

Germanischer Lloyd

EDITION 2 · 2008

nonstop

The Magazine for Customers and Business Partners

Greece

Old Tradition, Young Fleet

Tankers *Hull with Breaking Point*

Triplets *Christening in China*

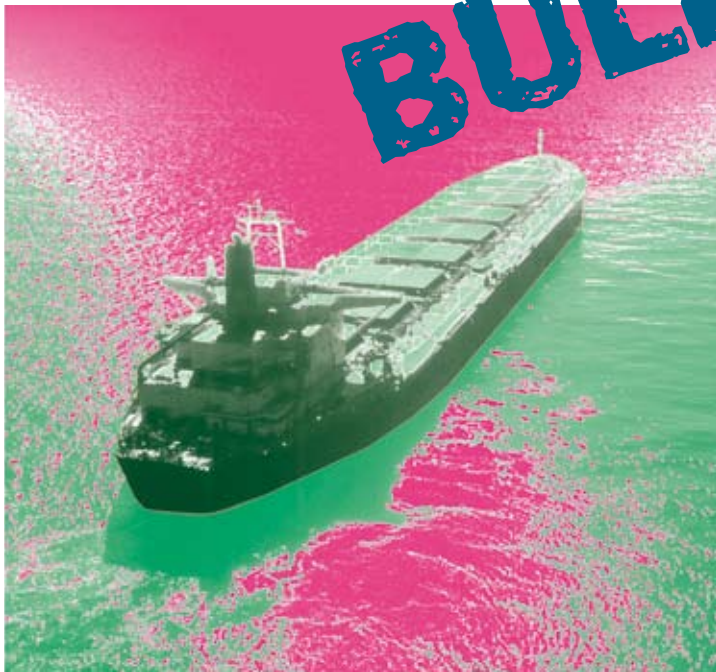
Technology *Pump up the Power*



See you at Posidonia, hall 2
stand 213, 2-6 June 2008



BULKERS



First Class Bulkers – a new perspective



At Germanischer Lloyd we focus on detailed structural solutions for bulk carriers. Our smart solutions ensure our customers can operate fit-for-purpose vessels. That's what we call a new perspective on bulk carriers. Why not contact us to find out how you can benefit?

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Dear Readers,

Recently, an interesting issue was raised: When will Greek shipowners also become active in the growing market for drilling vessels? This is a justified question if one considers the widely diversified business activities of Hellenic owners: Within only a few years, the tanker and bulk carrier fleet has been considerably expanded and rejuvenated. The proportion of containerships in the Greek fleet is rising steadily. And it is hard to image the LPG and LNG market without the Greeks. Newbuildings worth billions in total volume have been ordered from Asian yards.

Greece is one of the leading maritime nations – and traditional host of the Posidonia 2008 in Athens. Currently the subject of intensive wrangling in international circles: improving the environmental compatibility of sea transport. Germanischer Lloyd will be presenting its newly developed CO₂ index to the expert audience. Now environmentally conscious shipping companies can measure, record and compare the CO₂ emissions of their fleets. At the same time, the system lays the methodological foundations for maritime emission trading.



Pekka Paasivaara

With the classification order for a jack-up barge, a new chapter of special ships is beginning for a Greek yard. The production of electricity from renewable energy sources will increase substantially in the decades to come. For the North Sea and Baltic region alone, some 150 wind farms are planned, each boasting 60 to 170 turbines. This project is an excellent example of how the technical expertise of Germanischer Lloyd can be used both for the classification of ships and in the certification of wind turbines – to the benefit of the customer. Besides wind energy, the production of fossil fuels is playing an increasingly important role in the spectrum of technical services offered by the Industrial Services of GL. Most of the crude oil and natural gas fields discovered recently are no longer located on the mainland or in coastal regions, but rather in deepwater regions. Specialized know-how is needed here, to meet the challenge of the complex technical questions posed by production at great depths.

In May 2008, the technical consulting firm Trident Consultants, with headquarters in Kuala Lumpur, became a member of the GL Group. Its 80 experts advise international clients in the oil and gas sector. The company is a “success address” for technical issues relating to floating production, storage and offloading vessels. Together with our competence centre in Kuala Lumpur, we can now offer our customers in the maritime and energy sectors a truly comprehensive range of technical services and consultancy. From my vantage point as a newcomer at GL – since February, I have been responsible for the expansion of the Industrial Services – a new vista of possibilities is opening for both business areas of Germanischer Lloyd through the development of offshore energy resources. Profitability, reliability and efficiency are the beacons which we at GL use to navigate our way forward. When will you be making use of our expertise?

Yours sincerely,

Pekka Paasivaara
Member of the Executive Board
Germanischer Lloyd

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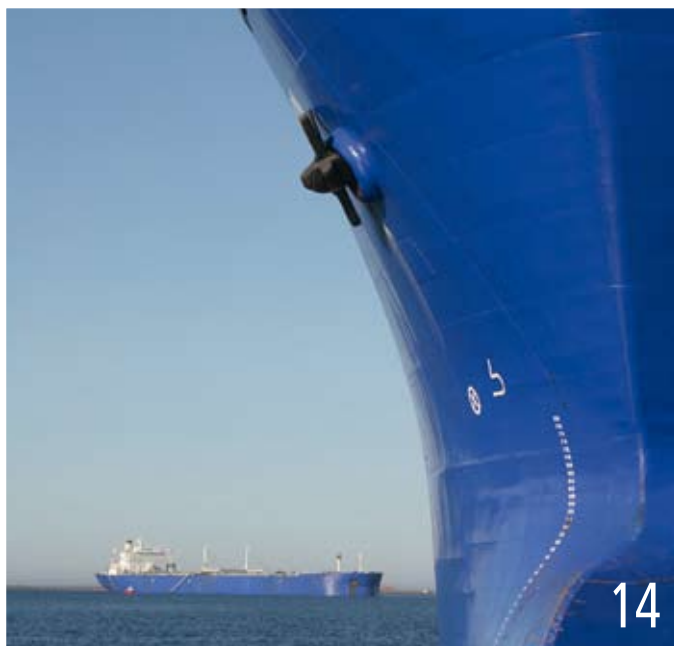


Photo: Stockphoto

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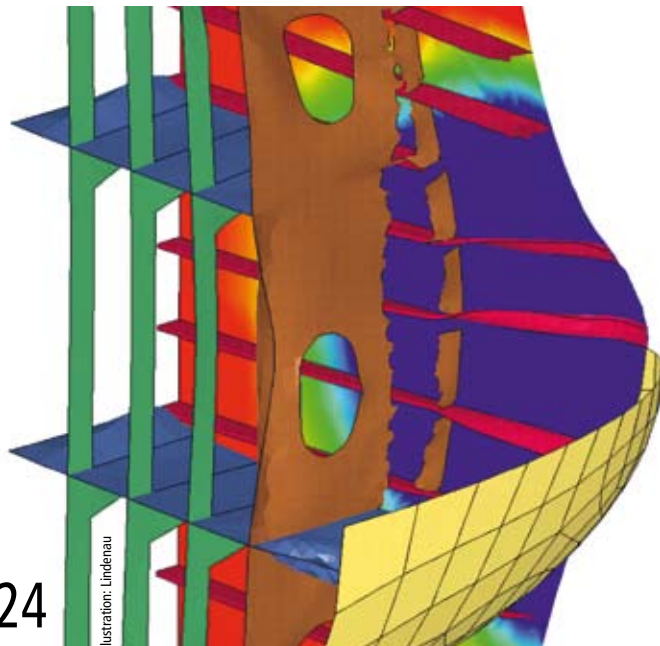


Illustration: Lindenau

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Cover photo: Werner Otto

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Is the engineer's world a man's world?
Certainly not as Germanischer Lloyd shows

Very Big and Very Safe

Ship class renewed in Dubai: GL surveyor Islam Abousaada closely examines VLCC tanker "Nordpower". Class renewal is a routine procedure due every five years. The 318,260-dwt supertanker, delivered by Hyundai Samho Heavy Industries in 2003, is operated by Hamburg shipowner "Nord" (Klaus E. Oldendorff GmbH) and sails under the Cypriot flag.

Dubai is a major tanker repair and maintenance centre. Following her successful class renewal tests, the 333-metre double-hull tanker was able to resume her voyages across the seven seas under GL class, satisfying the most stringent safety requirements.



news



SAFTEY. The new SOLAS rules require design changes.

SOLAS 2009

New Damage Stability Requirements Influence Ship Designs

The importance of stability assessment in the early design process is confirmed by the latest revision of the SOLAS 2009 regulations, which introduces damage stability calculations and specific design requirements.

The so-called damage stability harmonization principle applies probabilistic assessment to dry-cargo vessels and passenger ships, based on the assumption that two ships of the same type with the same attained index provide a similar level of safety.

Alternative options. The new regulations apply to vessels with keels laid down on or after 1 January 2009. Special emphasis is placed on the requirements for double bottoms between the collision bulkhead and the after-peak bulkhead, which must extend all

the way to the ship's sides. Any small wells in the double bottom must be as shallow as possible. The same restriction applies to lubricating oil tanks underneath main engines, which must maintain a 500-mm minimum distance from the outer shell.

Current designs for container and multi-purpose vessels often do not comply with these requirements and will have to be adapted accordingly. For non-compliant double-walled sections of a ship, a separate set of calculations for bottom damage scenarios may be used to substantiate an equivalent level of damage resistance.

This equivalency option is a deterministic element within the probabilistic concept of SOLAS 2009, with distinctive damage extensions in lon-

gitudinal, transverse and vertical directions. Calculations should assume damage to any part of the vessel not fitted with a double bottom, or fitted with an unusual bottom arrangement. Adjacent compartments within reach of the damage must be accounted for.

Useful leaflet. The new regulations introduce major changes that ship designers should incorporate into their work as soon as possible to facilitate certification. GL has published a "Leaflet for damage stability calculation according to SOLAS 2009", a comprehensive guide to the new regulations for shipbuilders and consultants.

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GL FILE INSPECTION

Viewing Ship Documentation Online

If you want to buy a ship or need to negotiate with a ship insurance company, you need comprehensive information on the vessel. The "GL file inspection" service now offers interested parties access to the full information assets on specific ships.

To be granted file access, a user must request authorization from the

shipowner and undergo a review by GL to confirm the user's legitimate interest. File access is subject to a fee and a time limit.

Realistic view. The online tool supplements GL's existing range of IT services. Apart from classification data, "GL file inspection" also furnishes statutory information such

as: When was the ship last surveyed? What certificates have been issued and when? What is the state of the hull and the engine?

The data is retrieved from GL's databases. Shipowners and fleet managers can continue to use the free GL tool "fleet online" to access key data on their ships.

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BUSAN.
Inaugural meeting of GL's
Hull Technical Committee.



CSR

Bulker Premiere

It was a premiere for Hamburg-based shipping company August Bolten: GL-classed "Western Wave" is the first bulk carrier built according to the Common Structural Rules (CSR) and was commissioned in April 2008.

More to follow. Delivered by Nantong Nikka Shipbuilding Co., Nantong, Jiangsu Province, People's Republic of China, the vessel will be running under the Liberian flag. One of a series of ten bulk carriers ordered from Asian shipyards, Western Wave measures 170 metres in length and 27 metres in width. Her gross tonnage is 18,493 GT.

HULL TECHNICAL COMMITTEE

It All Depends on the Hull

New Brains Trust at Germanischer Lloyd: 19 representatives of seven Korean shipyards gathered in Busan in April 2008 for the inaugural meeting of the Germanischer Lloyd Hull Technical Committee. The main topic on the agenda was the draft for the new containership classification rules, which are under development at Germanischer Lloyd.

Particular rules. The classification society has followed the technological progress and size development of containerships closely since the very beginning. GL's new structural rules for hulls will account for recent developments, as well as ship-type-specific engineering know-how and GL's experience accumulated while oversee-

ing nearly 2,000 containerships in operation. Designed specifically for this technically complex ship type, the construction rules will define a modern standard for the classification and manufacturing of containerships. Shipyards and shipowners alike will be able to rely on a single reference document covering all topics relevant for containerships.

The elected chairman of the Committee is Soon-Sik Lee, General Manager of Hyundai Heavy Industries. Further members include representatives of DSME, HHI, SHI, HHIC, HMD, HSHI, STX, Daesun and Sungdong shipyards. The Secretary to the Committee is Germanischer Lloyd's Head of Plan Approval in Korea, Jai-Oh Sun.



Photo: HHLA

HAMBURG. Fast growing Asian trade volume heats up the container traffic.

MARKET STUDY

MegaBoxers to Boost Container Traffic

Container traffic volumes in northern Europe are growing more rapidly than predicted, says a study by German Hypo Vereinsbank (HVB). But in the medium term, terminal capacity bottlenecks are imminent. Ports will therefore have to take action now, since the number of available moor-

ings is a critical factor for the competitiveness of a port.

Nine million TEU. According to the HVB study, North Range ports should expect an 11 per cent growth in container traffic annually. To date, forecasts have been predicting a growth rate of no more than 9.2 per cent. This means

that by 2015, approximately 77 million TEU will be handled in the area, rather than just 68 million TEU as previously estimated. The added volume is equivalent to the current total number of containers handled annually by the port of Hamburg. By comparison, only 34 million TEU were loaded and unloaded at the four biggest ports in northern Europe in 2007.

The main cause of the rapid increase in container traffic is the above-average growth of the Asian trade volume, which has prompted a containership newbuilding boom. In particular, the fat MegaBoxer orderbook will make an impact: The overall container carrying capacity will not only compensate for smaller ships being decommissioned over the coming years, but will actually multiply. As many as 173 of the container behemoths will be in operation by 1 January 2012, compared to nine in early 2008. MegaBoxers will be deployed almost exclusively on routes between Asia and Europe.



Photo: Hasenpusch

ROLE MODEL. "CSCL Los Angeles" already fulfils the new IMO requirements.

E.R. SCHIFFAHRT

Fit for Safer Recycling

Ship recycling is to become safer and greener. This is the aim of a convention which is due to be adopted by International Maritime Organization (IMO) in October 2008.

The containership "E.R. Los Angeles" – currently trading as the MV "CSCL Los Angeles" – is the first vessel worldwide to meet the new IMO requirements. E.R. Schiffahrt is one of the world's leading charter owners of containerships.

Well prepared. As part of a pilot project, the Hamburg company compiled a list of hazardous substances, with support from Germanischer Lloyd. This "Inventory of Hazardous Materials" (IHM) sys-

tematically registers all materials which, according to the IMO convention, pose a potential environmental hazard and which are used in ship structures or form part of the equipment. "During the pilot project, we gained valuable experience, and feel better prepared for the introduction of the new IMO instrument. All parties involved agreed on developing a user-friendly process for recording all harmful substances," says Knud Stubkjaer, Chief Executive Officer of E.R. Schiffahrt.

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VIETSHIP 2008

Vietnam Shipbuilding Boom

Six container vessels classed by Germanischer Lloyd are currently under construction at Ha Long and Bach Dang shipyards, respectively. The contract-signing ceremony for three 1,730-TEU and two 1,800-TEU container vessels to be built by Halong Shipyard, as well as one 1,730-TEU container vessel to be built by Bach Dang Shipyard, took place on occasion of the VietShip 2008 trade fair. The new ships were ordered by Vinalines and Vinashinlines.

High profile. Germanischer Lloyd has been promoting its new service offerings in Vietnam and is operating

out of four locations. With 30 classification orders received last year for container, multi-purpose and tanker ships built at Vietnamese shipyards.

Classification society Germanischer Lloyd announced that all containerships built in Vietnam to date had been classed with GL. More than 70 per cent of the container vessels calling at Vietnamese ports carried the GL class sign.

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VIETNAM

Labs and Awards

Vietnam Maritime University (VIMARU) based in Haipong and Germanischer Lloyd have agreed to co-operate closely on training programmes for future engineers by jointly arranging for both theoretical and practical courses. The co-operation agreement was signed during the VietShip 2008 trade fair by DSc. Dang Van Uy, Headmaster of VIMARU, Dr Le Viet Luong, Director of the Faculty of Shipbuilding, Le Thanh Binh, GL Country Manager for Vietnam, and Hans-Ulrich Schulze, Director of GL Academy. Founded in 1956, it is today Vietnam's leading university in maritime sciences.

Staff wanted. Germanischer Lloyd will offer two annual awards for outstanding academic performance to the best students of naval architecture and marine engineering at VIMARU. These awards will be presented on occasion of the graduation ceremony. "Qualified staff is rare, and the lack of experienced engineers hits the headlines almost on a daily basis," said Le Thanh Binh.

Students and professors in Vietnam have been encouraged to pursue collaboration opportunities with Germanischer Lloyd. The GL Academy, for instance, regularly offers a variety of advanced maritime education seminars.

For further information: Le Thanh Binh, Country Manager Vietnam, Phone: +844 755 6224, E-Mail: thanh-binh.le@gl-group.com



SIGNING OF CONTRACT. Fook Seng Chan, GL Area Manager ASEAN/South Asia (front row left), and Trương Hoàng Cao, Vice Director of Bach Dang Shipyard (front row right).



AWARD. Sumate Tanthuwani (shown with GL's Executive Board Member Dr Hermann J. Klein), GL ASEAN Committee Chairman of long standing and President of Regional Container Lines, was presented with the German Federal Cross of Merit.

ASEAN COMMITTEE

Ship Efficiency and Pollution Control

The topics of the 22nd ASEAN Committee meeting in Chiang Mai reflected the current state of the worldwide debate about the environmental impact of shipping. Dr Hermann J. Klein, Member of GL's Executive Board, presented a number of options for improving ship efficiency and reducing fuel costs. As he put it, "The issue today is choosing the 'right' option for cutting the fuel bill." Class can provide important advice towards optimizing

hull design, propeller performance, engine output, energy management, and even crew performance.

Lower emissions. With respect to the environmental implications, Dr Klein discussed appropriate measures to cut emissions of sulphur dioxide, carbon dioxide, nitrous oxides and particulate matter. With the use of low-sulphur fuels increasing, shipping will sustain its position as the most environmental-friendly mode of transport.

GL believes that low-sulphur fuels will ultimately prevail in global shipping. From a safety point of view, fuel changeovers are not encouraged since frequent fuel changes in coastal waters may increase the risk of grounding.

Dr Volkmar Wasmansdorff, Head of Division Asia/Pacific, explained that shipping companies are strongly attracted to large containerships due to the associated economies of scale. The current orderbook clearly reveals an increasing trend towards MegaBoxers: Vessels on order rated more than 10,000 TEU account for 32 per cent of the total containership orderbook.

But MegaBoxers require hub strategies involving transshipments and feeder services at major ports. As a result, mainline operators have already cascaded 3,000 to 5,000-Teu vessels into the feeder market. Niche markets could emerge for smaller operators who may serve routes with moderate volumes or offer specialized or individualized services.

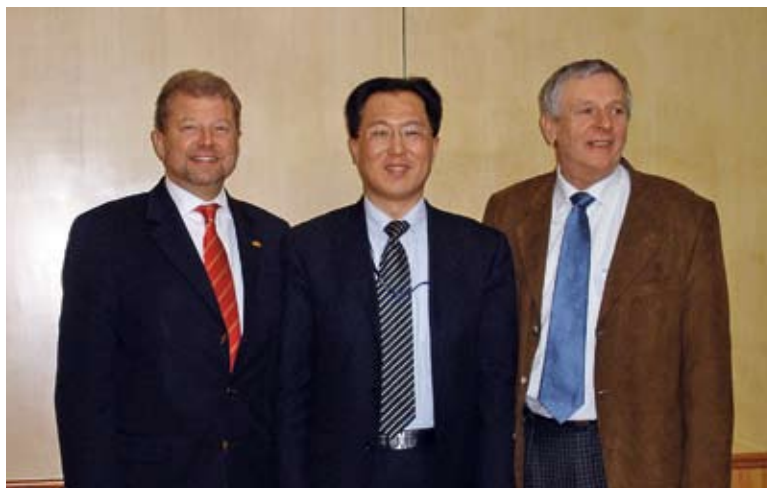
SHIP DESIGN

High Standards

Today's shipping technology embraces the protection of the marine environment. A new GL service offers design optimization to help meet the new MARPOL requirements on fuel oil tanks while improving the environmental performance of the ship. The service also helps shipowners comply with the large number of international standards.

Specific guidelines. The revision of MARPOL Annex I, Regulation 12A specifies the design requirements for fuel oil tanks in ship newbuilding. It defines locations and sizes for fuel tanks in all ships with an aggregate oil fuel capacity of 600 m³ and above. The regulation applies to ships whose building contract was signed on or after 1 August 2007, or ships scheduled for delivery on or after 1 August 2010. In absence of a building contract, the regulation applies to ships with keels laid down on or after 1 February 2008.

For further information: Hendrik Bruhns, Head of Department Stability, Phone.: +49 40 36149-635, E-Mail: hendrik.bruhns@gl-group.com



VISIT. GL's Executive Board Member Dr Hermann J. Klein (l.) Hu Jintao, President of SDARI, and Werner Enning, GL Area Manager China.

SDARI

Close Relationship

At a visit to China in April, Dr Hermann J. Klein was welcomed by the Shanghai Merchant Ship Design & Research Institute (SDARI). The marine design company is part of the CSSC group and looks back on a history of more than 40 years.

Proven partnership. SDARI has designed many ship types with GL class. A 3,600-TEU containership

was built 36 times by Shanghai Shipyard, and another SDARI design, a 1,749-TEU ship, was built over 60 times by Guangzhou Wenchong Shipyard. In addition, SDARI has designed several bulk carriers.

From 1996 until 2003, relations with GL were especially friendly because Germanischer Lloyd's Shanghai office was in the same building as SDARI's.

DUBAI MARITIME CITY

Building a New World

Dubai Maritime City (DMC), the world's first purpose-built maritime centre, focuses on two main projects: building up a new ship register and expanding the maritime education programme.

A delegation from DMC visited the GL Academy in Germany recently to discuss further collaboration in establishing an academic centre for Dubai Maritime City. "We are looking forward to co-operating with Germanischer Lloyd, and especially to the physical presence of GL Academy in



PURPOSE-BUILT. Germanischer Lloyd co-operates with Dubai Maritime City.

Dubai," said John Ewing, Chief Commercial Officer of Dubai Maritime City.

Further education. Hans-Ulrich Schulze, Head of GL Academy, added: „We have held continued education courses in Dubai in the past. Our aim is to establish a long-term co-operation with the Maritime Academy."

The representatives of DMC were especially interested in GL Academy's seminars for further educating captains of small-to-medium-sized boats and the implementation of courses and seminars at the Maritime Academy. DMC is situated on a 227-hectare man-made peninsula between Port Rashid and Dubai Dry Docks.



Photo: Michael Bogumil

ZEMSHIP

Clean Shipping

Across Hamburg's Alster lake with zero emissions: "The Zemship" marks the onset of a new era of pleasure boating. 25 metres long and five metres wide, she will provide space for 100 passengers upon completion. The Zero-Emission Ship is being built by SSB Spezialschiffbau Oortkaten near Hamburg. Both the body of the ship and her fuel-cell system are GL-certified. The prototype is expected to inspire many more fuel-cell ship newbuildings around the world.

PROTOTYPE. The fuel-cell ship will be classed by Germanischer Lloyd.

WINTEB

Dutch Success in India

Dutch manufacturer Winteb has received type approval from Germanischer Lloyd for its new air pipe head "WIN2000 BWM". The air pipe head incorporates a flushing exit for ballast water tanks and a closing device.

This innovation prevents possible damage to the float ball or the O-ring seal that could compromise the whole system. Once the exchange operation is complete, the exit cover is replaced and in doing so releases the safety device.

169 air pipe heads. At this year's VietShip exhibition, Indian yard Larsen & Toubro ordered Winteb Ballast Water Management systems for two sets of ships. The order in-

cludes a total of 169 pieces of the new "WIN2000 BWM" size DN250 air pipe heads, as well as WIN2000 air pipe heads.

The new version of the WIN2000 series air pipe heads allows the shipowner to meet the requirements of IMO convention Regulation D 1 by continuously flushing ballast water through the air pipe heads.

For further information:

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Photo: Winteb

BULKERS

Big Order – Big Task

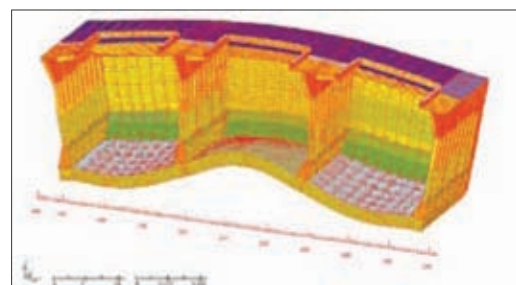
After the year of the bulk carrier – the shipping industry's label for the year 2007 – the current strong demand for bulkers is expected to continue for at least another three years, and probably longer. The estimated volume of dry bulk commodities for 2008 is 3.122 million tonnes, and that is only one example.

For JSC Shipyard Zaliv, one of the largest shipbuilding and ship repair yards in Ukraine, a new order for ten capesize bulkers is a safe bet. It is by far the biggest bulk carrier newbuilding order received in Ukraine in recent years. The vessels will be built according to

the rules of Germanischer Lloyd. The basic design of the bulkers was developed by design office Chernomorsudoprojekt in Nicolaev.

MARPOL implemented. Each 176,000-dwt vessel will be 280.8 metres long, 46.6 metres wide and 24.5 metres high. Classification will encompass the traditional configuration, with a single deck, nine cargo holds, a bulbous bow and a transom stern.

The vessel also features a double-side skin with wing and hopper tanks connected to the centrally-divided double bottom. Pursuant to the new MARPOL regulations for the protection of fuel oil



SIMULATION. Example for 3-hold cargo hold model according to common structural rules: Deformations for alternate loading condition.

tanks, the vessels will not carry any fuel oil in side or double-bottom tanks.

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KEEL LAID DOWN. Presentation of the keel-laying certificate to Danish company Stella Shipping (left to right): Capt. Michael Sorensen (Stella Shipping), Sakhawat Hossain (Western Marine Shipyard), M. M. Karim (GL), Capt. Niels Vestergaard, Niels Struve, Jan Fabricus (all from Stella Shipping), C.F. Zaman (GL) and Jan Dalhuysen (Stella Shipping).

BANGLADESH

Ship Exports on the Rise

Bangladesh shipyard Highspeed has won an order for eight 4,500-dwt multi-purpose vessels from Dutch shipping company Hollander Scholtens. The ships will be built to Germanischer Lloyd classification rules. Construction of the ice-class vessels will begin in December 2008. All units are to be delivered by April 2012.

Experienced contractor. The yard is about to upgrade its facilities and install state-of-the-art equipment. This will include expanding the slipway and adding cov-

ered sheds and machinery. "The order with Highspeed Shipbuilding is a great step forward for the shipbuilding industry in Bangladesh," says GL Country Manager C. F. Zaman. The company is the country's oldest shipyard.

In another new project, Western Marine shipyard has begun constructing five multi-purpose, dry-cargo vessels. The keels for the first two 4,100-dwt vessels were laid at the end of February. The ships were ordered from Danish Stella Shipping and will be built with GL class.

AWARD. GL's Executive Board Member Dr Hermann J. Klein, Alfred Hartmann and Hermann Buss (from left).

NAUTITEC

Ship Simulator SUSAN Certified

The ship handling and simulation system "SUSAN" in Leer, Germany, meets the qualitative requirements posed by the training regulations for simulators, as prescribed by the International Maritime Organization (IMO).

The certificate for Nautitec GmbH & Co. KG was presented to the initiators of this high-potential maritime training facility by Dr Hermann J. Klein, Member of the GL Executive Board. Fol-

lowing the closure of Hamburg's nautical training college, which had trained seafarers for more than 250 years, the shipowners and masters Hermann Buss and Alfred Hartmann purchased the SUSAN bridge simulator and re-commissioned it in Leer.

Hartmann views the fully functional shipping system and the nautical training provided by the seafarers' school in Leer as offering a prime locational advantage.



Old Tradition,

The Greek maritime economy is booming. A strong demand for tankers and bulkers is keeping the nation's shipping business on course

Tradition has a power of its own. In the Iliad, Homer tells us about an enormous Greek fleet setting sail for Troy: 1,186 vessels in total, he writes – a number almost unimaginable during the times of ancient antiquity. Shipping has always been among the strengths of the Greek nation. Legendary shipowners such as Aristoteles Onassis and Stavros Niarchos upheld a powerful legacy. And today's shipping companies, pursuing an ambitious modernization strategy, are staying on course.

Bulk carriers and tankers are the two shiptypes that have been forming the backbone of the Greek fleet, which continues to be the world's largest national fleet. As a matter of fact, its share in the global fleet is growing. Greek enterprises are in control of 8.7 per cent of all ships in operation or on order around the world. In terms of carrying capacity, the Greek share in the global tonnage is as high as 16 per cent.

Powerful Growth Dynamics

More ships, more capacity, more newbuildings: The dynamics and flexibility of the Greek shipping industry are impressive, and the growth trend is sound. Meanwhile the fleet, which is one of the younger ones already, keeps getting younger. According to the Greek Shipping Cooperation Committee's 2007 Annual Report, 4,173 ships totalling 262 million dwt and 156.4 million GT were owned or operated by Greek companies last year.

These statistics include 1,054 newbuilding orders equivalent to a total of 49.9 million GT. Ore and other bulk carriers make up the biggest share of the fleet, followed by chemical and product carriers, and oil tankers (refer to chart at right). According to the statistics, about one-third of the fleet currently controlled by Greek enterprises consists of ships on order.

The Greek fleet is not only voluminous, but it also keeps rejuvenating. The world's largest national tanker and bulker fleets are Greek-operated. The country's ship management companies are in control of 21.7 per cent of the global tanker fleet – including crude oil and refinery product tankers – as

POSEIDON. The Greek god of the seas is the namesake of the maritime trade fair "Posidonia" held in Athens.

Young Fleet

well as 20.4 per cent of the international bulk-carrier fleet in terms of dwt. These figures do not account for newbuilding orders. In 2007, enormous sums were invested in bulkers, increasing the Greek fleet by as much as 20 per cent, or 42.7 million dwt.

Greek shipowners prefer to purchase new ships or relatively young second-hand vessels. Today, an average Greek crude oil tanker is less than nine years old, and an average product or chemical carrier as little as seven. The overall average age of Greek-operated vessels is 12.5 years today, down from 14.3 years in 2007. By comparison, the average age of the global fleet is 13.5 years and is trending upwards. Calculated in GT, the mean age of Greek ships is as low as 10.5 years.

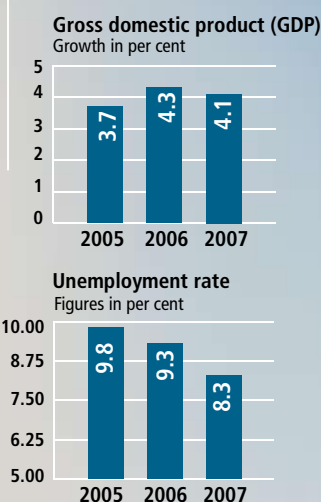
Major Economic Factor

Ships operated by Greek management companies are registered with 48 different flag states. The domestic flag is the most common one. In 2007, 228 ships, equivalent to 22.3 million dwt, were entered into the Greek register. A total of 1,197 vessels with a combined 93.9 million dwt were flying the white-and-blue standard.

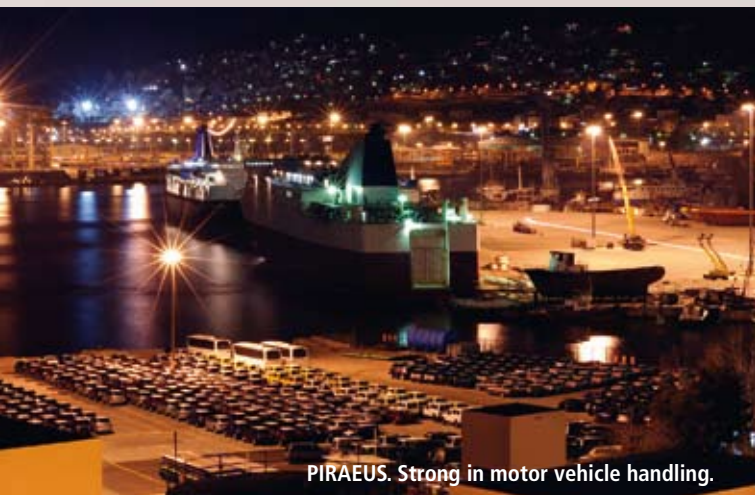
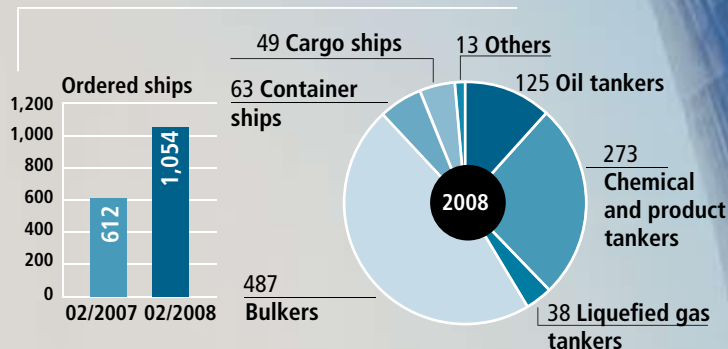
The Greek maritime industry, employing about 50,000 seamen and 11,500 highly-trained staff, is the national economy's strongest industry and a powerful driver of growth (see graphic at right). Around 160,000 people work in the maritime industry, equivalent to more than 4.5 per cent of the nation's workforce. According to estimates, the maritime sector contributes approximately 17 billion euros per annum to the Greek economy.

According to ancient Greek mythology, god Poseidon is watching over the ships at sea. He has been kind to the Greek maritime business. ■ SG

The Greek Economy in Numbers



Orderbook: Bulkers as Favourites



PIRAEUS. Strong in motor vehicle handling.

GERMANISCHER LLOYD IN GREECE

In 1929, GL opened its first office in Greece. In early 2005 the classification society established a special tanker and bulk carrier team in Piraeus to offer clients a more streamlined, comprehensive and focused services portfolio.

Germanischer Lloyd's Ships in Operation Service Team was set-up in May 2008 as a local group of experts in charge of supporting clients with class extensions, liaise with flag administrations, make arrangements for class inspections and handle admission to class according to "Transfer of Class" (TOCA).

Assistance to ship-management companies includes advice on upcoming IMO legislation, IACS regulations and GL rules. More than 216 Greek vessels are currently classed with Germanischer Lloyd (a significant increase over 2007).

Investing in Efficiency

Michael Bodouroglou, Chairman and Chief Executive Officer of Paragon Shipping Inc., talks about his career and the perspectives for his shipping company

Quality is a prerequisite for a good image of the maritime industry – a statement by the Secretary General of the International Maritime Organization (IMO), Efthimios E. Mitropoulos, that Michael Bodouroglou fully agrees with. The Secretary General has been calling for more persistent efforts to improve the public standing of shipping. There are, however, no clear answers how to accomplish that, or how specific enhancements will influence the image of the industry. Everybody in this industry has to take charge, says Bodouroglou, who believes that the key to a better image is the safety record.

Bodouroglou co-founded an independent shipping group in 1993 and has served as co-managing director of Eurocarriers and Allseas. In June 2006 he founded Paragon Shipping Inc. and has since been the listed company's Chairman and Chief Executive Officer.

The fleet he controls consists of 16 bulk carriers. Eleven modern vessels are owned by Paragon, while the older ones remain with Allseas. All are registered with the Marshall Islands, Cyprus and Liberia, respectively.

Transparent Numbers

For Bodouroglou, the image of a company is a crucial concern, since it results from a set of values related to business ethics. He prefers a company with a decentralized structure where clear authority levels offer incentives for key personnel. "We want efficiency and fast decision-making

PROFILE

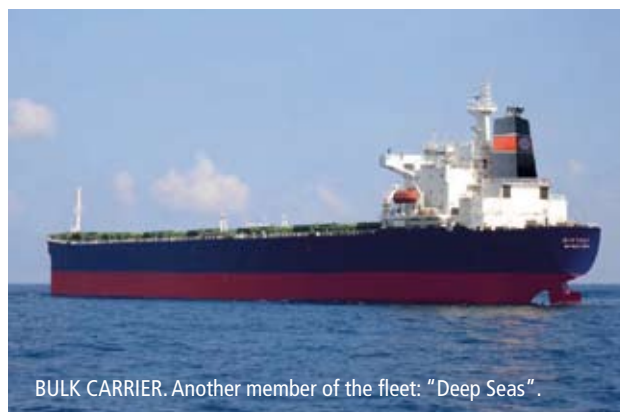
Michael Bodouroglou was born in a small village in northern Greece. He studied Ship Engineering in Newcastle, UK, and subsequently did his military service in the Greek navy. 15 years ago he and a partner founded a shipping company specializing in bulk carriers. He went on to start up Paragon Shipping Inc. two years ago and has been the publicly traded company's managing director since. Paragon currently runs a fleet of 16 bulk carriers.

ing when there is a need for rapid response," Bodouroglou says. "After all, time is money. Costs are an important element. One should not underestimate the overall operational costs, and all shipowners are inclined to accept high costs in good times. But in bad times, all costs are analysed and cost-cutting will be the topic of the day. As a listed company, all our operational costs are transparent. Analysts are looking at our cost structure in detail and comparing it with that of others."

During his studies in younger years, Michael Bodouroglou learned well how to deal with figures. Born in a small village in northern Greece without a shipping background, he graduated from the University of Newcastle-



MASTER LOADER. Paragon's bulk carrier "Blue Seas".



BULK CARRIER. Another member of the fleet: "Deep Seas".



upon-Tyne in the United Kingdom with a Bachelor of Science in Marine Engineering with honours in 1977 and later received a Master of Science degree in Naval Architecture. Having finished his studies, Bodouroglou returned home to serve in the Greek Navy. He subsequently worked as a technical superintendent for various shipping companies.

Together with a partner, Bodouroglou founded a ship-owning company specializing in bulk carriers in 1993. Like most other shipowners, he has to cope with a severe shortage in crew personnel. "We have a crew crisis of major dimensions," he says. "It is our obligation as a shipping company to treat our seamen well to achieve retention."

"It is our obligation as a shipping company to treat our seamen well to achieve retention."

Michael Bodouroglou, Paragon

He underlines that it is hard to attract new personnel. Greek marine academies received no more than 1,088 applications for the total number of 1,300 student places they were offering for the current academic year. For Greece, a country with a total population of eleven million, manning a fleet that represents 15.5 per cent of the global capacity is an especially difficult challenge.

Asian Shipyards Preferred

The Greek-controlled fleet, including new trading ships and ships on order, amounts to some 250 million dwt. It generates some 17 billion euros in earnings for the Greek economy. Landside investment by shipowners is increasing as Piraeus strives to establish itself as a shipping and finance centre. Asked about his stance on current market trends, Bodouroglou says: "We are going to expand our fleet by modern second-hand ships. We are ready to go, in particular since the demand is high today."

"The tanker market is fundamentally different," he adds. "The fleet is much younger, the demand is strong. The volume of available oil is limited, and it is less than demand. The high energy consumers are going to invest in efficiency. Everybody is going to conserve energy and explore alternative energy sources. The volume of oil carried on tankers will not change significantly in the short and medium term."

"We are interested in operating a fairly young fleet of vessels," Bodouroglou emphasizes, "Older tonnage would increase the average age of our fleet, which is as low as seven years. Our vessel selection is guided by a number of aspects related to the ship, its previous owner and the shipyard that built it. We prefer Japanese, Korean and the big Chinese yards." He focuses on panamax and handymax as well as other sizes, provided they match his company's portfolio. For 2008, he expects to purchase three to four bulk carriers within the upcoming months.

■ OM



Greek Perspectives

Nikolaos Savvas, Director of Cosmoship Management S.A., speaks about the economic role of worldwide shipping

Take a look at Nikolaos Savvas's extended family and you need not wonder where he got his penchant for sea trade. All his male relatives are in some way involved in shipping – whether as engineers or masters. So Nikolaos Savvas followed family tradition. After finishing school, he worked as a sailor for seven years, then for ten years in the liner and insurance department of Prodomos Lines. During that time, he learned more about ships, ship operation – and classification societies. Moving on, he worked as Managing Partner of Goldenport Shipmanagement Limited in Vouliagmeni near Athens for five years.

At the age of 45, he became a shipowner himself, and five years later, on 18 August 1997, started up Cosmoship Management S.A. together with a partner who owned one ship. Their initial staff consisted of six employees. Today, his company has more than 30. Savvas began co-operating with classification societies a few years ago. Five vessels operated by Cosmoship are currently classed with Germanischer Lloyd.

The Backbone of Globalization

Shipping is Savvas's lifeblood. He emphasizes the vital role of shipping in today's global economy, calling the shipping industry "the backbone of globalization". In his home country Greece alone, US\$ 30 billion were invested in ship newbuilding in 2007. The current strong demand for sea transport services, with Asia as the main driving factor,

will continue for years to come, providing excellent market conditions for the shipping industry. "China is a very important market," Savvas emphasizes. "Shipping is booming because China is booming." Yet, he says, there are some adverse factors to reckon with, as well. Predictions of further oil price hikes up to US\$ 200 per barrel will raise fears of inflation in many countries and among producers, and US macro-economic policy may curb the present growth trend temporarily.

But Savvas looks beyond such hurdles. He prefers a long-term perspective, based on careful analysis of economic up- and downturns. Today, he says, world economies are driven



Photo: Hasenpuch

SHANGHAI. China's enormous economic growth is boosting the international shipping business.

Photo: jiongkai zhang/Fotolia

LOADING. "Sina Nusa", originally named "Savannah", has been running under Cosmoship management since December 2007.





PROFILE

Nikolaos Savvas was literally raised in the shipping business. Following school he was a sailor for seven years, then worked in various shipping offices. In 1997 he started up Cosmoship Management S.A. together with a partner. The company recently ordered 22 newbuilds.

by central reserve banks, which will cut interest rates to calm down worries over stock market crises.

Outlook and Trends

The future looks promising. Meanwhile, shipowners must bear in mind that the operating efficiency of ships will play an increasingly critical role in the coming years. Given the steep increases in fuel and operating costs, the latter a consequence of better wages paid to seamen, ships equipped with advanced, fuel-saving technology will be more profitable. Therefore the demand for highly efficient ships will rise, while cost-intensive vessels will have a hard time get-

ting charter contracts. Savvas gives the example of a feeder with a capacity of 1,000 TEU. Ten years ago, a state-of-the-art vessel would consume up to 40 tonnes of IFO per day, depending on the country where it was built. Modern vessels of the same type consume 16 tonnes of fuel less per day. This trend has encouraged many shipowners to invest in new propulsion technology. Apart from the strong increase in second-hand tonnage, which will have to be replaced by newbuilds eventually, the demand for new ships has picked up considerably over the last year.

Savvas stresses that you have to handle many factors very carefully. "In shipping, you have to follow the trend, the markets, the size, and the conditions. If you are not up to date with market trends you will lose money and your business. Shipping is a big game. If you ignore the market, your customers will ignore you. It is like the fashion industry – the game reinvents itself all the time. You have to be 'en vogue'. It is a permanent adjustment to a changing and complex environment. Market research and reliable statistics help to obtain better information when to make a decision whether to buy or to sell. It is a fascinating business and no doubt a challenging one."

In Savvas's opinion, people in the shipping business form a very special community: "No matter who you are in terms of cultural background, people in shipping do understand each other as educated players in a big game. They have a common language. The fascinating aspect is dealing with volatile commodities."

Savvas has great plans for the future: "We are still looking at the market closely for something new, for something that is going to come up. Today, we have ordered 22 newbuilds: Twelve container vessels, four chemical tankers, and six bulk carriers. Especially the operation of oil tankers is one of our future priorities," he explains. ■ OM



"China is a very important market. Shipping is booming because China is booming."

Nikolaos Savvas, Cosmoship



Golden Ships

John Dragnis is the Commercial Director of Greek shipowner Goldenport, founded by his father. *nonstop* spoke with him about the enterprise, the Greek shipping market and future challenges in the shipping industry

John Dragnis, Commercial Director of Greek shipowner Goldenport, is a brilliant, well-informed, energetic man with obvious common sense.

As a son of a shipowner he literally grew up in the shipping business. He knows that operational and technical expertise are keys to business success and efficiency. A shipowner has to know how to run a fleet and how to offer transportation services to the customer at an adequate quality level.

Dragnis learned early in his career that different nations have different cultures: "The way of conducting business is different in the US, India, Japan Greece, Germany or China, to name a few. Whereas it seems rather direct and formalized in Germany, it follows a different pattern in Japan, where you have to be patient for a long time before the deal is done. Trust is an important element: Sometimes it takes time to build up trust and confidence so working together will be beneficial for both partners," says Dragnis. He adds that some people are more complex, others are prepared to think outside the box. And Greeks are fairly open-minded and quick to grasp a business opportunity without being too concerned about the attached risks.

Bulkers, Containerships, Yachts and Tankers

Goldenport, founded in 1982 by John Dragnis' father Paris Dragnis, is an international shipping company with a fleet of 33 vessels operating globally. Goldenport owns 16 container vessels and has ordered two newbuilds scheduled for delivery in 2010 and 2011, respectively. The company also owns nine dry-bulk carriers and will receive six newbuilds in 2008/2009.

To establish itself in the tanker market, the company founded its new tanker business "Oceangold Tankers" in early 2008. The product and chemical tanker fleet currently consists of five ships. Goldenport intends to steadily expand its fleet of mid-range product tankers steadily. Goldenport is also active in the luxury yacht market with its business unit "Golden Yachts", which is about to launch a yacht-building

PROFILE

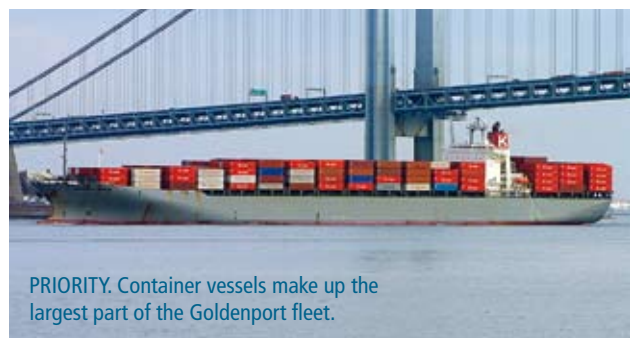
John Dragnis completed his BA and MSc in Management and Finance in London. He then worked as a trainee at a London investment bank for one year. Following his military service in the Greek Navy, he began his professional career as Commercial Director at Goldenport Shipmanagement. Within the first two years, he built up the yacht business, which was followed by his move into the dry bulk and containership operating business.

facility in Greece. The new yard will construct hulls, while the interiors will be fitted in Italy. "Golden Yachts" also received an order for the construction of a 65-metre cruiser. To date, the company has built up a fleet of five 45 to 55-metre boats that are hired out to holidaymakers.

Core Business and Future Goals

John Dragnis is full of plans for the future. In the coming years, he wants to expand Goldenport Holding by adding more vessels to its fleet. Furthermore, he would like his company to move closer to the producers of bulk cargo; so far, his business partners have mostly been traders. Establishing close business ties with producers, such as European steel makers, is a gradual process that requires the right touch, Dragnis stresses. Another project he mentions is optimizing his business model with a focus on operating vessels profitably at all times, rather than relying on assumptions about the future. "We are not into asset speculation. We do not order ten vessels without cargo and charter," he emphasises.

Asked about future challenges in the shipping sector, Dragnis calls to the crewing crisis. He is well aware of the long-term impact, pointing out that his father set up a crewing office in Odessa twelve years ago. Today, nearly every shipping company has an office in Odessa. The competition for crews is very tough. Wages went up in recent years, and the social benefit packages have become more generous, whereas contract periods continue to be reduced. The current trend towards short-term employment with contracts lasting as little as four to seven months is not conducive to building up a good crew. "It is Goldenport's



PRIORITY. Container vessels make up the largest part of the Goldenport fleet.

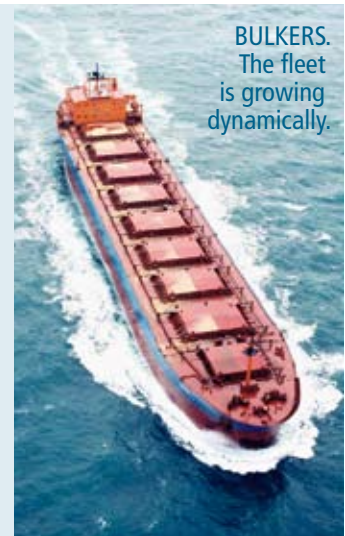
Photo: Goldenport





"We are not into asset speculation. We do not order ten vessels without cargo and charter."

John Dragnis, Goldenport



BULKERS.
The fleet is growing dynamically.

Photo: Goldenport

policy to offer its seamen a sense of belonging. Apart from a reasonable income, we offer our staff a career perspective and great potential to come to Greece. Our crews tend to stay a long time, which clearly indicates a good working environment on board. I suspect that the current bottleneck in crewing will continue until 2010. Each company has to try hard to attract long-term crews," says Dragnis.

Environmental issues are taken very seriously at Goldenport. But in view of the unfolding power of organizations like the European Union, which is extending its sphere of influence into maritime matters, the company takes a pragmatic approach. "If they ask for cold ironing power, we will equip our new buildings with the necessary installations. It is up to the regulatory bodies to set the standard, whether it is better fuel or individualized solutions such as cold ironing in heavily frequented ports. After all, economic incen-

tives are much stronger than half-baked solutions. We follow the regulations and try to do our best to offer a contribution to improve the ecological friendliness of shipping."

Bright Future – Orderbook and Outlook

John Dragnis is satisfied with the current orderbook of Goldenport. The demand for shipping services looks steady. "On the supply side, we have newbuildings in 2010/11 and quite a number of conversions," says Dragnis. "There is a bonanza at the ship yards – but consolidation is expected. Due to our long-term charter contracts, there is no need to get rid of old tonnage as long as they are safe and running – they deliver a healthy cash flow." The fleet is busy: 95 per cent of the ships are on period contracts for 2008. The current coverage for 2009 is at 75 per cent and at 50 per cent for 2010.

■ OM



Photo: Goldenport



STATUS SYMBOL.
"Golden Yachts" is successful in the luxury yacht business.

PERSPECTIVE. Under the name of "Ocean-gold" the shipowning company is establishing itself more and more in the tanker market.

More Know-how, More Service

New rules, new techniques, new services: maritime issues at the annual meeting of Germanischer Lloyd's Hellenic Technical Committee bear a meaning upon the operative business of shipowners

Photo: (Stock-photo)



Coating standards, EU maritime policy, high-tensile steel welding technology and the introduction of Technical Services Hellas were among the maritime topics addressed at the annual meeting of Germanischer Lloyd's Hellenic Technical Committee in early April – topics highly relevant for today's operational objectives of shipowners.

Athanasios Reisopoulos, Area Manager Mediterranean/South Africa with GL, the new classification services provided by Technical Services Hellas (TSH), a GL business established recently to the 40 participants in the committee meeting. Given the high number of newbuilding orders – Greek shipowners have commissioned GL to classify 106 newbuilds – the technical support for newbuilding projects has been extended to include preliminary plan approvals and specification reviews. Furthermore, TSH acts as a liaison between owners, the GL Head Office in Hamburg and the respective on-site project managers.

Furthermore, the technical competence for the fleet in service now includes evaluation of modifications and hull conversions, ballast water management, single-to-double hull conversions, evaluation of Emergency Response Services (ERS), as well as Tanker Management and Self Assessment (TMSA) consultancy services. Having undergone a structural overhaul, the Operation Service Team (OST) will be providing client advisory services and support.

It will collaborate with TSH in Greece and the GL Head Office, handling class extensions and liaising with Flag State Administrations. In addition, the OST will make arrangements for inspections, surveys and admission to class. Another important task of the organization is to keep owners up-to-date on forthcoming IMO legislation, IACS requirements and current GL rules.

Testing Coatings

GL Business Development Manager Dimitris Sariklis highlighted the implications of the new International Maritime Organization (IMO) standard on coating requirements for ballast water tanks. This standard will come into force on 1 July 2008. Maintenance and inspections continue to be key factors for a ship's longevity and must include the con-

dition of ballast water tank coatings. Protective coating systems applied to ballast water tanks need to be type-approved according to a revised testing procedure as defined by the IMO Performance Standard for Protective Coatings (PSPC). Germanischer Lloyd has established a testing laboratory for pre-qualification testing of coating systems prior to GL type approval.

To assist in preparing the required coating technical file, the classification society offers a special software tool based on GL Pegasus, a solution originally developed for creating thickness measurement reports. GL Pegasus has been modified to generate coating inspection reports in an electronic format at the newbuilding stage, and document maintenance activities. It captures the coating condition assessment along with any corrosion detected, indicating the respective location on the vessel. This will enable shipowners to monitor critical spots during the entire lifetime of a ship. The software relies on a comprehensive 3D structural model of the vessel, presenting interconnected tabular and graphical views.

The new IMO Performance Standard for Protective Coatings (PSPC) affects dedicated seawater ballast tanks in new ships of any type rated 500 GT and above, as well as double-side skin spaces in bulk carriers 150 m in length and more. It applies to ships contracted on or after 1 July 2008. Regulation II-1/3.2 of the International Convention of the Safety of Life at Sea (SOLAS) was amended accordingly. The IMO standard intends to provide for coatings with a useful life of 15 years. The PSPC requirements are mandatory within the scope of the Common Structural Rules of the International Association of Classification Societies.

Watching EU Policies

In her presentation on EU policies responding to challenges in the maritime sector, Dr Mary Papischinopoulou M.L.E., a consultant in Brussels, explained how EU policies and changes in national and international regulations impact the shipping industry. She reaffirmed the necessity to ensure adequate representation of Greek maritime expertise in Brussels to reflect the tremendous growth of



the Greek fleet in recent years. Greek shipping companies are offering more carrying capacity than ever, their fleet renewal rate is faster than ever, and the gap between Greek operators and their competitors in other shipping nations is widening. The debate about a new set of draft regulations and directives is in progress at the EU. At least seven proposals are currently passing through various stages of the decision-making process. Topics such as compliance with flag state requirements, investigation of maritime transport accidents, ship inspection and surveying organizations, liability of passenger ships, a maritime traffic monitoring system, port state control, and civil liability of shipowners are on the agenda.

In addition, the EU Commission is pushing a stricter emission control regime within the framework of EU Maritime Policy as defined in the Blue Paper. With an initiative to extend EU passenger protection to all modes of transport by 2008, the EU Commission demonstrates its determination to build a new regulatory framework for the maritime industry. Given the broad range of political and legislative activities and their projected costs to the shipping sector, Dr Papaschinopoulou urged the industry to let its voice be heard in the halls of EU decision-making.

Discussing Welding Techniques

A presentation by Athanasios Reisopoulos focused on requirements for welding high tensile steel (HTS). High tensile steel is used in numerous engineering applications, such as ships, pipelines, bridges, buildings and towers, offshore structures and equipment, LPG storage tanks, etc. Welding applies heat to form a joint between metal parts. As a general rule, a more easily hardened and higher tensile steel will be harder to weld. HTS steels have the same welding characteristics as medium carbon steels, however many HTS types can achieve higher strength and ductility while offering better weldability than the equivalent plain carbon alternative. Replacing some of the carbon by alternative alloying elements, such as chromium, nickel, molybdenum, vanadium etc., will improve toughness, impact resistance and the general mechanical properties.

GROWING FLEET, GROWING COMMITTEE

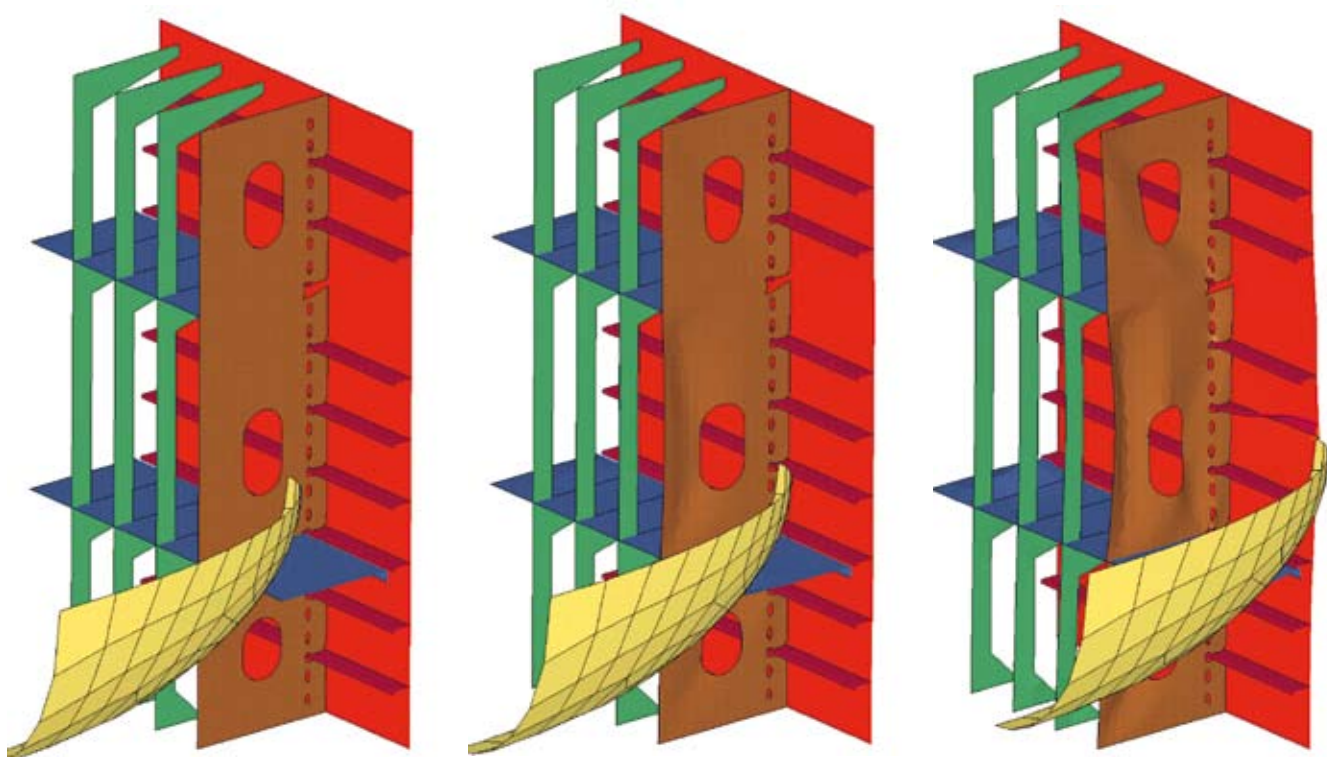
The committee was reinforced by eleven members, reflecting the growth of the Greek fleet attended to by GL. The new committee members are (in alphabetical order):

Babilis, Lambros, Stealth Maritime Corporation S.A.
Chorianopoulos, Michael, Dioryx Maritime Corp.
Kalogiannis, Anastasios, Oceanfleet Shipping Ltd.
Konstantopedos, Michalis, Benelux Overseas Inc.
Kotsifis, George, Diana Shipping Services S.A.
Migadis, Manos, Dynacom Tankers Management Ltd.
Perakis, Pavlos, Fairsky Shipping & Training S.A.
Skiadaresis, Nicholas, Skiadaresis Marine Consultancy
Touloumis, Constantine, Allseas Marine S.A.
Vlachos, Kostas, Consolidated Marine Management Inc.
Vitzileos, Dimitrios, Primera Maritime (Hellas) Ltd.

The use of high tensile steels in shipbuilding is a prerequisite for building larger vessels. At the same time, it requires innovative design concepts and improved assessing techniques. Concepts are developed by linking weight reduction with improved fatigue resistance. Keeping welds away from areas subject to high stress improves the structural integrity substantially.

For a classification society, the fatigue life of HTS structures is a critical issue. But careful design will achieve proportionality between increased yield strength and improved fatigue life. New structural concepts and the demand for high-quality welds call for the development of innovative fabrication technologies. Applying state-of-the-art bonding and welding techniques will improve the structural integrity of ships considerably. ■ OM

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 Greece, Phone: +30 210 4290373, E-Mail: georgios.livanis-markantas@gl-group.com



A Crumple Zone for Tankers

Lindenau Shipyard specializes in tankers. To further enhance tanker safety, the innovative German shipbuilder, based in Kiel, is developing ships with predetermined breaking points

Lindenau Schiffswerft & Maschinenfabrik has come up with a concept that is truly revolutionary: By providing tankers with predetermined breaking points in the double hull, the German shipbuilder wants to enhance tanker safety. While double hulls, now mandatory for all tanker newbuilds, offer significantly better protection in case of a collision than single-hull tankers, an oil spill may still occur if both the outer and inner hulls are penetrated.

This is what the Kiel tanker experts want to prevent: If the inner tank shell were designed to disconnect partially from the supporting structure in a lateral collision, it would deform more easily, bulging inwards to produce a large dent at the point of impact rather than rupturing. This would require an inner hull made from a highly ductile, extensible material. These reflections inspired the concept of a "crumple zone" for tankers.

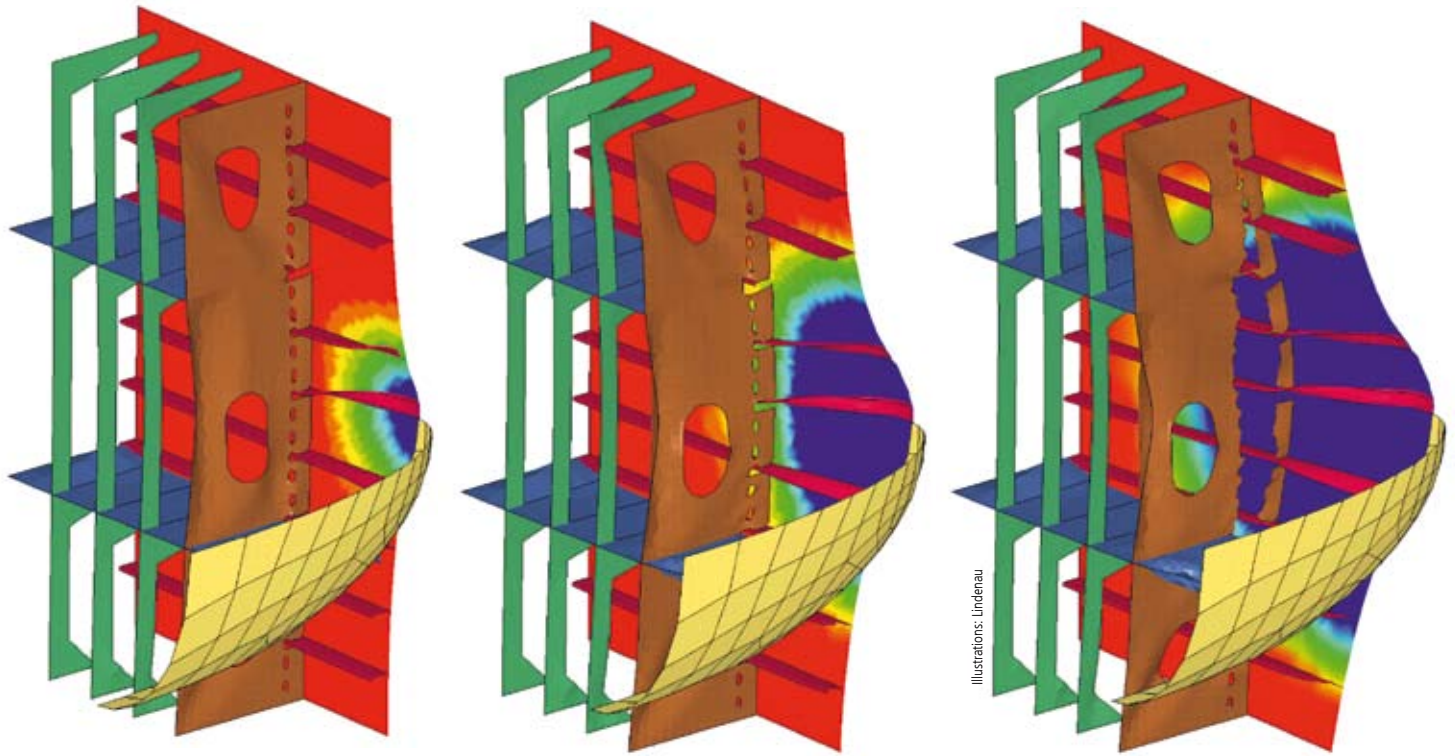
To turn the concept into an actual project, Lindenau shipyard got in touch with Hamburg-Harburg Technical University (TUHH) and Germanischer Lloyd to arrange for some initial, basic research activities. An Austenite with high ductile yield might be a suitable material for the inner

tank shell. Under tensile loading, these kinds of Austenites resist failure much longer than standard steel types. While shipbuilding steel has a ductile yield between 16 and 22 per cent, austenitic steel can be extended by 30 to 35 per cent before failing.

Releasing the Inner Hull

But a tensile shell by itself will not suffice. To bulge inward across a large enough area, the shell must be allowed to separate from its supporting structure. To illustrate the problem, Ingo Tautz, Lindenau's project lead in charge of developing the design, uses the image of a balloon inflated inside a wire cage and glued to the bars. "Pushing the balloon inwards will cause it to burst. But if you don't glue it to the bars, it will be free to move so you can push it inwards to quite an extent before it will burst," Tautz explains.

An equivalent to the cage can be found in any ship: It is formed by longitudinal stringers and vertical frames. Stringers and frames make up the skeleton that supports the outer and inner hulls of the ship and which are spaced about two metres apart. The critical question is how to enable the inner shell to separate from this supporting cage,



PREDETERMINED BREAKING POINT. In a collision, the malleable inner hull of the tanker will bulge inwards without causing an oil spill.

thereby enlarging the two-metre space. As far as the longitudinal stringers are concerned, the solution is straightforward enough: The stringers are welded to the outer hull only and have no contact with the inner hull. A more complicated matter is the vertical frames: Series of holes, known as perforated predetermined breaking points, are made in the sections closest to the inner shell. In a collision, the frames are intended to rupture at these locations, thus releasing the inner shell. The larger the number of breaking frames, the better.

This design concept was first developed by Lindenau partner and former managing director, Günter Stehn, who estimates that frames may break over a length of 20 metres along the ship's body, allowing the austenitic inner shell to bulge inwards by several metres without rupturing. To make this work, tanks may not be fully loaded and must be fitted with burst plates designed to break on impact. The cargo then flows into a neighbouring tank or ballast tank.

What makes Steen's approach appealing is its simplicity: The ship's inner shell deforms without causing an oil spill. But how far can this be taken before the ship's structure becomes unstable? As it is, sailing rough seas is a punishing experience for a tanker, exposing it to incessant assaults from changing load combinations, a constant interplay of compressive and tensile stresses. This relentless strain is particularly aggressive around cutouts and holes where cracks may form. Perforated predetermined breaking points are not exempt from this threat. The critical question is, how should the perforations be designed so the frames only fail in a collision as intended while safeguarding the structural integrity of the vessel during normal operations? In his dissertation completed under the

supervision of Professor Eike Lehmann at TUHH, Lindenau project leader Tautz analysed the hidden pitfalls of calculation methods that simulate the planned failure of predetermined breaking points. The ductile yield of austenitic steel, while known, does not help in determining the highly important parameter of time of failure when calculating collision simulations. Knowing the time of failure is critical: if tank shell separation from the frames is too late, the striking vessel might penetrate it.

Measuring Operational Safety

No matter how many calculations are performed, there is no substitute for physical measurements and practical tests. Lindenau shipyard has therefore requested research funding from the German Federal Ministry of Economic Affairs. The research project aims at clarifying important aspects of operational and collision safety. →

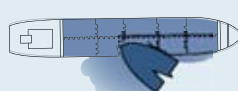


SEYCHELLES PATRIOT. One side section was built with integrated predetermined breaking points.

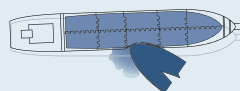
DOUBLE HULL: DISCRETION IS THE BETTER PART OF VALOUR

While a single-hull tanker will lose cargo in a medium-impact collision, a double-hull vessel will only spill oil after a high-impact collision. Designs allowing the structure between the flexible outer and inner hulls to yield in a collision offer even better protection against oil spills.

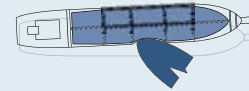
High-energy collision



Single-hull tanker



Double-hull tanker



Double-hull tanker with predetermined breaking points

Medium-energy collision

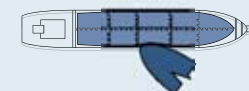
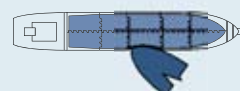
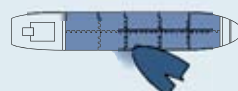


Illustration: Lindenau

→ Operational safety measurements have already begun on a ship section built according to the new design concept and installed in an actual ship in service called “Seychelles Patriot”.

This double-hull tanker, 189 m in length and designed to carry 45,680 tonnes, was delivered to Seychelles Petroleum Co. Ltd., Victoria (Seychelles) by Lindenau last February. A three-frame side section of this vessel was built according to Steen's design, featuring perforated predetermined breaking points. Germanischer Lloyd is conducting long-term measurements on one of these frames to verify the results of the structural durability calculations performed to date.

The measurements are taken using strain gauges attached to the perforations. These strain gauges consist of plastic strips with etched-on copper leads. When the material expands, the electrical resistance of the copper changes accordingly. The resistance readings are then converted into units of tensile force, providing a means to assess the static and dynamic stresses occurring around the measurement points.

Three perforation holes have been fitted with six strain gauges each. “Measurements will continue around the clock for an entire year,” says Peter Wania, metrology engineer with Germanischer Lloyd. “This should provide us with enough data to answer the question as to whether this design provides adequate structural durability.”

These measurements provide clarity regarding the operational safety of the innovative design under normal operating loads. “What we cannot do with these measurements

is verify what will happen in a case of collision,” Tautz concedes. Lindenau shipyard will therefore run a series of crash tests, some of them involving a scale model of a ship's side, complete with predetermined breaking points, which will be rammed by a bow-like element. “We will not be able to substantiate the precise functional behaviour of our design until we complete the entire research project,” says Tautz. A three-year term has been assigned to the project.

Technical Perspectives

All parties involved are aware that the new concept will fail in a worst-case collision scenario, a high-speed, right-angle impact. “When a ship collides at a 90-degree angle at high speed, it will cut right through to the centre of the struck vessel. There is no way to prevent that,” says Günter Steen. “But ships generally heave to when a collision is imminent so the impact occurs at an oblique angle.” Five to six frames might break in the process, Steen estimates, producing an inner-shell dent two to three metres deep.

The concept of a crumple zone for tankers may not be ready to be put into practice immediately. But conceivably it will shape the way oil and chemical tankers will be built at Lindenau yards during the coming decades. Günter Steen himself is open to the idea that the patented design concept of perforated predetermined breaking points may become an international requirement at some point in the future.

■ HS

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Photo: Lindenau



PUT TO THE TEST: A side section for Seychelles Patriot featuring perforations.

Simulating Ship Evacuation

by Hubert Klüpfel, TraffGo HT GmbH, Duisburg, and
Daniel Povel, Germanischer Lloyd AG, Hamburg

Introduction and Historical Background

DISASTER.
In 1994, ferry
Estonia sank
on her way to
Stockholm.



On 28 September 1994, the cruise ferry Estonia, en route across the Baltic Sea from Tallinn to Stockholm, sank in heavy weather, carrying 989 passengers and crew. The accident, which claimed 852 lives and was one of the deadliest maritime disasters in the late 20th century, had a dramatic effect on the general perception of maritime safety.

In the aftermath, the International Maritime Organization (IMO) fundamentally redefined its stance on ship evacuation safety, introducing a new, performance-oriented approach. The ability to evacuate a ship efficiently in an emergency was made a design requirement for RoRo passenger ships. Pursuant to the new rules, RoRo passenger ships built on or after 1 July 1999 must be designed to ensure successful evacuation within 60 minutes.

Initially, evacuation analyses relied on the so-called “Simplified Evacuation Analysis” method developed by the IMO Fire Protection Sub-Committee. From 2000 to 2002, this approach was further developed by the committee. Subsequently, they proposed an alternative method to determine evacuation times based on com-

puter simulation, the so-called “Advanced Evacuation Analysis” method. In response to the IMO requirements for the Advanced Method as defined in the IMO “Guidelines for Evacuation Analysis for New and Existing Passenger Ships” of 2007, an innovative software tool was developed to enable evacuation analyses compliant with the IMO specifications. This tool is called AENEAS.

This paper gives an overview of the development and current status of the IMO conventions, codes, regulations, and guidelines concerning the safety of passengers on board of passenger ships and their evacuation. The relevant IMO policies address three vessel types: high-speed craft (HSC), RoRo passenger ships and cruise ships.

In 1914, two years after 1,502 people had lost their lives in the Titanic disaster, the International Safety of Life at Sea (SOLAS) Convention was adopted by an international conference convened in London by the government of the United Kingdom. 13 nations participated in this conference. The 1914 version was eventually superseded by SOLAS 1929, SOLAS 1948, SOLAS 1960 (under the auspices of the IMO), and SOLAS 1974, whereby the latter is still in force today. However, SOLAS 1974 has been amended and updated many times. A revised version of the regulations contained in SOLAS chapter III relating to life-saving appliances and arrangements took effect on 1 July 1998. These rules intend to ensure the greatest chance for passengers and crew to outlive a catastrophe at sea.

When the IMO Code of Safety for High-Speed Passenger Craft (HSC Code) was first developed in 1992, the issue of passenger evacuation was given due consideration. Explicit requirements included in section 4.8 of the code call for a

TITANIC.
1,502 passengers
lost their lives. Two
years after the sin-
king the SOLAS Con-
vention was adopted
in London.



Model Basics



Photo: Colorline Cruises

“simplified evacuation analysis” for all HSC (for guidelines on evacuation analysis, please refer to MSC/Circ.1166).

RoRo passenger ships built on or after 1 July 1999 must comply with SOLAS regulation II/2-13.7.4: “For new Class B, C and D RoRo passenger ships constructed on or after 1 July 1999, escape routes shall be evaluated by an evacuation analysis early in the design process. The analysis shall be used to identify and eliminate, as far as practicable, congestion which may develop during an abandonment, due to normal movement of passengers and crew along escape routes. It has to be considered that the crew needs to move along these routes in a direction opposite to the movement of the passengers.

In addition, the analysis shall be used to demonstrate that escape arrangements are sufficiently flexible to provide for the possibility that certain escape routes, assembly stations, embarkation stations or survival craft may not be available as a result of a casualty.”

Among the most important aspects in the development of safety guidelines are the increase in size of modern cruise ships and the larger quantity of passengers and crew for whom they are designed and certified to carry. These facts raise a number of urgent technical questions, such as how to lift rescued people from a lifeboat or life raft onto another ship.

The so-called “safe return to port” concept defines three basic evacuation scenarios: (i) the ship has to be abandoned “immediately”, (ii) there is sufficient time for “safe and orderly evacuation and abandonment”, and (iii) the vessel is able to safely return to port. For case (ii), the aim is to provide sufficient time (three hours) for safe and orderly abandonment.

Several different simulation tools and methods have been developed for the above-mentioned aspects of evacuation analysis. One of these software tools, AENEAS, is the result of a co-operative effort by TraffGo and Germanischer Lloyd in Germany.

COLORMAGIC.
The new RoPax ferry of Colorline Cruises was optimized according to IMO rules using AENEAS.

Model Basics

In general, the factors influencing an evacua-

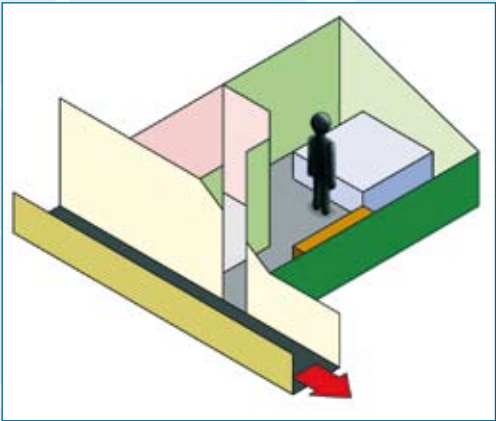


FIGURE 1. Representation of the floor plan as a grid of cells. The cellular automaton is a concept well established in computer science.

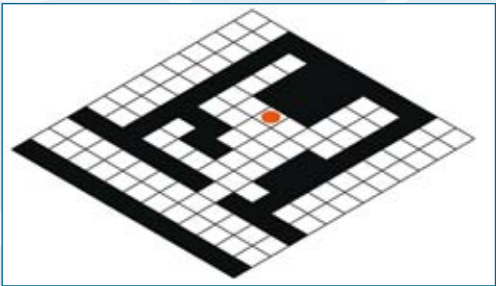


FIGURE 1 B. In case of an emergency the passengers are assumed to move from cell to cell towards the exit.

Calibration and Validation

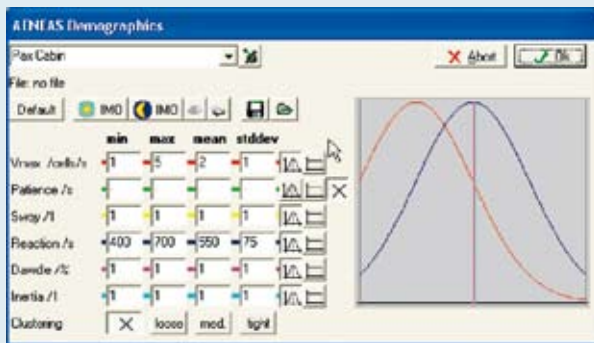


FIGURE 2. In AENEAS the passengers are defined by demographic parameters.

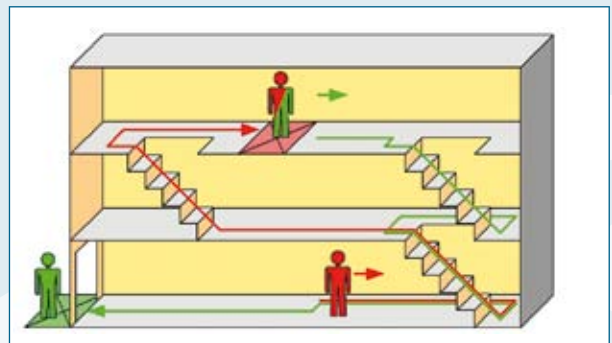


FIGURE 3. Definition of arbitrary groups, as well as crew and passenger routes facilitate the modelling of complex evacuation procedures and scenarios.

tion process can be classified into the following four categories:

- Geometry
- Population
- Environment
- Hazards

These four categories are described briefly in the following paragraphs.

Modelling the Geometry

In AENEAS, spatial geometry is represented as a grid of cells (cellular automaton). The cellular automaton is a concept well established in computer science for its robustness, ease of use, scalability, and speed of computation (Figures 1 and 1 b).

In a simulation, individuals (represented by “agents”) are assumed to move from cell to cell towards the exit, which is identified by exit signage information stored within the cells and accessible to the agents.

Social and Psychological Factors

Population diversity is represented in AENEAS in the form of a set of individuals (microscopic simulation). Each individual is assigned a set of parameters based on statistic (usually Gaussian) distribution (Figure 2). To account for different sub-populations, an arbitrary number of groups with parameter sets of their own can be defined, and assigned separate roles and goals (Figure 3).

Environmental Factors and Hazards

The most significant environmental factors and hazards in passenger ship evacuation simulations are fire, smoke and ship movement. Fire and smoke are accounted for by the Available Safe Egress Time (ASET) parameter. The ship's motion influences the Required Safe Egress Time (RSET), which can be determined by the simulation tool. The safe-egress time parameter will be described in greater detail later.

Calibration and Validation

Calibration and validation are two concepts similar in nature but different in purpose.

Calibration

Calibration means tuning the model parameters until the simulation results come close to empirical data. To be considered as well calibrated, a model must trace the fundamental diagram, as shown in Figure 4. The new and innovative software tool AENEAS provides a safety margin by erring slightly on the conservative side.

Validation

Validation means checking whether the software is fit for the intended use. The following validation categories can be distinguished:

Simulating the Evacuation of Passenger Ships

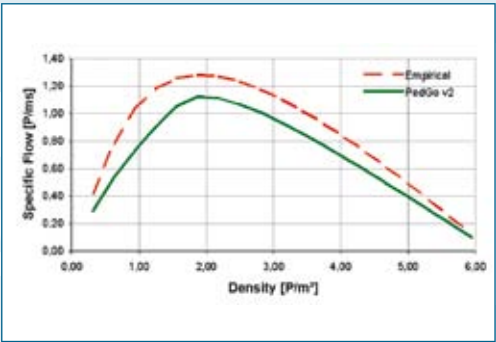


FIGURE 4. Flow-density relation (fundamental diagram).

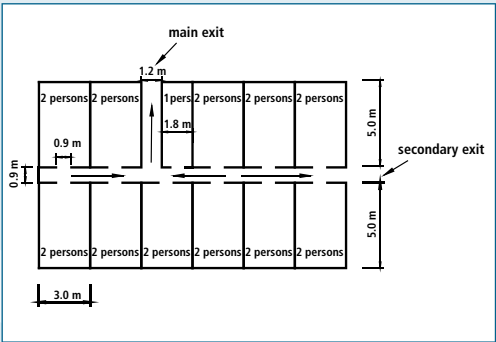


FIGURE 5. A validation case from MSC.1/Circ.1238 ("Cabin Area"). People moving either towards the main exit or towards the secondary exit, depending on their assigned route.

- Functional validation
- Component testing
- Qualitative validation, and
- Quantitative validation.

For illustration purposes, Figure 5 shows an example from the twelve test cases given in MSC.1/Circ.1238. The result to be expected would be people moving either towards the main exit or towards the secondary exit, depending on their assigned route (indicated by arrows).

Simulating the Evacuation of Passenger Ships

The model of AENEAS is described in detail in references. We shall limit our discussion to one major aspect of ship evacuation: the ship's motion as it influences the orientation and walking speed of agents.

Modelling Ship Motion

Existing test results accounting for the influence of rolling motion are either poorly documented or too small in number for meaningful statistical evaluation. Therefore only the results of static heel are used for modelling the influence of ship motion on the movement of humans on board.

Slope Influencing the Reduction Factor

The ship's heel influences the walking speed mainly by reducing it by a certain factor. Furthermore, the heel adds a drift to the movement of the agents, increasing the space they require in transverse orientation relative to the main heel angle (Figure 6).

While it has not been analysed explicitly, normal movement of pedestrians is assumed to stop when the slope angle exceeds 35 degrees. Due to loss of friction, loose material will usually begin to slide when angles exceed 36 to 38 degrees. This is pure mechanics but appears to apply to pedestrians on a ship, as well. At these steep angles, the geometry begins to change significantly. This effect was not taken into account by the simulation since it would consume too much computing time. In a conservative estimate, agents in

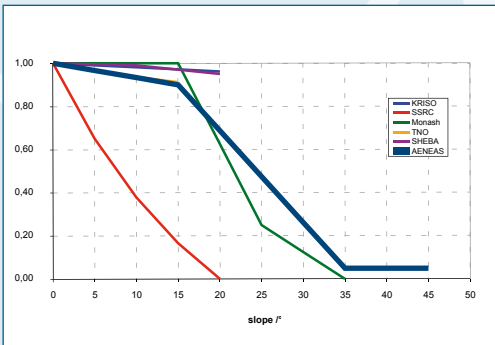
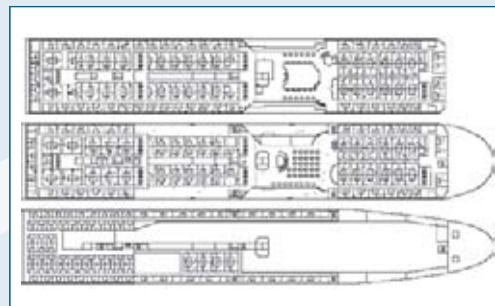
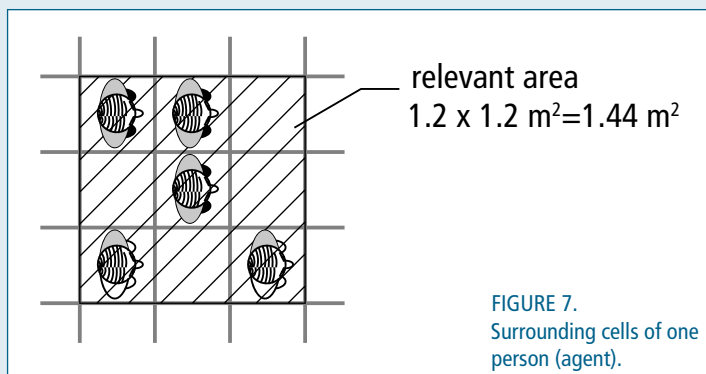


FIGURE 6. The influence of transversal slope on the speed reduction factor, applied to a flat surface by AENEAS. The agents need to have more space.

Workflow Optimization



AENEAS are assumed to move at a walking speed reduced to only five per cent at heel angles between 35 and 45 degrees, and to stop moving altogether when the heel angle increases further.

Corridor – Transversal Slope

Similar figures and formulae are available for longitudinal corridors, transversal and longitudinal stairs, etc. In the AENEAS software, they are implemented as factors reducing the walking speed and influencing orientation and walking direction.

Slope Influencing the Drift

Since a sloping geometry increases the space claimed by the agents in the simulation, a slope-dependent drift is added to each agent. This increases the probability of each agent moving downhill, an effect that results in an increasing demand for space in the direction of the slope.

Application Example

In order to demonstrate the effects of both static heel and dynamic roll, a number of calculations were performed on an exemplary RoPax design by Flensburger Schiffbau-Gesellschaft (FSG RoPax 1800).

Since the trim and pitch angles are relatively small, their effect is more or less negligible. The

passenger distribution and parameters were chosen according to the “Night” case specified by the IMO regulations. Deviating from the regulation, however, the modelling process was extended beyond mustering time to cover the boarding process, as well.

Figure 9 reveals that small static heel angles do not cause significant problems for passenger movement. Once the static heel angle increases beyond 15 degrees, however, the amount of time needed for evacuation begins to increase sharply as passengers have to struggle harder to advance upwards across the inclined decks. In addition, the evacuation time distribution spreads significantly.

When the ship performs a roll motion ($T = 12.5 \text{ s}$), the effects on the evacuation time are less significant for angles up to 20 degrees. In this case, the slopes agents must overcome will vary, and the problems associated with climbing up a transverse slope are less relevant.

Workflow Optimization

A simulation tool will be accepted by shipyards more willingly if it is easy to use and delivers results quickly. An essential requirement is the import functionality for CAD drawings, which is implemented in AENEAS via a filter for the common data exchange format (DXF).

The overall effort involved in preparing this mock-up example, starting from the CAD drawing and including the evaluation of the simulation results, was four

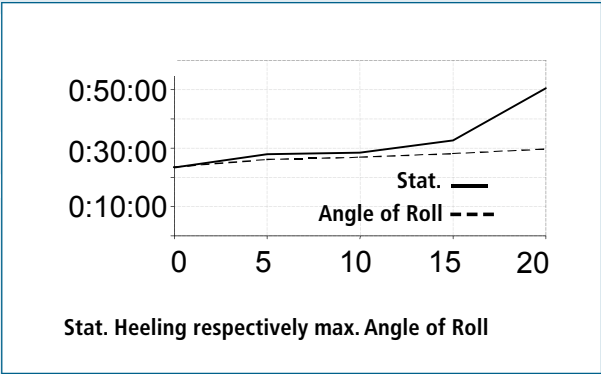


FIGURE 9.
The effect of static heel or periodic roll motion ($T=12.5$ s) on the significant evacuation duration for a given maximum angle.

and a half hours. For a typical RoRo ship with six to ten decks and 1,500 to 2,000 persons on board, the process (covering all calculations, documentation and the report as required by the Guidelines) will take one to two weeks.

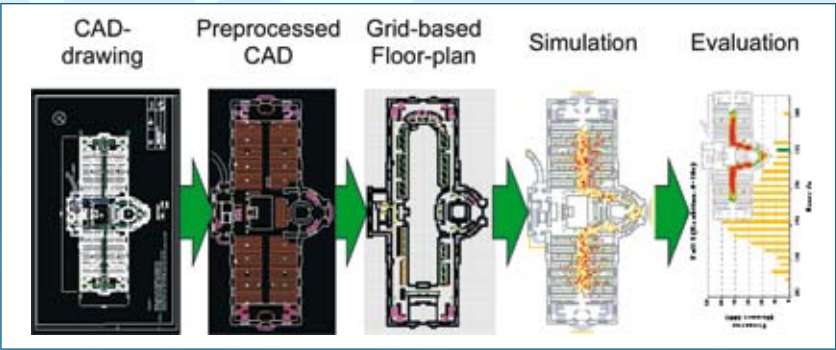
The Evacuation Analysis Framework

The precondition for safe evacuation can be expressed as follows:

RSET < ASET,
where RSET represents the required safe evacuation time and ASET the available safe egress time.

RSET is determined by the simulation (taking into account ship motion, if applicable), while ASET may be determined by fire and smoke calculations or simulations and by the simulation of the ship's stability (influenced by waves, flooding, etc.).

FIGURE 10.
An optimized workflow improves the usability of the tool. An essential requirement is the import functionality for CAD drawings.



Interpretation of Results; Acceptance Criteria

The Guidelines for Evacuation Analysis (MSC.1/Circ.1238), SOLAS (chapter II-2, Regulation 13.7.4), the High-Speed Craft Code (HSC 2000 Code) and the Fire Safety Systems Code (FSS Code) specify the requirements for escape routes, signage, maximum evacuation time and identification of congestion (as design criteria).

Therefore the overall evacuation time must be determined in two separate steps. The first step is to establish the walking time by simulating the movement of crew and passengers to the assembly station (accounting for individual reaction times).

This time parameter t_i is simulated for each individual. The overall evacuation time is then calculated according to the following two formulae:

Conclusion

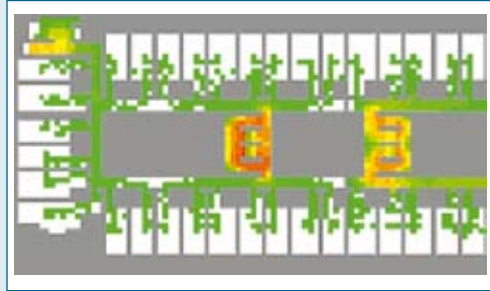
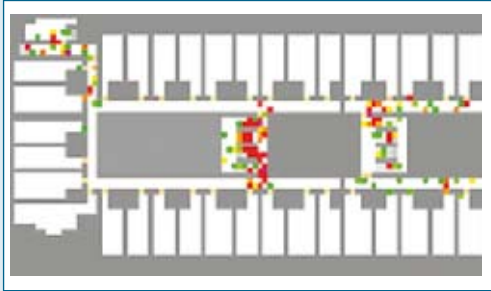


FIGURE 11.
Screenshot and
density graph.

$T = 1.25 \times \max(t_i)$ and $t_{\text{react}} = [400 \text{ s}; 700 \text{ s}]$
based on a log-normal distribution

$T + 2/3 \times (E + L) < 60 \text{ minutes}$

For RoRo passenger ships and passenger ships with no more than three main vertical zones (MVZ) the time limit is 60 minutes. For passenger vessels other than RoRo passenger vessels featuring more than three MVZ, the time limit is 80 minutes.

Conclusion

This article summarizes recent advances in passenger safety research. It focuses on evacuation-simulation tools developed in recent years, taking the simulation software AENEAS as an example.

Two major developments are currently driving the evacuation simulation business: automation and integration. These developments reflect general trends in engineering technology, aiming to reduce the workload and accelerate the delivery of results, especially in connection with design changes.

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What's Sprouting in Brussels?

Two proposals from the EU Commission's "Erika III Package" have been rejected by the EU Council. But the Commission wants to make its mark in maritime environment protection, putting pressure on IMO

The European Council of Ministers established itself against the European Commission in the debate on two especially controversial dossiers of the "Erika-III Package" on maritime safety. By referring to existing IMO conventions, the vast majority of European ministers of transport rejected the draft legislation on flag state responsibilities and civil liability of shipowners. The attempt to eliminate the limitation of shipowner liability is thus off the agenda for the time being. However, France has already announced that it will revive both dossiers while in charge of the Presidency of the European Council until December 2008.

The rejection of the two dossiers splits the eight-part "Erika-III Package" into two partial packages. For the remaining 6 dossiers – including the dossier on classification societies – the second reading in the European Parliament will start at the end of June.

Controversial Recast

The legislative procedure of the directive and regulation on amending current rules for classification societies will continue. The most controversial rule deals with mutual recognition of different classes as well as regular mutual consultations among the societies in order to harmonize their rules. This would lead to less competition among classification societies, which has always been a driving force

and a guarantee for innovation and high quality standards in shipbuilding. The current proposal for the directive would allow the European Commission to impose fines and sanctions on classification societies. This is a considerable extension of EU Commission competences, a fact that is accepted by the European Council of Ministers. However, the European Commission did not succeed in implementing its

idea of an "EU body" for the quality evaluation of classification societies outside of IMO. Instead, a quality evaluation and certification system has been established ensuring the involvement of IMO and IACS.

Focus on Protecting the Environment

The EU Commission is developing its own maritime environment protection policy, presenting specific requirements to EU member states and IMO. The decision of the Maritime Environment Protection Committee in April to reduce the maximum sulphur content in ship fuel from 4.5 per cent to 0.5 per cent by 2020 has not met with the approval of the European Commission, however. In addition, the Commission is calling for stricter CO₂ emission limits. Unless IMO commits to tighter rules for CO₂ emissions in shipping by the end of 2008, the Commission wants to launch a legislative initiative of its own. The transport Committee of the EU Parliament continues to demand the integration of maritime transport into the Emission Trading Scheme (ETS) in the near future. In addition, it has called for a tax system (for example, in the form of port and waterway fees), mandatory shore-side electricity for ships at berth, and the use of renewable energies on board.

Directive on Marine Pollution

The European Commission achieved a stage win on the issue of prosecution of marine pollution caused by shipping. According to a verdict of the European Court of Justice from October 2007, the European Commission may oblige EU member states to impose sanctions on those who pollute the sea. As a consequence, the original directive 2005/35/EC on marine pollution caused by shipping has to be modified. The new proposal includes stricter parameters for consistent minimum penalties throughout Europe. Administrative or penal sanctions are to be imposed on shipowners, captains and crews found guilty of polluting the environment. ■ MP

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LOBBYIST.
Dr Mary Papaschinopoulou.

CURRENT EU FUNDING PROGRAMMES		
INITIATIVE		SCHEDULED FOR
TRAFFIC		
Marco Polo II	Supports projects that shift freight transport from road to alternative modes of transport (especially short sea shipping)	next call will be published in January 2009
ENVIRONMENT AND ENERGY		
IEE – Intelligent Energy Europe	Supporting competitiveness of new energy technologies	26/06/2008
Life+	Supporting environment and nature conservation projects	next call will be published on 15/07/2008
Eco-innovation	Supporting proposals on material recycling, environment management and eco label	11/09/2008
STRUCTURAL FUND		
INTERREG IV C	Supporting interregional co-operation programmes focusing on innovation, environment and risk prevention	No calls at present

Quality Matters

Hudong Heavy Machinery is China's largest diesel engine manufacturer, boasting a 60 per cent market share in locally manufactured marine engines

Their main products are low-speed marine diesel engines; their customers are shipping companies around the world: One of the three Chinese makers of large engines, Hudong Heavy Machinery (HHM), is situated on the banks of the Huangpu River in Shanghai's new Pudong district. The factory in Pudong Dadao Street has been manufacturing engines since the 1950s, with a combined rated output of 10 million horsepower to date.

Starting with their own designs of medium-speed marine diesel engines, such as the 6ESDZ43/82 model from the 43/82 series, Hudong built their first 10,000-horsepower engine as early as 1958. In the early 1970s they developed the model 18VE390 submarine engine from the 390 series.

In 1982 Hudong Heavy Machinery started as an international licensed engine maker. At first, the manufacturer became a MAN licensee and began producing 8L55 MAN engines, joined in the late 1990s by 5S50MC-Cs. In 1988 HHM obtained a manufacturing licence for the Sulzer 84 engine.

The former HHM was an engine-making department of Hudong shipyard. Going public in May 1998 raised capital for further growth. By then the company had arrived at a

total output of 4.63 million horsepower. Today, engine sizes range from 420 mm to 980 mm bores. The production facilities in Shanghai can handle loads of up to 500 tonnes and feature a testing shop for engines of up to 100,000 horsepower.

Yet, the Shanghai plant had reached its expansion limits and in 2003, HHM began building a new, 350,000 m² production facility in Lingang south-east of Shanghai. A joint venture with the Japanese Mitsui company, the project represents an overall investment of 2.27 billion yuan. "Mitsui may not be the biggest producer, but they are leaders in technology," says Shao Yu, Vice General Manager of Production. "It is never a bad idea to co-operate with the world leader in technology excellence," he adds.

Production in Lingang began in 2007; five engines were delivered last year. The schedule for 2008 lists thirty engines totalling 1.3 million hp. "Eventually we want to deliver two million hp annually. The first stage of this project will be completed next year," says Shao Yu.

With spare parts in high demand, the company also manufactures engine frames, bedplates, cylinder blocks



Photo: HHM



Shao Yu (35) graduated in Wuhan with a degree in Marine Engineering in 1993. He has been working for HHM ever since, first in the engine adjustment workshop, and as a quality engineer. Later he became assistant to the General Manager. In January 2008 he was appointed Vice General Manager of Production.

INTERVIEW WITH SHAO YU

nonstop: What is the biggest challenge for engine makers today?

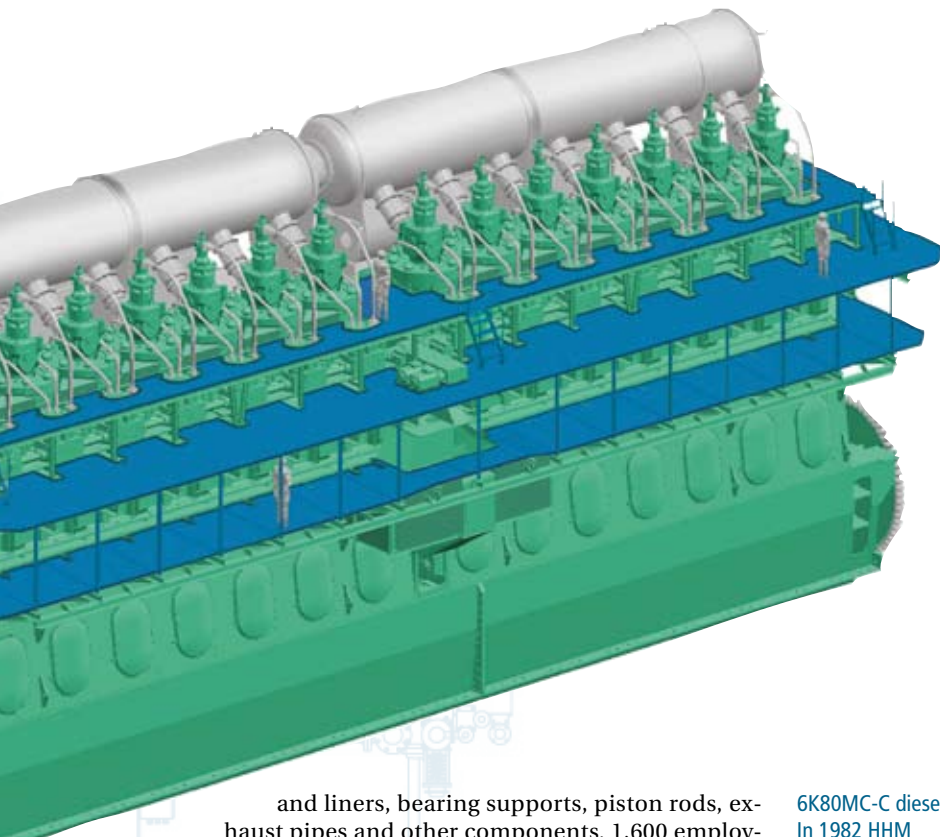
Shao Yu: Firstly, the market demand is the biggest challenge. Will it remain stable, will it go up or down? Nobody knows. According to our judgement, the next three years will continue to be okay. As for the time after 2011, everybody will have to make their own judgement.

Secondly, market costs are rising, for example for oil and for steel plates. Coping with these costs is a big challenge. Compared with the end of last year, the price has gone up 20 per cent.

And thirdly, the customers are more critical. An engine that was acceptable ten years ago would not be okay today. Quality is critical. We are expanding and at the same time we have to maintain our quality level. This is our business! We are confident we can do it. Looking at the past years, we have been dealing with this issue quite well.

nonstop: What do customers want?

Shao Yu: Emissions are important. For the engine itself, everything regarding emissions should be improved. Also, people pay more attention to safety at sea. Engines



and liners, bearing supports, piston rods, exhaust pipes and other components. 1,600 employees are currently working for the company, which is part of China State Shipbuilding Company (CSSC), the state-owned shipping and shipbuilding conglomerate in southern China.

"The majority of our products are delivered to the eight CSSC shipyards," says Shao Yu. But HHM supply engines to privately-owned shipyards in China, as well. As stipulated in their licence agreement, the company has been exporting engines to Singapore, and more recently, to Vietnam.

In the light of rising production output, quality is an important factor. HHM has been ISO-9000 certified since 2000. The company's quality management system covers every aspect of the production process, from casting to delivery of the finished product. Says Shao Yu: "Improving quality is a continuous, non-stop process." ■ SNB

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PLANT. The new production hall at Pudong New Area covers an area of 209,000 m².

6K80MC-C diesel.
In 1982 HHM became an MAN licensee.

Photo: HHM



Photo: HHM



Photo: HHM



OFFICE BUILDING. HHM has been producing diesel engines for 50 years.

need to run all the time. Life is more valuable now than before.

And, compared to ten years ago, at that time manufacturing technology in China was still in its infancy, but owners were used to this low-level production. Today, technology has advanced very much. Shipowners can compare well, they will ask for more. It's not really a technology issue – it's psychology!

nonstop: What did Germanischer Lloyd contribute to your quality level?

Shao Yu: An example is the Hudong quality system. We received assistance

in the manufacturing process on how to evaluate the supplier, how to check the quality of the material.

Germanischer Lloyd has a lot of experience auditing ship component suppliers. HHM was inspired by these ideas, and we now apply them to our own process.

nonstop: Alternative propulsion methods such as wind energy, fuel cells or nuclear energy are becoming more popular. How do you evaluate the future of diesel engines?

Shao Yu: Diesel engines will continue to be in use as long as the world still has oil. Dual-fuel engines have the biggest potential.



Swiss Quality

Trasfor SA of Switzerland develops and manufactures several types of transformers, reactors and inductors for the fields of maritime technology, industry, power distribution and traction

Interesting stories abound in engineering. One such story is told by Frank Heimann from the Augsburg branch office of Germanischer Lloyd: "At a shipyard, one of the ship's mains transformers was installed in a small compartment the wrong way round by mistake, and then welded to the ceiling. With any other transformer, it would have been necessary to rip out the ceiling in order to turn the transformer around, but we were able to dismantle the Trasfor unit completely in only a few hours, rotate it and then reassemble it. I was amazed at how easy it was!" Evidently, there are people in the design department at Trasfor who know their stuff and also have practical experience.

Tailor-Made Transformers

The headquarters of the company in Molinazzo di Monteggio has a workforce of 250, with another 100 employees based at a second location in Northern Italy. "The competitive situation is fairly relaxed for us," says Andrea Ghidini

in a self-assured manner. "We don't even serve the hotly contested standard market. Our products are not off-the-shelf goods." Established in 1967, Trasfor offers customer-specific solutions and relies on the great competence of its development engineers and production experts. A lot of the staff have been with the company for many years. For Ghidini, this continuity of skills and a well-targeted personnel development programme are the main ingredients for the company's success. Another key aspect is the consistent orientation to the needs of the customers. For this purpose, Trasfor has grouped together a pool of specialists in the company Trasfor Consulting. Many innovations are based on the specific request of a particular customer. "Although we are really too busy to consider developments that are not tailored to customer applications, we invest part of our efforts in the search for new solutions that will keep us ahead in technology." This focused strategy is paying off: the company was able to triple its turnover to 74.5

SERVICE. Trasfor engineers installing a new system. The Swiss experts adapt the units to suit the special requirements of the customer in terms of the space available and the technology needed.

million euros in the period from 2004 to 2007. One of the firm's strongest areas is shipbuilding. Trasfor transformers are in service worldwide on some 160 containerships carrying more than 6,000 TEU, on 20 LNG carriers, and on dozens of oil rigs and floating dredgers.

Demanding Customers

The high quality of the components from Ticino is also demonstrated by their use in the most demanding sectors of shipbuilding technology: navy and cruising. About 50 naval vessels and cruise ships worldwide are equipped with Trasfor transformers. On cruise liners, the propulsion transformers are used for electrical propulsion plants, such as pod drives. ■ JJ

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INTERVIEW

"Hardly Ever Standard Solutions"

Andrea Ghidini is the sales director of Trasfor SA. *nonstop* spoke to him about international business and the future of the company

nonstop: Mr Ghidini, with a small country like Switzerland as your domestic market, are you export-oriented by necessity?

Andrea Ghidini: That's true enough: 95 per cent of our production is exported all over the world. Half of our business is done in Europe, with the rest distributed over Asia, the USA and the Middle East, and also Australia.

nonstop: Your products are a success – but Switzerland, like Germany, is known to be a high-wage country. How do the two facts fit together?

Ghidini: Well, we benefit from the many years of experience of our staff and their excellent quality awareness. So we are working to a high standard with respect to technology as well as research and development. This puts us in a position to offer the customers specially tailored solutions to their problems. That is certainly a core competence for us. The customers get exactly what they need – and that, in turn, gives them certain advantages in terms of quality and total cost.

nonstop: What role does shipbuilding play here?

Ghidini: For us, ship technology is a very important area of business, and one in which we have been active for over 25 years now. We have delivered over 4,000 transformers for ships to date, and so we have a rich stock of experience at our disposal. We can serve all possible applications: ship's mains transformers, reefer service transformers and propulsion transformers – everything you need on a ship.

nonstop: Is it just a business sector like any other?

Ghidini: No, the special challenge in shipbuilding for us is to have sufficient design capacity on hand, because we can hardly ever use standard solutions. You have to design the highest possible level of reliability into the product itself. Everyone who knows a bit about shipping will understand just how im-

portant this point is. Without a reliable source of electrical power on a vessel, you have a big problem. Apart from that, special requirements for mechanical engineering also play an important role – just think about the vibration involved in normal ship operation or the unavoidable dust and dirt inside the ships. All this has an effect on the choice of components to be used.

nonstop: You are active in sectors that are definitely booming, like shipbuilding and wind energy. Are there any problems with the supply sources for production?

Ghidini: Of course, we have a number of different suppliers. We haven't experienced any real production bottlenecks yet, but the price hikes for aluminium, steel and copper are making life tough for everyone. That is a major challenge for us.

nonstop: What developments are you currently focusing on?

Ghidini: Our improvements are aimed at making transformers more compact and easier to service. The goal is always to make them more resistant to extreme operating conditions. For example, we are working on a transformer that will withstand water ingress for 24 hours. Our research and development team is also looking at the question as to how we can use more economical materials and yet achieve the same quality.



TRANSFORMER. Certification is particularly important for maritime applications.

Photo: Trasfor



SALES DIRECTOR. Andrea Ghidini.

Photo: Trasfor





COMMON CHRISTENING. In a triple naming event, three containerships were christened at Ouhua Shipyard, Zhoushan, China, last April.

Three-in-one Go

Advanced technology and high efficiency – characteristics of Chinese yard Zhejiang Ouhua Shipbuilding that German shipowners and financiers appreciate. Three new vessels were named recently

The Zhoushan archipelago off the coast of Shanghai is formed by 1,390 islands, only 58 of which are larger than one square kilometre. The archipelago's principle island, Zhoushan, one of the largest islands of China, is known for its beauty. But the group of 20 people arriving at the Sheraton Hotel one morning in late March did not come here to visit the favourite tourist attractions but to name three containerships at Ouhua Shipyard. Hull numbers 501, 502 and 509 are waiting at the pier as the shipowner, the financier, the godmothers and representatives of the design office and the classification society arrive from the neighbouring island.

Before the naming ceremony begins, the delegation is welcomed in the shipyard's conference room on the first floor of the administration building. Over a bowl of green tea they watch a short video about the history of the shipyard – a story that may cover a short period of time only but is nevertheless rich in achievements. Zhejiang Ouhua Shipbuilding Co. Ltd. was established in October 2004. It represents a new type of shipyard emerging in China: privately-owned operations not affiliated with any of the large state-owned Chinese shipbuilding groups. The capital base was ¥ 250,000,000.

Modern Shipyard

Construction of the shipyard, which covers an area of 300,000 square metres, began in May 2005. As early as December the same year, workers began cutting steel for the first vessel, a 1,200-TEU containership. In November 2006 this first vessel was completed. Annie Hao, one of the shipyard's owners, is proud. "It is a remarkable record of our working efficiency," she says. Within as little as 18 months, they had built the shipyard and delivered the first vessel.

CEREMONY. The dragon dancers arrive at the administration building of Ouhua Shipyard.

Werner Enning, Germanischer Lloyd's Area Manager China, is impressed. "I was here when there was nothing but mud. Now there is a modern shipyard here, and it even completed its first vessel within its first 18 months." The classification society has been overseeing the construction of all vessels built at Ouhua shipyard to date.

The Zhoushan station of GL employs more than 20 surveyors serving the shipyards and manufacturers based on the archipelago. Dirk Dohmen of ship financier HSH Nordbank agrees: "Ouhua is a typical successful example of a green-field yard." HSH Nordbank is co-financing all of the shipyard's projects, joined by Agricultural Bank of China, Industrial and Commercial Bank of China and Bank of China.

Relations with German business partners play an important role for Ouhua Shipyard. All of the newbuilds were →





PROCESSION. The dragon dancers lead the guests to the pier where the three ships await the naming ceremony.



GODMOTHER. Petra Hadaschick cuts the rope holding the bottle of champagne that is about to shatter on the bow of Medontario.

→ ordered by German owners. The three containerships to be christened today were all built for Hermann Buss and his associates. The ships were designed by Neptun-Stahlkonstruktionen GmbH of Rostock, Germany.

Improving Quality

Following a joint lunch at the shipyard's own restaurant, the group is taken on a tour of the facilities. The yard's layout and design are the result of a project supported by Ingenieurtechnik und Maschinenbau GmbH, Germany, aiming at achieving an optimal arrangement of all facilities. Workshop floor space totals 80,000 square metres, while the production field covers 140,000 square metres. The painting and blasting workshops are designed for an annual output capacity of 1,000,000 square metres. The two docks are sized for panamax and handy-sized ships. Eight gantry cranes capable of lifting between 100 and 600 tonnes serve the docks and 25,000 square meters of assembly area. The outfitting quay has an aggregated length of 560 metres. The shipyard currently has 200 employees working alongside 3,200 subcontractor employees at the Zhoushan site.

At 3:00 p.m. in the afternoon, the dragon dancers arrive to lead the procession from the administration building to the pier where the three ships await the naming ceremony. "I believe it is fair to say we are gathered here at one of

China's best shipyards," says owner Hermann Buss in his speech. To substantiate this claim he adds: "Quality and efficiency have been improving steadily. The excellent co-operation of all parties involved has enabled us to deliver ships today that were originally scheduled for delivery a year later."

Then the great moment arrives: Petra Hadaschik, god-mother of the 1,200-TEU container vessel "Medontario", has finished her speech, and the group moves towards the vessel. Petra Hadaschik swings the hatchet to cut the string. A few metres above the waterline, the bottle of champagne hits the bow of the ship. At the same time, a confetti-filled balloon bursts, and fire crackers go off. Moments later, the same happens at the sister vessel "Warnow Beluga", followed by the 1,000-TEU container vessel "Medbothnia". In just a few weeks, all three ships will be on their way across the world's oceans.

The day closes with a banquet at the Sheraton Hotel. In her speech, Annie Hao highlights the good relations with the German business partners. She also expresses her pride in the achievements of the yard. "I hope you will all love China!" are her closing words before the festive dinner begins. ■SNB

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SHIPBUILDING IN CHINA



Six years ago, China's shipbuilding industry accounted for no more than six per cent of newbuilds completed globally, trailing far behind Korea and Japan. The sheer scale and speed of expansion of Chinese yards to date is hard to grasp. At 18.93 m dwt, the 2007 volume of deliveries was 30 per cent up from the previous year, while new orders totalled 98.45 m dwt, up 32 per cent from 2006. Today, China's market share in new orders has risen to 33.9 per cent CGT, closing in behind the No. 1, Korea.

Delivered vessels of Ouhua Shipyard:

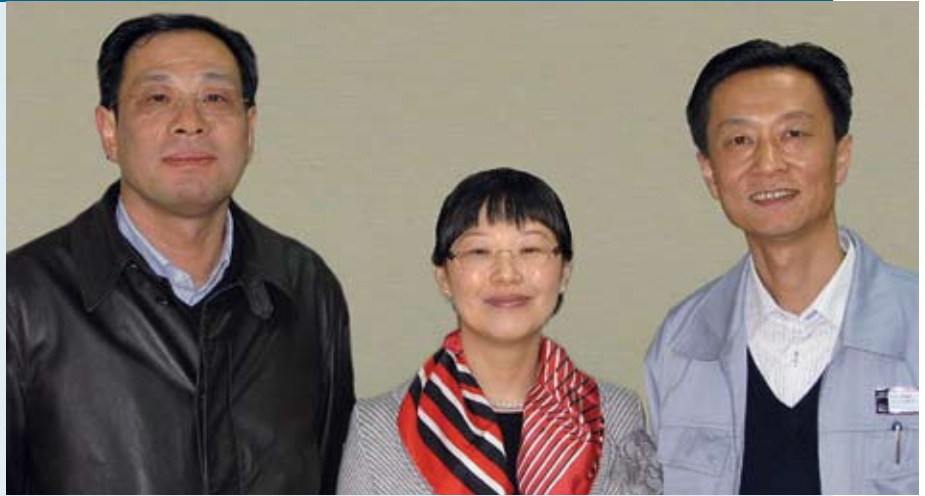
- 12 x 1,200-TEU container vessels geared
- 2 x 1,200-TEU container vessels gearless
- 3 x 1,000-TEU container vessels gearless

Orderbook of Ouhua Shipyard:

- 1,200-TEU container vessels gearless
- 1,000-TEU container vessels gearless
- 1,500-TEU container vessels gearless
- 5,300-TEU container Vessels
- 30,000 dwt MPC

INTERVIEW

General Manager Weihei Qiao (l.), Chief Engineer Yanming Qin (both Zhejiang Ouhua Shipbuilding Co. Ltd.), and Annie Hao (m.), Managing Director, Love China Trading, talk about today's challenges in shipbuilding.



nonstop: How do you feel today, having completed a project?

Weihei Qiao: I am very glad and happy today! The achievement that Ouhua is celebrating today is in part attributed to the shipowner and also to Germanischer Lloyd. We are glad to express our sincere thanks to GL for our long-time cooperation.

nonstop: What was the special technical challenge in building the new ships?

Annie Hao: The vessels named today are numbers 14 and 15 of a series. For us it has become a routine. The efficiency of our shipyard allows such a triple christening every three months.

nonstop: What is the main achievement of Ouhua shipyard?

Hao: I would like to highlight that we have managed to build both the shipyard itself and the first vessel within 18 months. That is something we are really proud of.

nonstop: How did you accomplish that?

Yanming Qin: In China, the shipbuilding process is that fast. But compared with other shipyards internationally, in Europe and Korea, we still have a lot to learn and we have to improve.

Hao: It is a matter of teamwork at our shipyard – our management team and our workers. We also co-operated successfully with the owner, the design office, the classification society and the banks.

nonstop: Can you give us a short overview of the development at Ouhua?

Hao: The official registration of the yard occurred in November 2004. In May 2005, we received official approval from the local government to start digging. Then, in December 2005, we began cutting steel for the first vessel. In November 2006, the first vessel was delivered.

nonstop: How would you describe the development of the yard since its foundation?

Hao: We received an order for a series of ships of the same type. By improving our operational efficiency internally, we were able to shorten the building period again and again. We have so far delivered 14 ships. Number 15 will be delivered soon. What is remarkable for number 12, a 1,200-TEU ship: We managed to get the vessel delivered within 3 weeks after the main engine had arrived. We suffered a lot from delays caused by the engine maker. But we still managed to adhere to our schedules.

nonstop: Where does the equipment come from?

Hao: We receive a large number of components from Europe.

nonstop: Do you plan to work more and more with manufacturers from China?

Hao: That depends on the availability of equipment in China. For our smaller feeder vessels we need four-stroke engines. There is no licensee [in China], so we have to order them from Europe. For two-stroke engines it is a different story. Licensees are available here in the Far East and of course we will try to order as much as we can from nearby.

nonstop: What measures have you taken to improve the internal operating efficiency?

Mr Qin: Some of the key factors are sincerity and honesty to our partners. We were able to instill a very positive spirit into the entire yard to work hard. More specifically, we have been learning very hard from shipyards in Korea and Japan.

nonstop: Does that include investment in specific equipment?

Hao: The layout of the shipyard was designed by a special German company with the aim of finding out the most efficient production line, minimizing cost and improving the efficiency. The basic logistic system functions very well because of the initial layout. Also if you look at the hoisting capacity for example, we are considerably "over-equipped" as some would say compared to a normal shipyard. We have benefitted a lot from this, too.

We are pretty sure that such investment in hardware will bring a lot of benefits. Every tiny detail is designed with modern technology.

nonstop: What has your experience been with Germanischer Lloyd?

Hao: GL is the only class partner of our shipyards so far. We have 80 ships on order and all of them are committed to GL. The

GL team at our yard is very professional and the cooperation is generally very smooth. From our side we have the feeling that it would be beneficial if the team were bigger, because we work very fast.

nonstop: Do you plan to expand in the future, build other ship types?

Hao: We do not have any expansion plans at the moment, we have enough to do with our dry docks. We are already building four 5,300 TEU container vessels due for delivery in 2009. These ships are the most complicated panamax container-ships in the world with 1,200 rcp. It's a big challenge for the yard and it will also be a big achievement for the yard. We will continue in this manner, we will try to honour each contract and to improve every year by delivering more vessels. Huge expansion plans without any realistic preparation are not our style. We plan to fulfil more specific requirements of various owners in the market.

nonstop: What are owners requesting?

Hao: The market is developing day by day. It is hard to know what kinds of ships will be more accepted by the market tomorrow. We must contribute new concepts of ship design and communicate well with the owners while keeping up with market development. We have given this aspect of business a lot of attention.

nonstop: How do you get in touch with your shipowners?

Hao: So far we have only been working with our existing customers, who are like old friends to us. Personally I have been working together with this group of owners for 15 years. There is indeed great personal trust in our business relationship. But as far as the future development of the yard is concerned, we are prepared to win new clients, and I am sure that with our sincerity and honesty towards each and every project we will gain more and more trust from owners all over the world.



Ghost Ship to Port!

Increasing the safety of shipping – this includes the optimum arrangement of the ship's bridge and the working conditions of the bridge team. However, the corresponding regulations are, to a certain degree, contradictory. And not everything that is possible is really meaningful

Comparisons can express a complex situation in simple and vivid terms. When Captain Michael Oberländer, safety expert for nautical systems at Germanischer Lloyd, is asked to describe the statutory jumble regulating the design and equipment of ship bridges, he avails himself of a religious idiom: "In the beginning, there were only ten short commandments," he smiles, "but today we have legal statutes running into thousands of pages."

In the design and arrangement of ship bridges, it is the sad truth that tradition, custom, and international and national rulings all collide together with economic interests. And through this chaos of expectations and somewhat paradoxical provisions, the designer of ship bridges has to carefully pick his way forward.

At least there is consensus that poor bridge design constitutes a potential risk factor. Once an error is made here, it cannot be corrected later, or at least only partially – as bridge expert Oberländer points out time and time again. In view of the fact that a ship has an expected lifetime of 20 to 30 years, this shortcoming manifests itself as a long-term risk. But why is it so difficult to develop the best of all possible bridge designs, one that will meet all the safety requirements and provide a workplace in keeping with modern ergonomic principles?

Divergent Regulations

Answers to this question are not lacking; a large chorus of experts is there to provide many different voices. What is missing here to provide the needed harmony is the conductor. The problem is that the stipulations of SOLAS, IMO, ISO, Panama Canal Administration and national provisions sometime deviate from each other, pursue different standards, and are not applicable to all ships, which in turn leads to exemptions.

A ship bridge is a complex workplace, as evidenced by a circular of the Maritime Safety Committee (MSC). Accord-

ing to this document, there are "workstations" for various tasks on the bridge:

- Navigating and manoeuvring the ship
- Monitoring the course, speed, machinery, cargo, etc.
- Manual steering
- Docking manoeuvres on the bridge wing
- Voyage planning and documentation (chart table)
- Safety with monitoring and information instruments.

Up until 1998, there were no generally binding international regulations for the design of bridges. Depending on the size of the ships and their range of trade, requirements were only set for certain devices, such as the compass and radar units. Ergonomics, i.e. the study of the performance capabilities and optimum working conditions for people, was not only an unknown word for most designers, shipbuilders and owners, but was often viewed as an attack on traditional customs. From the outside, bridges had a defiant appearance: floating castles with windows which sometimes even looked like medieval arrow slits.

If the visibility was poor, the ships had to be controlled almost like a plane in instrument flight. The steering position, engine telegraph, chart table, and radio and radar units were arranged more or less haphazardly on the bridge. To prevent the watch officer from being blinded by glare, the chart table was screened off. This also made →

Photo: Flensburger-Schiffbauergesellschaft



WORKSTATION. The bridge must also satisfy ergonomic criteria.



Photos: Fred Berghoff

DIVERSITY. A variety of workstations must be accommodated on the bridge.



DESIGN. The optimum arrangement of technology increases the level of safety.

→ it difficult to keep a lookout at night. “You don’t earn money with a bridge,” says Sören Kuper, responsible naval architect at the yard Flensburger Schiffbau-Gesellschaft (FSG), “and so this part of the ship is sometimes neglected by the shipowners.”

Accidents like the Exxon Valdez casualty, the collision of the Norwegian Dream and the near-catastrophe of the Crown Princess, which suddenly heeled by 15 degrees as the result of a minor error in steering, have sharpened the general awareness that the design of ship bridges and their technical equipment should not be left solely to the designers, yards and shipowners.

The Battle of the Blind Spot

Since 1998, the SOLAS regulations have set requirements for the vertical and horizontal field of view. As the main workstation, the conning position must offer a clear view of 225 degrees, and this must not be obstructed by curtains, chart table or radio station. Amongst other benefits, inclined windows help to prevent the reflection of instrument lights or the glow of monitor and radar screens in the panes. On a certain cargo ship, for instance, the nautical officers were repeatedly hit by a moment of shock during the night watch when a ship appeared to be approaching to port, without any echo being visible on the radar. After some investigation, it was found that a green pilot lamp on the instrument panel was reflecting in the perpendicular windows and causing this maritime fata morgana. Blind sectors due to shipboard cranes and deck cargo must generally not be allowed to make up more than five or ten de-

grees. On the whole, these blind angles may not add up to more than 20 degrees. The forward view should not be obscured by more than two ship lengths or 500 m, whichever is less, forward of the bow to 10° on either side. And yet there are inconsistencies that can give rise to conflict between classification societies and yards.

For example, SOLAS only lays down that the manual steering position may not be located directly behind a window frame – but it could be placed right behind a gigantic crane. At a seminar held by the GL Academy on the topic “Bridge Design, Equipment and Arrangement”, expert Oberländer outlines the problem: “If SOLAS had only considered all the important issues, it would have rendered many other regulations superfluous.”

The ergonomic arrangement of workstations on the bridge is the subject of rulings currently being drafted by the International Association of Classification Societies (IACS). As many as 80 per cent of all collisions and groundings are ascribed to failure of the “bridge” system. Of course, the training of the crew and their ability to respond correctly in crisis situations also play an important role. Studies have shown, however, that too much information has led to uncertainty and thus to wrong decisions.

Avoiding Confusion

A serious source of bewilderment: electronic instruments on the bridges are usually supplied by different manufacturers. The production quantities are too low to permit standardization. So the instruments have incompatible user interfaces, the colour palettes on the monitors are not uniform, the operating elements are sometimes implemented as switches, sometimes as levers – and, to make matters worse, with different rotating or toggling directions. “No consistent logic can be discerned here, which can lead to faulty operation in times of stress,” says FSG expert Sören Kuper.

In 2007, IACS tried to establish a worldwide bridge standard, the BDEAP: Bridge Design, Equipment, Arrangement and Procedures. Unfortunately, the project was halted by Asian yards, who feared that they would lose part of their competitive lead, owing to the stricter requirements for equipment and quality. “The proposals have now been watered down as recommendations,” says GL’s Oberländer, “and we now have to convince shipowners and yards that they are really worthwhile.”

■ JH



Photo: Flensburger-Schiffbau-Gesellschaft

OFFICER.
Operating procedures
should be intuitive
wherever possible.

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Happy Birthday THB!

For 60 years, "Täglicher Hafenbericht" (THB) has been providing the shipping community with dependable, in-depth coverage of the news and trends in the maritime industry

Many countries with a maritime tradition have their own daily, weekly or monthly newspapers or news magazines for the shipping industry. Examples are the UK's "Lloyd's List", the Norwegian "Trade Winds" or Japan's "Nippon Kaiji Tsushin". As for Germany, "Täglicher Hafenbericht" is the industry's authoritative organ. There is no way around THB if you want to be up-to-date on current developments in shipping.

THB is considered as the ultimate source of news among German maritime publications. Besides shipping news – covering topics such as ports, logistics, shipbuilding, suppliers, technology and people – THB includes interviews with experts from the maritime business community as a standard feature. On 1 June 2008, THB will celebrate its 60th anniversary – and the publication of 15,000 issues. The paper has 16 to 20 pages that tell the readers everything they need to know about ships, charter rates, ports and more. In addition, the THB Ticker delivers comprehensive information on ships of all types.

Boredom? Not Here!

"If THB didn't exist, you would have to invent it," says Jens Meyer who was editor-in-chief of THB for 40 years – that's 40 years of 5 issues per week! "During all those years with THB I lived through and recorded a bit of shipping history. I am very proud of that," says Meyer. Then he begins raving. For him, ships are more than just objects made of steel. From the very beginning, close ties with the readership, a



SUCCESS STORY: The first issue

high penetration of the target audience, and highly up-to-date reporting were characteristics of THB. "In retrospect, it was an adventurous time. There were no computers or internet. We had to do most of our research by telephone," laughs Meyer, whose professional training was in ship trading.

While occasional technical problems or holiday periods with little news to report sometimes made publishing a bit tedious, one thing never bothered the editors: boredom. Jens Meyer's favourite pastime had become his job: his love for ships and his journalistic talent paved his way to THB.

In mid-2006, Frank Binder took over from Meyer as editor-in-chief of the top-ranking German shipping daily. He and his co-editors, Jan Mordhorst and Wolfgang Eder, continue reporting on national and international topics of the maritime industry. "Each one of us has his own favourite subject matters," Binder says. "Jan Mordhorst loves tugboats, Wolfgang Eder leans towards newbuilds, and I have a weakness for luxury yachts. My grandfather was a captain. I used to work in the press department of Hapag-Lloyd, among other places. Shipping has been part of my life as long as I can remember. But I never thought it would ever become my livelihood," he adds with a chuckle.

■ AN

INTERVIEW: THREE QUESTIONS WE POSED TO FRANK BINDER

Frank Binder has been editor-in-chief of Deutsche Schiffahrts-Zeitung since June 2006. The 50-year-old journalist, author of books on maritime subjects and reserve officer of the German Navy has restyled the THB. The paper continues to evolve under his leadership.



nonstop: What kind of character traits does it take to be an editor of THB?

Binder: Without a sound understanding of shipping and a love for the sea you won't stand a chance. Furthermore, you need excellent contacts and profound background knowledge to do this job. Our writers and editors need to be familiar with the terminology of the trade and be able

to see events within a greater context. Two of our long-standing editor colleagues, just to give an example, are ship merchants by training who have the necessary know-how.

nonstop: What is the "shiplnx" column all about?

Binder: This is the new index I developed for the international shipping industry, which was introduced on 24 July 2008. The

index is calculated by the German Stock Exchange to reflect the stock market trends among the 30 leading international enterprises of the maritime business with a market capitalization of over US\$ 1 billion. This is a truly innovative feature.

nonstop: Do you have a favourite type of ship?

Binder: I am fascinated by luxury yachts. I admire their design, technology and equipment

service

Dates at a Glance

JUNE

02.06.2008 – 06.06.2008
Posidonia
Athens, Greece
www.posidonia-events.com

10.06.2008 – 12.06.2008
Global Petroleum Show
Calgary, Canada
www.petroleumshow.com

10.06.2008 – 12.06.2008
Offshore Mechanics and Arctic Engineering
Estoril, Portugal
www.oma2008.com

24.06.2008 – 26.06.2008
Windpower Asia
Beijing, China
www.windpowerasia.com

23.06.2008 – 27.06.2008
Neftegaz
Moscow, Russia
www.neftegaz-expo.ru/en

SEPTEMBER

09.09.2008 – 13.09.2008
Husum WindEnergy
Husum, Germany
www.husumwind.com

23.09.2008 – 26.09.2008
SMM
Hamburg, Germany
www.hamburg-messe.de/smm

OCTOBER

23.10.2008 – 24.10.2008
3rd European Conference on Production Technologies in Shipbuilding
Stralsund, Germany
www.ecpts.de

NOVEMBER

04.11.2008 – 06.11.2008
UDT Pacific
Sydney, Australia
www.udt-pacific.com

05.11.2008 – 08.11.2008

Shipport China

Dalian, China
www.shipport.com.cn

26.11.2008 – 28.11.2008
Inmex China
Guangzhou, China
www.inmexchina.com

DECEMBER

02.12.2008 – 05.12.2008
Exponaval
Vina Del Mar, Chile
www.exponaval.cl

03.12.2008 – 05.12.2008
Workboat Show
New Orleans, USA
www.workboatshow.com

14.12.2008 – 16.12.2008
Seatrade Middle East
Dubai, UAE
www.seatrademiddleeast.com

Staff Changes

Alaa Fathi Ahmed is responsible for the Station Office Abu Dhabi as Station Manager.

Alexei Glazounov now has the position of Deputy Country Manager Lithuania.

Rainer Gutzmer is new Deputy Country Manager Iceland.

John Helland has been promoted to Deputy Country Manager Norway.

Norbert Kray has been appointed as Deputy Chief Surveyor. On 1. August he will succeed Erhardt Arndt as Chief Surveyor.

Pawel Maj is Station Manager in charge of the new Station Fuzhou.

Rady Reyner has been appointed as Deputy Country Manager Russia.

Mohamed Sabbagh is new Deputy Country Manager United Arab Emirates.

Burkhard Schiwkowski follows Hermann Jacobs as Station Manager of the Station Office Hamburg.

Konstantinos Siozos has been Deputy Area Manager of Area Mediterranean/South Africa since March.

Somthai S. Tavechoke is new Country Manager Thailand, he deals primarily with oil and gas business.

Helmut Tajmel is new Country Manager Austria.

Mark A. Tomlinson has been appointed as Deputy Country Manager for the Country Office South Africa.

Rules for Classification and Construction

Our latest brochures, rules and guidelines are available on request. Order forms are available on the Internet:

www.gl-group.com > Client Support > Rules & Guidelines

I – Ship Technology

Part 1 – Seagoing Ships

Chapter 3

Electrical Installations	2008-03-15
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Chapter 17

Guidelines for Machinery	
Condition Monitoring	2008-02-15

Part 4 – Rigging Technology

Chapter 3

Guidelines for the Type Approval of Carbon Strand and PBO	
Cable Rigging for Sailing Yachts	2008-03-01

New Addresses

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JUNE

10.06.2008.

**Latest Amendments
to Maritime
Regulations**
Limassol,
Cyprus

10.06.2008

Port State Control Basics
Limassol,
Cyprus

10.06.2008

Workshop ISPS Exercise
Colombo,
Sri Lanka

10.06. – 11.06.2008

**TMSA Workshop –
Risk Assessment,
Change Management,
Incident Investigation**
Piraeus,
Greece

11.06.2008

**US Ports Requirements
for Ship and Operator**
Limassol,
Cyprus

12.06. – 13.06.2008

**TMSA Workshop –
Risk Assessment,
Change Management,**

Incident Investigation

Taipei,
Taiwan

26.06.2008

**ISM for Ship
Management Personnel**
Saint Petersburg,
Russia

26.06. – 27.06.2008

**Internal Auditor
ISM/DIN EN ISO 9001:2000
for Shipping Companies**
Genoa,
Italy

AUGUST

28.08.2008

**Latest Amendments to
Maritime Regulations**
Saint Petersburg,
Russia

28.08.2008

Port State Control Basics
Saint Petersburg,
Russia

OCTOBER

15.10.2008

**Practical Aspects of
Corrosion Protection for
Shipping Companies and
Shipyards**
Piraeus, Greece

IMPRINT

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news

BARD

1st Jack-up Barge

Lithuania, cloudy skies, zero degrees. Yet, visitors both local and international turned out in large numbers to witness the keel-laying ceremony for the BARD installation ship "Wind Lift I" at PC Western Shipbuilding Yard in Klaipeda. 102 metres in length and 36 metres in width, the jack-up barge, a special lifting platform, will be able to jack itself up out of the water on four legs, each of them 71 metres tall. The barge is ideally suited for the logistic challenges involved



CEREMONY. Keel-laying for "Wind Lift I".

in the construction of large offshore wind turbines. "Wind Lift I" is the first jack-up barge BARD Engineering GmbH is having custom-built for erecting offshore wind turbines.

Two lucky charms. "Wind Lift I" is designed to install foundations as well as complete wind power plants, including towers, nacelles and rotors – and all of it with ease. The special ship will be certified according to construction rules and guidelines of GL. The first vessel of its kind, "Wind Lift I" is scheduled to be commissioned next year. Viaceslavas Cumakov, project lead with PC Western Shipyard, and Anton Baraev presided over the keel-laying ceremony. They attached a one-euro coin and a one-lita coin to a steel plate that will be welded onto the craft later on.



MODEL. The jack-up barge is scheduled for completion a year from now.

Photo: Public Emotions

WIND ENERGY

The Tightening Factor

Since the beginnings of wind power technology, the tightening factor on large-diameter bolted joints has emerged as a critical factor. It is an indication of the repeating accuracy of the tightening method. To ensure safe operation of the wind turbine, the heavy loads acting, for example, on the rotor hub require optimal tightening accuracy on the large rotor blade boltings.

At the European Wind Energy Conference in Brussels in March 2008, Germanischer Lloyd's Mike Wöbbeking presented Guido Consogno, re-

sponsible for technical sales at Swiss manufacturer P&S Tensioning Systems Ltd., with a certificate for the CY-series SUPERBOLT® Multi-Jackbolt Tensioners (MJT).

Better accuracy. Germanischer Lloyd oversaw tests on size M36 and M48 CY-series fasteners. The test results show that the repeating accuracy for the MJT is better than for conventional tightening methods such as torque-controlled or hydraulic tightening. A tightening factor of 1.2 may be used for dimensioning bolted connections.

CERTIFICATION. Mike Wöbbeking, GL, hands over the certificate to Guido Consogno, P&S Tensioning Systems Ltd.



EWEC

Operational Safety Delivers

The demand for renewables is increasing dynamically. Nevertheless, wind power currently covers just over one per cent of the world's energy need. And while the trend is pointing upwards, the wind power industry is far from having reached the level of professionalism common to other energy sectors. Experts agree: To be successful in the long term, wind power will have to find ways of overcoming its technology challenges.

Higher efficiency. And the challenges are staggering. At the European Wind Energy Conference (EWEC) in Brussels in late March, a panel of experts consisting of Jürgen Schmid, chairman of the European Academy of Wind Energy, Matthias Schubert, CTO of Repower Systems AG, Troy Christopher Patton, Senior Vice President of Vestas Wind Systems, Dutch expert journal-



MJTs represent an advanced bolting technology, warranting safe operation and meeting stringent criteria. Bolts of any size may be tightened with a hand torque wrench only. The boltings are free of torsion and in pure tension.

For further information: Fabio Pollicino, Machinery Components and Safety, Phone: +49 40 3 11 06-70 57 E-Mail: fabio.pollicino@gl-group.com

PERSPECTIVES. Large and reliable turbines are the foundations for the economically sustainable success of wind energy.



Photo: Vestas

Competitive Advantage

ist Eize De Vries, and Raffaele Liberali, Director of the Research Directorate General with the European Commission, discussed the future prospects of wind energy. The panel discussion, titled "Technology: 2020 Vision", was chaired by Andrew Garrad, Managing Director of British wind energy consultancy Garrad Hassan & Partners Ltd. Its key message: New materials, new designs and new control software will further improve the operational profitability of wind turbines.

The operational safety of wind turbines will be a litmus test of their manufacturers' commitment to quality. The steady trend towards ever larger wind turbines requires sustainable efforts towards increasing the technical and operational reliability of wind turbines substantially. According to the experts, only manufacturers capable of supply-

ing failure-free equipment to the operators will be able to secure long-term business success in a market that continues to be highly fragmented.

Open questions. Making accurate predictions regarding the future development of wind energy is next to impossible, the experts agreed. Too many open questions remain: Will the wind turbine of the future have a gearbox or not? Is there an upper size limit for wind turbines, and will the market demand such mega machines? What loads will they be able to withstand? Will the power grid be able to handle the amount of electricity produced? And, even more important: Are there enough engineers to meet the rising demand? There are definitely enough open questions to fuel a lively discussion at the EWEC 2009 in Marseille.

CTQI

CTA: Certified Performance

As container vessels continue to grow in size, container terminals must follow suit to ensure fast, safe and cost-efficient operation. Container Terminal Altenwerder (CTA), operated by port operator Hamburger Hafen und Logistik AG (HHLA), has stood the test: It is the world's first container terminal to be certified according to the new international "Container Terminal Quality Indicator" standard (CTQI). "Our certification system is designed

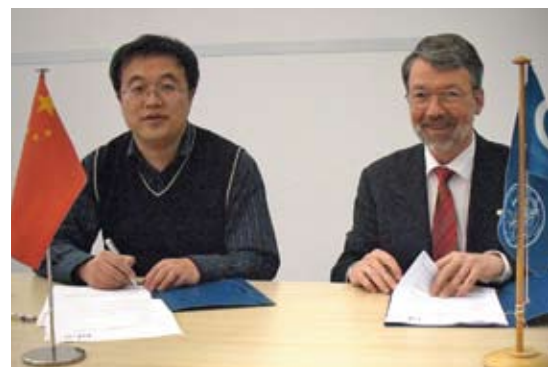
to make container terminal performance and quality levels measurable and transparent," explains Bernhard Ständer, Germanischer Lloyd Certification GmbH.

The new CTQI standard was developed jointly by the Global Institute of Logistics (GIL), GL and several other experts. "Our successful certification has reassured us that the CTA's process management and performance are where they need to be," says Heinrich Goller, General Manager of the terminal. A follow-up audit for the CTA has been scheduled for June 2009.

For further information: Wilhelm Loskot, Head of Department Shipping and Logistics, Phone: +49 40 36149-593, E-Mail: wilhelm.loskot@gl-group.com

HANDOVER. Heinrich Goller, HHLA, Kieran Ring, GIL, and GL's expert Bernhard Ständer (from left).

Photo:HHLA



SIGNING OF THE CONTRACT. Sinoval Manager Tong Tong and GL's Christian Nath.

SINOVAL

Wind for China

According to a report by the Energy Information Administration (EIA), China's energy consumption will rise to 4,500 KWh per year by 2015. In order to satisfy its demand for energy, China is tapping new energy sources; in particular, wind energy is gaining momentum. Sinoval, a leading Chinese wind turbine manufacturer, has developed a 3-MW wind turbine of its own – and is having it certified by GL.

Germanischer Lloyd has been requested to certify the entire design of the 3-MW wind turbine "SL 3000", which will be available in onshore and offshore versions. The GL experts will assess the design according to GL rules as well as international regulations and directives. The process comprises assessment of all installation components including the tower, rotor blades, mechanical as well as electrical components, and the safety system.

For further information: Marcus Klose, Rotor Blades and Civil Engineering, Phone: +49 40 36149-7143, E-Mail: marcus.klose@gl-group.com



Experts in Risk Management

Trident Consultants specializes in technical risk management, as well as safety, health and environmental assessments. Based in Kuala Lumpur, Malaysia, the consultancy firm also has comprehensive expertise in FPSO. Trident became a member of the Germanischer Lloyd Group in May

A reinforcement of the regional staff by a factor of two and a boosted presence in Malaysia and East Asia are the bottom line of the acquisition of Malaysian consultancy Trident Consultants, based in Kuala Lumpur, by the GL Group in May this year. "The activities of Germanischer Lloyd and Trident Consultants are a perfect match," said Bruno Solinas, Germanischer Lloyd Industrial Services Regional Manager Asia/Pacific when the joining of forces was announced in a press conference. "They allow for a considerably expanded technical service portfolio to the oil and gas industry, especially in Malaysia."

The capabilities of Trident Consultants apply to areas such as oil and gas operations and production, petrochemicals, utilities and environmental performance. "We specialize in the management of risks associated with equipment operation," says Raza Amin, Trident Consultants' Managing Director, summarizing his company's services portfolio. "We analyse risks emanating from equipment that are a potential threat to people and the environment. We also consider risks to our customers' asset revenue and reputation."

The international oil industry remains one of the most important and capital-intensive industries, exposing bottom line profits to considerable risks, not only globally but on a regional and local level, as well. Health, safety and en-

vironmental performance (HSE) require constant improvements. "No reputable company will proceed with a development without considering HSE studies at some level – by choice," says Francis Minah, Technical Director of Trident Consultants.

Practicable Solutions

There is a strong world-wide demand for HSE studies. A typical oil and gas project requires 15 to 20 HSE studies. Trident Consultants begin by identifying the hazards, either through a desktop hazard identification study or by conducting a facilitated study jointly with the client. "We work with our clients to find out what their perceptions of hazards in the project are, and from that we will develop major accident event scenarios which will then be analysed further," says Minah. The hazard identification stage is followed by a hazard and risk assessment. The consultants look into the likelihood of hazards and try to predict their consequences. They calculate the risks and identify ways of reducing those risks. "It all comes down to the principle of ALARP – 'As Low as Reasonably Practicable'," says Minah. "That's what drives our recommendations." Today, all major oil and gas companies in South East Asia are benefitting from Trident Consultants' services.



Kuala Lumpur

Trident's work also includes scrutinizing management systems. "The interaction of people with the hardware is very important, and this is defined by the management system," Minah continues. "We develop the system and integrate it with the risk and hazard assessments to give the customer an overall safety case." Since their formation, Trident Consultants have provided services for more than 30 Floating, Production, Storage and Offloading (FPSO) facilities.

These large floating tank systems are used in offshore oil and gas production. They are designed to accommodate all of the oil or gas produced from a nearby well, process it and store it until it can be offloaded onto an export/shuttle tanker. In the last two years alone, Trident Consultants supported more than 17 FPSO engineering and compliance projects with their risk management and process integrity expertise.

The project history of the 80 engineers based in Kuala Lumpur includes top-side safety, such as deck equipment arrangement, design verification, accident investigation and ship collision studies, as well as evacuation, escape and rescue facility reviews and flow assurance. "We ensure that pipelines are adequately designed for their intended service," Minah explains. Trident runs simulations to identify and assess potential hazards. "There's a phenomenon



FRANCIS MINAH.
Customers receive comprehensive HSE analyses.

called 'slugging' that you get in pipelines. If you have a two-phase liquid, it can happen that gas and oil separate, causing slugs of liquid within the line," Minah explains. "We help customers predict the slugging pattern and the flow regimes in their pipeline so they can design their receiving equipment to handle it."

Integrated Models

High-integrity pressure protection systems help ensure proper equipment operation. "This is about configuring a control system so it will close valves quickly enough and ensuring sufficient hardware integrity to protect processing equipment from damage," says Minah. Trident Consultants have also created fully-integrated models for entire plants. "Through our simulations we can see where the constraints are for the operations the client wants to perform," Minah clarifies.

While the traditional strengths of Germanischer Lloyd have been in certification and inspection services, Trident Consultants have specific capabilities in technical risk management as well as process engineering. "It is our aim to combine both service portfolios into a consistent asset lifecycle service concept," says Bruno Solinas. ■ SNB


TRIDENT CONSULTANTS CORPORATE PROFILE

Trident Consultants was formed in 1982 to provide process engineering and safety consultancy services to the onshore and offshore, upstream and downstream oil and gas industries.

In 1987, the company became independent, expanding its capabilities to include environmental consultancy and offer services to other industries, such as railway transportation. In 1996, the company's accumulated expertise was integrated into a risk management portfolio targeting a more diversified clientele.

80 employees work for the Kuala Lumpur company today. Trident Consultants will continue to operate as a stand-alone business led by its current management team including Raza Amin, Francis Minah and Tom Kennedy.

www.trident-consultants.com



TOM KENNEDY.
The consultant is one of Trident Consultants' three Directors.

EXAMPLE. Oil platforms in the North Sea such as "Stena Dee" meet the highest safety standards.



Starting Point North Sea

High energy prices and recent technological advances are making oil and gas exploration in the British North Sea more attractive than ever – reason enough for Advantica to expand its activities in Aberdeen and beyond

With oil prices reaching new record highs almost on a daily basis, exploration and development activities in the British North Sea are booming. The daily oil production from more than 500 platforms in the North Sea currently amounts to 4.4 million barrels. 75 per cent of these oil wells are operated by 15 key players. The British oil & gas industry comprises more than 800 companies and a workforce of over 300,000.

As one of the UK's fastest growing industries, with a 30 per cent growth in 2007, the subsea oil & gas sector is now among the country's top performers, according to the industry organization Subsea UK. This year-on-year growth rate exceeded market expectations; a further increase has been forecasted for 2008.

In the North Sea, oil was first discovered in the early 1960s, with the first well coming on line in 1971. But it was not until the 1980s that a rising oil price made exploitation economically feasible. Due to volatile weather conditions,

drilling is particularly hazardous in this area. But the ever-growing demand for energy has made oil exploration more profitable than ever.

Around the globe, the search for new oil deposits continues. When Haroldo Lima, the head of Brazil's national oil agency ANP, announced that the Carioca field discovered recently off the coast of Brazil could possibly contain up to 33 billion barrels of oil, Brazil was hailed as "the next oil giant". But under the present market conditions, mature reserves such as those in the North Sea can be very lucrative, as well.

"Oil and gas exploration in the North Sea has experienced phenomenal growth," says Brian Gunn, CEO of engineering consultancy Advantica. His company, operating an office in Aberdeen, Scotland since 2001, has been facing an ever-increasing workload. In response to Advantica's continuous growth and the company's new role as a member of the GL Group, the Aberdeen staff was moved into a larger office in

a new complex recently. 20 engineers are currently working at the Aberdeen office at Riverside House. And there is space for more.

Paul Shrieve, Advantica's Executive Director, explains: "The North Sea is probably one of the most important oil and gas regions worldwide." It also functions as a role model for other exploration areas. "A lot of technology, best practices and methodology in the North Sea have been exported into other developing oil and gas regions."

Safety standards in the British North Sea are among the toughest in the world of oil and gas. "This is due to the Safety Case Legislation which was introduced in response to the Piper Alpha incident in the late 1980s," explains Paul Shrieve. "Piper Alpha was a North Sea oil production platform, which was destroyed by an explosion and fire, killing 167 men. Nowadays there is an improved safety-based culture in the North Sea." A perfect environment for a company offering engineering consultancy services designed to enhance safety and performance.

Fast, High-value Support

New measuring methods and refined directional drilling techniques capable of penetrating depths of up to seven kilometres have improved the yield from North Sea oil deposits. "The North Sea is actually just past its predicted peak," says Howard Thompson, Technical Safety Manager at AMEC, one of the world's leading engineering consultancies for the oil and gas industry. "But it took forty years to get to that peak and will probably take another forty years to get past it." Technology continues to improve, he points out.

AMEC, a British company headquartered in London, serves an international market. "We are everywhere where there is oil," Howard Thompson says. AMEC's services go past expert consulting in the oil and gas industry: "We can basically be involved in anything that can be built and requires project management." In some cases, e.g. when carrying out safety cases, AMEC calls on fast, high-value support from outside. In the field of safety analysis, AMEC and Advantica have been co-operating for years.

"For example, Advantica produced the safety cases with detailed technical information for the Armada platform. Their analyses have been quite valuable," Thompson

states. The Armada platform produces gas, condensate and oil from a number of fields in the UK North Sea and the adjacent Seymour field. The entire complex is operated by British Gas (BG) Group. Co-operating with Advantica was a natural choice. After all, Advantica is a spin-off of the BG organization.

"When British Gas divided up into a number of components, the research and development department of BG became Advantica," recounts Paul Shrieve. Now, with new support and the extended network of Germanischer Lloyd, he is looking forward to expanding Advantica's projects across the globe. "We have a whole new range of opportunities and arguments to approach our customers. Now, we are able to manage global accounts, sharing the resources with Germanischer Lloyd."

Both Advantica and its customers will benefit from this new perspective. Martin Worth, Aberdeen-based Lead Safety

Engineer with Canadian oil company Talisman, is pleased with the development of Advantica. A former Advantica employee, he is glad to see the company expand. "For us it is important to have people based in Aberdeen who can respond quickly. It is good to see the office grow – but with quality people." Highly qualified staff are difficult to find in Aberdeen. "Recruitment is a major problem for everyone in the industry," says Martin Worth. Even for a company like Talisman, an international upstream oil & gas company operating in North America, Southeast Asia and the North Sea.

Indeed, the hardest challenge for Advantica's Aberdeen office is to find qualified engineers. "The demand for technical experts across the area is extremely high," says Paul Shrieve. "We have successfully recruited a number of people from all parts of the world. But most of them come directly from university." Nevertheless, Advantica's position has improved significantly since last year when the industry knew that the company was up for sale. "We are growing, we are investing in Aberdeen," Paul Shrieve is pleased to say. "And we have a lot of work to do. There is a lot more investment coming in and we can offer more opportunities to our employees!" The plan is to treble the local work force within the next two years.

A wise step: Prospects for oil operations in the North Sea are bright. Although new oil field discoveries in the North Sea tend to be relatively small, the existing platforms and infrastructure still make it one of the world's most attractive areas to flow oil. For Advantica, this is good news but no longer crucial for survival. Paul Shrieve concludes: "With the support of Germanischer Lloyd we are now ready to serve the world." ■ AM

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MILESTONE. Advantica's Executive Director Paul Shrieve opened the new office in Aberdeen.



SCENERY. View to the harbour of Europe's "oil capital" Aberdeen.



Store of Power

The gain of wind energy fluctuates. Intelligent storage technology could stabilize the energy supply. Scientists work at full speed on solutions to the problem

Wind energy is not an entirely dependable source of power. This fact is constantly used as ammunition by the renewable energy sceptics. After all, a modern industrial society needs reliable sources of energy: only with the aid of conventional power stations can the gaps arising during lulls in the wind be closed properly. For years now, scientists have been working on diverse concepts for reliably storing the energy harvested from wind turbines. Thus far, compressed-air and pumped storage and the use of gigantic battery depots have been considered. There now appears to be a trend towards compressed air energy storage (CAES) as a "power warehouse". About two years ago, the utility company EnBW started the planning phase for an EU-funded project involving a compressed air storage facility in Lower Saxony, Germany.

Solutions for Lowlands

Whenever their electricity is not required immediately in the grid, some large power stations feed their energy to pumping stations, which push water up to storage dams situated on a higher level. When the energy is needed again, the water is allowed to flow back down, driving hydroelectric turbines in the process. Since such facilities are usually located in mountainous areas, they are poorly suited for storing the energy produced by, for example, offshore parks or wind turbines close to the coast.

By contrast, a CAES plant makes use of the energy packed in compressed air. A compressor is used to create high-energy air and then store it in an underground salt cavern, for instance. The whole air reservoir is closed off by a valve, which can then be opened during periods of peak demand to let the air drive a turbine. Such plants may seem farfetched, but they already exist: in the US State of Alabama and also in Huntorf, Lower Saxony. There, the first compressed air energy storage plant in the world was set up in 1978 to collect the electricity produced during the night by a nuclear power station in the form of air at a pressure of 70 bar, and then transform it back to electric-

ity during the day to serve the peak loads. Unfortunately, such plants are quite wasteful – the Huntorf facility offers an efficiency of just about 42 per cent. When the air is compressed, the compressors must be cooled considerably by burning fossil fuels; when the air passes through the turbines, they have to be heated, otherwise they would immediately ice up, owing to the high pressure drop.

The special feature of the new EnBW plant is that the engineers intend to apply "adiabatic state changes" in developing a method to boost the efficiency to 70 per cent. In concrete terms, the aim is to buffer the heat generated by the compression process so that it can be utilized during the expansion phase for preheating the cavern air to the turbine inlet level. The adiabatic system also needs a heat storage tank. The plant can function without the additional combustion of fossil fuels. Admittedly, this scenario – with a capacity of 100 to 250 megawatts – is really still "up in the air": at present, the search for a site with an acceptable cavern as mass storage vessel for the compressed air is still continuing. In principle, it is possible to store compressed air in a wide variety of geological layers, but the most reliable and cost-effective formations are believed to be salt domes.

Comeback of Batteries?

Germany's second-largest supplier of energy, RWE, also believes that air is the answer. At the end of last year, RWE and the US group General Electric signed a declaration of intent on the development of a compressed air energy storage plant. The focus of their research activities will be on the design of a heat storage unit, the development of the air turbine, and the identification of suitable locations for storing the compressed air. A feasibility study for the construction of a demonstration plant is to be compiled by the end of the year, and the aim is to have the plant up and running by 2012. In the meantime, other concepts are also being considered, and even the long-derided idea of storing energy in batteries is making a comeback. At its technology centre in Nottingham, the E.ON Group is currently working on a huge battery offering the capacity of one megawatt in a housing the size of four truck containers.

By contrast, the German company ENERTRAG declares that only the conversion of wind energy into hydrogen will allow the long-term storage of large quantities of energy at low cost. Not far from the Polish border, the company is currently operating a power station in which 230 MW of wind energy and 20 MW of biogas electricity are being fed into its own high-voltage grid. This energy mix in the feeder network forms the basis for an innovative hybrid power

complex – with a capital expenditure of 19 million euros – scheduled to come online in 2009. Here the goal is to produce hydrogen by means of three wind turbines with an output of 400 kW, using an electrolyser. This unit is coupled with a 400 kW biogas plant and an

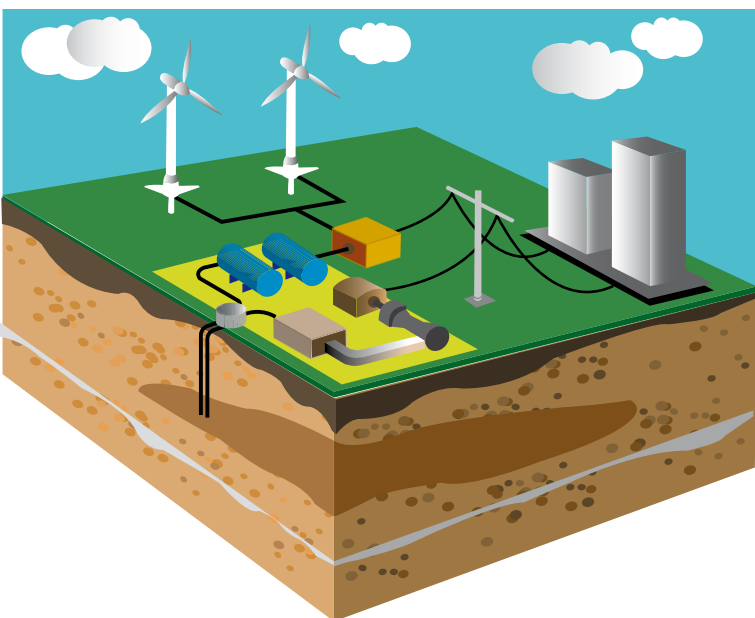


Photo: Gero Vogel

PATTERN. In Huntorf, Germany, the first compressed air storage facility worldwide was installed in 1978.



Photo: Siemens AG



Compressed Air as Energy Storage

At the compressed air storage technique the power, produced by wind energy plants, is used to compress air. The air is stored subterraneously. In a calm period it is activated to drive the turbines.

HusumWind 2007 exhibition by the US company General Compression: instead of a generator, four compressors are located in the nacelle of the wind turbine. These are used to convert the wind energy directly into compressed air. With the aid of an underground pipe network and a power station of expanders and generators, the plans are to generate and store between four and twelve energy hours a day.

The Federal Ministry for the Environment in Berlin is also pushing things forward: a feasibility study has been ordered from Clausthal University of Technology to investigate the possibilities for integrating large quantities of offshore wind electricity into the grid. A completely new approach is reflected by the combination of compressed air storage units and electricity generation using lean gas from reserves in the North Sea. The main thrust of this research programme is to drive technical progress to optimize the power supply in accounting for the growing proportions of renewable energy sources. No doubt about it: in view of the ambitious targets set by the Federal Government for the expansion of renewable energy, the provision of adequate storage technologies is one of the research objectives with the highest priority. ■ CG

above-ground storage facility. A sophisticated control system installed locally decides whether the plant should generate electricity or hydrogen. Hydrogen is an energy carrier that is relatively easy to produce from wind-based electricity: by applying the electrolysis method, efficiency levels of 70 to 85 per cent can be attained. The hydrogen produced in this way has an energy content of about 100 kWh per cubic metre at a pressure of 30 bar.

According to ENERTRAG, this is one hundred times greater than the same volume of compressed air. What is more, hydrogen is easily transported through pipelines; large quantities of hydrogen, mixed with methane, can also be stored in caverns. The experts are convinced that, in a few years' time, the demand for hydrogen will grow enormously through its use for transportation. If the automotive industry really does commence series production of hydrogen-powered cars, as is slated for 2009, hybrid power stations will be able to supply this emerging market with a pollutant-free substitute for petrol and diesel.

Another surprising and innovative storage concept is the "Dispatchable Wind Power Systems", presented at the

CLASSIC.
Energy storage by pushing water to a reservoir situated on a higher level.

Photo: Vattenfall





Predilection for technology: Katarzyna Krulczewska, Tanya Valova, Gabriele Leuer, Katerina Franzen and Alke Schultz (from left).

Women Power in Plan Approval

Is the engineer's world a man's world? Certainly not as Germanischer Lloyd shows

They are young, they are female, and they are all ship enthusiasts. Tanya Valova, Katerina Franzen, Gabriele Leuer, Alke Schultz, Katarzyna Krulczewska and Iris Leistner are engineers in charge of plan approval. "When I tell people about my job, they always react the same way: they look at me with big eyes, and then they ask how I ever ended up with this," says Gabriele Leuer. "The fact is, this job is lots of fun and incredibly exciting – something most people cannot imagine," adds engineer colleague Katerina Franzen.

The shortage of skilled personnel, especially engineers, is a serious problem. For example, Germany: according to a 2007 survey by the German Association of Engineers (VDI), 25,000 job openings for engineers remain unoccupied every month in Germany. In spite of the lack of skilled personnel, the unemployment rate among female engineers was twelve per cent in 2006, more than twice that of their male peers. Experts identify the difficulty of reconciling professional and family duties as well as prejudice against female engineers as possible reasons. Only about twelve per cent of all German engineers are female. Women engineers therefore have something of an exotic status in the corporate world. While the number of female engineers rose by four per cent in 2007, the total number is still too small to satisfy demand.

The ladies working in plan approvals at GL quote a variety of reasons for their decision in favour of an engineering career in general, and shipbuilding in particular. Katerina Franzen says it was her fascination with the sea that made her opt for shipbuilding; Alke Schultz followed a family tradition, while Gabriele Leuer discovered her interest in ship-

building during an internship while still attending secondary school. Tanya Valova and Katarzyna Krulczewska were so fascinated by big ships they chose shipbuilding as their educational focus. Iris Leistner recalls: "I was impressed by the idea of contributing my knowledge as a professional to enhance safety at sea." While studies have shown female engineers spend twice as much time looking for employment after graduation as their male colleagues, the six women at GL had no problems finding a job.

Both Tanya Valova and Katerina Franzen had begun working part-time with GL while completing their academic studies. Both did their graduation research at GL. Following graduation, they immediately began working as plan approvers. "I felt well accepted from the very beginning," says Tanya Valova. She got used to being one of very few women in engineering while she was attending university.

Earning Appreciation

At GL, the young women have all the options available to them. Tanya Valova, for example, will go to South Korea for three months in September, then to Shanghai for three years. "This is a great challenge for me, and I am very much looking forward to it," the 28-year-old says. She has been studying Mandarin, her fifth foreign language, for the past six months. "I am not under the impression that I am second to any of my male colleagues in any way," she says. Katerina Franzen adds that respect and appreciation are things one has to earn in any profession, whether as a man or woman. Another point where the six plan-approval engineers are in full agreement.

■ AN

In a class of their own

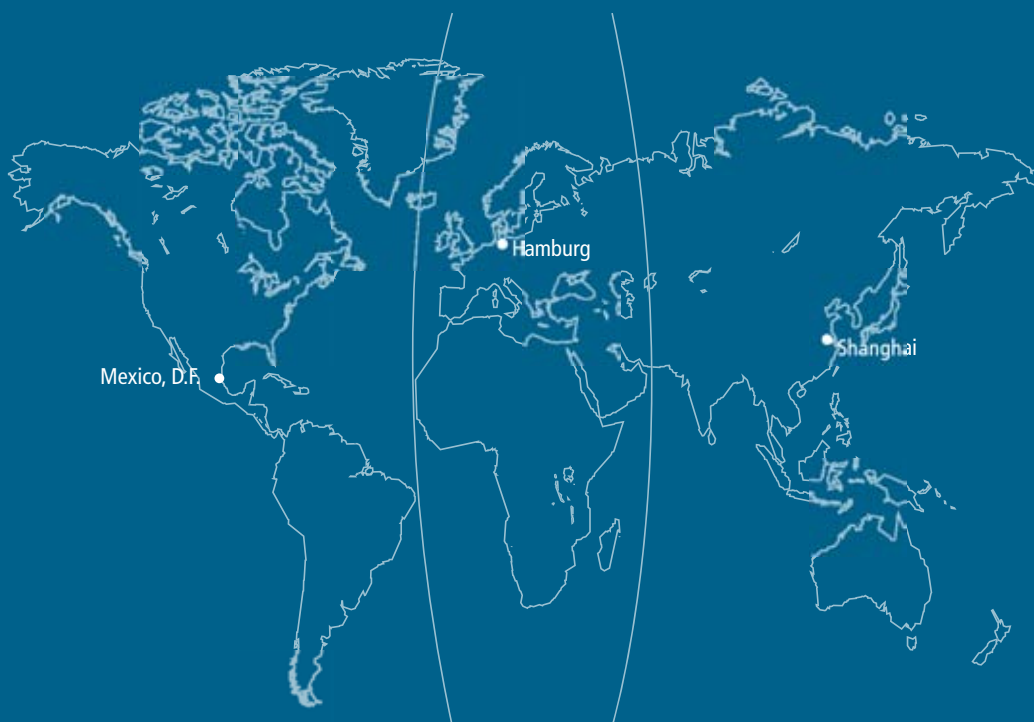
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