

Germanischer Lloyd

ISSUE 2 · 2009

nonstop

The Magazine for Customers and Business Partners

GL Group

Perfect Interaction

Simulation *Lifeboats in Free Fall*

FPSO *Tankers Feeding Tankers*

Wind Energy *Worthwhile Investment*

FuelSaver

The smart way to save fuel



Save fuel? GL shows you how. In three simple steps.

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Dear Readers,

"The times they are a-changing." The effects of the global financial crisis are becoming noticeable not only in shipping but also in other branches of industry. In their quest to meet the needs of the market and to offer their customers an even more comprehensive portfolio, companies everywhere are prospecting for innovative services and new fields of business. The current situation offers a golden opportunity to set the course for efficient and sustainable business operations.

In addition, the rapid change in the world's climate calls for concerted efforts by the community of states, in order to achieve quantifiable success in the battle against global warming. A frugal and economical use of fossil energy sources is everyone's duty, the increased application of renewable energy sources – such as wind, solar and water power – the logical consequence. In this field, Germanischer Lloyd is a competent and reliable partner.

Extended spectrum of services. On 1 May, the cartel authorities approved the merger of Noble Denton and Germanischer Lloyd, making this British enterprise the youngest member of the dynamically growing GL Group. With a global workforce of over 900 specialists, Noble Denton has been instrumental as a marine advisor and warranty surveyor in reaching most of the major milestones in the offshore industry. Together, we will provide consulting, assurance as well as project management on a worldwide scale, especially for the oil & gas and renewable energy sectors as well as for the maritime industry. As a result, we are becoming the leading provider of services to the offshore sector.

The use of mobile FSO/FPSO units can transform production in small or remote oil fields into an attractive business proposition, as described in our article on producing oil without a pipeline (from page 39). Especially in these times of financial crisis, a thorough evaluation of the technical and commercial feasibility is simply indispensable, and this is true not only of wind energy projects. The due diligence service of GL Renewables (see page 44) helps to put projects on a firm footing – from both the technological and the financial viewpoint.

Once again, a lot has happened at Germanischer Lloyd. With Friendship Consulting and Friendship Systems joining the GL Group in January, we were able to extend our range of consulting and software services for shipping companies and yards as well as the maritime supply industry. This was soon followed by the acquisition of International Refinery Services in Singapore, giving GL extensive expertise in the field of risk management and sophisticated inspection techniques. Know-how and services from a single source: in the lead story (from page 12), read how GL and the new member companies have systematically broadened the performance spectrum in both the Maritime Services and the Industrial Services – all to your benefit.

Whatever your plans, ask us first – we support you in all your endeavours. Globally and locally.

Yours sincerely,

Pekka Paasivaara
Member of the Executive Board
Germanischer Lloyd



Pekka Paasivaara

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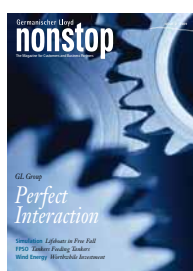


Photo: Corbis



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Cover photo: Corbis

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Professional technical and management services for the booming oil industry in Western Asia

Jackup Rigs Refurbished

In 1976, the oil drilling rig "Al Ghallan", a three-leg, rack-and-pinion jacking unit, was the first mobile offshore drilling unit (MODU) commissioned by National Drilling Company (NDC), the leading drilling company in Abu Dhabi, United Arab Emirates. Built in Clydebank, UK by Marathon Shipbuilding Co. Ltd., Before refurbished, Al Ghallan used to have an aft hull slot for oil-well-platform approach. A total of nine units owned by NDC have been classed and handled by GL Abu Dhabi Maritime Services since 2000.

Hand-in-hand. When the prices of new offshore drilling units skyrocketed in recent years, NDC launched an initiative to upgrade their existing fleet, called Rig Integrity Assurance Program (RIAP). The refurbishing project consists of two major phases: basic design approval, and shipyard supervision and initial surveys. While the basic design has been handled and approved by the GL Industrial Services Oil & Gas division in Hamburg, GL Abu Dhabi has been in charge of supervising the construction, conducting the surveys and coordinating the detailed design of the units to be rebuilt during 2008 and 2009. The works are carried out at the Lamprell and MIS Shipyards in Sharjah, 170 km from Abu Dhabi. The modernized Al Ghallan was recently redeployed in the Gulf.

Photos: Pramod Mondhe



Conversion. GL supervises the modernization of drilling rigs.



news

GASCHEM. The tonnage of GL-classed ships has more than doubled, and rose to 80 million GT in 2009.

Photo: Meyer-Weert



As at: 31.03.09

GL FLEET

Topping the 80 Million GT Mark

The classification of the gas tanker "MT GasChem Nordsee" by Germanischer Lloyd marked the society's 80 million gross-tonne threshold. "MT GasChem Nordsee", flying the German flag, was delivered in late March by Meyer shipyard, Papenburg, Germany. The LPG (liquefied petroleum gas)/ethylene tanker is the first of a series of

four gas tankers of the same hull type to be built by Meyer shipyard and its sister firm, Neptun Shipyard by 2010.

Double Use. An advanced design with a gross tonnage of 13,878, the vessel can hold up to 17,000 m³ of liquefied gas in its cargo tanks. Besides LPG, the tanker is also designed for the transport of liquefied ethylene gas

(LEG), a key substance for the petrochemical industry. The tanker, measuring 154.95 metres in length and 22.70 metres in width, has a maximum draught of 10.60 meters and cruises at a speed of 17 knots. "MT GasChem Nordsee" will initially be deployed by Japan's Marubeni Group to ship liquefied gas to Asia.



Photo: Dreamstime

MARPOL

Fuel Tank Protection: Beware of Delays!

Environmental protection, prevention of marine pollution and enhanced ship safety all benefit from fuel oil tank protection. GL helps in identifying hidden risks and avoiding regulatory sanctions for non-compliance.

The shipping industry is now quite familiar with the requirements of the revised MARPOL Annex I, Regulation 12A on Oil Fuel Tank Protection (FTP). Most current designs were developed to comply with the FTP requirements, in particular, the location and size of fuel tanks in all ships with an aggregate oil fuel capacity of 600 m³ and above.

Hidden Risk. The regulation applies to ships whose building contract was signed on or after 1 August 2007 or whose delivery is scheduled for 1 August 2010 or thereafter. In the absence of a building contract, the regulation applies to ships with keels laid down on or after 1 February 2008.

However, there is a hidden risk regarding the effective dates. It is not only the date of the building contract that decides which ships must comply but also the completion date: any vessel completed after 1 August 2010 is subject to the new FTP provisions.

In response to the current weak freight market, there is a trend towards slowing down the building of vessels. Notwithstanding the benefits of delayed completion under certain circumstances, GL is aware of the necessity to support shipowners and shipyards in meeting the FTP requirements.

High Oncost. If the completion of a vessel is delayed beyond 1 August 2010, the provisions of FTP will apply to that vessel. Converting a completed vessel to meet the FTP requirements will typically cause considerable expense. Therefore any proposition to delay the completion of a vessel should give due consideration to the FTP issue.

In cases where modifications to arrangements might be necessary, GL can assist customers, drawing on its broad experience in the field of FTP. GL's service offerings range from simple pre-checks to enhanced design proposals that improve environmental safety while reducing the economical impact of the modifications to be made.

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SHIPBUILDING. Due to the FTP requirements, delayed completion of vessels can cause considerable expense.

CHINA

The Future is Ship Efficiency

During its first shipping and shipbuilding forum in Shanghai this year, GL was promoting “ship efficiency” as a competitive advantage for shipyards in a challenging market environment and offered a full spectrum of technical as well as operational topics concerning the maritime industry in heavy seas. Shipowners are basically interested in running fully laden ships at low operational costs. “Fully laden vessels are dependent on the global demand and trade patterns while low operational costs depend on the way a ship has been built and how it is sailed,” said Executive Board Member Dr Hermann J. Klein.

With respect to the latter aspect, shipyards have a very important role



FORUM. GL experts in Shanghai (f.): Executive Board Member Dr Hermann J. Klein, Dr Pierre C. Sames (Research & Development), Holger Jefferies (Approval Services East Asia), Jan-Olaf Probst (Ship Newbuilding).

to play. Says Dr Klein: “I am convinced that ship efficiency is the key for shipyards to overcome the current stagnation!” He pointed out, that constant technological enhancement is the only way to keep costs at a reasonable level, promote efficiency and generate competitive advantages.

Strong Growth. China’s shipbuilding industry has an enormous market potential. “The future of the world economy is still bright, especially in Asia

where the growth potential is huge and population size massive, which represents requirement for much more shipping and specific vessels and higher energy efficiency,” said Dr Volkmar Wasmansdorff, Head of Region Asia/Pacific. “To prepare for the recovery stage, shipping companies and shipyards have to optimize their products regarding energy efficiency and operation,” Dr Wasmansdorff said at the seminar which attracted more than 180 participants.

MLC CERTIFICATION

Settle the Seafarers’ Bill of Rights

Another step forward in safeguarding the seafarers’ working and living conditions: After Liberia, the Marshall Islands and Bahamas, Panama as the fourth and Norway as the fifth flag state have now ratified the Maritime Labour Convention (MLC), 2006. Once the Convention comes into effect, it obligates the acceding

states as well as the shipowners and operators to define and implement statutory requirements complying with the minimum standard of the Convention.

Helpful Package. MLC, 2006 certification applies to all vessels of 500 GT or above performing international voyages, except navy ships and

vessels built in traditional naval architecture. GL offers a certification package including a self-assessment tool to help shipowners prepare and achieve certification in time. With a gap analysis on board, GL can determine what needs to be improved before ships fulfil the requirements.

The GL Academy provides seminars and workshops on MLC, 2006. It is suspected that the convention will come into force in 2011. By then some 50,000 ships must be certified.

LIFEBOATS

Concentrated Inspection Campaign

Each year the major PSC regions launch a so-called Concentrated Inspection Campaign that focuses on an agreed topic. The next campaign is scheduled for September to November 2009:

CIC on Lifeboat Launching Arrangements (SOLAS Ch. III)

When boarding a ship, the PSC inspector will check the respective equipment and related documentation on board in addition to the general PSC routine inspection. It has been officially confirmed that the re-

gions PARIS MOU, TOKYO MOU, INDIAN OCEAN MOU and BLACK SEA MOU will participate in the campaign.

The inspection follows a checklist prepared by PSC. This list will be published by the regions on their respective websites at the beginning of August. GL will post the checklist within the “PSC related” section of its own website. Shipmasters should take note of this and take the necessary steps to ensure proper maintenance of their equipment (see also Extra, page 27).



DQS

GL Receives ISO 9001:2008 Certification



Germanischer Lloyd's (GL) Maritime and Corporate Services received the ISO 9001:2008 certification. It was awarded by the German certification body DQS (registrar in independent third party management system certification) after a thorough assessment of GL's quality management system. GL complies with internationally recognized standards for quality systems.

High benchmark. The ISO 9001:2008 certification process started in November 2008. Germanischer Lloyd

developed and implemented a Quality Assurance System that conforms to the strict requirements of the ISO 9001:2008 standards. "By implementing the ISO standard Germanischer Lloyd has committed to a high benchmark which will be binding for us in future", said Dr Hermann J. Klein, Member of the Executive Board Germanischer Lloyd, at the handover of the certificate.

The quality management has been reviewed according to criteria such as customer orientation, accountability, leadership, process-orientation as well as continuous improvement, to name a few.

SAUER COMPRESSOR

Serial No. 100,000

A premiere was recently celebrated at the Kiel test bench of J.P. Sauer & Sohn Maschinenbau GmbH: the compressor with the serial number 100,000 received its GL inspection stamp not from a surveyor, but from Dr Edgar Schmitt, Managing Director of Sauer. Before this, GL had examined the quality of the materials and production process.

Premium Standard. The unit belongs to a series of 2-stage air-cooled starting-air compressors. Today, the principle of air cooling belongs to in-

ternational shipbuilding standards where starting-air compressors of smaller capacity are concerned.

Sauer compressors count among the most modern and maintenance-friendly compressors available worldwide. They feature low installation costs, lightest weight and small installation space. They offer reliable and safe operation even at ambient temperatures ranging up to 60 °C. The anniversary compressor, which is of the type WP 45L, will be used on a new building of the Hamburg Sietas yard.

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INSPECTION STAMP. Dieter Stecher, Martin Maybaum (l., both GL) and Dr Edgar Schmitt, Managing Director of J.P. Sauer & Sohn Maschinenbau (r.) in front of the anniversary compressor.

VCSC

ISM-Certificate Confirms High Safety Standards



HANDOVER. VCSC executives (from l.) receiving the ISM Certificate. Do Viet Ha, Phan Xuan Son, Dinh Hai Bac, General Director (all VCSC), GL's Country Manager Vietnam Le Thanh Binh, Le Xuan Thanh, Tran Van Sang and Do Tuan Nam (all VCSC).

Vinalines Container Shipping Company (VCSC) received the Interim Document of Compliance required by the International Safety Management-Code (ISM Code) from GL. The certificate documents that VCSC implements a Safety Management System (SMS) to comply with national and international standards for the safe operation of ships and pollution prevention. Le Thanh Binh, GL's Country Manager Vietnam, presented the Document of Compliance to VCSC executives at a ceremony in Hanoi.

High Aims. "We have always been dedicated to the safety of our people and the marine environments where we operate," said Dinh Hai Bac, General Director of VSCS. "ISM certification is further evidence of our commitment. In fact, we have chosen to implement

the ISM standards throughout our fleet." VCSC has been newly established as a subsidiary of Vietnam National Shipping Lines (Vinalines). VCSC operates all its containerships under the flags of Vietnam and the Republic of Panama.

Provided Proof. The SMS covers all aspects of shipboard operations, including crew qualifications, vessel maintenance, emergency procedures and internal audits. The certification documents that VCSC provides safe practices in ship operation and a safe working environment. VCSC established safeguards against risks and continuously improve their safety management skills of personnel ashore and aboard ships. VCSC complies with mandatory rules, and considers applicable codes, guidelines, and standards recommended by the industry and GL.



Photo: Dreamstime

WELD. Optimized welding processes can reduce costs and improve the durability.

10th CONFERENCE

The Diverse World of Welding

Advanced bonding and welding technology can reduce the costs of building ships and other steel structures considerably while offering significant improvements in terms of structural integrity. Foundations of offshore wind turbines require specialized, optimized welding processes due to the exceptional stresses they are exposed to in the maritime environment.

New Trends. In April, about 120 experts from the maritime and offshore industries met in Hamburg for the 10th Conference on Welding in Shipbuilding and General Engineering to exchange ideas and discuss new industry trends. Eleven presentations by business, science and industry experts highlighted innovative designs, materials, welding processes and testing methods for maritime applications. The event was hosted jointly by GL, the Training and Research Centre for Welding Technology, Hamburg (SLV), and the German Welding Society (DVS).

The next conference will take place in Hamburg on 28/29 April 2010.

OCTOPUS

6,000 Metres Below Sea Level

For the video-guided hydraulic gripper made by OCTOPUS in Kiel, Germany, working at 6,000-metre ocean depths doesn't pose any problems. GL supported and supervised the development and manufacture of the gripper, reviewing the drawings and performing in-process checks, a harbour inspection and a full range of functional tests. The GL experts subjected the device to load and tensile tests, applying loads of up to six tonnes. The gripper is deployed by the German research institute IFM-Geomar on its research vessels.

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INDIA

New Office, New Advanced Training

With the move to a larger office in Mumbai, more manpower, and new projects with the Anglo-Eastern Maritime Training Centre (AEMTC), Germanischer Lloyd expands its activities in India.

The cooperation agreement with AEMTC focusses on advanced maritime training. Collaboration includes value-added seminars and workshops for the maritime industry, as well as the development of a common trainer pool. The first GL Academy course,

graduates to participate," explains Winfried Jaray, Market Development Manager Region Asia/Pacific with GL. "A preparatory module brings graduates up to speed on basic ship theory before they immerse themselves into the science of ship design." The course is divided into a seven-month core module and a subsequent one-month specialization module at Bharati shipyard, one of the leading private-sector shipyards in India. The first course begins this summer.



Cooperation. Dr Hermann J. Klein, Member of Executive Board GL and Capt. K.N. Deboo, Principal of AEMTC. OPENING. High profile visit at GL's new office in India.

titled "Ship Structures II", was held in February. Further courses covering a variety of topics will follow during 2009. In addition, AEMTC and GL Academy have teamed up to bring GL's wide range of specialist seminars to different locations in India several times a year.

High Expectations. Offering an "Advanced Diploma Course" in naval architecture for post graduates is a project the two partner organizations have put high on their agenda. A Memorandum of Understanding was signed by Dr Hermann J. Klein, GL's Executive Board Member, and Capt. K.N. Deboo, Principal of AEMTC. "At AEMTC we are extremely enthusiastic about the opportunities that have been created by this collaboration. I look forward with great anticipation to the commencement of this course and other training projects that will follow," said Capt. Deboo.

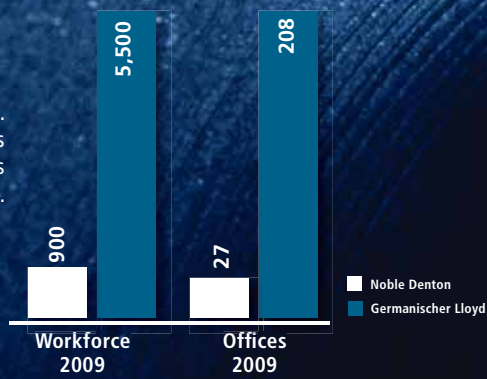
The naval architecture course is a hands-on programme. "The entry-level stream has been kept flexible to enable a broad spectrum of



The signing of the contract for the naval architecture course was a highlight at the opening ceremony of the new GL office in central Mumbai. To meet the rising demand for classification and related services, GL has increased its staff considerably and moved into a larger office. The new premises are located in the emerging business district of the Kurla-Bandra Complex which is centrally located and equidistant to both the old Mumbai Port and the Jawaharlal Nehru Port Trust (JNPT) container terminal.

More Stations. "Strengthening our presence in India significantly is an important step in our strategy of supporting our Indian and international clients even better and faster in the future. We took decisive action to support our Indian customers when we established Station Goa in 2008. Additional stations will follow this year," said Dr Volkmar Wasmansdorff, GL's Head of Region Asia/Pacific. GL currently has offices in Chennai, Delhi, Gujarat and Mumbai.

GLOBAL NETWORK.
More than 200 offices
and over 6,400 experts
available worldwide.



Perfect Interaction

Germanischer Lloyd continues to expand its range of technical service offerings. The most recent accomplishment is the merger with Noble Denton. The result is an integrated technical testing and certification enterprise with a global reach, capable of offering a comprehensive portfolio of services to its customers in the maritime and energy industries. Global coordination will deliver the combined expertise of both companies to local customers anywhere

A strong connection: The merger of Noble Denton and Germanischer Lloyd in April forms a fully-integrated technical assurance and consulting company to serve the worldwide energy industries. The new entity will provide assurance, inspection, and consulting as well as project management on a worldwide scale.

It will focus its worldwide services along the entire oil and gas life cycle – upstream, midstream, and downstream – renewables and onshore and offshore energy installations.

This includes safety, integrity, reliability and performance management.

“The merger is a reflection of the needs of our clients, who increasingly face challenges relating to technology, the environment and asset integrity. They are looking for partners who can provide a single source of engineering, consulting and project management services in the regions in which they are based. This merger will ensure that we become the premier global business partner →

→ in oil and gas, renewables and energy supply markets,” says Pekka Paasivaara, Member of the Executive Board of Germanischer Lloyd.

A New Dimension of Services

Germanischer Lloyd, headquartered in Hamburg, Germany, and Noble Denton, headquartered in London, UK, have followed similar growth strategies. Both organizations have recently conducted a number of acquisitions to complement their areas of expertise. Acquisitions by GL include the UK-based Advantica Group, Canada and US-based PV Inspection, Montreal-based Helimax, Kuala Lumpur-based Trident Consultants, US-based Materials Consulting Services, International Refinery Services in Singapore (see page 18) and the companies FriendShip Consulting and FriendShip Systems in Potsdam, Germany (see page 15). Noble Denton has strengthened its portfolio by acquiring Martech Unlimited, BOMEL Consultants, Intelligent Decisions, Poseidon Maritime Ltd., Lowe Offshore International Inc., Standard Engineering and Brevik Engineering.

“With Noble Denton’s expert knowledge in assurance and consulting as well as project management and transportation and installation services relating to offshore assets, we will enter a new dimension of services and expertise for the marine, offshore oil and gas industry. We will be the full service provider for the entire life cycle of oil and gas installations,” says Pekka Paasivaara.

Common Values, Common Goals

Both companies serve clients from oil and gas companies, contractors, shipyards, shipowners, consultants, designers and financial institutions across the marine and energy industries. The joint workforce will amount to more than 6,400 employees in 80 countries.

“Noble Denton is excited to be merging with GL. We share the same values of safety, integrity and technical excellence. This partnership brings benefits to our clients and employees alike. We are now able to provide to our clients an even more comprehensive service offering, with access to a greater number of technical experts and this will enable us to enter developing markets,” explains John Wishart, Group Managing Director of Noble Denton. Comprehensive expertise on a global scale: having joined forces, the two companies are now in a perfect position to face future challenges. ■ OM

NOBLE DENTON

With a long-established presence in all major oil and gas markets worldwide, Noble Denton is a world-class provider of life-cycle marine and offshore engineering services to the energy industries. The company’s existing highly-skilled, dynamic workforce of around 900 employees worldwide combines practical seafaring skills and high-end analytical engineering expertise.

Delivering innovative solutions to complex problems with integrity and technical excellence, Noble Denton has been involved as a marine advisor and/or warranty surveyor in reaching most of the major milestones of the offshore industry and continues to lead the way in the development of industry-standard marine operations guidelines.

www.nobledenton.com

TWO EXAMPLES: CURRENT PROJECTS OF NOBLE DENTON

Major Vessel Design Contract

Last August, Noble Denton won a major contract to carry out detailed design work for a new elevated support vessel. The deal with Gulf Marine Services in Abu Dhabi involves the preparation of a design package and license for

a multi-purpose self-propelled jack-up vessel, the Gusto MSC NG-2500X. The engineering work will be performed by the company’s subsidiary ODL from its Sharjah base, and work on the primary structure is already underway. The contract is a contributing factor in Noble Denton’s expansion in Sharjah where employee numbers will increase to 100 this year.

The NG-2500X is designed to perform field moves and jacking operations without tug assistance. The current design is intended for well services, repair and maintenance, installation and decommissioning projects. It provides accommodation for 150 personnel, is equipped with a 280-tonne crane and can operate in 200 feet of water. The unit will be built according to the requirements of the Panamanian flag and will conform fully with North Sea specifications. “There are insufficient lift boats of this quality in the market,” said Reuben Segal, Noble Denton’s Global Design & Construction Director. “Its unique design allows the vessel to operate in benign regions as well as limited areas of the North Sea, and its DP-2 class positioning system will permit a smooth approach to offshore platforms.”



Photo: GustoMSC



Photo: Redw

MEGA DEAL. Noble Denton supports the Thanet offshore wind park.

Largest Ever Contract

In September, Noble Denton secured its largest contract to date. The order from Thanet Offshore Wind Limited (TOW) covers project management and foundation installation management services for the Thanet offshore wind farm project. It consists of two individual contracts involving two of Noble Denton’s subsidiaries: BOMEL Limited has taken on the project management role including the design, construction, installation, testing and commissioning activities, while Noble Denton Consultants Limited are responsible for the foundation installation management.

Located off the coast of Margate in Kent, the Thanet offshore wind farm project will be the UK’s largest offshore wind farm. Power delivery is scheduled to begin as early as next year. The wind farm will provide power for up to 240,000 homes, increasing the UK’s total offshore wind power capacity by 30 per cent.




The Crunch Question

Friendship Systems joined the GL Group at the beginning of the year. Friendship-Framework is the company's world market-leading software application for computing hydrodynamically optimized ship hulls

The search for the ideal freighter hull always begins with the task of determining the water resistance the traveling vessel will have to overcome. The crunch question is, how can the power demand be reduced at a given, or even at an increased payload? Designing the optimal ship first and foremost means optimizing the design strategy.

This is where Friendship Systems comes into play. Claus Abt, Dr Stefan Harries and Dr Karsten Hochkirch, the three shipbuilding engineers who established the company in 2003, realized that the traditional approach – drafting →



PROTOTYPE.
Highest possible
payload with least possible
power demand.

→ the ship's hull on the computer screen – was no longer adequate. “We were convinced that ship designing methodology was going to evolve towards simulation-based design,” Claus Abt explains. The draughtsman engineer was going to be replaced by the designer giving shape to the hull through consistent application of numerical methods – purely mathematical strategies.

Thousands of Hull Variants

“At the outset, none of us really believed in this business model,” Abt confesses. “But the outcome has confirmed we made the right decision.” In summer 2007, after four years of work, the founders of Friendship launched an innovative simulation application they called “Friendship-Framework”. Now shipyards can have their computers generate several thousand variants of a design in a single weekend, depending on system performance. “What sets our method apart is the concept of describing a complex body based on a small number of parameters,” Stefan Harries points out. “While traditional approaches take hundreds of variables to define a ship's hull, all our method requires is ten to fifteen parameters. The key question is: How many parameters are ultimately commonsensical?”

Friendship-Framework is rooted in the well-established Computer-Aided Design (CAD) concept every designer is familiar with. What is new is the incorporation of Computational Fluid Dynamics (CFD). CFD software is used to compute, for instance, the water resistance and seakeeping properties of ships. The Friendship engineers call the result of this integration “simulation-driven design”. Following its market introduction, the application quickly established itself as the world's leading numerical design tool for bodies in a flowing environment. Friendship-Framework can not only be used to compute ship hulls but also turbo machines of all kinds.

World-leading Design Process

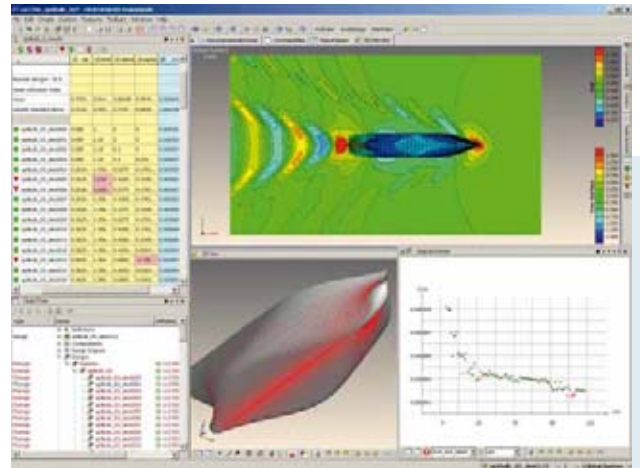
“If you work with the conventional CAD method, changing one point on a ship's hull will simply cause a dent at that location,” Abt explains. “With Friendship-Framework, changing one parameter will cause the entire hull to be adapted based on the overall design concept.” For example, entering a new value for the water angle of incidence into the user interface will cause the three-dimensional, freely rotating hull image displayed on-screen to take on a more slender contour. Within less than five seconds, the computer will produce the new data. The user can tell at a glance what the new, slimmer hull contour will “cost”: The water displacement, and thereby, the cargo capacity, have remained unchanged, while the reduced resistance will lower fuel consumption – and thus lead to higher energy efficiency.

Friendship Systems' customers are companies such as Thyssen Krupp Marine Systems, Meyer Werft, DSME in Korea, as well as Chinese shipyards and design offices. In August 2007, Friendship Systems presented Friendship-Framework version 1.0. An upgrade to version 2.0 was released this spring. ■ HS

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3D IMAGING. The behaviour of the hull in a flowing environment after optimization with the Friendship-framework.

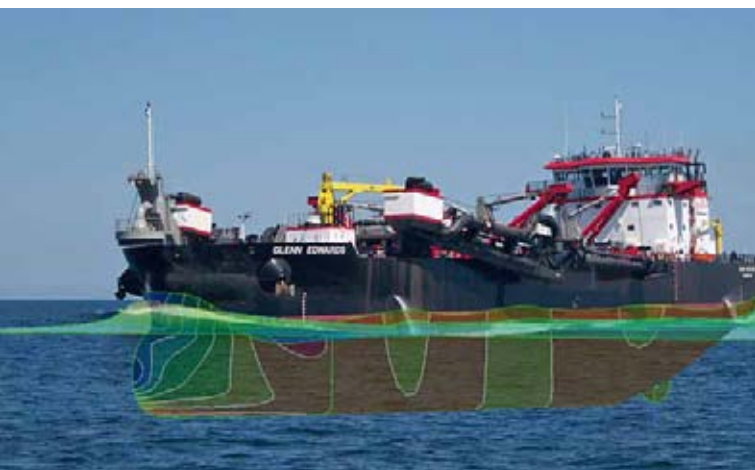
FutureShip –

Finding the best parameters for the on-board systems and an optimal ship design are key prerequisites for efficient ship operation. FutureShip, a new Germanischer Lloyd subsidiary established recently, helps customers get ready to face tomorrow's challenges

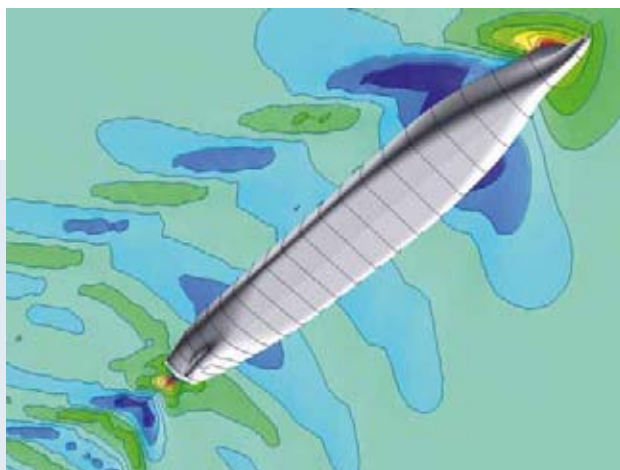
You don't have to be a prophet to know which way the wind is blowing. There can be no doubt that ships must become more efficient within the next few years. In the face of tighter environmental restrictions and rising fuel costs, ship operators have no other choice than to take advantage of whatever means can be found to optimize ship operation, on-board systems and hull designs.

To prepare for these challenges, Germanischer Lloyd established its new subsidiary FutureShip. “FutureShip offers a catalogue of services with a common objective: optimizing ships, both those in operation and those yet to be built,” explains Managing Director Volker Höppner. GL's FuelSaver programme, including CO₂ analysis (ECO Patterns) and operational fuel consumption analysis (ECO Practices) services, forms the basis of a range of expert consultation offerings geared towards reducing fuel consumption. To streamline the hydrodynamic properties of ships, Germanischer Lloyd integrated the expertise of its recently-acquired subsidiary Friendship Consulting, Germany, into the FutureShip pool of resources.

FutureShip is a comprehensive, detailed consultancy that scrutinizes all on-board systems of a ship for potential energy savings. “It all begins with the CO₂ index analysis,



WATER RESISTANCE. The computer-generated design optimizes the hydrodynamic properties to conserve fuel.



SELECTION. Many designs are better than the reference design – but only one variant will be accepted.

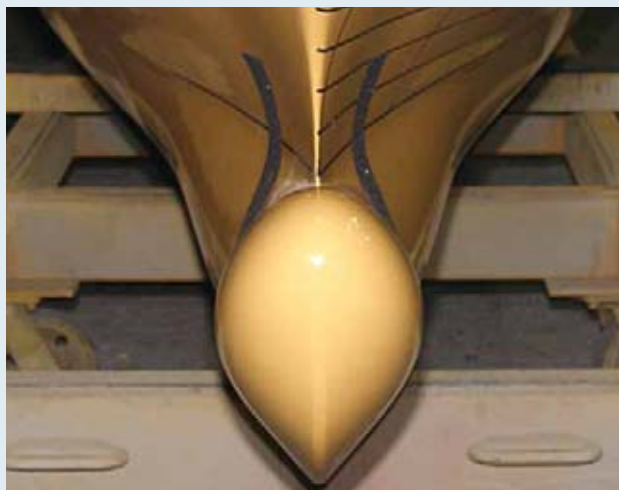
Designing for Energy Efficiency

which tells us how much power a ship is consuming on a certain leg," says Höppner.

Poring Over the On-board Systems

A frequent cause of energy wasted is the way the equipment is run. In addition, many systems operate at full load permanently, without even offering the option of reducing their energy use. In a two-day workshop, GL consultants will work together with a ship's crew, going over every single system on board to identify the operating routines. In many cases, the main engine is over-dimensioned. Coolant pumps are frequently poorly adapted, running constantly at full capacity. By installing a frequency converter, 70 per cent of the energy consumed by these pumps could be saved. "But most ships do not have a frequency converter," says Höppner. "And what is more, many ships with a design speed of 25 knots are run at no more than 18 knots. Since their bulbous bows are not optimized for that speed range, the generated wave patterns cause the water resistance to increase." As a result, fuel costs rise.

Dr Karsten Hochkirch, one of the founders of Friendship Systems, heads the Department of Hydrodynamics at FutureShip.



"We usually begin our calculations by generating a reference design – a plan for a ship that needs to be optimized." Using the parametric modelling tool Friendship-Framework and the custom-developed flow simulation software FS-Flow, the experts put 500 processors to work to calculate more than 20,000 hull variants within as little as two days. The resulting diagrams look like modern art - seemingly random patterns of red colour sprayed onto a sheet of paper. But each single dot represents one particular hull variant. The two axes of the graph represent water resistance and load carrying capacity, respectively; the "100" mark on each axis corresponds to the reference design. As many as one quarter of the computer-generated designs beat the reference design on both criteria.

A Gigantic Design Space

The FutureShip experts then begin to add other criteria, such as an optimized centre of buoyancy or higher stability. In a rigorous selection process, they extract a short list of about five designs to present to the customer. "It is usually not until this stage that the owner determines where he wants to go," says Hochkirch. The next step is a detail analysis. "The design space is huge," Hochkirch explains. The search for the right solution resembles a hike across unknown terrain. At the end of the analysis there will be one single variant – a "peak". This is the only design that will be tested physically in a ship model basin. "In most cases our design turns out to be four per cent more efficient," Hochkirch reports. "Once we actually achieved as much as 20 per cent." But for a Panamax containership sailing 260 days per year, 4 per cent of fuel conserved translates into savings of 1470 tonnes of HFO annually. ■ HS

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THE TIP. The shape of the bulbous bow must match the typical cruising speed of the vessel.

“More Tools for the Toolbox”

International Refinery Services (IRS), a specialist in the field of asset integrity management based in Singapore, is the GL Group’s most recent acquisition in a drive to expand the GL services portfolio for the petroleum, oil and gas industry

When the credit crisis was already dominating the headlines and front pages around the world, Germanischer Lloyd announced its latest acquisition at a press conference in Singapore. Journalists were curious to know how the company’s growth strategy will continue in such demanding times.

The answer came promptly. “Strengthen the global network, broaden the service portfolio and become a global engineering solution and service provider,” said Pekka Paa-sivaara, Member of GL’s Executive Board. “With IRS, the GL Group is acquiring substantial expertise in risk management while boosting our resources in advanced inspection techniques,” he explained. “We will continue to develop the Industrial Services business very aggressively.”

Previous acquisitions in Great Britain, Canada, the USA and Malaysia over the past 18 months had already strengthened the technical portfolio of GL Group considerably. The addition of IRS will enable GL to provide extended services specifically to the oil and gas industry in the Asia-Pacific region.

Long-Term Relationship

“We have worked with GL before and see this as a perfect match,” IRS Managing Director Doug Pauling comment-

ed. IRS first began to work with GL five years ago in joint projects located in Brunei, Singapore and Egypt. Doug Pauling continued: “We established a close relationship with GL. We contributed additional resources and also helped build one of the modules in GALIOM.”

GALIOM is Germanischer Lloyd’s asset integrity management tool designed to ensure reliable and economical plant operation throughout the asset lifecycle. The services offered by the two companies are perfectly complementary, Doug Pauling stresses. “You might say, we are contributing additional tools to the asset integrity toolbox of GL!”

John Lockwood, IRS’ risk and safety expert and GL’s new Vice President Risk & Process Safety, is convinced the merger will produce synergisms. “We do what we call total asset integrity management. The scope of our services goes far beyond inspections.” IRS’ risk management toolbox includes various management processes and methods such as HAZOPS (Hazard and Operability Study), QRA (Quantitative Risk Assessment), and RBI (Risk-Based Inspection), used to identify, evaluate and monitor risks associated with an asset.

Considering the current economic situation, is this a good time to sell asset integrity concepts? The experts at IRS are convinced it is. “The industry cannot wait for a

REFINERY. Asset integrity management for more safety and efficiency.



serious incident to happen and the government to introduce more legislation. It is crucial to be proactive, rather than just reacting to past events,” says John Lockwood. Doug Pauling adds: “In China we see a large number of maintenance projects in progress everywhere, mainly in gas. The facilities are ageing and have to be maintained properly.”

Safety and Risk Expertise

With their risk engineering expertise, IRS offer structural and earthquake engineering, evaluation of structural deterioration, offshore jacket inspection plans, LNG storage and terminal design assessments as well as finite element analysis of complex structural configurations. Advanced inspection techniques offered by IRS utilize state-of-the-art technology to evaluate pressure vessels, storage tanks, piping and heat exchangers for their continued mechanical integrity. This includes long-range ultrasonic pipeline evaluations, acoustic emission testing, magnetic flux scanning and other special ultrasonic thickness measurement methodologies.

John Lockwood explains the philosophy behind the process safety services: “Risk is a combination of the severity of the consequences and the likelihood that these events occur. The ultimate consequences are much easier to determine by computer modelling: how big the explosion is, how far the toxic cloud may travel, etc.

The likelihood of such events, however, is more difficult to predict accurately since it depends largely on human factors and the effective implementation of the client’s process safety management system. Therefore one has to take an even closer look at the factors affecting likelihood, particularly in this current unpredictable worldwide economic downturn, and try to ensure these events will never occur.”

IRS encourage their clients to implement and maintain all the elements of the process safety management system in an effective manner. “These elements need to be monitored and audited in-

INTERNATIONAL REFINERY SERVICES

Ever since its foundation in 1992, IRS has contributed to the safety, reliability and environmental performance of onshore and offshore installations, pipelines, terminals, refineries and all types of chemical plants throughout Southeast Asia and the Middle East.

The company assists operators in managing plants more efficiently through both online and offline-based services. 80 engineers with both field and analytical expertise serve customers throughout the region.

dependently as part of ‘total quality management’ to reduce the likelihood of major accidents to a level as low as reasonably practicable.” Under the current economic conditions, proposed cutbacks and/or changes in inspection and maintenance schedules must be subject to a risk assessment prior to implementation. Failure to do so will significantly increase the likelihood of a major accident, i. e. an incident that has been considered very unlikely or impossible could happen tomorrow.

A Close and Fruitful Cooperation

Germanischer Lloyd has been taking a similar approach in its asset integrity services, which have been offered for more than twenty years. John Lockwood explains: “GL and IRS have the same commitment to high professional standards in the prevention of all types of losses. And this is just one of the reasons why everybody is looking forward to a close and fruitful cooperation.” With effect from April 2009, IRS trades under the name “GL Industrial Services Singapore”.

■ AM

For further information:

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E-Mail: irs@pacific.net.sg

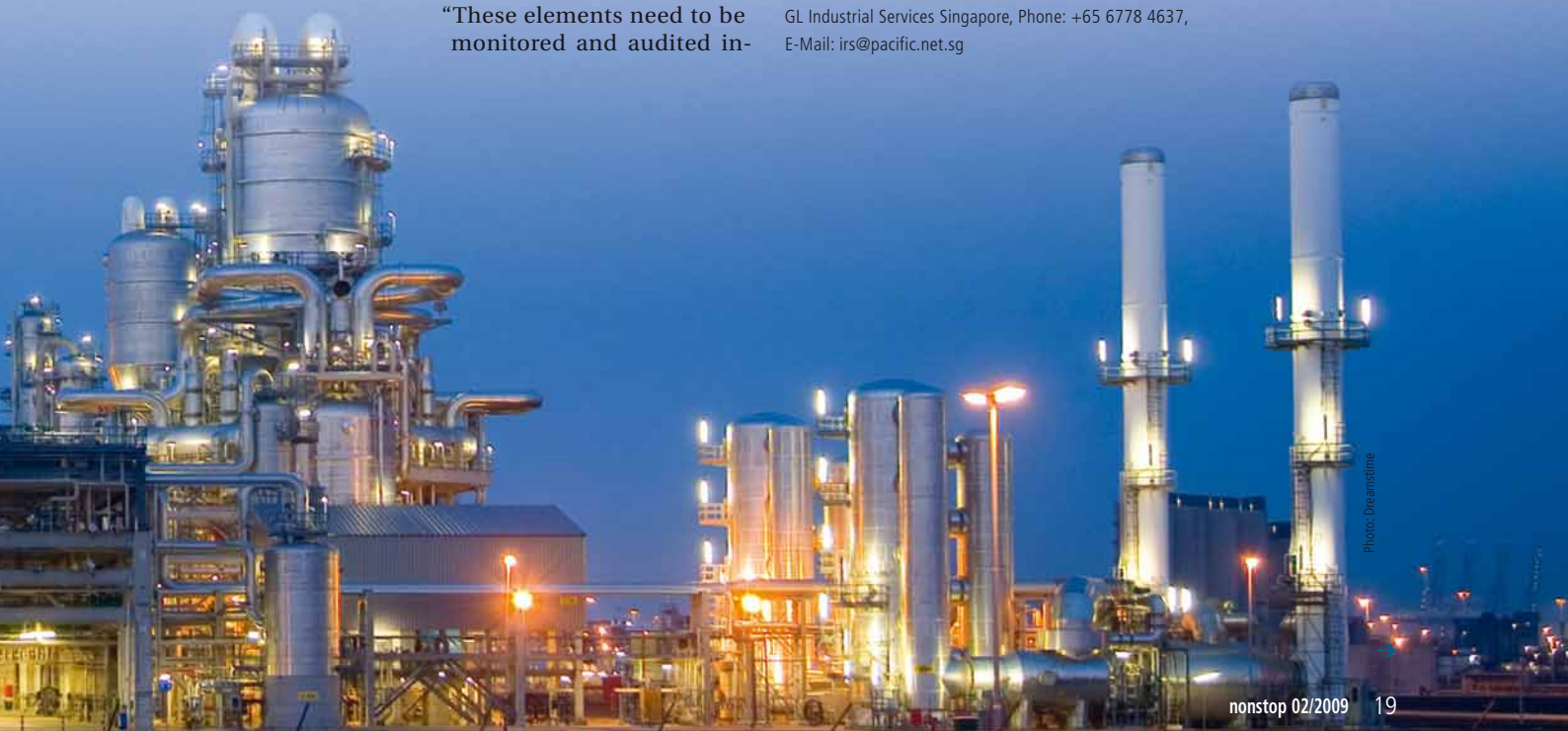


Photo: Dreamstime



Quick Connection

Four new high-speed catamarans with GL class are cutting the transit times across the Red Sea



RIYADH. The ferry is one of two catamarans deeded by Saudi Arabia to Egypt as a gift.

Saudi Arabia is putting tourism on the fast track. Only a few weeks ago, two new high-speed catamarans commenced service between Jazan in the southern part of the country and the Farasan island group located 25 sea miles away. Regarded to be a diver's paradise because of its spectacular coral reefs, this archipelago is a popular holiday resort, especially for local tourists.

What is more, the quick connection considerably shortens the travelling time needed by commuters and scholars. With a top speed of 32 knots, the two catamarans "Jazan" and "Farasan" cover the distance in less than an hour. They offer space for 650 passengers, 50 cars and 15 trucks. To account for the cultural and religious requirements of the passengers, who are mainly of the Muslim faith, the passenger deck has designated seating zones for families and separate prayer rooms for men and women.

The fast ferries are two of four high-speed catamarans ordered in 2007 by Saudi Arabia's Finance Ministry from the Australian yard Austal.

The first two vessels, the "Riyadh" and the "Cairo", had already been taken into service in December 2008, at a ceremony held in the presence of King Abdullah of Saudi Arabia and President Hosni Mubarak of Egypt. The catamarans are a state gift to the Egyptian government and reduce the transit time across the Red Sea between Duba and Safaga by five and a quarter hours.

Safaga in Egypt is one of the oldest



FARASAN. This high-speed catamaran has a speed of 32 knots and can accommodate up to 650 passengers.

harbours on the Red Sea. With a draught of 25 to 34 m, it can also be used by larger ships. Besides exporting aluminium and importing wheat, it serves as a "stepping stone" for pilgrimages to Saudi Arabia. Business visitors and tourists are already making good use of the "Riyadh" and the "Cairo". Both catamarans can transport more than 1,200 passengers, 200 cars and 15 trucks.

Safety at Sea

All four high-speed catamarans were built at Austal to the classification rules of Germanischer Lloyd and the International Code of Safety for High-Speed Craft (HSC Code). "In this way, the customers are documenting their high demands on safety and reliability," says Georgios Spiliotis, GL Vice President Area Australia/New Zealand. The "Riyadh" and the "Cairo" are powered by four MTU 20V 8000 diesel engines developing 4 x 7,200 kW. The sister ships are each 88 metres long, with a beam of 24 metres.

The four MTU units driving the "Jazan" and the "Farasan" are smaller: the 16V 4000 diesels each provide 2,800 kW. These catamarans are 68.6 metres long and 17.65 metres wide. For the initial voyage from Western Australia to Jazan, the fast ferries took 15 days under their own steam. ■ SNB



CEREMONY. President Hosni Mubarak of Egypt (front row l.) and King Abdullah of Saudi Arabia.

Safety as a Design Objective

After four years of research, the SAFEDOR project culminated in a final conference in London

Making safety a design objective rather than viewing it as a constraint imposed by design rules was the goal of the SAFEDOR (Design, Operation and Regulation for Safety) initiative. The maritime research project on the significance of risk-based design and approval was concluded after four years of intensive study. 53 multinational project partners from all sectors of the European maritime industry had joined for this programme coordinated by Germanischer Lloyd to work out the details of an innovative, risk-based approach to maritime engineering.

The results of this effort were presented by the steering committee at the final conference held at the IMO headquarters in London in late April. Dr Pierre C. Sames, Senior Vice President Strategic Research & Development at GL, and chairman of the steering committee, also gave an outlook on the future of risk-based engineering in the maritime industry.

Flexible Framework

Over the past four years, the project partners discussed and developed new ways of enhancing the safety of ships. Three major achievements resulted from this work:

First and foremost, the SAFEDOR partners created a framework for risk-based design, which is now documented in a handbook for naval architects and marine engineers. The second achievement was the development of an approval process for risk-based ship designs, which was submitted to the IMO. The third result of the SAFEDOR initiative is a set of application examples. "We would like to see more flexibility in innovation in the future," said Tom Strang of Carnival plc, the shipowners' representative on the SAFEDOR steering committee. The series of innovative ship and system designs demonstrates the practicability of the SAFEDOR approach.

In addition, the project conducted five formal safety assessment studies for major ship types to document the present risk levels. These were also submitted to the IMO. All documents released can be downloaded from the SAFEDOR website www.safedor.org.

The ambitious goal of the SAFEDOR project was to enhance safety through innovation, thus strengthening the competitiveness of the European maritime industry. Incorporating safety into the design process is not a new concept; in the past, however, safety was generally added to a design during its later stages to comply with existing rules. SAFEDOR's approach offers greater flexibility to ship designers, and new economic opportunities to shipowners.

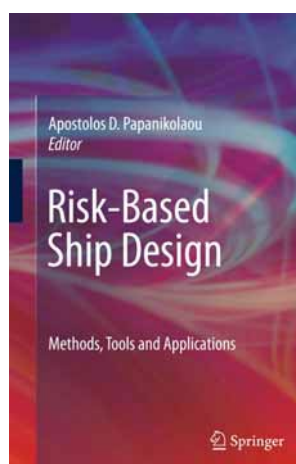
The SAFEDOR research focused on five ship types that are of major economic importance for Europe – cruise ships, RoRo/RoPax vessels, gas tankers, oil tankers and container vessels. Key objectives of the development effort were a

risk-based regulatory framework, a risk-based design framework, advanced probabilistic simulation tools and their integration, as well as a series of application examples. The elements of the risk-based regulatory framework include an approval process, risk

evaluation criteria, and requirements for documentation and key personnel qualifications.

Risk-based design is an extension of the traditional design process in that it integrates assessment of the safety performance into the design process. Prevention and/or reduction of risk to life, the environment and property is embedded as a design objective, alongside conventional design objectives such as speed and capacity. SAFEDOR developed this design framework to enable enhanced decision-making that balances traditional objectives – performance and cost – with the new objective – minimizing risk. The book "Risk-Based Ship Design" is one key result of the SAFEDOR project.

In his outlook on the future, Dr Pierre C. Sames concluded that SAFEDOR was just the beginning of a broader trend: "We expect that the number of risk-based design and approval applications will continuously grow, that the application of risk-based approaches in rulemaking will increase, and that the linking with risk-based approaches during operation will increase." ■ SG



DISCUSSION. SAFEDOR is completed. At the final conference in London, members discussed the project results. Dr Pierre C. Sames (4th from r.), Chairman of the SAFEDOR steering committee. The reference book "Risk-Based Ship Design" (l.) describes methods, tools and applications of risk-based ship design.



Remaining at the Helm

Financing services, ship management, affreightment, crewing – JR Shipping are competent in all disciplines. Last year the Dutch company celebrated its 15th anniversary

Harlingen in the Dutch province of Friesland is a popular place of business for shipping companies. More than 30 smaller shipowning companies are headquartered here. And there is a larger one too: JR Shipping. Founder Jan Reier Arends, a descendant of a family of shipmasters, went to sea at the tender age of 16. Life on board was quite his thing, and ships continue to be the bread and butter of his entire family: both his father and his brother are masters running ships of their own. In 1993, Arends bought his first vessel, a 3,000-tonne motor coaster. In 1996, he added two more ships of the same type. When the Dutch government introduced the tonnage tax in 1997, many owners were discouraged from ordering new ships. But Arends did the opposite – he ordered his first newbuild. 15 investors joined him to finance the project. Today, 3,600 investors put their trust in JR Shipping by contributing capital to finance his fleet.

Arends' entrepreneurial determination has been the driving force enabling JR Shipping to emerge as an internationally respected shipping enterprise within just a few

years. Arends personally manages his current fleet of 22 vessels, making all the arrangements for cargo and crew as well as for financing. His company headquarters are situated in an ideal place: Harlingen, a city with a comprehensive maritime infrastructure, is located centrally and home to numerous shipyards, shipping companies and banks. Even Arends' staff is mostly from the region.

Early Specialization

Reading the signs of the times, JR Shipping specialized on feeder shipping early on, taking on containerized cargo at the big hubs and ensuring the flow of goods to major sea-ports. By contrast, many competitors in the Netherlands were focused on general cargo. Feeder vessels were usually operated by large shipping companies only. After all, a containership involves substantially more capital investment than a motor coaster.

In the late 90s, Arends once again expanded his enterprise – and added a new face to his team: Sander D. Schakelaar, who is now a co-owner and Managing Direc-





BUSINESS DYNAMICS. With a capacity of up to 1,400 TEU, container feeders offer flexible deployment options. Affreightment and crewing is handled independently by JR Shipping.

tor of JR Shipping. As a ship financing expert, he has excellent connections within the maritime business community. As a consequence, the company not only grew its staff but also its fleet. By the end of 2001, there were six vessels, half of which were smaller containerships. “The rapid growth of our fleet made it necessary to hire more personnel to build an organizational basis for further success,” says Arends.

Around the same time, the company leadership decided to take the task of affreightment into their own hands instead of using agencies. “An outside observer may fail to follow the logic behind this decision at first, but it was very important for us to do this to move closer to the market and know the demand for tonnage and the general market trends as early as possible,” Arends explains. Winning new customers was the biggest challenge, he adds. But the effort paid off: the company has been able to respond to the market more quickly, and soon its business partners were reassured they could trust the young enterprise.

High Quality Standards

The maritime economy is facing a decade full of surprises and imponderabilities, Arends predicts: “The cyclic development coinciding with the global financial crisis raises questions that are difficult to answer: How severe will the recession be? How long will it persist? Has it bottomed out or is the worst yet to come? How will all this impact the shipping market?” Yet, while all over the world ships have been laid up for the time being, JR Shipping are still running their entire fleet.

One of the strengths of JR Shipping is the fact that since 2000, all equity capital has been raised by the company itself. “There are advantages, but also disadvantages to this approach. If we were to order a series of ships in China, the bank would ask for a capital guarantee, which we cannot provide, contrary to other investment companies,” Arends explains. When ordering new ships, the Dutchman usually puts his trust in German know-how. “The quality of the ships is high, even after many years of use,” he says. He believes feeder ships in the 1,400-TEU range to have the most promising future. One such vessel is currently on order at Peene-Werft shipyard in Wolgast, Germany.

Another strength is the company’s staff whose degree of loyalty towards their employer is exceptional. It is hard to find qualified employees, Arends stresses. JR Shipping therefore co-operates with a local navigation training centre and the Harlingen shipping administration. As for Germanischer Lloyd, Arends says he has been working with the society since 2004. A GL trainee surveyor was even allowed to join a crew for a trip on board a ship once to learn about work and life on board. “That was a valuable experience for both sides,” says Arends. That same year, the demand for feeder ships rose considerably, a fortunate development for an enterprise specializing in container vessels up to 1,200 TEU.

From building their ships to ship management and crewing: JR Shipping are in control of every aspect of their business. It is this philosophy that differentiates the enterprise from its competitors – and it might just be the factor helping it to prevail in these difficult times. ■ SG



JR SHIPPING

From “MS Expansa” to “Empire”: JR Shipping operate a fleet of 23 container feeder ships. Their names usually begin with the letter E. With tonnages ranging between 2,920 and 15,940 GT, these vessels have a capacity of 340 to 1,440 TEU. The largest ships, “Emotion” and “Empire”, were delivered in 2008 and 2009, respectively. Both are “Baltic Max” series container feeders built by German shipyard Peene-Werft. Another ship from the series, “Elysee”, will be delivered in 2010.

The fleet represents a combined investment of 382 million euros. 3,600 investors have contributed to the financing of the fleet via JR Shipping Investments, a subsidiary of JR Shipping.

www.jrshipping.nl



Photos: JR Shipping

Temporary Market Leader

Kang Gyoung-Taek expects the global shipbuilding overcapacity to persist for years to come. The Korean politician told nonstop about possible ways to cope with the crisis, the shortage of highly-skilled engineers, and Asia's growing influence in international shipping

Korea has built up a strong and diverse industrial portfolio. Shipbuilding and mobile phones are among the most important products. Exports of eight key products – including oil products, ships, steel and general machinery – showed double-digit growth last year. Out of a total export volume of 422.4 billion US dollars, ship exports accounted for more than 40 billion US dollars, the highest level ever recorded. Nevertheless, according to the Korea Shipbuilding Association, newbuilding orders dropped by 40.6 per cent in 2008 despite a strong first half. For obvious reasons, few orders were received in the latter part of the year. How do Korean shipyards cope? How does the Korean government see the situation? nonstop spoke with Kang Gyoung-Taek, Deputy Director of the Automobile & Shipbuilding division of the Ministry of Knowledge Economy (MKE). His division is a department of the “Office of Industries” which reports to the Vice Minister of Industry and Technology.

nonstop: How do you support the Korean shipbuilding industry?

Kang Gyoung-Taek: Large shipyards of Korea, such as Hyundai Heavy Industries, Samsung Heavy Industries, and Daewoo Shipbuilding and Marine Engineering (DSME), have a world-class competitive edge in their scale and productivity. However, we cannot say that they are world leaders in technology. The government is committed to assisting their efforts to develop core, original technology or enabling technology so that they can continue to enhance their technological competitiveness.

nonstop: What are the specific challenges the Korean maritime industry and economy are facing?

Kang: In the second half of 2008, orders in the global shipbuilding market decreased sharply. We had anticipated such a decrease in orders, but for a later time. However, the global financial crisis and a sluggish real economy in recent months have sped up the decline more than expected, and we are concerned about possible adverse effects on the industry.

For example, some companies who entered into the shipbuilding market during the recent boom period have not even finished building their shipyards. In the worst cases, they are likely to suffer from adverse effects of the gloomy economic situation today. The question of how the companies who have expanded their facilities extensively, including new start-up shipyards, will solve the problem of redundant facilities will be the pending issue for the domestic and global shipbuilding industry in the coming years.

nonstop: How does the worldwide shortage of engineers and maritime personnel impact you and how do you deal with it?

Kang: Korea has a sufficient technological workforce – about 600 graduates majoring in Shipbuilding Engineering enter the market every year. However, what the industry is lacking is an adequate number of engineers skilled in specialised technological disciplines. In addition, the level of technological expertise of the personnel may not always be up to industry expectation. In other words, there is a certain mismatch between the demand and supply sides in our workforce.

The government is making efforts to eliminate this mismatch through joint research and development projects in cooperation with companies and local governments, as well as through employee retraining programmes.

nonstop: Energy prices are volatile. What does that mean for the Korean maritime industry?

Kang: The world experienced both a sharp hike and a sudden drop of energy prices in 2008. Currently, oil prices are decreasing. As long as the global economy continues to rely on fossil fuels, energy prices may rise sharply at any time. Such a sudden energy price increase will likely boost the development of deep-sea and smaller oil fields, creating more business opportunities for local shipyards to make highly value-added products such as drillships. →

“The strength of Korean shipyards is their ability to deliver products in a timely manner”

Kang Gyoung-Taek


PROFILE: KANG GYOUNG-TAEK

Mr Kang Gyoung-Taek (35) has been working for the Korean Ministry of Knowledge Economy since 2004 where he is in charge of the national maritime industries. He graduated from Seoul National University with a degree in naval architecture in 2000. Before assuming his current position, Mr. Kang worked at the Korean Intellectual Property Office for three years.

nonstop: The competition in shipbuilding is growing. Where do you see the “unique selling point” of Korean shipyards and what is the strategy to keep up with competition?

Kang: I think that the biggest strength of Korean shipyards is their ability to deliver products that meet different needs of the ship owners in a timely manner. This is possible because local shipyards have thousands of designers at hand and employees have a strong sense of responsibility for their duties.

nonstop: What contribution can classification societies make to the Korean maritime industry?

Kang: Classification societies serve to make ships safer through standardization of shipbuilding-related technologies and stability tests. This is a common goal they share

MINISTRY OF KNOWLEDGE ECONOMY (MKE)

The objective of the Korean Ministry of Knowledge Economy (MKE) is to transform the nation's economy into a knowledge-based economy, combining traditional goods and services with the benefits derived from enhanced research and innovation efforts. The Ministry of Knowledge Economy was created as recently as 2008 to enable the country to “meet new challenges of the 21st century”, as its website says. The MKE is responsible for the real economy. It was formed by merging the Ministry of Commerce, Industry and Energy, the Ministry of Science and Technology, the Ministry of Finance and Economy and elements of the Ministry of Information and Communications.

www.mke.go.kr

with shipyards. We hope that joint research and development projects between classification societies and shipyards will help find a faster and easier way to achieve this common goal.

nonstop: Compared to Europe, in what ways will Asia increase its influence in putting forward its views on international shipping matters such as goal-based standards, ship recycling, air pollution and ballast water treatment systems?

Kang: Asian shipbuilders have a global shipbuilding market share in excess of 85 per cent. I think that in the course of discussing and establishing ship-related rules at the IMO, the voices of Asian shipyards should be given full consideration. Giving emphasis to this cause, Korea hosted the 2nd Asian Shipbuilding Experts' Forum meeting in November 2008. The Korean government is ready to provide positive support for these kinds of activities of private-sector experts.

nonstop: What are your goals for your term of office?

Kang: For the past several years, Korea has been the leading shipbuilding nation in terms of orders received, shipbuilding performance and remaining orders. But, as Europe and Japan did in the past, the time might come for Korea to step down from its leadership position.

I am striving to figure out what Korea's shipbuilding industry should be like when domestic shipyards, which are global market leaders today, will no longer be able to make ships at the current scale. During my term of office, I would like to devote my efforts to setting an ultimate goal for the development of Korea's shipbuilding industry, and to laying a foundation for achieving that goal. ■ SNB



USER. Doehyun Kim,
naval architect at HHI.

“Ease of Use”

GL ShipLoad opens up new opportunities for yards and design offices. *nonstop* asked Doehyun Kim, Senior Engineer at Korean Hyundai Heavy Industries, about his experiences with the software tool

High performance in an easy-to-use application: GL ShipLoad opens up new opportunities for yards and design offices in helping them analyse the structural design of ships to understand and improve their strength properties. Developed by Germanischer Lloyd, GL ShipLoad is an efficient load generation software that enables global FE analyses of ship structures. The tool models the mass distribution of ship and cargo and computes static and hydrodynamic pressures induced by waves.

A convenient mechanism for defining selection criteria allows the user to specify the design waves to be used for the global strength analysis. The software generates a small number of balanced load cases that are sufficient for dimensioning the hull structure. Version 2.0, released in March 2009, allows the user to incorporate slamming loads and features the automatic selection of load cases. In this interview, Doehyun Kim, Senior Engineer at Hyundai Heavy Industries describes how the application supports his daily work.

nonstop: When did you begin using GL ShipLoad?

Doehyun Kim: We began working with GL ShipLoad some time during the first half of 2007.

nonstop: How many ships of your fleet have you calculated with GL ShipLoad?

Kim: To date, we have used GL ShipLoad to calculate 4 different prototypes for a total number of around 20 ships.

nonstop: Could you tell us the ship sizes?

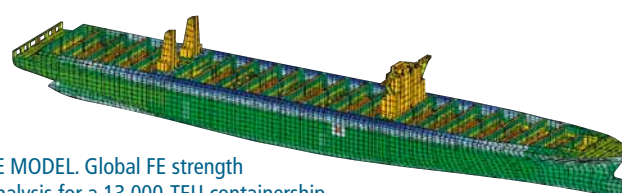
Kim: All four ship types were container carriers designed for 8,200 TEU, 10,000 TEU, 11,300 TEU and 13,100 TEU, respectively.

nonstop: How does GL ShipLoad help you in your daily work, and what are the most important benefits of the software for you?

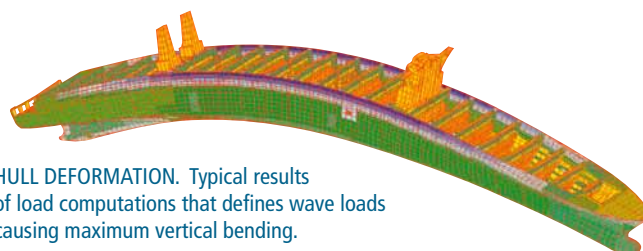
Kim: What sets GL ShipLoad apart is the ease of use, especially when calculating hydrodynamic loads. Even designers without any relevant background can easily understand the software and work with it. In other words, a hull structural designer can do the entire analysis by himself, without needing help from a hydrodynamics specialist.

nonstop: How do you rate GL ShipLoad in comparison to competing products?

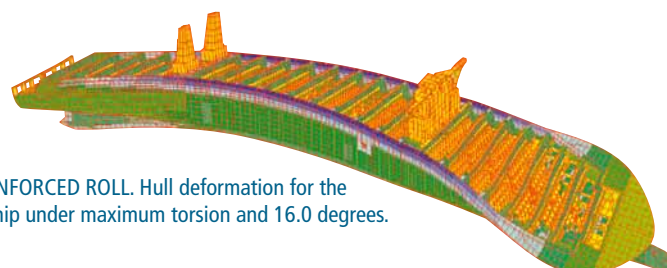
Kim: The approach GL ShipLoad takes is fundamentally different from other products, so it is difficult to answer this question. What can be said is that the graphical user interface (GUI) and user-friendliness of GL ShipLoad are among the superior features of this application. On the other hand, when it comes to convenient data accessibility



FE MODEL. Global FE strength analysis for a 13,000-TEU containership.



HULL DEFORMATION. Typical results of load computations that defines wave loads causing maximum vertical bending.



ENFORCED ROLL. Hull deformation for the ship under maximum torsion and 16.0 degrees.

and RAO prediction features, the product could be developed further.

nonstop: Do you have any other suggestions for improvement?

Kim: Actually, the new auto load-case selection feature added in GL ShipLoad Version 2.0 is a highly welcome improvement. It will help us considerably because it eliminates a major cause of concern for us.

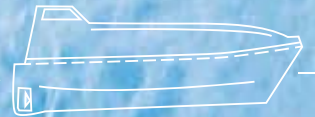
We would also suggest a sub-model feature to allow the transfer of local loads and boundary displacement from a global model to a local model.

nonstop: How would you describe your relationship with GL?

Kim: Putting it into a nutshell, we have a common interest: building sound ships.

nonstop: Do you use GL ShipLoad for ships not classed GL? **Kim:** We do in some cases, because the analysis procedure of GL ShipLoad is quite tangible and easy. ■ SG

For further information: Dr Jörg Rörup, Analysis of Hull Structures & Damages, Phone: +49 40 36149-7400, E-Mail: joerg.roerup@gl-group.com; Dr Christian Cabos, Head of Department CAE Development, Phone: +49 40 36149-576, E-Mail: christian.cabos@gl-group.com



Lifeboat Launch Simulation

Prof. Hans Jørgen Mørch, CFD Marin and Agder University, Norway

Prof. Milovan Peric, CD-adapco

Prof. Ould el Moctar, Germanischer Lloyd AG and University of Duisburg-Essen



Introduction: Evacuation

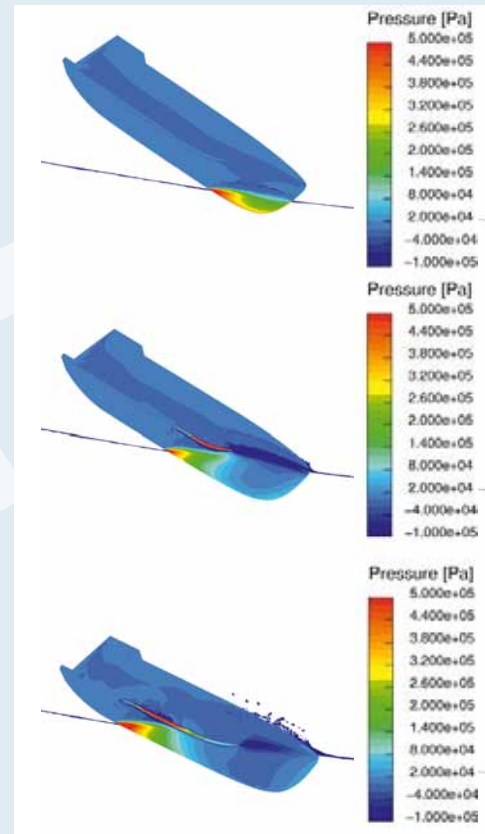
Lifeboats form one of the key safety elements for the passengers and crew on ships and offshore platforms. To ensure reliable evacuation, lifeboats must not suffer any damage when entering the water; they must also leave the danger zone quickly. In addition, the accelerations acting on the occupants should not exceed a defined level over a certain period of time.

Until recently, lifeboats were analysed and optimized solely on the basis of experiments. The pressure was measured at a certain number of points distributed over the hull. At the same time, the velocity and acceleration was recorded. However, because of the many different sizes of lifeboats and the great diversity of operational conditions that are possible, it is not feasible to analyse all of the possible hull types and situations in this manner. There are several other reasons why the experimental approach is inadequate for optimizing lifeboats:

1. Model trials cannot provide complete emulation of the real-world situations, since the sizes of the models (approx. 1:10) and the wave heights (normally less than a metre) are limited. Extrapolating to full scale and design conditions introduces uncertainty into the results.
2. Full-scale experiments can only be performed under good weather conditions. In contrast, wave heights of up to 15 m and very strong winds may be used as the basis for design conditions. This discrepancy makes it difficult to evaluate the test data.
3. In respect of the falling height, the facilities at model basins are subject to the limitations imposed by the ceiling height of the laboratory. Likewise, dropping a full-scale lifeboat from a height corresponding to that of the usual launch point is often impracticable or too costly.
4. Experiments are suitable for determining the actual loads acting on the structure and the crew, but they do not yield enough information to allow for an improvement in the design. Consequently, it is important to ascertain the pressure and velocity distribution around the hull during entry into the water and the subsequent immersion period.

Advances in flow simulation (computational fluid dynamics – CFD) now permit simulations of lifeboat launches at full scale and under realistic initial and boundary condi-

Overlapping Meshes



STRESS. Free surface and pressure on lifeboat wall during water entry (50 ms between frames).

tions. Moreover, simulation makes it possible to examine the effects of hull design changes without having to produce physical models. This approach allows designers to investigate a larger number of design parameters for a whole spectrum of operational conditions and to find a design that is optimized for the expected purpose.

Overlapping Meshes

The method described here uses the latest CFD software from CD-adapco. It is linked to a CAD tool and uses a solver for calculating the boat movements with six degrees of freedom. For computation of the flow, a finite volume method is used that employs unstructured meshes with arbitrary polyhedral control volumes. The water flow as well as the



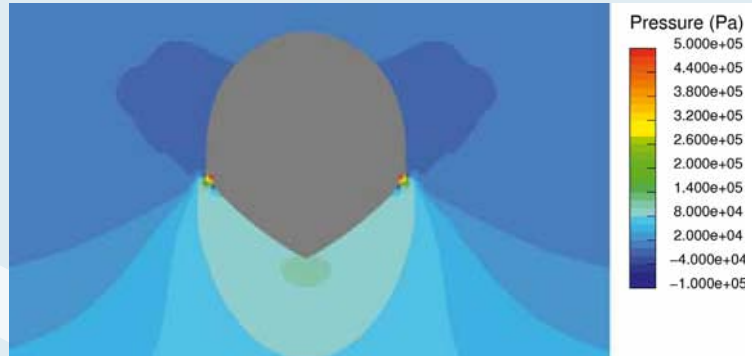
Critical Phase



EFFORT. Test of a lifeboat at a free fall from a very high ramp.

flow-induced motion of the lifeboat (which is regarded as a rigid body here) are computed as a coupled system. The flow-induced forces and moments acting on the lifeboat, and the resulting new position of the boat, are determined in each time step.

Since the change in the boat's position influences the flow, the coupling must be considered iteratively: the iterations in each time step are repeated until neither the flow field nor the position of the boat exhibits any appreciable change. Typically, five to ten iterations are needed for each time step. Since the number of the simulations required for an optimization study is large, it is important to ensure that the method is efficient from the viewpoint of computing effort. This necessitates local mesh refinement and efficient handling of the mesh adaptation to the position of the moving lifeboat.



In this case, the approach involves the use of overlapping meshes. With this method, a background mesh is fitted to the free surface and outer boundaries (the seabed, the oil rig or the ship), while the overlapping mesh is attached to the lifeboat, moving together with it but without deformation. The benefit offered here is that the method of overlapping meshes can be applied to any movements (also capsizing), and the boundary conditions (such as wave generation) can be implemented more easily than with other approaches.

The position of the centre of gravity and the inclination of the lifeboat relative to the water surface serve as initial conditions for the simulation. The initial velocities in the horizontal and vertical direction as well as the angular speeds must also be specified. For a free-fall launch, they are equal to zero; in the case of ramp launching, the velocities must be determined separately for the instant when the boat leaves the ramp.

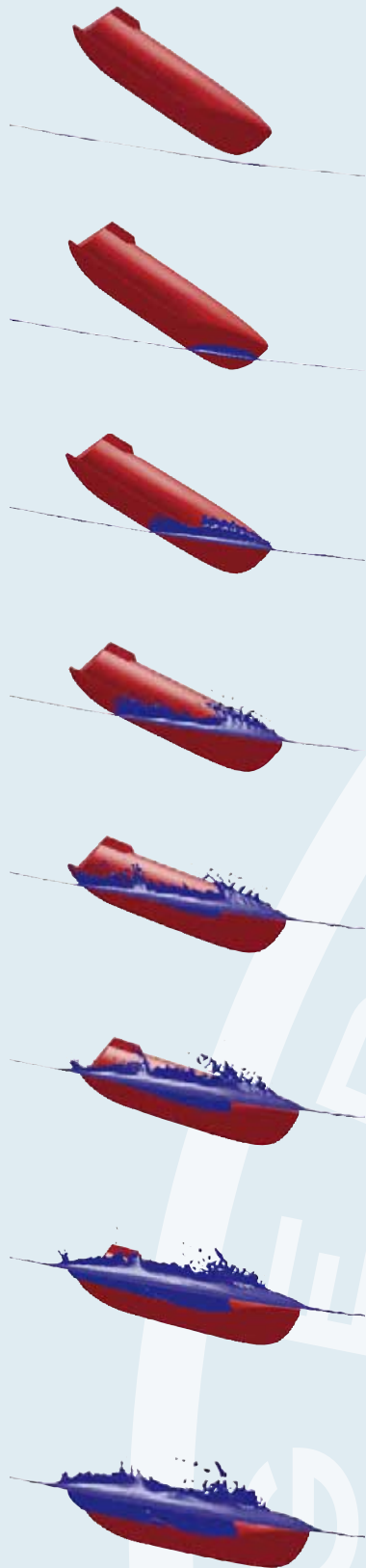
When calculating the motion of the lifeboat in free fall through the air, simplifying methods can be used to reduce the computing time required for CFD simulation. In this case, the simulation can be started with an initial condition determined by means of alternative methods at a height of several metres above the water surface.

Critical Phase

Frequently, the simulation is only conducted for the water entry phase, since this is when the greatest loads occur – in terms of the load on the structure as well as the acceleration affecting the crew. This phase lasts for about two seconds. Usually, time steps of about a millisecond are used, so that the simula- →

FINE MESH. Pressure distribution during water entry (corresponding to the last graph in the row on page 28).

Wave of difficulty



→ tion has to extend over some 2,000 time steps.

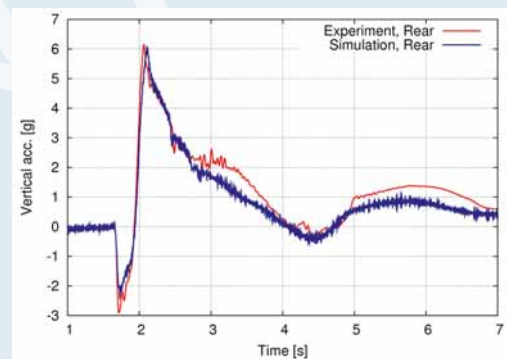
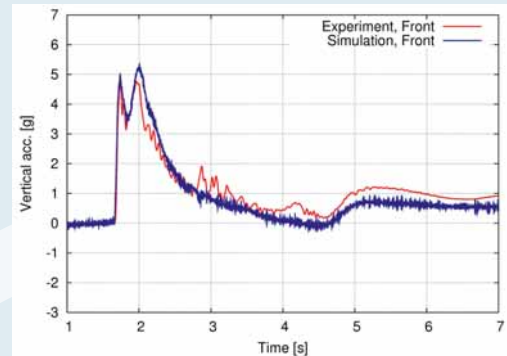
The operational conditions that can be analysed include the starting position and speed of the lifeboat, wind force and direction, water currents, water depth, wave profiles and direction of propagation, and any combination thereof. A fifth-order Stokes' theory is used for modelling the waves. The initial velocity field is also determined from this theory.

To test this simulation procedure, a validation study was performed in cooperation with Norsafe AS. The study examined the influence of the hull shape on the movements of the lifeboat and on the accelerations acting upon the occupants. Three different hull shapes were considered: the original version, one with a modified aft section and one with modified aft and bow areas. By making use of the symmetry, the calculations took account of three degrees of freedom: horizontal and vertical motion, and rotation about the transverse axis. The computation mesh consisted of approximately 350,000 cells.

Comparisons of the results obtained from the experiments and simulations (see diagrams right) demonstrate: the development of the accelerations, both in the bow and stern areas, was predicted very well for the critical phase (the first two seconds). The bow hits the water first, experiencing a deceleration of approximately 5 g; the water resistance at the bow causes a tilting moment, which is why the stern is initially accelerated (up to about 3 g over the acceleration due to gravity). Only when the stern comes into contact with the water is a deceleration of up to 6 g introduced for a very short period of time.

The usual quantitative measure for acceleration can be expressed as the so-called CAR value, which is determined as a combination of the accelerations in three directions. For all three hull shapes, the accelerations in the afterbody are higher than in the forebody, but the difference decreases with the changes to the original design. What is more, the absolute level of the CAR values is reduced with each modification.

SIMULATION I. Lifeboat position and free surface shape during water entry (50 ms between frames, from top to bottom).

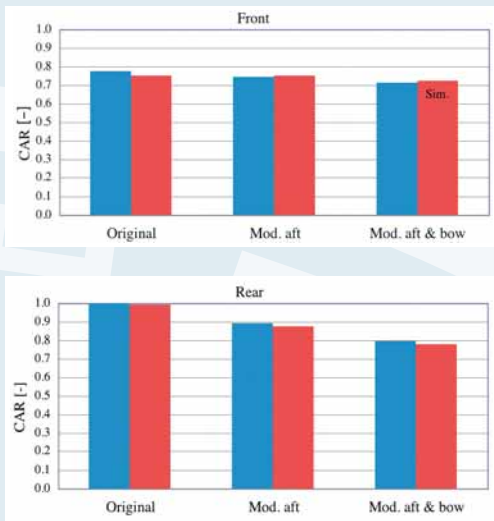


The hull with a modified stern and bow yields a decrease in the stern CAR values of almost 20 per cent in relation to the original design. The reduction in the bow CAR values is much lower – approximately 5 per cent.

These comparisons show that the simulation results are plausible from both the qualitative and the quantitative standpoint: they reflect the influence of design changes in the same way as the experiment.

Wave of Difficulty

For the entry into waves, the direction of wave propagation and the entry point relative to the wave crest both play an important role. To investigate these effects, a lifeboat (which is approximately 15 m long and has a mass of about 20 t) was launched from a height of 32 m with



PREDICTION. Comparison of normalized CAR values for full loading with an additional ballast of 10 t for the three hull shapes, determined by experiment (blue) and simulation (red) in the forward (top) and aft (bottom).

COMPARISON. Launch in still water: time curves of the vertical accelerations for experiment and simulation in the forward (top) and aft (bottom).

an inclination of 35° (bow down) into a wave with a period of 13 s and a height of 15.8 m in water 33.5 m deep and without any current.

A total of 18 simulations were performed: nine with waves approaching from the front, nine with waves following from behind – the initial position of the wave crest being varied by 20 m. The boat was given three degrees of freedom – as in the previous case – and the mesh had approximately 600,000 cells.

The figure left (SIMULATION I) shows the position of the lifeboat and the deformation of the water surface during entry into the water; the figure right (SIMULATION II) depicts the lifeboat's position and free surface shape during resurfacing.

These examinations demonstrated that the highest loads arise for following waves, i.e. when the boat hits the wave before the wave crest (at a distance of approximately 15 per

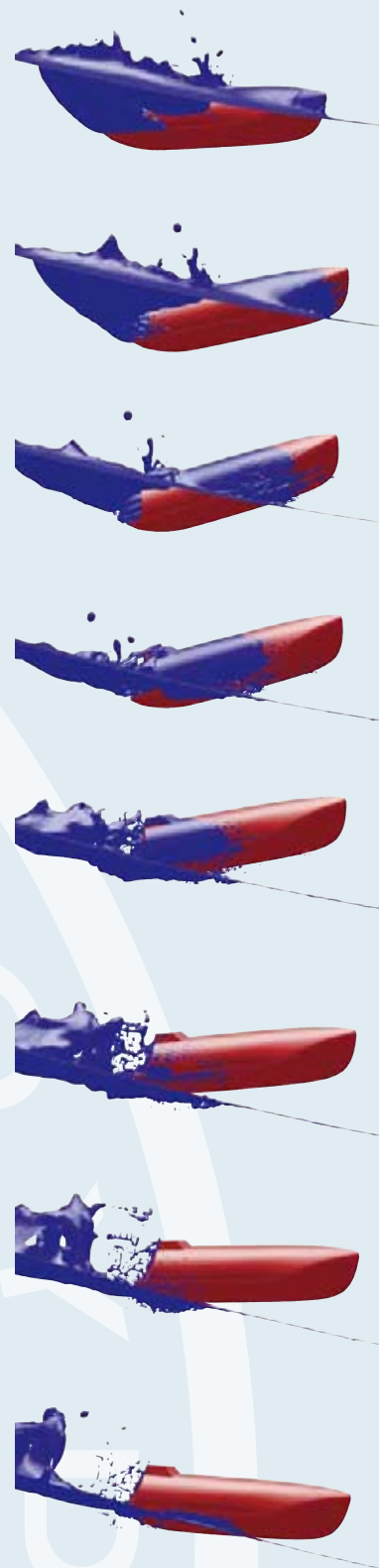
cent of the wavelength). The peak average pressures measured by a sensor in the keel area exceed 7 bar in the critical case, while the maximum load attains approximately 4 bar for approaching waves. The peak accelerations in the critical case amount to 13 g (vertical) or 27 rad/s (rotation); for the reverse wave propagation direction, the maximum values lie at 10 g and 20 rad/s respectively.

For waves approaching obliquely, other drop heights, launching from a ramp, different inclinations, other wind directions and speeds, etc., the loads will vary accordingly. It will only be possible to identify which situation is the most unfavourable overall after comprehensive analysis with variation of all the relevant parameters. For the final evaluation, the probability of this situation occurring at a certain geographical location must also be considered.

The calculations performed thus far indicate that simulation of the lifeboat movement during the critical phase of approximately two to three seconds with three degrees of freedom in full scale with a mesh of approximately half a million cells can be conducted in a day on a single processor (i.e. one core of a multi-core processor). Simulations with a much finer mesh (approximately 1.5 million cells) predicted only a negligibly lower loading, so that the former mesh size may be regarded as adequate for the purposes of optimization.

The use of CFD for studying the loads on the lifeboat hull and the accelerations acting on persons seated at various positions inside it during entry into the water hence represents an ideal supplement to experimental investigations. The experiments can be limited to the final phase, for validating the simulation of an optimized geometry. With a cluster comprising a hundred processor units, it is possible to execute thousands of simulations and to evaluate the results within only a few weeks.

SIMULATION II. Lifeboat position and free surface shape during resurfacing (250 ms between frames, from top to bottom).



service

Dates at a Glance

JUNE

09.06. – 12.06.2009

NorShipping

Oslo, Norway

www.messe.no

21.06. – 26.06.2009

ISOPE

Osaka, Japan

www.iso-pe.org

22.06. – 23.06.2009

Offshore Wind China

Shanghai, China

www.offshorewindchina.com

23.06. – 25.06.2009

WWEC – 8th World Wind Energy Conference

Jeju, Korea

www.2009wwec.com

25.06.2009

Seatrade Asia Awards

Shanghai, China

www.seatradeasia-online.com

AUGUST

10.08. – 12.08.2009

3rd Renewable Energy India

New Delhi, India

www.renewableenergyindiaexpo.com

SEPTEMBER

02.09. – 04.09.2009

The 4th China International Wind Power

Beijing, China

www.bjwindpower.com

10.09. – 12.09.2009

India Electricity 2009

New Delhi, India

www.indiaelectricity.in

14.09. – 16.09.2009

EOW – European Offshore Wind 2009

Stockholm, Sweden

www.eow2009.info

20.09. – 23.09.2009

CanWEA

Toronto, Kanada

www.canwea.ca

22.09. – 25.09.2009

Neva

St. Petersburg, Russia

www.neva2009.com

30.09. – 02.10.2009

MS&D

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I – Ship Technology

Part 0 – Classification and Surveys 2009-05-01

Part 1 – Seagoing Ships

Supplementary Rules for Application of Steel with Yield Strength of 460 N/mm² 2009-02-01

Chapter 1

Hull Structures 2009-05-01

Chapter 2

Machinery Installations 2009-05-01

Chapter 5

Structural Rules for Container Ships 2009-05-01

II – Materials and Welding

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Chapter 1

Principles and Test Procedures 2009-04-01

Chapter 2

Steel and Iron Materials 2009-04-01

Chapter 3

Non-Ferrous Metals 2009-04-01

Chapter 4

Equipment 2009-04-01

Chapter 5

Materials for Propeller Fabrication 2009-04-01

VI – Additional Rules and Guidelines

Part 11 – Other Operations and Systems

Chapter 9

Guidelines for the Condition Assessment Program 2009-02-01

IACS Common Structural and GL Complementary Rules

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Volume 2

Complementary Rules 2009-05-01

Double Hull Oil Tankers

Volume 2

Complementary Rules 2009-05-01

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Poseidon ND 9.0

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Greater China

Area Greater China has been

split into five districts. Three

districts are based on

mainland China (North China,

Central China and South China).

In addition, Hong Kong and Tai-

wan form separate districts.

At the same time, former station

offices belonging to Area

Greater China will be renamed

“liaison offices”.

USA

Since 1 April, Advantica Group

US Holdings, Inc. has been

operating under the name GL

Industrial Holdings USA, Inc.

furthermore Advantica, Inc. has

been operating under the name

GL Industrial Services USA, Inc.

Personalia

Julio Vollmer Morlan is the new Country Manager for the Netherlands Antilles.

Robert Edner has been appointed as acting Country Manager for Sweden.

Reinhard Siegmund will take over the position as Country Manager for Romania with effect from 1 July to replace Hans-Dieter Gruben who retires.

Kao Tien-Shon is the new District Manager for Taiwan.

Hans-Werner Steiner is the new Deputy Area Manager for ASEAN/South Africa.

Alexei Glazounov is the new Country Manager for Estonia.

Viktor Ostrovskis is the new Country Manager for Latvia.

Andrej Dutov has been appointed as Country Manager for Lithuania.

Thorsten Groth will be appointed as designated new Area Manager for Japan.

GL Academy

Selected seminars in 2009 (in English) – information and Registration: academy@gl-group.com

JUNI

10.06.2009
Oil and Chemical Tankers – Technical and Operational Aspects
Tokyo, Japan

10.06.2009
Ship Structural Design
Piraeus, Greece

11.06.2009
Design for Production
Piraeus, Greece

12.06.2009
Oil and Chemical Tankers – Technical and Operational Aspects
Shanghai, China

15.06. 2009
ILO Maritime Labour Convention
Manila, Philippines

16.06.2009
Oil and Chemical Tankers – Technical and Operational Aspects
Haiphong, Vietnam

17.06. – 18.06.
Implementation Workshop ILO Maritime Labour Convention
Colombo, Sri Lanka

19.06. 2009
ILO Maritime Labour Convention
Colombo, Sri Lanka

22.06.2009
ISM Basics
Limassol, Cyprus

22.06. – 23.06.2009
Internal Auditor ISM/ISO 9001:2008 for Shipping Companies
Hamburg, Germany

23.06.2009
ISPS Internal Auditor for Shipping Companies
Limassol, Cyprus

25.06.2009
Damages to Hull and Equipment
Piraeus, Greece

25.06. – 26.06.2009
Company/Ship Security Officer (CSO/SSO) Training Course
Limassol, Cyprus

26.06.2009
Bulk Carriers – Technical and Operational Aspects
Naples, Italy

JULI

02.07.2009
Advanced Maritime Accident Investigations

and Analysis
Piraeus, Greece

08.07. – 09.07.2009
Company/Ship Security Officer (CSO/SSO) Training Course
Piraeus, Greece

12.07. – 16.07.2009
Lead Auditor Environmental Systems ISO 14001
Cairo, Egypt

13.07.2009
Basics in Ship Finance
Tokyo, Japan

15.07.2009
Basics in Ship Finance
Dalian, China

17.07.2009
Basics in Ship Finance
Shanghai, China

20.07.2009
Basics in Ship Finance
Taipeh, Taiwan

SEPTEMBER

03.09.2009
ISPS Refresher Course
Piraeus, Greece

14.09.2009
Emergency Preparedness and Crisis Management
Limassol, Cyprus

25.09.2009
ILO Maritime Labour Convention
Tokyo, Japan

IMPRINT

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news



POWER PLANT. GL's software GALIOM optimizes the operation of industrial facilities.

Photo: Ra Boe

SOFTWARE

New Interface for Maintenance

GL's asset integrity management tool GALIOM, which helps to safeguard reliable and cost-efficient operation for the entire lifetime of a plant, is now available with SAP integration.

The SAP Plant Maintenance (PM) module is one of the most popular electronic maintenance management systems in the world. To provide SAP customers with a complete, integrated solution, GALIOM now comes with built-in, plug-and-play SAP adapter software.

Full Support. GL and Junot Systems, Inc. have entered into a reseller agreement allowing GL to embed the NLINK® product into GA-

LIOM to enable the SAP integration. In addition, GL offers full implementation support, helping to carry out any changes required in the baseline configuration, test the interface on-site and complete all initial data mapping. Formal training for IT administrators is also available. The GALIOM support team is ready to assist customers via e-mail, telephone or on-site.

The GALIOM-SAP interface is now ready for demonstration to customers using live GALIOM and SAP software.

For further information:

Mathews Varkey, Business Applications,
Phone: +60 3 2160 1088,
E-Mail: Mathews.Varkey@gl-group.com



Photo: Global Process Systems Inc

BUILDING SURVEY

Checkpoint "Alex"

Following a review of the safety concept, potential emergency scenarios and escape routes, it was time for a survey of a rather unusual kind: From a height of 203 metres, six GL surveyors roped down from Berlin's TV broadcasting tower "Alex" to inspect the concrete façade for possible structural damage. The surveyors descended simultaneously, forming a ring around the tower.



A CLIMBER'S DREAM. The survey of Berlin's TV tower "Alex" took 4.5 hours.

HELIMAX

Anniversary in Canada

For ten years, Helimax Energy Inc. has been providing consulting services to the wind power industry. More than 200 clients and partners have benefited from the expertise of the Canadian company.

Pioneers. The total output power of the wind projects Helimax has commissioned or is currently overseeing amounts to over 30,000 MW.

In addition, the company has installed more than 400 meteorological towers. Helimax is considered a pioneer in SODAR measurement programmes and wind forecasting and was the first company in North America to test LIDAR technology for determining wind power potential. Since January 2009, Helimax has been wholly owned by the GL Group.





BLACK GOLD. Mobile offshore production units will soon be producing oil from two fields off the coast of the state of Sarawak, Malaysia.

MALAYSIA

Mobile Offshore Production

Malaysian Joint Operating Company (PCPP), a joint venture of Petronas Carigali, Pertamina and PetroVietnam, has signed a contract with Global Process Systems (GPS) for the lease of two mobile offshore production units (MOPUs). Trident Consultants, a GL subsidiary, has been commissioned to provide safety consultancy services during the design phase of the project.

Numerous Reviews. Trident's services for this project include a project safety plan, a safety design philosophy, the classification of hazardous areas, a review of the layout of the fire and gas detection systems, a

review of the escape route and safety equipment layout, as well as a review of the fire-fighting water system design. Furthermore, Trident will review the fire protection system and the safety equipment layout for the accommodation module, prepare a quantitative risk assessment (QRA) and a hazard and operability (HAZOP) study, and develop a safety case.

The two MOPUs will be deployed on the D30 and DANA field development projects on block SK305 off the shores of the Malaysian state of Sarawak for a contract period of ten years. The first oil is expected to flow in June 2009.

AVIATION

Extensive Certification, Excellent Results

Recently, Premium AEROTECH GmbH, a company of the EADS Group, was successfully certified in accordance with the international aviation standard EN 9100. AEROTECH is the largest German supplier, and a leading global supplier, of civil and military aircraft structures.

Excellent Standards. Certification of the facility in Varel, Germany, covers organizational aspects, such as communication and planning competence, as well as internal communications, customer service, resource management and the realization of quality objectives.

The audit documented the company's reliable operation and compliance with above-average qual-

ity standards. The IT system in particular, which is used to control daily work and development activities, achieved excellent results.

The standards governing quality and safety in the aviation and aerospace industry, including all of its manufacturers and suppliers, are especially strict. Certification of competence for subcontractors, dealers or service providers in this sector is likewise subject to industry standard EN 9100.

Helpful Database. Apart from the EADS divisions, many other companies of the aviation and aerospace sector acquired EN 9100 certification through Germanischer Lloyd in 2008, as well. EN 9100-certified



companies qualify for inclusion into the international OASIS database (Online Aerospace Supplier Information System). Aircraft and component manufacturers use this database to look for suitable suppliers.

CERTIFICATE. Bernhard Ständer, Managing Director of Germanischer Lloyd Certification (GLC), presented the document to Plant Manager Uwe Fresenborg of Premium AEROTECH.



Small Is Beautiful

Small and mid-scale LNG is growing in importance. In particular, offshore mid-scale LNG seems to be here to stay

Small-scale LNG has traditionally been used to supply small markets remote from pipelines and to provide, on an annual basis, a peak-shaving capability. The peak-shaving business dominates the small-scale industry with a large number of facilities in operation in the United States and Europe.

These facilities produce LNG only for a portion of the year when gas demand (and usually prices) are low, usually in summer. The LNG is stored and then regasified when gas demand rises, typically in winter. There are about 120 peak-shaving plants worldwide, most of which are supplied by road tanker from larger facilities. Known as satellite facilities, they store the gas locally for vaporization and distribution.

Increasing Popularity

Energy demand is rising, particularly in less developed countries, where the gas-fired, combined-cycle gas turbine (CCGT) is the power generation technology of choice. LNG provides a convenient, environmentally acceptable way of delivering energy to outlying industry and population centres where a pipeline would not be feasible. A small lique-

fier, a couple of satellite facilities and some road tankers can satisfy the demand.

Technological Options

Small-scale LNG projects have generally concentrated on minimizing capital investment. Most peak-shaving plants were built either as a contingency or for limited periods of use. Minimizing capital costs was therefore important, and high operating costs would only be incurred for lim-



NETWORK. The LNG storage facilities liquefy natural gas by cooling it to -160 degrees centigrade and store it in liquid form.



Photo: Stockphoto

PERSPECTIVE. High worldwide gas prices enhance chances for small-scale LNG.

ited periods. LNG peak shaving plants use two liquefaction technologies: Nitrogen refrigerant cycles or a single mixed-refrigerant (SMR) cycle. Nitrogen cycles are generally used for low gas liquefaction volumes, while SMR processes are employed in the larger peak shaving plants because of their improved efficiency. The key decision for a mid-scale LNG project is: scale up a low capital cost, high operating-cost peak-shaving technology, or scale down a high capital cost, low operating-cost baseload LNG technology? Both strategies, as well as hybrid technologies, are being used by the industry.

Mid-Scale Costs

Mid-scale LNG developers have opted for a different construction strategy than base-load producers, preferring modularization over the in-situ assembly approach generally in use for baseload plants. The physically smaller equipment required for mid-scale projects is much more amenable to shipping and connection.

There are also other important features. Firstly, more suppliers can make the equipment, providing more competition, and hopefully, lower prices. Secondly, manufacturing schedules are shorter as alternative fabrication shops can be used. And thirdly, less complex equipment designs mean that the equipment can almost be supplied “off the shelf”. In contrast, the baseload LNG industry relies on specialized equipment from few (usually very busy) suppliers with the need to provide significant test work (and poten-

tially rework) to ensure that margins and guarantees are met.

Potential Disadvantages

Both shipping and storage of LNG are costly. A mid-scale project has a very difficult decision to make on its export strategy, which will have a profound impact on these issues: Does the project want to supply a niche market, which can accommodate small LNG ships (with small storage tanks and a reduced marine facility), or should it supply a variety of customers (therefore needing to handle standard ship sizes with a larger marine facility and associated storage tanks)? Being a portfolio supplier will potentially allow higher earnings but at potentially much higher capital investment.

Since the cost contribution of marine facilities and site preparation will be many times more for a smaller-throughput terminal, mid-scale plants require careful site selection. It seems logical for a small terminal to use small ships to reduce the need for expensive onshore storage capacity. However, vessels of less than 60,000 m³ are few. A dedicated, new-build small ship is an expensive option.

LNG storage tanks are another high-price project element. There must be sufficient storage available to fill the waiting LNG tanker without unnecessary delay and still retain a sufficient quantity of LNG to meet demand until the next delivery. While modularization and off-the-shelf equipment improve construction schedules for the →

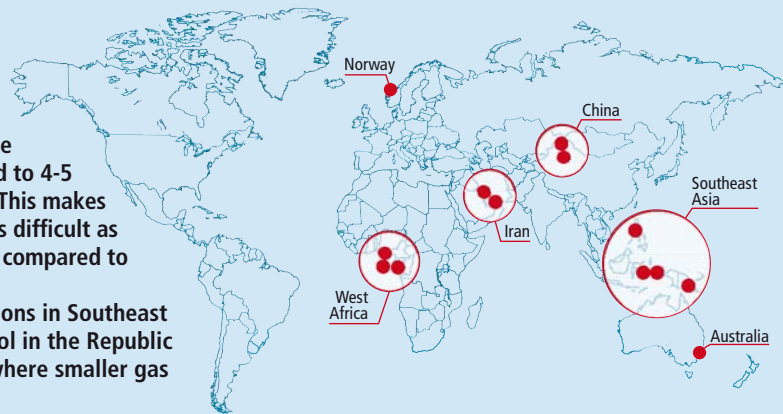


TERMINAL. Discharging a shipment from an LNG tanker.

Project Locations

Mid-scale LNG does not require multiple trillion cubic feet (tcf) gas finds. A 1.5 mtpa mid-scale LNG project only requires recoverable reserves of 1.7 tcf over a 20-year life compared to 4-5 tcf for a conventional 3.6-4.5 mtpa LNG plant. This makes finding gas reserves for a mid-scale project less difficult as 4-5% of world gas fields are greater than 1 tcf compared to 1% that are greater than 5 tcf.

Mid-scale LNG is being proposed for locations in Southeast Asia (e.g. Sengkang) and West Africa (e.g., Gasol in the Republic of Congo and Gabon, GdFSuez in Cameroon) where smaller gas fields have not been developed to date.



→ LNG plant considerably, the storage tank is the longest-schedule item. To minimize costs, a single-tank solution is preferred, but a conventional, large LNG tank will reverse the schedule gains from liquefaction. To date, the embryonic mid-scale LNG industry has not developed a common strategy to address this issue.

Regions of Implementation

A clear advantage of mid-scale LNG over conventional baseload LNG projects is the fact that it does not require multiple trillion cubic feet (tcf) gas finds. This makes finding suitable gas reserves less difficult. Many of the locations that mid-scale LNG is being proposed for are in South East Asia and West Africa, where smaller gas fields have not been developed as economies of scale have prevented commercialization. Specialized markets also exist in Norway and China where environmental concerns and the supply-demand deficit are driving development (see map).

Potentially the largest market for mid-scale LNG is, however, offshore. Efforts to develop a floating LNG (FLNG) liquefaction project are progressing rapidly. There are two de-

sign concepts: While the oil supermajors are attempting to marinize the baseload LNG technologies to produce large-tonnage FPSOs, entrepreneurs are looking at smaller capacities using mid-scale LNG technologies.

Offshore Technology

Floating LNG offers the potential to considerably reduce costs within the LNG industry. Furthermore, loading offshore solves many environmental, political and access-related issues, provided it can be technically demonstrated on a consistent basis.

Firstly, the physical plant size must be smaller, as the deck area is limited. As a result, safety concerns must be given special attention. Secondly, equipment sizes may need to be reduced to minimize the impacts of wave motion on performance. And finally, maintenance is more difficult, requiring more attention to availability and equipment selection. The resulting need to minimize equipment, hazardous inventories and manning levels makes the nitrogen-based liquefaction processes of the peak-shaving industry a natural choice for FPSOs. The absence of a hydrocarbon-based refrigerant significantly lowers the risk of fire or explosion and minimizes the environmental impact. The first offshore nitrogen-type refrigeration units for LNG are already in service on LNG ships, and no problems have been reported over the first months of operation. Several nitrogen-cycle floating liquefaction vessels are on order. Other, smaller offshore liquefaction developers have opted for alternative strategies.

While the credit crunch and potential worldwide recession have taken the edge off international LNG prices, price levels remain sufficient for mid-scale LNG to profitably enter the market. In particular, offshore mid-scale LNG seems to be here to stay.

■ DH



Photo: Courtesy of SBM Offshore/Linde

STUDY. LNG FPSO concept design.

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Tankers Feeding Tankers

Enabling oil production without the need for pipelines, FSO and FPSO units for temporary storage make exploring and exploiting even small or remote offshore oilfields lucrative. The risks, while requiring thorough analysis, are manageable

Golden Lion” is the meaning of the Vietnamese term “Su Tu Vang”. It is the name of the largest oil field in Vietnamese waters. Exploration was completed in the autumn of 2008. “The field is expected to produce up to 100,000 bbl per day,” says Nguyen Dang Lieu, Vice President of the national oil company Petrovietnam, the main shareholder of Su Tu Vang. Production began at around 10,000 bbl per day and rapidly increased to two-thirds the planned maximum production rate.

What sets this oil well apart from other offshore wells: it does not use a pipeline to pump its oil to the mainland. Rather, the oil produced by the well has been flowing to the FSO unit “Queensway” since 25 November 2008 via a Central Processing Platform (CPP). Queensway had arrived at her moorings in the oil field in late October and soon began loading oil. The oil will be off-loaded onto the shuttle tanker at regular intervals.

By the time the first shuttle came alongside, Queensway had already stored roughly 350,000 bbl, about one-third of her capacity. FSO, or Floating Storage and Of-

floading units such as Queensway, are essentially huge floating oil tanks. They store the produced oil before exporting it via shuttle tankers for further processing on land. The shuttles arrive at scheduled intervals that depend on the production rate of the well and the FSO’s storage capacity.

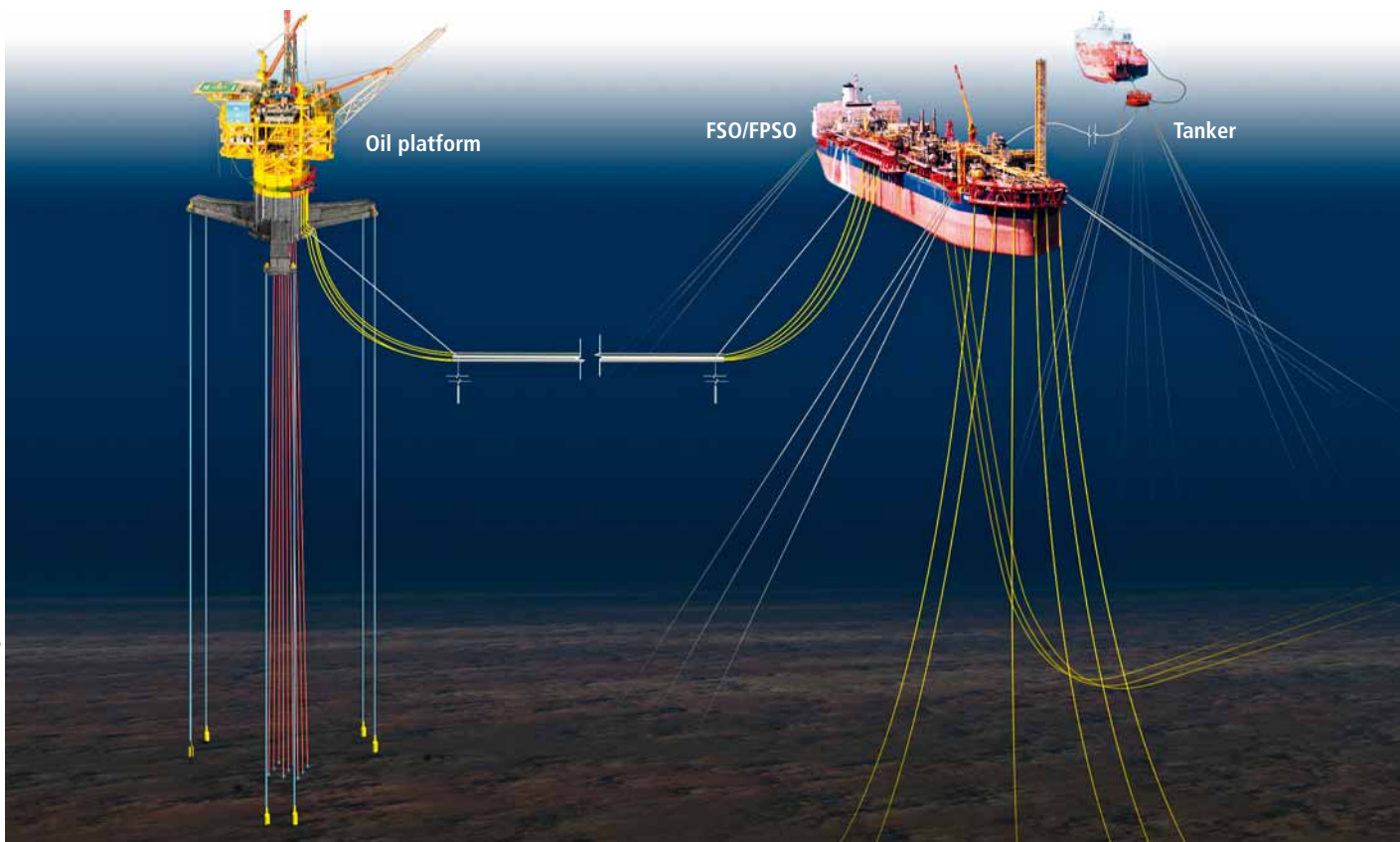
Floating All-Rounders

FPSO ships – with an added “P” for “Production” – can do even more. They not only receive crude oil from a nearby production platform but also process oil, gas and water using their own, on-board production plants. After all, what comes out of the ground is by no means pure oil. Rather, it is a mixture of oil, gas and water. FPSO units separate oil, gas and water. The water is cleaned and dumped back into the sea. The gas is dried, compressed and exported to shore via a pipeline pumped through a pipeline, while the oil is stored on board the vessel. An FPSO or FSO can usually store the production of two weeks. The pipeline running to the mainland is exclusively used for gas. →

FLOATING STORAGE.
FSO vessel “Queensway”
receives oil from the Viet-
namese Su Tu Vang field.



Photo: SBM Atlantia, Inc. 2009 All rights reserved



→ “FSOs and FPSOs are an excellent option for remote or deep-sea oil fields. Installing pipelines to connect wells to the mainland increases costs immensely, mainly because of the large quantities of steel required. This is why an FSO or FPSO is an ideal solution,” explains Raza Amin, Managing Director of Trident Consultants, a consulting firm based in Malaysia that joined the Germanischer Lloyd Group in 2008.

But cost efficiency is not the only benefit of using stationary storage vessels, says Amin: “FSOs and FPSOs are also an ideal choice for fields with limited oil reserves. It does not make sense to invest huge sums of money to extract oil out of these fields. An FPSO is more economical than installing a pipeline. For smaller oil companies and for newly industrializing or developing countries, FPSOs are a natural choice.”

Manageable Risk

Trident has been in business for 27 years and has overseen more than 30 FSO and FPSO projects. Trident’s expert consulting services focus on HSE risk management, making sure the equipment will operate safely without endangering Health, Safety or the Environment (HSE). Both equipment installed on the “floaters” and operational procedures used must be designed for both economical feasibility and safety. “The FPSO business is full of challenges,” says Amin. “To give an example, it is extremely weather-dependent.”

Rough weather conditions make loading a very complicated process because the shuttle tanker must manoeuvre very closely to the FPSO. While there are sophisticated rules for these offshore operations, implementing them is nearly impossible without expert advice, Amin adds. “So our job is to analyse technical risks and do our best to minimize them. To accomplish this we cooperate closely with gov-

ernment and private-sector supervisory bodies. We try to lower risks as much as reasonably possible.”

Cost-Effective Alternative

The most important component of an FPSO system is the ship as such. To find the best solution for a given application, you need to consider the size of the oil reservoir, says Amin. “If the reservoir is substantial, it may make sense to custom-build an FPSO vessel, or floater, including a double hull and special features to suite the operating environment. That is the expensive option. And apart from the cost, shipyards around the world have long waiting lists. Time is a big factor in this business.” In the western African Bonga field, for example, Shell deployed large, custom-built floaters, says Amin. Another field in Indonesia was likewise exploited using newly-built floaters several years ago. But those are ex-



HEAVY LIFTING. FPSO vessels must be anchored reliably. The technology preferred today is a single-point mooring (SPM) system.

Offshore Oil Production

In the beginning, oil simply welled up from the earth. Thousands of years ago, humans started using oil and its residues. In Mesopotamia, people applied naturally-occurring earth pitch to make their reed boats watertight. In modern times, the history of commercial oil production did not begin until the 1850s. Surprisingly, this happened in several different regions simultaneously: in Dithmarschen in northern Germany, in the US state of Pennsylvania, and in Poland. For roughly a century, oil was solely produced from inland wells. Then, in the 1950s, pioneers ventured out into the seas. Thus the history of offshore oil exploration is short by comparison.

For several decades, oil platforms were simply set down onto the bottom of the sea. In general, we associate offshore oil drilling and production with the concept of the jack-up rig, an oil platform sitting atop a lattice-type structure anchored to the seafloor. Jack-up rigs are a standard solution for water depths up to 130 metres even today. Other, more recent developments are platforms with a solid concrete base, or semi-submersible designs that can be deployed in deep water.

In 1995, the Norwegian enterprise Aker Kvaerner completed the world's largest offshore drilling platform to date. Named Sea Troll, this concrete deep-water or "Condeep" structure is best described as a huge tank with four concrete pillars extending upwards. The drilling platform, nearly 500 metres in height, was anchored



Photo: Statoil

GIANT. Nearly 500 metres tall, "Sea Troll" located off the Norwegian coast is the world's largest drilling platform.

in waters over 300 m deep far off the Norwegian coast, where it produces gas.

A mobile solution suitable for deepwater that can be deployed even further away from the shoreline first appeared in 1977 when a Spanish shipyard built an FPSO vessel for the Shell Castello field. 20 years later, the first FPSO system for liquefied gas was completed. One of the largest FPSO units ever built is "Kizomba A". Designed to accommodate up to 2.2 million barrels, this behemoth is currently anchored 320 km off the Angolan coast.

ceptions from the rule. "Most FPSO solutions are converted tankers. After their decks have been cleared of all redundant parts, the required equipment is installed."

The second most important feature for trouble-free, safe operation is the mooring system. An FSO or FPSO unit must be anchored in place reliably so its movements in the water remain predictable. The technology preferred today is a single-point mooring (SPM) system. Maritime engineers categorize this technology as a "dual system" because it consists of anchoring and loading/unloading equipment. Advanced FPSO vessels feature an internal turret mooring system and an integrated anchoring system. The anchor cables are attached to the revolving turret located in the centre or bow of the ship. The FPSO is loaded through a riser coming from the wellhead that attaches to the underside of the turret.

The third main component is the production plant, which consists primarily of separators for separating oil, water and gas, treating the produced water, and separating the gas from the oil. But the work of Trident Consultants is by no means limited to offshore equipment and maritime manoeuvrability of FPSOs. The production facilities themselves,

which represent a substantial capital investment, are subject to risk management as well. "We also advise our customers on technical equipment they need in order to maintain the production plants and keep them in good operating condition," says Amin. An effect offshore operators dread is the so-called water hammer. It occurs when a flowing liquid is stopped abruptly by a rapidly closing valve. "Our customers want to understand it, control it, and be assured that their equipment can cope with these dynamic effects."

Integrated Drilling Equipment

FSO and FPSO units offer many benefits in the current volatile situation on the energy markets. Oil prices have been fluctuating wildly in recent months, but will inevitably rise in the long term. Even in remote oil fields and challenging environments, mobile crude oil storage systems can make oil production economically feasible. Perhaps their most important advantage, says FPSO expert Amin, is their flexibility. Once an oil field has been exhausted, the oil company can relocate the FPSO system to another field with relative ease. It is this benefit in particular that is causing the number of FSO and FPSO deployments to rise globally. Not only do these vessels offer volume storage, there are also technical innovations adding value to this concept.

The first-ever FDPSO units already left their shipyards. "D" is for "Drilling": carrying drilling equipment on board, these innovative floaters can operate more or less independently in offshore oil fields. A yard in Singapore is about to deliver one of the world's first FDPSO ships for deployment in an oil field off the West African coast in waters 1,500 m deep, says Amin. Trident has developed a comprehensive risk management concept for this project. ■

TRIDENT: THE GL GROUP'S RISK EXPERTS

Trident Consultants joined the Germanischer Lloyd Group in May 2008. The company has offices in London, Aberdeen and Kuala Lumpur. Established in 1982, Trident provides process planning and safety consulting services to the oil and gas industry. The company describes its service portfolio summarily as "management of operational risks to operating systems, people, the environment, asset revenue and reputation."

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Strategies for the Fight Against Corrosion

Strong currents, salt water, ice, high wind speeds: Offshore wind turbines are exposed to extreme conditions. To avoid excessive maintenance costs and downtime, operators must implement long-term anticorrosion programmes

Constant high winds on the open sea are what makes offshore wind generation appealing. But to operate profitably, wind turbines must be designed to resist the onslaught of the elements for many years and run reliably without requiring costly maintenance and repairs. Corrosion protection is a key factor in ensuring the longevity of these systems – a topic discussed in depth during the 8th conference on corrosion protection in maritime engineering this January.

Continuous Monitoring

“As wind turbines get bigger and bigger, boasting nameplate ratings of five megawatts and beyond, it is necessary to tune all relevant parameters accordingly,” said Uwe Meesenburg of REpower Systems. The quality and production control expert specializing on tubular tower design and corrosion protection was referring to two pilot projects, “Beatrice” in the North Sea, and “Thornton Bank” in the English Channel. REpower supplied the tubular towers, nacelles and rotors for both units.

While REpower did not have to address the issues associated with the high-stress sections of the foundations below the waterline and in the range between the low and high water levels, these projects involved other technical challenges no less demanding: How can the components be protected against corrosion? How can they be transported and assembled? Are there any manufacturers capable of building tubular towers of these dimensions and protecting them with effective anticorrosion coatings?



Photo: REpower

SUCCESS. At the project “Beatrice”, good planning and exact realization lead on to a reliable coating.

In the case of the Beatrice project, the tower segment is 66 metres long. This “tube” had to be cut into three sections to fit into the sandblasting and paint shops. But thanks to its excellent planning work and precise execution, REpower succeeded in providing a reliable coating. The repair system supplied by the paint manufacturer allowed the anticipated nicks and marks caused during the transport and assembly to be eliminated.

In the case of Thornton Bank, however, the tower manufacturer initially failed to meet the stringent requirements of REpower. In particular, the use of shop-primed plates was not consistent with specifications. Yet, by cooperating closely, REpower, the tower manufacturer and the supplier of the steel plates were ultimately able to deliver a high-quality product. “What all this shows is that uncompromising quality and production control is crucial, especially so in the area of corrosion protection,” said Meesenburg. “It will take time as well as larger batch sizes to achieve a truly reliable process.”

To provide an effective repair system for cases of damage, it is essential to document all corrosion protection measures. This includes instructions for surface preparation when restoring the necessary coating layers. “There are very few tower manufacturers that are technically ready to meet the challenges,” Meesenburg emphasized. After all, building production facilities for these enormous tubular tower segments takes substantial capital investment.

Low Maintenance

“Any wind turbine should be designed to operate for 20 to 25 years without requiring much maintenance,” said Mathilde Lindhardt Damsgaard of Danish energy company Dong. “So when a corrosion protection system is selected, every single parameter must be scrutinized.” Ensuring a level of protection that is both economical and durable means examining each specific project and component individually. No matter whether the structure is made of concrete or steel, selecting the right materials and design features is the first step to minimizing the risk of corrosion, Damsgaard adds.

The strengths and weaknesses of an anticorrosion system will not become apparent until the offshore wind turbine has been in operation for



CASE STUDY.
The Nysted
wind farm in
the Baltic Sea
off the Danish
coast.

Photo: Gunnar Britse

some time. “To give an example, in the case of the Horns Rev wind farm off the western coast of Denmark, which was built in 2002, the coatings used were of a rather basic kind,” Damsgaard continues.

Within a few years of operation, the structure exposed extensive surface damage. That experience made it clear that coating systems must be applied in multiple layers to achieve a buffer effect. The reason is that pores and inconsistencies are not likely to occur at the same locations in each layer.

Damsgaard refers to another example: At the Nysted wind farm, 120 kilogrammes of protective zinc anodes had been embedded into the foundations. Some of the anodes became inactive but could not be located. This shows how important it is to document every construction detail. With the appropriate documentation at hand, it would be possible to check other anodes from the same batch to reduce future repair efforts and costs.


Expert Care

The first wind farm, with a rated power of five megawatts, was built in the Baltic Sea off the Danish coast in 1991. Nevertheless, offshore wind turbines are still a relatively new and unexplored field for all parties involved. There is no extensive experience as yet. And there are no general rules or standards to rely on. “The importance of high quality standards and reliable monitoring systems cannot be overemphasized,” said Daniel Engel, Vice President Materials and Products with Germanischer Lloyd.

To arrive at an optimized, economically and ecologically feasible anticorrosion concept for offshore wind turbines, experts from all industries involved must co-operate closely. Experience gained by one industry may benefit the others. Bimetallic corrosion, for example, can be avoided by selecting appropriate materials or integrating other protective measures during the design stage.

Similarly, wind turbine designers may draw on experience gained by shipyards in implementing the challenging VOC guidelines, which limit emissions of volatile organic substances. And then there is the paradigm of anticorrosion strategies for offshore oil platforms. These should be adopted and modified to provide sustainable protection for wind turbines.

■ NL



COMPONENTS. Rotor blades before assembling in Portugal.

Worthwhile Investment

With less financing available, undertaking a comprehensive technical and economic viability assessment of wind energy projects is even more essential. GL's Due Diligence Service supports clients in making investments

36.5 billion euros was the value of the global wind market for turbine installations in 2008, as reported by the Global Wind Energy Council. Over the past year, the worldwide wind capacity grew more than ever, with a 28.8% growth rate, which is equivalent to 27 GW. This resulted in a total global capacity of more than 120.8 GW at the end of the year. A

bright outlook one would believe. However, as a result of the economic crisis, financing for new wind projects and new orders for turbines slowed down at the end of 2008 and in early 2009.

With less financing available and increased pressure to ensure adequate returns on investment, undertaking a comprehensive technical and economic viability assess-

INTERVIEW

Global Coordination, Site Specific Expertise

Marion Hill and Peter Dalhoff are the heads of Germanischer Lloyd's Due Diligence (DD) Service. In *nonstop* they speak about the benefits and perspectives of DD.

nonstop: What are the unique characteristics of this service?

Hill: First of all, our expert team, with its reputation for reliability and accuracy, offers our clients guidance while providing them with ideas of how best to mitigate investment risks and guarantee that both technical and commercial uncertainties are quantified and addressed.

Secondly, clients benefit from our systematic approach allowing them to make well-informed business decisions faster because of our expertise coupled with greater efficiency, timely results, and highly integrated services. With a methodology specific to the deal in question, lenders and investors can be assured the complexities related to the number and location of generators as well as the iterative nature of the contracting and permitting processes are considered as a whole.

Finally, GL provides a broad range of due diligence services in the market, covering wind engineering, conventional engineering, interconnection and integration, environment and permitting, commercial contract reviews, and financial pro forma reviews. Furthermore, services include inspections throughout the project life cycle specifically in component manufacturing, transportation, construction, commissioning and end-of-warranty as well as due diligence of wind power projects and manufacturing facilities.

nonstop: In this context, what is the benefit of due diligence for your clients?

Hill: Clients are enabled to make timely, well-informed and competitive investment decisions as a result of being involved in a due diligence process where we identify the principle technical project risks, evaluate their probability of occurrence and the client's level of

exposure thereto, as well as their potential impact on the project and thus ultimately propose appropriate risk allocation and mitigation opportunities.

Dalhoff: GL Consulting & Engineering has developed a wealth of expertise in analysing and quantifying the design, operational, contractual and permitting risks associated with wind projects. Through its understanding of the principle drivers and risk management possibilities, GL manages the technical details of the project while balancing the overall objectives of the investment or loan.

nonstop: How many clients do you have in terms of megawatts (MW)?

Dalhoff: GL has completed over 12,000 MW of technical due diligence reviews and independent expert opinions for lenders and investors. These projects are split between 9,225 MW in North America and 3,400 MW in Europe or in terms of

ment of wind energy projects is essential. Lenders and investors require expertise from GL to ensure they have a sound and reliable financial model with realistic assumptions on income and costs. The objective of GL's Renewables Due Diligence (DD) Services is to support clients in their assessment of the technical and commercial risks in a potential investment or loan.

A Comprehensive Risk Assessment

The due diligence process can be required for a project in any of its phases of development. In a pre-construction project or an operational project, one must identify the principle technical project risks, evaluate their probability of occurrence and the client's level of exposure thereto, as well as their potential impact on the project. This ultimately results in a proposal identifying appropriate risk allocation and mitigation opportunities.

During the operation phase, one must inspect the condition of the turbines, monitor the performance of the project, update budgets, and ensure adequate spare parts. During the construction phase, the work consists of ensuring that

the components are delivered to the site in an appropriate condition, approving the draw-down schedule, and performing acceptance tests at the commissioning stage.

Aspects included in due diligence reviews contain all of the following: assessment of the structural integrity of the turbine for the site, evaluation of the reputation of the turbine technology, assessment of the foundation and electrical design, assessment of the project and O&M costs, assessment of the construction schedule and assessment of the terms and conditions of all project contracts, evaluation of whether all permits were obtained. The focus lies on the identification and assessment of specific risks from the lenders', and investors' perspective and a description of possible ways to limit possible risk factors.

Over the past ten years, GL has undertaken due diligence contracts for over 12,000 MW of wind power projects on- and offshore worldwide. Additionally, the company has acted as an independent technical advisor for the majority of company takeovers and investments in wind turbine manufacturers and important component suppliers. Overall, GL has completed over 70 due diligence studies for investments and loans to wind farms. Customers include BP, BC Partners, Nordic Capital, UBS Warburg, Candover, City Bank, GE Energy Financial Services, Yes Bank, NIBC Bank, FPL Energy, Energias de Portugal, Electricité de France, ENMAX Corporation, EPCOR Power Development, Enbridge Wind Energy and Kruger Energy. ■ SG

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onshore and offshore projects between 9,460 MW onshore and 3,000 MW offshore.

nonstop: From your point of view: What regions will be most important for you in future?

Hill: The countries with the largest expected growth over the next five years are the United States, China and India. While we are already present in these regions, our objective is to increase our market penetration while providing services adapted to the local context.

Dalhoff: For the Engineering & Consulting Services in Europe, I would attach special importance to Germany, the UK, France, Spain and Eastern Europe. Concerning offshore wind energy, the British and German markets are of high relevance with both countries having huge project pipelines.

nonstop: Could you give an example of one very successful project you transacted last year?

purchase of Creststreet's operating 63-MW Kettles Hill Wind Farm in Canada. In the context of this mandate, we assessed the risk profile with respect to the operation of the wind farm, site suitability of the Vestas V80 model and the reputation of this turbine in the market, condition monitoring systems, technical terms of the service, warranty and maintenance agreement, and the future and potential revenue for the wind farm and its projected expansion.

Dalhoff: In 2008, we were contracted for a technical due diligence project that consisted of a package of four offshore wind farms with a capacity of more than 1,500 MW in the German North Sea and Baltic Sea. Thanks to our large pool of resources, we were able to process all four projects in parallel and meet the client's very ambitious deadlines.

We assessed the wind conditions, the energy yield, the capital expenditures

Hill: We completed the technical due diligence relating to ENMAX Corp's successful purchase

(CAPEX) and the operational expenditures (OPEX), as well as the decommissioning costs. The building permit was reviewed for potential issues concerning technical parameters and their influence on a variety of issues, such as the environment. The turbine, foundation and electrical technology, as well as the installation and service concepts were assessed in terms of track record and risk profile. This project was a highlight due to its sheer volume. At the same time, it fitted in nicely with our other technical due diligence projects for offshore wind farms.

nonstop: What will you focus on in the upcoming twelve months?

Dalhoff: Project due diligence is becoming more and more relevant, both onshore and offshore. We are continuously improving our CAPEX and OPEX database. Strategic investors are not only looking for project pipelines but also for opportunities to take over operational projects. Additionally, we are increasing our inspection resources in due diligence for operational projects as this provides a direct view into the technical condition of the wind farm and as such brings real added value for the investor to assess the asset.



Photos: Carole Orébig, Jonas Salkauskas, Sosa

IMPRESSIONS. Pictures from Kazakhstan – between tradition and modernity.

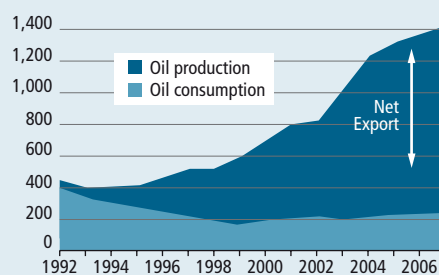
GL Seeking Engineering Opportunities in Kazakhstan

Professional technical and management services for the booming oil industry in western Asia

Foreign companies have been showing strong interest in Kazakhstan ever since the country gained independence in 1991. This is mainly due to Kazakhstan's rich oil reserves. The booming petroleum industry of the western Asian country accounts for roughly 30 per cent of the national GDP and over half of its export revenues, according to the US Energy Information Administration. In response to the growing demand for local engineering services, Germanischer Lloyd has established an in-country subsidiary, Germanischer Lloyd Industrial Services Kazakhstan LLP.

"There are great opportunities to provide our services for onshore, offshore, power construction, drilling and environmental projects," emphasizes Yerzhan Syrymov, the new Managing Director at GLIS Kazakhstan. From the new offices located in Atyrau, GL will be providing verification and certification, risk and integrity management services, supply chain inspection, materials testing and non-destructive testing services, ISO training and certification as well as GOST-K certification. A GOST-K certificate confirms the quality of products and their compliance with the norms and standards of the Republic of Kazakhstan. Most of the products imported to Kazakhstan are subject to compulsory GOST-K certification.

Oil production and consumption in 1,000 barrels/day



Yerzhan Syrymov joined GL in February 2009 after working as a regional business development manager for SGS Kazakhstan for two years. The chemical engineer gained considerable professional experience as a construction engineer, senior QA/QC engineer, project engineer and project manager within the Tengzichevroil Company, a joint venture of KazakhMunaiGas (KMG) and ChevronTexaco (CVX), between 1991 and 2007.

Currently still a team of two, GL Kazakhstan is keen to expand. "We intend to employ up to twelve people and establish a network of 20 to 25 freelancers as required to satisfy our clients' needs. The plan is to hire and train local people to meet our expected qualification level and then start providing services through local staff," says Yerzhan Syrymov.

He is looking forward to the challenges ahead: "Our plan is ambitious: Keep up and continue expanding the market in the country with the GLIS service portfolio as a 'one-stop shop'.

In a few years' time, we hope to offer our services in other 'stan' countries such as Uzbekistan, Kyrgyzstan or Turkmenistan, as well." ■ AM



EXPANSION. Yerzhan Syrymov, GL Kazakhstan.

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Principles, base line definitions, application consequences
- **Cost Savings by Hydrodynamic Measures (Grieg Shipping Group, N)**
Reduction of speed, trim optimization, power saving devices incl. newly developed pre-swirl duct
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Ship design, retrofit, performance management, operational optimization
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Saving potentials in resistance, propulsion, main engine, auxiliaries and other onboard consumers
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Intervals for hull/propeller, spot blast versus full-blasting, coating systems, effect of wake ducts/propeller caps etc.
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Measurement parameters, analyses, fouling, fuel saving, trim optimization, power-saving devices, reduction of speed
- **Shipboard Weather Routing – Operational Benefits (GL, D)**
Prevention of damages, hull response monitoring, efficient ship scheduling, experience and further development
- **Increased Efficiency by Crew Training Simulation (MTC, D)**

Future Fuels and Efficient Power

- **Gaseous Fuels – Operational Aspects (Wärtsilä, FIN)**
Dual fuel versus pure gas engines, efficiency and emission aspects, cold ironing versus gas driven engines
- **Gaseous Fuels – Safety Aspects (BV, F)**
Safe operations of gas engines, risk analyses, rules and regulations
- **Use of Wind Energy (SkySails, D)**
Potential of Sky Sail system, first operational result, future developments

- **4 Stroke Engines – Efficiency and Emissions (Cat, USA)**
New developments, NOX reduction, exhaust gas treatment
- **2 Stroke Engines – Efficiency and Emissions (MAN, D)**
New developments, gaseous fuel and low sulfur aspects
- **Energy Efficient Engine Room Ventilation (Witt & Sohn, D)**
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Programme:

September 28

9:00 – 10:00 Registration, Welcome
10:00 – 13:00 Papers on Ship Operation and Ship Design
13:00 – 14:30 Lunch
14:30 – 17:30 Papers on Ship Operation and Ship Design (cont'd)
19:00 Conference dinner with keynote speaker

September 29

9:00 – 13:00 Papers on Future Fuels and Efficient Power
13:00 – 14:30 Farewell buffet

Conference Fees:	If booked prior to August 21	Full fee
Participants	€ 650	€ 750
STG-Members	€ 500	€ 600
Members of RINA/SNAME/JASNAOE/SNAK	€ 500	€ 600
IMarEST/SSNAME/IME/HIMT		
Students/Pensioners (STG members only)	€ 100	€ 100

The conference fee includes proceedings on a CD, admittance at all technical sessions, lunches and refreshments, conference dinner and farewell buffet.



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