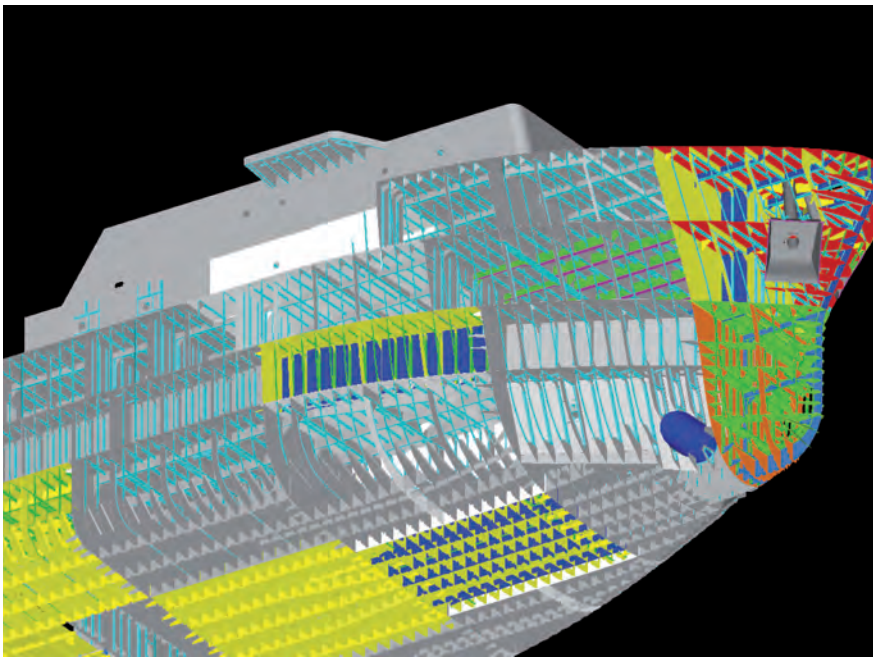


Example of production units. Each production unit is a group of parts and stiffeners.

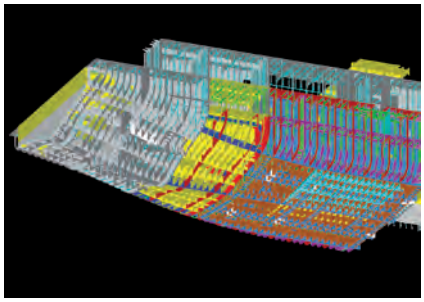


River container ship: Dynamic parts adapt automatically to the hull shape.

Offshore vessel foreship: The more "similar" the construction, the more time can be saved with dynamic parts.



Offshore vessel aftship: Dividing the 3D-model in production units results in better logistic control during the entire production process.



NUPAS CADMATIC

3D Ship Design Software

Ship model courtesy of Wärtsilä Ship Design Norway AS

VERSION 6

increases ease of use and efficiency

Nupas-Cadmatic latest software version, V6, is an extremely powerful tool for ship design and engineering. The most eye catching feature of V6 is the introduction of a new user interface that will further ease work and bring new efficiencies throughout the ship design process.
The new user interface combines a modern Office 2007 look and feel with enhancements welcomed by both novice and experienced users. It will change the way the software is used and allow for faster and more efficient work. In V6 it is available in Plant Modeller with other modules to follow in due course.

The software's easy-to-use 3D modelling tools can be used for early and basic design, detailed engineering, and the production of workshop drawings and generation of ready-to-use production data for production machinery.

With Nupas-Cadmatic you can successfully carry out the entire ship design project, right from the early start, up to the detailed engineering and final production phase. It improves engineering quality and shortens design and construction times. Nupas-Cadmatic seamlessly distributes engineering projects globally between different sites while ensuring effective communication between project partners.

Version 6 highlights

New GUI For the first time in history an Office 2007 style User Interface has been applied to 3D software, making it easier and faster to learn than comparable systems. Nupas-Cadmatic's intuitive and efficient User Interface speeds up design projects. **Distributed design** Nupas-Cadmatic's CoDesigner technology is the most advanced and easiest tool to use for distributed projects. It does not require massive hardware or very fast internet connections. **Easy administration** Administration of 3D software has never been so easy. Nupas-Cadmatic has the most modern tools for library and catalogue management. **Internet-based technology** Nupas-Cadmatic was the first developer to launch an Internet-based 3D model viewer and data query tool on the market in 2003. Today eBrowser is the most advanced software to visualize 3D models, to walk through, to query data and to communicate design details interactively with other users and project parties. The internet-based technology has unlimited scope for easy integrations.

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- GA and MA
- Classification drawings
- Hull structures
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- Machinery & piping, HVAC
- Accommodation & interior
- Outfitting
- Virtual 3D models
- On-line Walk Around
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OPTIMIZING RESOURCES

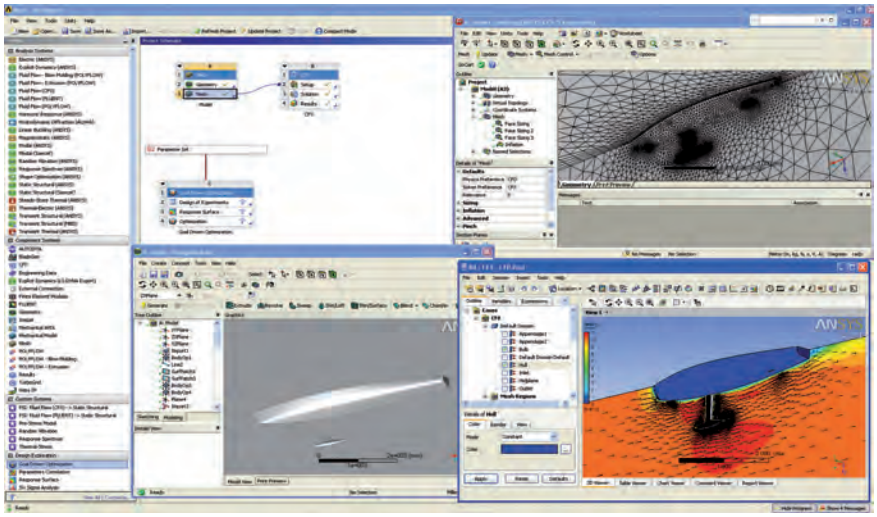
Enhancing the design process

Ansys 12.1 engineering simulation software is set to build nore automation into the product development process.

The release of Ansys' version 12.1 will support customers in simulation driven product development, with tools being added that will further automate the development process, making it easier for the user to create designs, say Ansys. In addition, Ansys 12.1 will extend the integration of its products with several further applications for electronics, polymer and glass-forming, and hydrodynamic applications into the Ansys workbench that will mean faster modelling times and a wider scope of cross-physics integration.

The platform will also deliver greater flexibility in how simulation procedures are defined and will also see the introduction of drag-and-drop multiphysics problem setup. Smart Engineering Simulation delivered by Ansys 12.1 is said to enhance the complete system development by automating the design and analysis cycles. Such automation will enable parametric studies and design optimisation across multiple physics, increases the accuracy and completeness of virtual prototypes, and allows for capture and re-use of simulation processes and data.

The release of 12.1 will see tools that extend the existing capability of real-world simulation authoring in the Ansys Workbench platform, introducing the ability to record, customise and automate analysis steps through journaling and scripting. Journaling captures operations that modify data in an Ansys Workbench simulation session and records them in a journal file. Such a file can be replayed to return the state of a resumed Ansys Workbench session. Alternatively, a journal can be modified to change or incorporate additional operations, which are referred to as scripting. Ansys Workbench journaling and scripting that will allow users to easily replay previously recorded journals or to reconstruct previously created projects, automate repetitive tasks or execute simulation projects in batch mode. The new automation and customisation solution now links all Ansys Workbench integrated solver and modelling technologies.



Ansys version 12.1 expands its portfolio with further integration of tools.

"Ansys 12.1 software leverages these new capabilities within the Ansys Workbench environment so customers have additional unique opportunities to find the best designs, in the shortest time, and gain a competitive edge in their global marketplace," said Jim Cashman, president and CEO, Ansys, Inc. "Smart Engineering Simulation is about finding the best possible solution for the real world - not the world that exists in a vacuum - in the least amount of time using the fewest resources, enabling customers to study product designs from a multiphysics viewpoint. The automation capabilities available in version 12.1 can be leveraged within the framework itself, through the integration of other Ansys technologies into Ansys Workbench, and via external tools," he added.

Ansys has integrated three of its industry-specific applications within the Ansys Workbench framework for electronics, polymer and glass-forming, and hydrodynamic analyses. This integration extends automation and process compression of the platform's geometry, meshing, parameters and post-processing solution to these industry segments. Ansys Icepak; which is used for rapid creation of complex electronic assembly models, this integration results in mechanical computer-aided design (MCAD) connectivity and the ability to create multiphysics thermal-stress solutions using Ansys Mechanical software. In polymer processing and glass-forming applications, the integration of Ansys POLYFLOW software gives die engineers the ability to predict stresses that occur during cool-down following high-temperature production processes. Ansys AQWA users who study loads caused by waves on offshore structures and marine vessels can benefit from the direct linkage to Ansys DesignModeler through importing of external CAD geometry and using geometric parameterisation.

Another significant framework enhancement to release 12.1 is the External Connection add-in, which allows applications that are not yet integrated with Ansys Workbench to communicate with the framework by sharing parameters in the workflow. By enabling easy data transfer, the add-in allows external applications to take advantage of the automation that Ansys 12.1 provides. The External Connection triggers access to other Ansys Workbench functionality, including design of experiments, sensitivity and six sigma design studies. *NA*

Autoship keeps busy in 2010

Streamlined Autoship heralds next generation software as Singapore acquires licences for existing programmes from the Vancouver based company.

Autoship Systems Corporation has said that its flagship surface modelling programme, Autoship, will feature improved usability and ease-of-use due to a re-write of the surface-to-surface intersection function, the removal of the need to worry about tolerances plus a host of additions to what the Navigator can do.

Adding to this, many of the user-input dialogues have been streamlined in order to simplify control of the programme. The Pro version of the programme will allow import of initial graphics exchange specification (IGES) entities 141 and 143, further broadening designers' capabilities.

The stability and strength calculation programme, Autohydro, will increase its scope of abilities to include the latest regulations. These include the new probabilistic damage assessment rules and enhanced handling of free surface effect. Also, a completely new, configurable report tool is in the works and it will dramatically shorten the time needed to create customised reports. An entirely new Modelmaker (for model creation and editing), which is built around the latest thinking in user-interface controls is set to be released.

Autoship Systems is also working on a closer integration of modelling for Autohydro from within Autoship. As vessels become more and more complex, the tools needed to model them need to be more capable. Realising the limitations in the models that Modelmaker can be used to construct, attention is turning to the more capable platform, which it is looking to embed in its Autoship software, say Autoship Systems.

Adding to the recent activity of Autoship Systems it has also supplied additional licences of its Autohydro hydrostatics and stability calculations software to Keppel Shipyards of Singapore.

Autohydro is the main hydrostatic and stability programme used at the offices of Keppel Offshore & Marine for new design and conversion projects in the offshore sector. The additional Autohydro licences will enable Keppel's naval architects to rapidly produce stability books for Class Approval.

Keppel Offshore currently operates with eight Autohydro licences and now their sister company, Keppel Shipyard, will add a 2nd licence. Autohydro 6.4 will offer the shipyard cutting-edge stability software to its 1500 User Base, such as the 'Auto-Ballast' feature: given one or more tanks and a targeted draft, trim and heel, the Auto-Ballast function will automatically calculate tank fills for selected tanks to satisfy given targets. *NA*

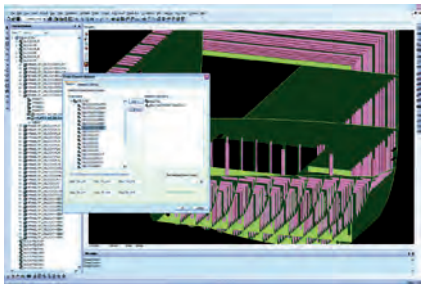
Aveva expands its portfolio

Aveva has launched it latest product in the Aveva marine portfolio the Aveva Hull Finite Element Modeller 12.0.

Finite Element Analysis (FEA) is an essential tool for a shipdesigner, enabling the creation of structurally efficient hull designs, which meet the stringent requirements of the classification societies and modern standards of low noise and vibration.

Aveva Hull Finite Element Modeller is the latest product in the Aveva marine portfolio that will allow designers to perform a pre-mesh of the steel structure and to export this mesh in various formats to third-party finite element analysis software for stress analysis.

The development of the Hull Finite Element Modeller came in to being from a consortium of German Shipyards and designers that partnered Aveva to develop a more powerful modelling tool. On a variety of vessel designs, all have reported project cost savings of 30-50% of the traditional finite element method (FEM) tasks, as well as significant timescale savings.



Various idealisation parameters may be adjusted to optimise the mesh to suit the purpose of the analysis.

The mesh output is supported by ANSYS APDL file format and is also available in neutral XML-format output file format. Aveva Hull Finite Element Modeller is supported by Aveva Hull Structual Design 12.0 SP5 and ANSYS V11 and above, with no additional hardware or software needed.

Aveva's Hull finite element modeller with ANSYS APDL and neutral XML output is available, with additional output for other FEA programmes is expected to be available from in the second half of 2010. *NA*

Nupas launches version 6

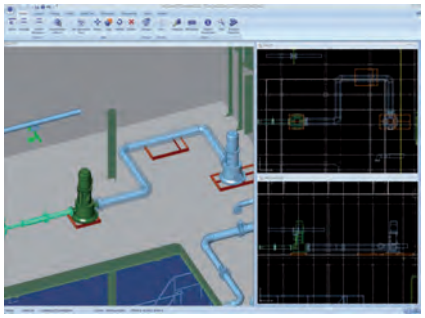
Nupas Cadmatic has launched version 6 of its cadmatic software.

The next generation of software by Nupas Cadmatic will see the gradual introduction of a new interface that will ease work flow and bring new efficiencies through the design process, said Nupas Cadmatic.

Version 6 will also be available in Plant Modeller for the design of piping systems and will see the introduction of other modules at later dates.

The update of the cadmatic software will include tabs to be able to switch between command bars, fewer and more powerful commands, undo and redo commands and Office 2007 with Nupas Cadmatic logic.

The latest ribbon interface or tabs, located at the top of the screen, have been created to increase context awareness. The tabs will allow the user to switch between command bars and will correspond to task areas and contain the necessary commands and options for each area.



The launch of Nupas version 6 will bring new efficiencies to the work flow.

The update also includes less but more powerful commands to keep the design process as simple as possible. The commands are located in the toolbar with clear and descriptive icons. A new 'views' window has also been added that includes the functionality of a previous menu containing commands, along with application settings that are easier to locate as they can now be found in a single place.

Undo and redo commands are now available in version 6 eliminating pop-up message boxes requiring the users' confirmation.

Working closely with users to develop the interface, version 6 combines the standard Office 2007 look and feel with the Nupas Cadmatic logic. The windows, command button, etc have the look of Office 2007, but specialised interfaces in areas specific to 3D CAD have been developed by Nupas Cadmatic. *NA*

Meyer Werft boosts design efficiency

Meyer Werft has selected the Dassault Systèmes V6 product lifecycle management (PLM) platform, for collaborative product development of its cruise ships.

Dassault Systèmes and IBM will supply Dassault Systemes V6 PLM platform along with IBM Global Business Services (GBS) providing transformation consulting, implementation and integration services to improve time, quality and cost in the yards' engineering and manufacturing processes.

Meyer Werft has been looking for a next-generation PLM solution that would support growing efficiency in design and production, and boost its ability to innovate and manage the increasing complexity of luxury cruise ships. Already a user of Dassault Systèmes' CATIA shipbuilding solution, Meyer Werft conducted an extensive benchmark at the beginning of 2009, and selected Dassault Systemes V6 platform and IBM GBS expertise for consulting, implementation and integration of the new PLM platform. IBM will be partner for definition and design of process of all development projects of Meyer Werft.

"PLM is a key enabler for us allowing us to manage the increasing complexity of our ships in more effective ways," said Lambert Kruse, managing director, Meyer Werft. "Our decision for the V6 solution was based on several key factors, including its powerful combination of 3D and PLM infrastructure, as well as IBM's and DS's commitment to partnership and openness."

IBM GBS is to leverage the business potential of V6 PLM in the Meyer Werft process. IBM GBS will be responsible for the project management as well as the organisational change management. Furthermore IBM consultants will design a sustainable architecture for an efficient integration of V6 PLM with the existing application and process environment based on long term experiences in the service oriented architecture (SOA) together with Meyer Werft.

It is expected that with V6 Meyer Werft will be able to provide to a broad internal audience an intuitive online access to the comprehensive 3D definition and product data of their ships in design and production. *NA*

The sound of silence

Dining while on a cruise vessel is an integral part of the cruise experience and so the acoustics of a vessel's dining room is crucial. Danish consultants Lloyd's Register ODS describe how they lower the tones on major recent newbuilds.

Acoustic comfort is a byword in the cruise industry with owners demanding less vibration and less noise for their customers. Using computer technology and experienced noise consultants Lloyd's Register ODS successfully mitigated the noise levels on a recent cruise newbuild.

Delivery of a recent significant cruise liner saw the work to ensure maximum passenger comfort in respect of sound levels begin as long ago as 2006. Many cruise operators are taking serious measures to make certain that noise is reduced to a minimum and the acoustics brought to the highest standard.

According to Lloyd's Register ODS the aim of its many assessments is to ensure the acoustic comfort of a vessel's many accommodation areas as well as work areas. This includes challenging public spaces such as the dining room where achieving acceptable speech intelligibility during meal times is one of many challenges. Effectively people at one table must be able to converse comfortably without distraction by the noise from several hundred other people talking and the background noise of the vessel in operation (that is engines and miscellaneous systems).

Virtual Acoustics

Achieving acceptable noise levels and satisfactory acoustic properties is no mean feat, but the use of acoustic software such as ODEON to construct the acoustic parameters of a given space has significantly boosted the designer's ability to modify and optimise within a specification agreed with the client.

In the first instance a three dimensional numerical model is generated using the acoustic software, see Figure 1.

With acoustic properties represented, through the numerical model the auralisation

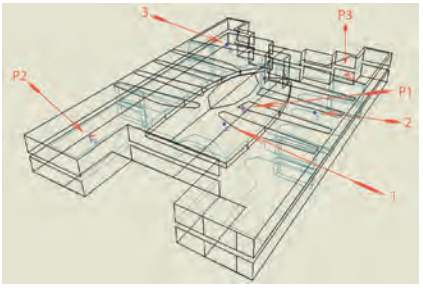


Figure 1. 3D geometry of a dining room modelled in ODEON. P1, P2 and P3 are source of sounds and the listening points correspond to 1, 2 and 3.

sound files allow designers to experience the different room configurations. Changing characteristics of material and surfaces in the numerical model, the room acoustics are assessed in an efficient manner ensuring a high quality end result.

Simple measures can improve an overall acoustic experience dramatically. To demonstrate the effect, three scenarios are listed below.

- Scenario 1 – Floors covered with thin carpet and no absorbents mounted in ceiling
- Scenario 2 – Floors covered with thick carpet and no absorbents mounted in the ceiling
- Scenario 3 – Floors covered with thick carpet and absorbents mounted in the ceiling.

The reverberation time and speech transmission index (STI) is calculated at each listening point 1, 2 and 3, see Figure 1. In Table 1 and Table 2 the average reverberation time and STI for each scenario is listed.

Introducing simple measures the STI has improved from fair to good.

Table 1. Calculated average reverberation time – listening point 1-3.

Reverberation time (sec)								
Frequency [Hz]	63	125	250	500	1000	2000	4000	8000
Scenario 1	0.94	1.05	1.42	1.32	1.25	0.93	0.88	0.71
Scenario 2	0.89	0.99	1.25	0.96	0.86	0.87	0.84	0.73
Scenario 3	0.89	0.94	0.84	0.80	0.88	0.88	0.76	0.61

Engineering possibilities

There are effectively three mitigating measures that an acoustic engineer can take when designing the acoustic properties of a dining room:

- Changing room layout by installation of screens and adjusting ceiling heights
- Changing the pattern of seating
- Changing the amount of sound absorption.

The use of screens is well-known from open-plan offices. They are effective in reducing sound transmission, but they may have undesired visual effects. When such screens are transparent, that is made of glass, a reflection mirror is produced and a new acoustic problem can be created.

When changing the seating pattern, it is feasible that the sound level in front of a talking person is significantly higher than behind them. If all seats are turned in the right direction, a "free-of-charge" advantage can be obtained. Aeroplane- and coach seating benefit from this effect, as their seats are arranged in a back-to-face seating pattern. However, this solution is unrealistic in cruise ship dining rooms.

The third measure is an optimisation of the ceiling height combined with careful positioning of sound absorbing material. Many types of remedies, such as carpets, suspended ceilings, walls, seats, and even suspended absorbers like baffles or spheres provide a wide range of opportunities for solutions, where the acoustic and the visual design is combined.

Speech intelligibility and acoustic privacy

In order to allow people to enjoy their dinner and converse in a normal level of voice – without disturbance from the talk at neighbouring tables – the level of both speech intelligibility and acoustic privacy must be improved. A high level of acoustic privacy means that the conversation at any one table cannot be easily understood – or even heard - at the neighbouring table. This makes it possible

Speech Transmission Index (STI)		
Scenario #	STI (0.1 – 1.0)	Rating
Scenario 1	0.52	Fair
Scenario 2	0.58	Fair
Scenario 3	0.61	Fair/Good

Table 2. Calculated average speech transmission index – listening point 1-3.

Acoustic Privacy	Speech Transmission Index STI	Speech Intelligibility
• Environment allowing private conversation • Poor understanding of conversation at neighbouring tables		• Person-to-person conversation • PA-system messages • Addressing an audience
None	0.75 - 1.00	Excellent
A little	0.60 - 0.75	Good
Acceptable	0.45 - 0.60	Fair
Moderately good	0.30 - 0.45	Poor

Speech Transmission Index (STI) for Acoustic Privacy and Speech Intelligibility.

for people to discuss personal matters.

As with speech intelligibility, privacy aims at reinforcing the private sphere in a crowded space. The term "privacy" is also employed in the acoustic design of offices, hospitals, train saloons, and on-shore restaurants. Speech intelligibility, on the other hand, is used to classify the sound level of a person addressing an audience or a loudspeaker system (e.g. in a terminal, a subway car, a coach or an airplane). In such contexts, it is imperative that the message is easy to perceive.

Speech intelligibility around a table	STI > 0.60	Good or excellent
Acoustic privacy level from table to table	STI < 0.45	Acceptable or moderately good

Testing of the acoustic properties of a dining room

From the STI left, we can deduce that 1 is an extremely good speech intelligibility level, while a poor acoustic privacy level. The opposite situation is asserted at 0.

After the ship has been completed, the agreed figures for the acoustic properties of the dining saloon can be tested. Special test equipment is used for that purpose and included in the equipment is an artificial mouth, which has the same acoustic properties as the human mouth.

The acoustic properties are measured without people in the dining room, saving the shipyard the trouble of gathering a 1000 people in order to create the right background noise scenario. The background noise is added as synthetic noise to the measured figures.

Numerous projects predicting the noise levels and acoustics onboard luxury vessel and participating at sea trials of the vessels have been an opportunity to Lloyd's Register ODS to verify the results upfront, and the computerised auralisation method has proven to be a very strong tool in assessing the onboard acoustic comfort.

The efficacy of the noise consultant and computer models is acknowledged, making the modern cruise experience an altogether quieter affair than in the past. *NA*

Odense closure forces Nadiro move

The innovative lifeboat system designed and built by Nadiro, an AP Møller and SH Group joint venture has found a new home just down the road as Odense begins its preparations for closure.

The future of Nadiro the lifeboat producer has been assured with the shift of its production facilities from the Odense Steel Shipyard, which is due to close in 2012, to the SH Group premises in Svendborg, some 30km or so south of Odense.

Esben Juul Sørensen, Nadiro MD, said the move had been a positive step for the lifeboat manufacturer with winches and machinery for the lifeboat system already made at its joint owner's facilities. "It is a splendid set up with SH Group," he said.

Interest in the lifeboat system is continuing to develop according to Mr Sørensen with three Korean yards, STX Korea, Daewoo Shipbuilding and Marine Engineering (DSME) and Hyundai Heavy Industries and a yard in the USA all following up their interest in the system.

"One complete system has been sold to a client of DSME that is building a large offshore installation that will operate in the Arctic region, which is due for delivery in 2012," said Mr Sørensen. He said the system was particularly well suited for the Arctic as the container protects lifeboat and winches and heating devices can ensure that it is always prepared for action.

Nadiro has also developed a cut-price version of the system, which effectively dispenses with the container allowing the company to offer a 30-40% discount on the full versions. "It is a free-fall solution that has many of the same features," explained Mr Sørensen.

However, while the company is performing well Mr Sørensen admits that they would like to develop "external customers". He said that while the two complete systems that have been sold, aside from the Korean sale, both were for AP Møller FPSO's built in Singapore, testing of these systems was due to start in late March.

A further 100 drop in ball systems have been sold to AP Møller subsidiary Maersk Line which is looking to ensure it has technology that will meet all new regulations. However, there is a drive to develop new clients in a market that is difficult to say the least.

The epitome of the economic downturn is the demise of the Odense Steel Shipyard itself, Nadiro's original home. Built just after the conclusion of the First World War in 1918 the yard has produced many memorable vessels, including most recently the world's largest containership, the 397m, 11,000TEU plus, *Emma Maersk*, which was delivered in 2006.

Head of decommissioning at the Odense yard Dan Corfitzen, who coincidentally was involved in the development stage of the Nadiro project, which he says was "more or less designed on the back of an envelope", confirmed that the yard had 11 more vessels to build before its closure some time in 2012.

A number of pieces of equipment have already been sold, including robot welding equipment, grinders, lathes and drilling machines. However, Mr Corfitzen could not say who had bought the equipment.

The yard itself is leasing out space to new tenants, one of which is a shiprepair company, which has taken 10% of the space at the yard while another company, producing windmills for energy has leased a further 10% of the land.

Some 3500 workers at the yard, many of whom are approaching retirement will lose their jobs, though some could find employment in the shiprepair sector, said Mr Corfitzen. *NA*

New fire test methods set to hit in 2012

In 2012 new regulations from the International Maritime Organization's (IMO) fire test procedures (FTP) will impact the world of shipbuilding, but what will the update bring to the industry?

The current fire test procedures code was established 14 years ago; but since its introduction, methods and procedures have moved forward, and now the Code book is to be amended to bring it up to date with current methods and practices. The changes to the code will see updates to test methods, test apparatus and will include the IMO's Maritime Safety Committee (MSC) circulars.

Janet Murrell, technical manager of Finnish firm VTT, based in Warrington highlighted that the fire test procedures code has needed updating for sometime, but there has been a lack of will to push this through, until now.

The amendments to the Code will be headed up by the Japanese Flag State. Mr Koichi Yoshida from the National Maritime Research Institute (NMRI) who has been involved with the amendments to the latest fire test procedures, will also chair the ISOTC92 (fire safety) SC1.

In recent developments, Altro, a UK-based flooring manufacturer, recently introduced its latest flooring product Galium to the market, which is expected to exceed all the new test requirements to be introduced in 2010 the company has said.

"When it came to developing a product for the new maritime regulations (IMO Marine Equipment Directive (MED)) we soon came to the conclusion that no PVC based formulation of flooring could pass the stringent smoke toxicity tests stipulated under the IMO fire test procedure code," says Simon Andrews, maritime sales manager, Altro Transflor.

"PVC is a fairly fire retardant product, it does not burn easily but when it does burn it produces lethal Hydrogen Chloride (HCI) gas. When hydrogen chloride makes contact with moisture, (for example – the fluid in your lungs) it turns in to hydrochloric acid which of course is fatal," he adds.

However, Mr Andrews highlights that the current IMO fire test procedure code does not stipulate a uniform test method for the measurement of gas analysis in products such as floorings and wall coverings. "All it asks is that the method used can provide traceable results; with the current method used called Ion Chromatography (IC)."

"We believe that this ambiguity means that potentially dangerous products could achieve a pass result in one test but would fail in another," says Mr Andrews.

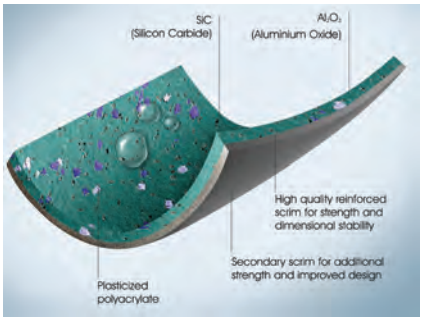
A uniform one known as fourier transform infrared spectroscopy (FTIR) which is widely acknowledged by test houses as more accurate method of measuring toxicity in fire smoke has been included in the amendments. Mr Andrews has pointed out that in future this may make it harder for PVC products to pass the smoke and toxicity tests, raising costs further.

> "This ambiguity means that potentially dangerous products could achieve a pass result in one test but would fail in another"

The benefits of FTIR testing are that it will be easier to detect products emitted in testing. Even so, the introduction of the FTIR method has caused controversy, points out Ms Murrell.

"The base of the FTIR method is ISO produced. It has failed one ballot due to technical problems with the standard, and is currently being re-balloted," said Ms Murrell.

As part of its own research and development, Altro Transflor has tested other IMO MED-compliant products in different test houses to see whether they passed or failed. "We know there is a base equation relating to the amount of PVC in a product – which means that x amounts of PVC will produce y amount of HCI," he says.



Galium, the latest product for the marine industry from Altro

Citing an example of a current IMO MED PVC based product that was tested, Mr Andrews comments: "The level of HCI permitted in the IMO test is 600 parts per million or less. The sample that we tested came in at over 1000 parts per million at two different test facilities, with a further test house giving it a pass of 250 parts per million."

PVC by its nature can be inconsistent and it has been shown that results can vary. Ms Murrell explains: "Studies carried out for testing HCI have been variable. Although, research is still being carried out as to why this is happening, a factor of this, for example, could be the sampling that is used."

Adding to the amendments will also be the validity of test reports. The new amendment for validity reports will see products being tested every 15 years, to ensure that they meet the latest requirements. It is expected that this will have a high impact on the shipbuilding industry and will see costs running to thousands of euros, Ms Murrell said.

The updated Code was submitted to the IMO fire protection sub committee this month and is currently awaiting approval, coming into force in 2012. *NA*

Accommodating the masses

Finland-based Shippax has announced its modular accommodation units that it says could save shipbuilders time and costs.

Cabin builder Shippax is currently in talks with STX Finland for a common development project where its accommodation modules can be applied to ship designs. Shippax is looking to develop its idea to be installed below the main deck, as currently this solution is used only above deck, as Shippax believe that further savings can be made by shipyards, but it would mean the building process would need to change in order to be able to install the modules.

The modular accommodation units which are made from a steel sandwich structure will offer the shipbuilding industry an alternate solution from the standard practices of building accommodation blocks on vessels such as cruise ships, say Shippax.

The solution is based on macro-modules and patented Fixel steel sandwich structure applied to erect fully outfitted and functionally complete accommodation towers. Fixel sandwich structure is made of hot galvanised steel profiles using triple seam rolling technology with no additional welding required.

The cabin structure has high corrosion and fire resistant properties and has been tested by VTT, technical centre in Finland. The testing has showed that a cabin can provide two hours of fire integrity protecting the surrounding structure against severe damage and loss of its strength.

The modules will be constructed onsite at Shippax where they can then be transported to the shipyard to be installed onboard a vessel. The modules can be constructed in blocks of up to eight cabins. Each module will be formed of fully finished cabins that will contain corridors, piping and wiring and will only need to be 'plugged-in' when installed onboard.

Jukka Laitera, sales director, Shippax said that these modules are different from previous accommodation blocks in that previously they would have cabins installed one at a time. The only restriction of the size of the modules comes from the lifting capacity of the shipyard and the maximum transport size of a land based transport. The current maximum size of module allowed to be transported by road is one consisting of eight cabins.

He continues that in order to explore the idea of larger modules Shippax is in talks with shipyards, to operate on site at the yard, which would eliminate the restriction of the modules having to be transported by road.

The accommodation modules are also expected to save both time and costs for shipyards, Mr Laitera comments: "The modules we can do at the same price as current cabin modules, but we can save time in production and lead times, which will save a shipyard in its capital expenditure." *NA*

All cabins will be constructed and outfitted at the Shippax factory and then transported as a complete module.

Shippax offers a different approach to accommodation onboard.

GTF Freese floors the noisy ship market

G. Theodor Freese GmbH & Co. KG (GTF) has recently completed a study looking into the noise and vibration onboard ships and how its flooring products aim to reduce these disturbances onboard.

The prevention and control of ship vibration and noise is today receiving more attention than ever in connection with ship design and construction. The specification's for noise in ships is becoming more stringent. The comfort onboard a ships is an important quality of the vessel. For passenger ships, in particular cruise vessels, the comfort is significant for the rating on the market. Also noise and vibration are in this respect significant parameters.

The choice of low noise resilient mounted engines and low noise propellers are well known methods to reduce the structure-borne noise and vibration in cruise ships.

However experience shows that in many areas of a ship where sufficient improvements cannot be obtained only by reducing the noise generation at the main noise sources.

Such areas can be:

- Passenger areas in the aft of a cruise ship with substantial noise from the propellers
- Impact noise excitation to passenger cabins located just below open deck areas, galleys, discos, etc
- Airborne noise from machinery rooms, disco music, theatres, etc.

Such problems are normally solved by a careful design of cabins, lounges and passenger areas. In order to reach a successful result the acoustic properties of accommodation materials are extremely important. The most important element for the noise in cabins is often noise radiation from the floors. In order to meet the requirements of the market GTF has carried out a programme of development. The result of this programme has given appropriate solutions for noise reducing measures onboard ships.

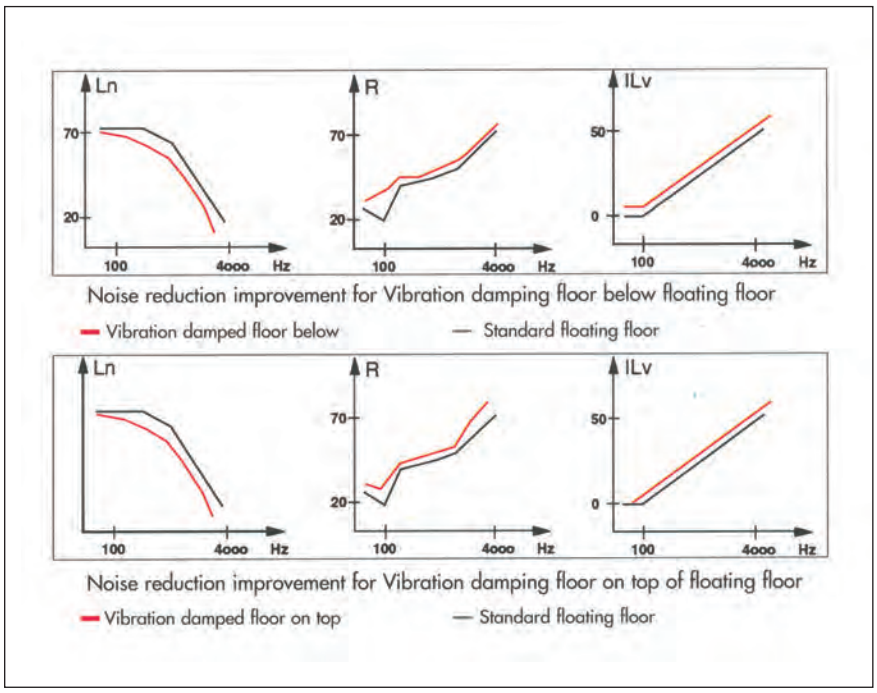
In practice three principle types of floor are applied in ships, namely standard levelling floors, vibration damping floors and floating floors. The acoustic properties of the different types of floor are widely different. The standard levelling floor is normally applied in areas with no need for noise reducing measures.

Comparison of different floor types from GTF Freese.

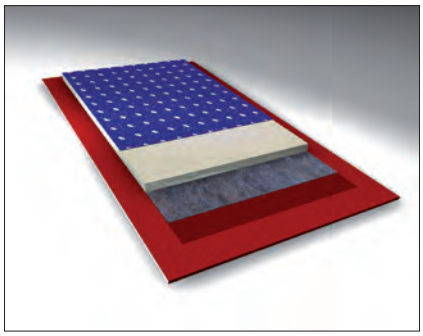
Standard floor	Vibration damping floor	Floating floor
Primary deck coverings like TEFROTEX® 100 TEFROTEX® 90-L TEFROTEX® 60 etc.	TEFROTEX® VISCOELASTIC with steel-plates or primary deck coverings like TEFOTEX® 60 TEFROTEX® SF etc.	TEFROMENT S TEFROLITH® M TEFROLITH® FF-STEEL
Small noise reduction	Medium noise reduction	Large noise reduction
Noise reduction only obtained by the increased mass of the deck covering.	Noise reduction obtained by adding damping material with very high losses in vibration(constrained damping layer). Good reduction for low frequencies.	Noise reduction obtained by adding a mass floating floor on mineral wool above the steel deck Normally poor reduction for very low frequencies.

Vibration damped floors

The vibration damping constructions are normally applied in areas where only structure-borne or impact sound contribution is substantial. The principle of the vibration damping floor is that the vibrations are absorbed by means of a specially designed constrained layer construction (TEFROTEX VISCOELASTIC plus steel-plate or



Comparison between below and on top flooring vibration dampening.



TEFROTEX VISCOELASTIC and TEFROTEX 60.

primary deck covering, f.e. TEFROTEX 60) reducing the vibration level in the local plate fields of the ship deck structure, hence reducing the radiated noise into the accommodation. This method is often referred to as viscoelastic damping or constrained damping constructions.

A vibration damping floor having the optimum acoustic properties are characterised by the following:

- High loss factor of the viscoelastic material
- Low sheer module of the viscolelastic material
- High module of elasticity of the top plate
- Optimised thickness of each layer.

Loss Factors

The TEFROTEX VISCOELASTIC material can be combined with different types of top layers in order to fulfil any need in a vessel. Therefore, TEFROTEX VISCOELASTIC has been tested according to International maritime Organization (IMO) Resolution 635 (16)/A. 687 (17), MED EC 96/98, in order to allow combinations with any type of top layers.

The loss factor of the viscolelastic material is the most important parameter for the vibration damping properties of constrained layer constructions. By optimising the thickness of the materials applied in the constructions it is possible to obtain high loss factors for constrained layer constructions.

Floating floors

Floating floors (TEFROLITH M, TEFROMENT S, TEFROLITH FF-STEEL) are applied in areas where high airborne or structure-borne sound insulation is needed. The principle of the floating floor is that the vibration transmitted is reduced by means of the mineral wool so the vibration level of the top plate and hence the radiated noise is lower.

A floating floor construction can be ascribed as a mass / spring system, with a frequency of resonance corresponding to the stiffness in the mineral wool and the weight of the top layer. The floor has the optimum acoustic properties characterised by the following:

- Heavy mass of the top plate
- Low stiffness of the mineral wool
- Low resonance frequency in the floating floor construction.

For frequencies below the resonance frequency of the floating floor the noise reduction will theoretically be zero. The resonance frequency for the floating floors is normally approximately 80 – 100Hz.

Noise Transmission

In order to be able to select the correct type of noise reducing floor it is important to know:

- The type of the noise source (propeller, main engine, auxiliary machinery, air condition machinery, human activity (walking, jogging or music)
- The noise transmission paths in the ship, e.g. the location of the cabins relative to the noise sources in the ship.

Noise Reducing Floors

At very demanding applications where a very high damping is required or the noise spectrum is dominated by either high frequency or low frequency components it is possible to design variations of the standard floors or to combine different types of floors, f.e. TEFROTEX VISCOELASTIC/ STEEL plus TEFROLITH FF-STEEL with remarkable noise-reduction results. This construction is used on cruise vssels, high technology offshore supply vessels built in Norway and on vessels and platforms in Far East. Furthermore constrained layer TEFROTEX VISCOELASTIC plus TEFROTEX 60 are often installed constructions for noise-reduction and levelling of the steel-deck at the same time.

GTF Freese is currently suppling flooring products onboard cruise vessels being constructed at Meyer Werft and STX St. Nazaire, offshore vessels and platforms built in Norway, Singapore, Indonesia, and Korea. *NA*

Solar Solve gets onboard car carriers

Twelve SOLASAFE protective screens have been ordered for installation onboard the navigation bridge windows of each of the car carriers managed by OSM Ship Management.

UK-based Solar Solve Marine has been contracted to supply its SOLASAFE screens for OSM Ship Management car carriers.

The contract is for 12 of its SOLASAFE anti glare, heat rejecting screens for installation onboard the navigation bridge front windows of each of the 12 car carriers being managed by OSM Ship Management.

Paul Hopkins, Solar Solve Marine's sales and marketing executive commented: "The negotiations involved with this contract were through OSM's Singapore office and quite involved. Whilst we are a well known supplier to OSM world wide and they are impressed with our products and service, we still had to get the price right.

"As always it was worth the effort. An order for 12 ship-sets is worth fighting for and in particular it reinforces the partnership and good working relationship we have with OSM."

In January this year saw the delivery and hand over of *Hoegh Caribia*, a new pure car and truck carrier (PCTC), owned by Gram Car Carriers Pte Ltd. and built at Kyokuyo Ship Yard in Japan; and included MacGregor's latest fully electric liftable decks and ramp.

The second of four vessels being built at Kyokuyo, the first was *Viking Odessa* that is managed by OSM Ship Management and one of a series of 12 that they have signed up with Gram to supervise the building of and then fully manage. The other eight vessels are being built at MINGDE Ship Yard in Nan Tong, China. The vessels will be time chartered out to various large car carrier companies.. *NA*

Viking Caribia the second in the series of 12 car carriers that will have SOLASAFE screens onboard.

Testing times for ro-ro sprinkler systems

Higher water flow rates and pressure along with smaller droplets are needed to improve the efficacy of modern sprinkler systems on ro-ro ships. A series of trials by BrandPosten that recreated a fire on a truck tested its latest technology.

Determining the necessary capacity of a sprinkler system that will ensure that it is effective in the event of a fire, which can be intense on ro-ro ships, and determining how well sprinkler systems being installed today will perform is clearly essential for any owner/operator to know.

In order to improve the performance of sprinkler systems on ro-ro ships SP Fire Technology has conducted a project under the name IMPRO, Improved water based fire suppression and drainage systems for ro-ro vehicle decks.

The International Maritime Organization's (IMO) Resolution A.123(V), from 1967, sets out the detailed requirements for the design and installation of water spray systems for ro-ro decks and it forms the framework in which these tests were conducted. The resolution prescribes a water density of at least 3.5mm/min for decks not exceeding 2.5m high, and of at least 5mm/min for higher decks.

Recent years have seen the requirements of the resolution increasingly questioned in terms of its ability to control a fire in present day passenger cars, coaches or heavy goods vehicles.

Figure 1. The heat release rate was 5MW when the systems were activated.

Large scale fire tests

Large scale tests have been carried out, investigating the efficacy of a water spray system and a water mist system in tackling a fire in a simulated heavy goods vehicle trailer. The trailer load consisted of stacked pallets carrying standardised goods consisting of cardboard boxes containing plastic cups, all known as the 'EUR Std Plastic' commodity.

Two different fire scenarios were tested: one in which the fire was fully exposed to the water, and the other in which a roof above the fire prevented direct application of water. The first scenario used six rows of cartons, presenting a potential maximum heat release rate of about 25MW. For the second scenario, with direct water impingement being prevented by the roof above the burning goods, the total fire load was lower, consisting only of two rows of cartons, and giving a potential maximum heat release rate of about 9MW. The reason for using a smaller quantity of goods was that there were fears that the heat release rate might exceed the rate that can be handled by the test facility and experimental equipment.

Figure 2. One minute after starting water delivery at 15mm/min.

Both water spray and water mist systems tested

The trials were carried out with different water flow rates (water density), varying system pressures and different nozzles. Most of the trials were carried out using an additional water spray system, with the water pressure varied between 1.2bar and 4.9bar. Water delivery densities were 5mm/min ([L/min]/m^2), 10mm/min or 15mm/min. Other trials were carried out using water mist and system pressures of 84bar and 100bar, with water delivery rates of 3.75mm/min, 4.6mm/min or 5.8mm/min. Heat release rates were measured using the industrial calorimeter, which provides excellent data for determining the efficacy of the systems.

The sprinkler systems were activated when the heat release rate reached 5MW:

The fire on board *Vincenzo Florio*

A fire occurred on the ro-ro ferry, *Vincenzo Florio*, on route between Naples on the Italian mainland and Palermo in Sicily, on 29 May 2009. The fire started on one of the ro-ro decks at 03:16, when the ship was only 40km from Palermo. The cause of the fire is uncertain, but is thought probably to have started either in a private car or in a refrigerator unit on a goods vehicle. The crew attempted to extinguish the fire manually, but despite their efforts the fire spread to the extent that, at six in the morning, the captain took the decision to evacuate all 526 passengers. Using the ship's lifeboats, the passengers were transferred to another ferry and to a coastguard vessel. Five persons, including a pregnant woman, were taken to hospital with shock, but no other casualties were reported.

After the passengers had been taken off, the ship was towed to the quayside in Palermo to allow fire-fighting to continue. A team of fire-fighters was mobilised, and equipment was flown in on a chartered aircraft. The fire was concentrated on one of the ro-ro decks, but high temperatures, limited visibility and the fact that a number of heavy goods vehicles with various types of loads were on fire made fighting the fire very difficult. It took over ten days to put the fire out, using foam and a cutting extinguisher (as familiar to the Swedish Fire and Rescue Services).

Fortunately, fires on ro-ro decks are not common, but they can have serious consequences.

Figure 3. One minute after starting water delivery at 10mm/min.

Figure 4. Three minutes after starting water delivery at 5mm/min.

Figure 1 shows the fire at this stage. It can be seen that the fire has spread up through the vertical flues between the cartons, and that the thermal radiation from the flame has ignited a considerable portion of the upper surface.

Clear relationship between water density and results

The trials in which the fire was fully exposed to the water shows that there is a clear relationship between water density and system efficacy. At a water density of 15mm/min, the fire was suppressed almost immediately, as can be seen in Figure 2. A water discharge density of 10mm/min also reduced the heat release rate, but not as quickly (see Figure 3). The lowest water discharge density, corresponding to 5mm/min, brought the fire under control, as shown in Figure 4. A further trial was carried out at the 10mm/min rate, with a higher system pressure, involving the use of nozzles with a smaller orifice diameter. The results indicate better performance with higher pressure and smaller nozzles.

Figure 5. One minute after starting the water mist system at 5.8mm/min. The limited visibility made further photography difficult.

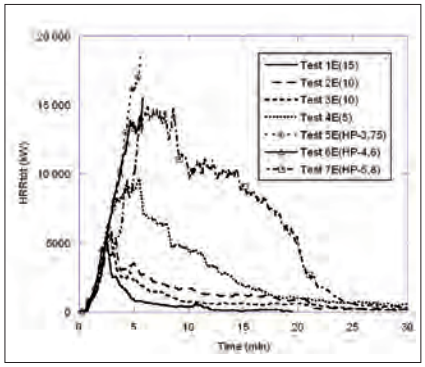


Figure 6. Heat release rates with the fires fully exposed to water impingement. Test 5E(HP-3.75) and 6E(HP-4.6) had to be terminated, and the fires put out manually, as the test flow rates were insufficient to control or suppress the fire.

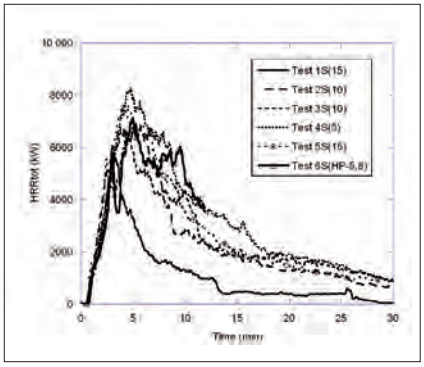


Figure 7. Heat release rates when the roof above the fire prevented direct water impingement.

The water mist system controlled the fire with a water density of 5.8mm/min, as can be seen in Figure 5, which shows the fire when the system is activated. However, water densities of 3.75mm/min and 4.6mm/min were found to be insufficient to control the fire. In both these cases, the trial had to be discontinued and the fire put out manually.

Figure 6 shows the heat release rates as a function of time. It can be seen that a higher system pressure, and smaller water droplet size, improve the efficacy, as illustrated by comparing Test 2E(10) with Test 3E(10).

In the case of the scenario with a roof above the fire, preventing direct impingement of water, the total heat release rate was not noticeably reduced and essentially all the combustible material was burnt. However, this arrangement did reduce the convective heat release rate, i.e. it reduced the temperature of the hot combustion gases.

The best cooling effect with the water spray system was obtained with a water density equivalent to 10mm/min and a pressure of 4.9bar. The convective heat release rate was reduced even more effectively by the water mist system, delivering 5.8mm/min. However, in the same way as with the water spray system, this did not significantly reduce the total heat release rate. Figure 7 shows the heat release rates as a function of time. During the first test, Test 1S(15), a small leak occurred in the roof above the fire. Despite the fact that only relatively small quantities of water (not known exactly how much) reached the fire, there was a clear effect in comparison with the other tests during which the shield above the fire was fully watertight.

Conclusions

The tests show that present day requirements for 5mm/min can control a fire in a simulated heavy goods vehicle trailer, although the heat release rate is still very high. There would be a considerable risk of the fire spreading to other vehicles on the same deck, or to vehicles on a deck above. Increasing the water flow rate to 10mm/min significantly improves the performance, and would probably quickly suppress a fire in a goods vehicle trailer. A further increase of the delivery rate to 15mm/min improves the performance, although not by as much as that from 5mm/min to 10mm/min. The results also indicate that a higher system pressure, with smaller water droplets, improves the performance.

The water mist system was not as effective as the water spray system when the fire was fully exposed. This is probably because the smaller water droplets do not have the momentum needed to overcome the high velocity and temperature of the gases in the fire plume. In addition, the small water droplets will be evaporated before they reach the burning surfaces. However, the tests using a roof above the fire to prevent direct water impingement show that small water droplets have an excellent cooling effect, which may prevent the fire from spreading to other vehicles on the same deck or to vehicles on a higher deck, despite the fact that the heat release rate is not reduced as much as by a water spray system.

This work is described more fully in SP Report 2009:29 'Large-scale ro-ro deck fire suppression tests'. The project is financed by VINNOVA under its Safety at Sea programme, by the Swedish Mercantile Marine Foundation, the Swedish Fire Research Board and the Swedish Transport Agency. *NA*

Instability rules UK

Some naval architects and flag administrations claim that probabilistic rules, outlined under SOLAS 09, governing the design of ro-ro ferries are confusing for designers and masters alike, but worse than that they may make ro-pax ferries less safe than the rules they replaced.

According to one naval architect the probabilistic rules outlined in SOLAS 09 are "like a Rubik's cube, when you move it a colour moves on another plane". Probabilistic rules are complex and each time a designer alters an element of the design new calculations need to be made for every single damage scenario.

Yet the survivability of a vessel may remain uncertain even after possibly hundreds of calculations are entered and re-entered into the equation and the survivability index shows an acceptable level of damage stability.

The UK's Maritime Coastguard Agency (MCA) Research Project 592, Investigation into the Safety of Ro-Ro Passenger Ships Fitted with Long Lower Holds – Phase II, revealed in the spring of last year that there were scenarios that could mean ships remained vulnerable in certain circumstances even if they complied with the rules.

This project outlined two ro-ro ship type designs that were developed and optimised for compliance with the SOLAS'09 regulations. A range of limiting KG curves was derived for various stability regulations, and advanced analyses of ship survivability were performed.

Using the above research the "MCA confirmed that water on deck may not be adequately dealt with under probabilistic rules," said Ronnie Allen, the head of MCA's Marine Technology Branch.

In conclusion Research Project 592 said: "compliance with either, SOLAS'95 [the Stockholm Agreement] or SOLAS'09, does not ensure survival in all feasible collision flooding cases. Indeed, in SOLAS'09, there is a "(1.0-R)x100" percentage of flooding cases which a typical ship may suffer in a collision which are permitted to be completely non-survivable, with zero or only marginal level of stability which is insufficient to counteract the impact of higher sea states.

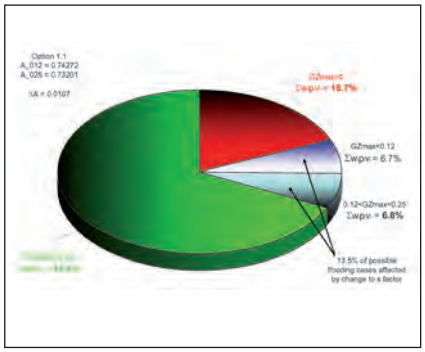


Figure 1. Distribution of probability for GZmax (occurrence of flooding cases with given range of parameter of residual stability GZmax). Ship 1. The index A decreases by A=0.0107, and is affected by ~13.5% of flooding cases.

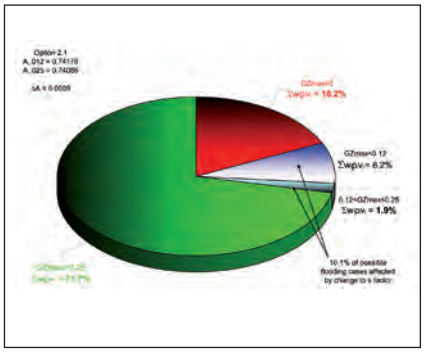


Figure 2. Distribution of probability for GZmax (occurrence of flooding cases with given range of parameter of residual stability GZmax). Ship 2. The index A decreases by A=0.0009, and is affected by ~10.1% of flooding cases.

"It would therefore be advisable to revise the goals of the SOLAS convention to try to eliminate (or substantially reduce) the worrying vulnerability of these ships particularly where straight forward, feasible damages which result in rapid capsize are entirely permissible."

And the MCA is not alone in this view. "I'm not happy with the probabilistic approach, naval architects don't understand it any longer, they try to meet rules, they [naval architects] can no longer work out whether a ship is safe," said Andrew Kendrick, vice president of BMT Fleet Technology Ltd.

According to Mr Kendrick, who is based in Canada, "the Canadians are not implementing the probabilistic rules into domestic legislation". He explained that all of Canada's ferries are domestic and after an extended period considering the rules the decision was to continue with deterministic rules laid out in SOLAS 95 and 98.

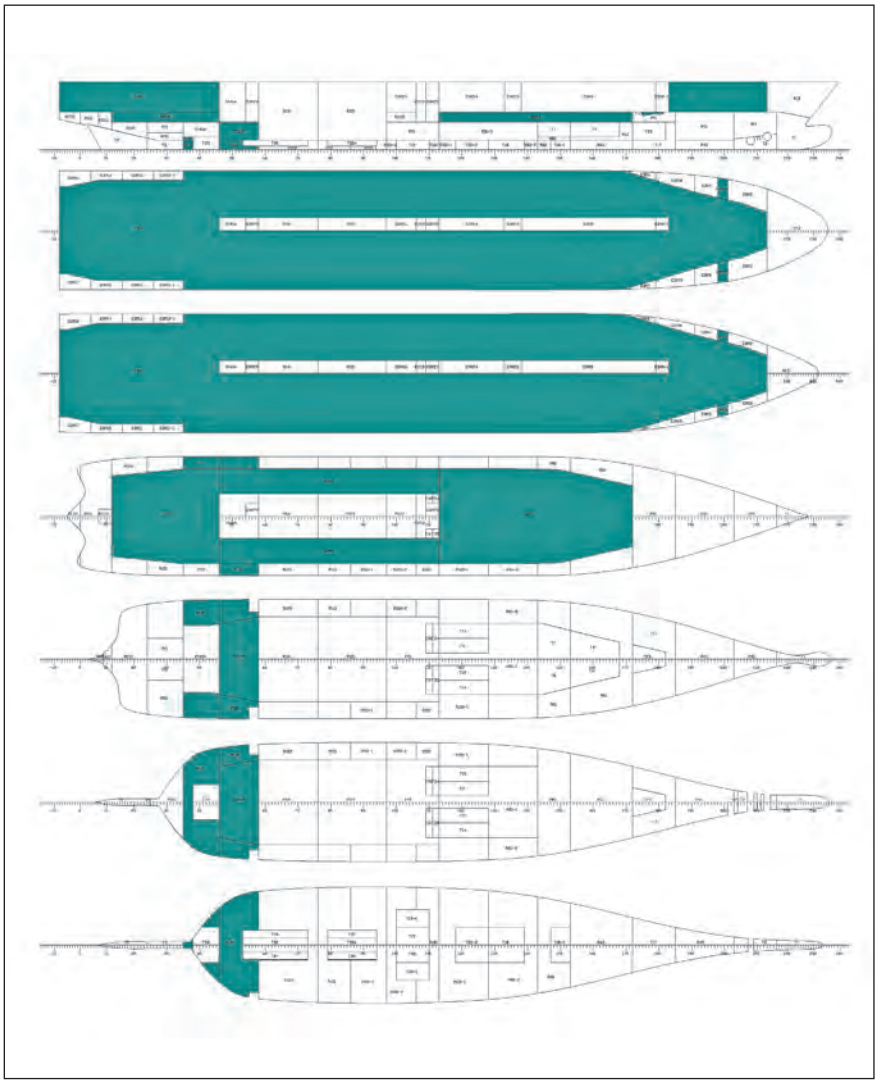
"We should look towards improving the risk based approach," said Mr Kendrick, "we should start at the top level asking what would be the scenario that would allow a ship to sink? A capsize should be avoided at all costs."

The European Union (EU), while having adopted the probabilistic rules have also maintained the Stockholm Agreement as a safeguard as there is sufficient disquiet over the SOLAS 09 rules for the authorities to want more information.

In the past, under the deterministic regulations, "a master knew what he was talking about, ships were designed for particular types of damage and they could check for each situation on a computer that the ship had survivability, under probabilistic rules he would be looking at the probability that the ship could survive," according to one senior maritime figure who did not want to be identified.

Safety and survivability of an accident under both sets of rules could prove to be similar in many circumstances, but under probabilistic rules there remains the chance that a situation develops where the vessel does not survive because SOLAS 09 allows for long lower holds and has less collision damage protection.

An important element to the debate then is the B/10 rule which requires a buffer of 10% across the beam to protect the ship



Damage case 5-6.1.1, one of the many damage scenarios considered by the MCA in its Research Project 592 which shows the car decks flooding on a vessel following damage aft.

against minor collision damage, under the previous regulations this was B/5, where the buffer comprised of 20% of the beam.

"If the longitudinal bulkhead is closer to the side [of the vessel] the more likely it is to be penetrated," explained Mr Allen. Statistically the probability of breeching the B/10 margin is 75% compared to 45% for the B/5.

"However, it was the intention that SOLAS 2009 would have no prescriptive requirement for longitudinal bulkheads: B/10 was an addition to prevent minor damage having an unacceptable consequence," said Mr Allen.

The MCA report, therefore, concludes: "Since SOLAS'95 has been accepted in Europe, it would be logical to ensure that the level of survivability intended to be provided by this standard is not lowered by the SOLAS'09 amendments. By taking a vessel design representative of the past, such as a ship with B/5 longitudinal bulkheads, it seems that the SOLAS'95 standard could be maintained fairly straightforwardly by ensuring that the level of survivability is no lower than that given by the index R but for every draught condition."

In addition the MCA said: "Such a requirement would reduce vulnerability at damage stability to the level which would be expected from SOLAS'95. This raises a question about cases such as damage case 5-6.1.1 [in which the MCA depicts a scenario where a vessel is damaged aft, shown in Figure 3]. Despite the vessel meeting the criterion suggested in the previous paragraph, a rapid capsize is still not prevented."

However, it also said that "Unfortunately, it can be seen from any of the results presented, most notably those shown in Figure 1 or Figure 2 (static stability), that today's standards allow for as many as 18% of feasible flooding cases to deprive a damaged ship of ANY stability, and therefore to leave it vulnerable to rapid capsize. Case 5-6.1.1 is just one of many such cases. SOLAS'95 does not resolve the matter.

With the water on deck issue "not properly dealt with [under SOLAS 09]," the MCA is now undertaking a further research project that will "investigate floodable length requirements in relation to long lower holds and internal subdivision layouts using a series of design layouts and survivability performance assessments".

This project is expected to start imminently and to run for six months and the results may be ready to be presented at SLF53, the International Maritime Organization (IMO) Stability and Load line and Fishing vessels safety (SLF) sub-committee under which damage stability regulations are considered, in January 2011. Coordination of the correspondence group that was established at the last SLF meeting in January this will fall to the MCA's Ronnie Allen and Andrew Scott, policy lead for stability at the MCA. The correspondence group will consider a variety of amendments to SOLAS, ro-ro stability research that is being conducted by the European Maritime Safety Agency, the MCA and others and operational information for masters over the issue of the Safe Return to Port requirements.

Puzzling as the new rules may be unravelling the intricacies of the SOLAS 09 regulation may not be as simple as first thought. But for designers, owners and operators of ships transparency and which accident scenarios should be considered will be the main issues. And that those can be further summarised to; 'are ships built to SOLAS 09 standards safe?'

More detailed information on the MCA Research Project 592 can be found at: http://www.mcga.gov.uk/c4mca/final_report-2.pdf. *NA*

Robot loaders feature in future ro-ro cargo handling

An emphasis on speed and environmental regulation are driving changes to cargo handling in the ro-ro sector. Jeff Frier of consultants Burness Corlett Three Quays (BCTQ), and Paul Simmons, of cargo-handling specialist, Cargotec, offer some solutions.

As a concept for moving cargo the ro-ro system of transportation has remained little changed since its inception more than 60 years ago and the logic for the system also remains unchanged, namely to allow the handling of cargo independent of port systems such as cranes.

Key to the success of the ro-ro concept has been its flexibility, allowing vessels to handle wheeled cargo carriers of varying designs, according to Jeff Frier, BCTQ London's general manager and principal consultant.

"In addition to cars, trucks, trailers and the ubiquitous container, future ro-ro design must also accommodate reefer containers, rail wagons and the emergence of the intermodal cargoes such as the SECU (Stora Enso cargo unit) where 'standard boxes' can be readily transferred from road to train to ship," said Mr Frier.

He added: "With respect to ship design, although no major changes to the basic ro-ro concept are anticipated, certain refinements can be expected. Bespoke designs may be developed for intermodal units in specific trades where transportation can be readily linked with shoreside facilities."

One of these refinements will be the introduction of automated cargo handling systems including the use of robot tractors and cassette lifters that are expected to be used where there are large volumes of containerised cargo with intermodal connections.

Changes to the design of ro-ro vessels are allowing the shift towards automated cargo handling systems to take place, explained Mr Frier.

"Open areas with reduced internal bulkheads facilitates the use of automatic loading systems and cargo handling. From a structural perspective, open ro-ro decks are supported by a portal frame arrangement. Introducing deck openings for ramps interrupts the primary structure and adequate compensation must be provided," he said.

There are several important advantages with electric drives including energy savings and no pollution from oil to sea or goods.

Armorique will shortly enter service for Brittany Ferries and has been designed specifically to run between Plymouth in the UK and the Breton port of Roscoff in France (credit: Brittany Ferries).

BCTQ ship design covers full analysis of deck openings required, and optimising secondary structures to account for both global hull bending and local loading from cargo operations. "In this event, the 'load' footprint of the different cargo handling systems, including fork lift trucks, needs to be considered," Mr Frier says.

The Royal Institution of Naval Architects

INTERNATIONAL CONFERENCE ON INNOVATION IN HIGH SPEED CRAFT

29-30 September 2010, London, UK

First Announcement & Call for Papers

Few sectors of the maritime industry have embraced innovation as readily and successfully as the high speed marine vessels sector, in seeking to extend operating envelopes, reduce downtime and increase reliability, safety and comfort, and reduce costs. Advanced design, the use of new materials and more efficient production methods and other means have and are all being explored to achieve these aims for commercial, military and recreational vessels.

This conference continues a sucessful series of events the Institution has run on high speed craft. It will provide an opportunity for all those involved with this sector of the maritime industry to present and discuss recent and future developments in all these aspects of commercial, military and recreational high speed vessels.

Technical papers are invited containing new and original ideas, innovative applications and practical achievements in various aspects of high speed marine vessels, including but not limited to the following topics:

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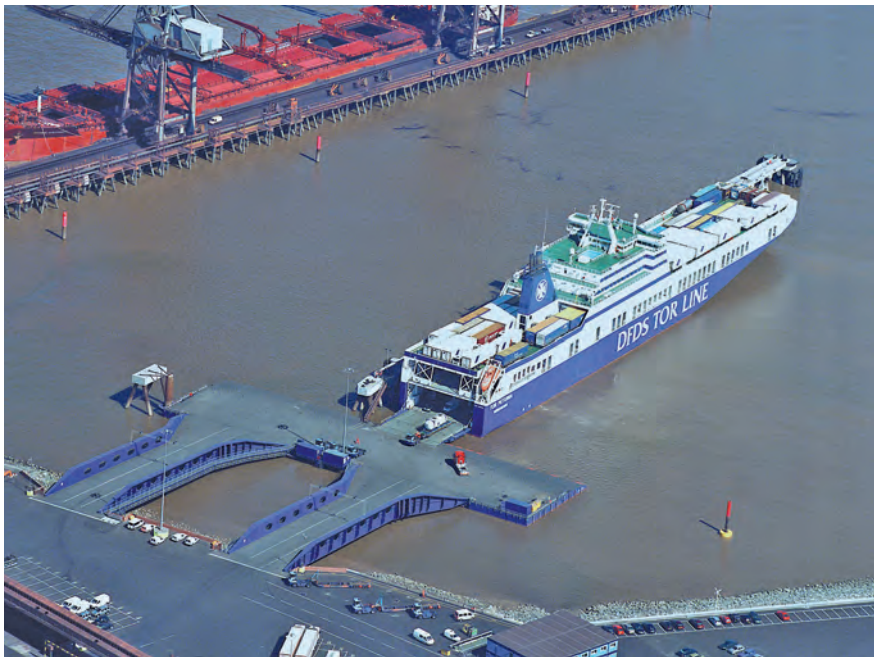

MacGregor linkspans are specifically designed for the facility in which they are employed, the Immingham linkspan is one such example and is capable of serving three vessels simultaneously.

He went on to explain that the constant drive for increased efficiency and reduced turn-round times will intensify the focus on cargo handling for both short-haul and long-haul voyages. With input from Cargotec, designers can understand cargo-handling features installed on existing ro-ro ships and indicate possible trends for design of future tonnage.

An issue currently gathering momentum is environmental protection and, in line with other sectors of the industry, it is envisaged there will be an impact on vessel speed to curb emissions according to BCTQ. "Speeds will likely be reduced to less than 20knots, which will influence the machinery plant size and arrangements," said Mr Frier.

Cargotec's technical sales manager Paul Simmons said: "Due to this new eco-awareness, ro-ro technology is moving towards fulfilling these needs at a faster pace. Accordingly, the conventional method of using a hydraulic power pack with electric motors and dedicated pumps is changing. Already cleaner more user-friendly forms of operating systems are being developed and in many cases are already in use. As a consequence, there is a positive shift in Cargotec towards further developments with electric drive technology".

Last year, *Viking Odessa* entered service, the first ever ship with all electrically-driven internal ro-ro equipment. It is the first of four 2000-car unit pure car carriers for privately-owned Norwegian company PD-Gram that was delivered from Kyokuyo Shipyard in Japan. All feature MacGregor cargo access outfits.

In addition Cargotec undertook the conversion of two freight ro-ro ships from hydraulic to electric drives last year. "The ro-ro conversion team completed a contract from Finnish operator Finnlines to supply approximately 3000m^2 of electrically-driven plywood car decks to its 25,654gt freight ro-ro sisterships Finnpulp and Finnmill," Mr Simmons said. "The owner also placed orders for Cargotec to supply electrically-driven MacGregor car decks for Finnlines' six new buildings being built at Jinling Shipyard in China."

There are clearly several very important advantages with electric drives, explained Mr Simmons, there is no oil pollution to sea or goods, they are maintenance friendly, and they provide energy savings as continuous running is not required. They are also easy to monitor and remove the need for a power pack.

Procedures for berthed vessels are also undergoing radical changes. "In compliance with International Maritime Organization (IMO) recommendations, countries such as the USA, Sweden and Germany are implementing the principle of 'cold ironing', which reduces engine emissions in port by connecting ship electrical cables to dedicated shore facilities," Mr Simmons said. "Stena Jutlandica, for example, has recently been converted by adding a small MacGregor shore access door to enable cable routing from the quay in Gothenburg, Sweden."

Improvements in efficiency are an ongoing consideration for both designers and manufacturers as owners seek a competitive advantage. "Brittany Ferries' latest 24,641gt ro-pax ferry *Armorique* is representative of today's modern ro-pax vessel," Mr Simmons said. The ship, which entered service in February 2009, was specifically designed to run between Plymouth in the UK and the Breton port of Roscoff in France, carrying 120 crew and a maximum of 1500 passengers.

Armorique has garage space comprising of 980 lane-metres for around 470 cars or 60 articulated lorries, and has a comprehensive hydraulically-operated MacGregor ro-ro equipment package based on bow and stern access using a two-tier loading system.

"The high-capacity, high turnaround cross-channel services that the operator provides mean that the company's vessels require a highly-efficient vehicle access solution," Mr Simmons says. "This was a particular design focus when considering vehicle access".

Stena Line's two new 62,000gt 'superferries', due for delivery this year, have also been built with this in mind. *Stena Hollandica* and sistership *Stena Britannica* accommodate vehicle space comprising 5500m of trailer lanes and 700m of car lanes, and can carry up to 1200 passengers. Each has four cargo decks and can discharge and load simultaneously over two decks at either end of the ship.

Other examples include Color Line's pair of 34,231gt fast ro-paxes *SuperSpeed 1* and *SuperSpeed 2*, delivered from STX Europe in 2008 and 2009. They each feature a comprehensive MacGregor ro-ro system and also employ the use of a two-level MacGregor linkspan and passenger gangway for port facilities in Kristiansand

and Larvik, and two upper-level MacGregor linkspans for the operator's services in Hirtshals in Denmark.

Newbuildings can have their designs operationally-tailored from the outset, but Cargotec is also often involved with projects where a vessel has changed ownership and roles, explained Mr Simmons. "For example, the former 7500dwt Sto-Ro forest product carrier, *Transgard*, was reconfigured to carry cars, high and heavy vehicles and rolling project cargoes. We delivered MacGregor hoistable plywood car-decks and so successful was the transformation that three other vessels in the operator's fleet, *Seagard*, *Heralden* and *Serenaden*, were similarly converted for a 10-year charter with United European Car Carriers (UECC)."

Northern Merchant and Midnight Merchant are two vessels that were converted for two-tier loading at the ports of Dover and Dunkirk. After the extension of both driveways of Dunkirk's linkspan, the ship conversions helped reduce loading times from two hours to about 30 minutes. This allowed the two 23knot ferries to add one more departure in each direction daily and now the two-tier system is being implemented by other ferry operators.

Development of the linkspan has provided a versatile platform to transfer cargo between ship and shore, vital where tidal variation is considerable to cater for ship draft and to enable smoothing of angles between quay, ro-ro access ramp and ships deck.

MacGregor designs its linkspans specifically for the site at which they are employed, resulting in few standard arrangements. The range of tide, types of vessel and distance between loading decks, which impacts the slope of the linkspan, are just a few examples of the parameters that need consideration. The Immingham linkspan is one such example and is capable of serving three vessels simultaneously.

In exposed ports where tidal variation is limited such as the Baltic or Mediterranean new opportunities can arise. As ro-ro vessels increase in size, sometimes causing angular problems for conventional mooring ropes, combined with adverse weather, high winds or heavy swell, unwanted ship movement may occur, said Mr Simmons. "Conventional berthing with ropes then becomes a safety issue. This has prompted Cargotec to develop a semi-automated mooring system called Moorex."

Moorex can be mounted ashore or onboard. Once the rope is attached to the bollard, an operator activates the unit to maintain a constant pull. For larger tidal variations and hands-free operation, Cargotec has developed a separate fully-automatic mooring device.

If keeping the vehicles rolling on and off is your business then speed is clearly of the essence while new environmental considerations are pushing owners and operators to look for cleaner technology. It is not a ro-ro revolution, but rather a step change for a hitherto technologically stable sector of the maritime industry. *NA*

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First Notice & Call for Papers

2010 will mark the 200th anniversary of the birth of William Froude, and the 150th anniversary of the founding of the Royal Institution of Naval Architects, both of whom have made a significant contribution to advancing the understanding of hydrodynamics during their time. The William Froude international conference will provide an appropriate opportunity for those who are involved in the research, development and application of hydrodynamics to meet and discuss current and future advances in theoretical and applied hydrodynamics. The two-day conference will present 20 papers, with a session devoted to the work being undertaken by universities involved with the Lloyd's Register strategic hydrodynamic research programme. Selected papers from this conference will also be presented in a special issue of the International Journal of Maritime Engineering. The conference will include a visit to the QinetiQ towing tank and exhibition at Haslar.

The scope of the Conference will be broad, covering all the aspects of theoretical and applied hydrodynamics. Papers are invited on the following and other related topics:

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Hydro-Testing Alliance - Summer School 2

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From the
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The second Summer School organised by the FP6 Hydro-Testing Alliance Network of Excellence (HTA-NoE) consortium will take place from the 30th of August to the 2nd of September 2010, at MARINETEK, in Trondheim, Norway.

The aim of the Summer School is to provide the participants with an understanding of the fundamentals of model testing and technologies used to aid model tests. The topics will include "3-D Wave field measurements", "Wireless data transmission", "Free running model technology" and "Wetted surface area" measurement techniques. The Summer School will comprise of formal lectures as well as practical demonstrations in each topic. The final day of the course will consist of a career's fair with the participation of the major hydro-testing facilities in Europe and where participants will be interacting with other researchers already working for these marine model testing institutions.

The course is intended for students in their final year of undergraduate studies or doing postgraduate studies and researchers who require understanding of the principles behind model testing technologies.

Lecture notes covering the course will be distributed to participants on arrival. All lectures and lecture notes will be given in English and a certificate of attendance will be given to all participants at the end of the Summer School.

For further details please visit the HTA-NoE project website (http://hta-noe.eu) or for other queries please e-mail ana.mesbahi@ncl.ac.uk.

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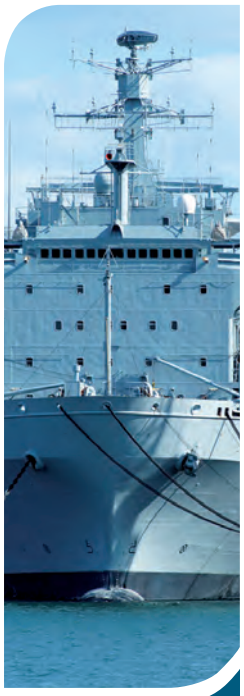

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By Jonathan M Ross MRINA Ref: HFNM
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