Germanischer Lloyd

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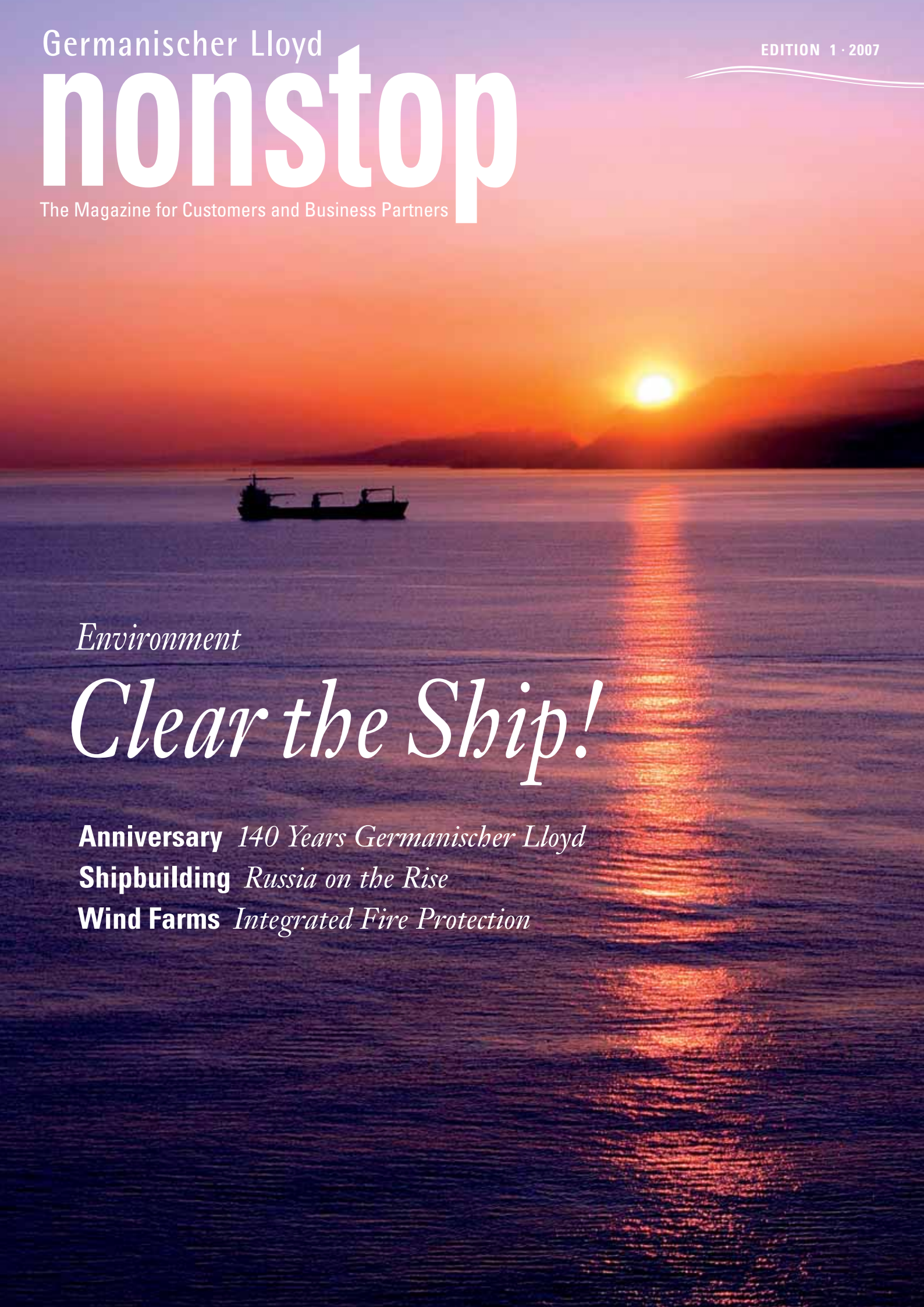

Environment

Clear the Ship!

Anniversary *140 Years Germanischer Lloyd*

Shipbuilding *Russia on the Rise*

Wind Farms *Integrated Fire Protection*

First Class tankers: a new perspective

TAKING TANKERS SERIOUSLY

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

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Germanischer Lloyd
OPERATING 24/7

Dear Readers,

Dr Hermann J. Klein

On 16 March, Germanischer Lloyd will again be celebrating its birthday. More than that: this date marks the 140th anniversary of the founding of our company. A fitting moment to reflect on the past, and at the same time a good opportunity to look far into the future. What will the next 140 years hold in store for Germanischer Lloyd? What are the issues of the future, what challenges will be facing us?

The change in global climate will become of vital importance for our work – as much as the commodity flows increasing worldwide. One of the possible consequences could be the development of new transportation systems. The advancing modernization of many national economies is causing an enormous increase in the world's hunger for energy. This has resulted in a need for global conflict management that poses the very highest demands on risk minimization, not only from a technical viewpoint.

What contribution can Germanischer Lloyd make to finding the best solutions to the questions of tomorrow? How can we make the operation of ships, wind turbines, oil production facilities and pipelines more friendly to the environment? In view of the rapid pace of technical progress and the associated ecological problems, these questions are of strategic significance.

Together with you, we wish to use the jubilee year to find new paths for the environmental compatibility of worldwide shipping, whilst simultaneously continuing to optimize its profitability.

A keynote theme in this issue is therefore maritime environmental protection. Ecological aspects characterize the life-cycle of a ship from beginning to end, from construction to scrapping. Our lead story spotlights the regulations which shipowners will have to observe for the ecological disposal of their ships. In addition, we explain how the international inspection and control regulations on the prohibition of TBT-based anti-foulings can best be observed, and we present intelligent maintenance strategies for diesel engines. For wind turbines too, it is essential to detect and rectify malfunctions in operation as quickly as possible. Autonomous early-warning and fire-extinguishing systems play a decisive role, particularly in the offshore sector.

In keeping the right balance between profitability and ecological compatibility, these topics are becoming ever more important. And how may we support you?

Yours sincerely,

Dr Hermann J. Klein
Member of the Executive Board

contents

Design for Safety

On 30 March, 2007 the management of the SAFEDOR project will hold a seminar titled "Approval of Risk-Based Ship Design" for flag state representatives and employees of classification societies. The event will take place in Munich and will focus on the approval procedure for risk-oriented ship design.

Under the leadership of Germanischer Lloyd, 53 co-operation partners from enterprises, government agencies and scientific institutions from all over Europe joined forces in the SAFEDOR research project. SAFEDOR views safety as an objective of the design process, not as a limitation imposed by standards and regulations. SAFEDOR integrates risk assessment methodology into the engineering design and approval process. Furthermore, it develops the rules framework required for risk-based approval.

For further information and registration: www.safedor.org

Photo: CPD-Foto

news

PARLIAMENTARY WORKGROUP

Successful Tonnage Tax

MEETING. Rainer Schöndube, Member of the Executive Board, Germanischer Lloyd, MP Wolfgang Börnsen and Reinhard Stuth, representing Hamburg's senate office, at the State of Hamburg's Berlin branch (left to right).

Sea damage assistance in the Baltic Sea, the significance of the tonnage tax, ensuring the competitiveness of the German shipbuilding industry, recycling ships in an environmentally sound manner, and current legislative activities in Brussels: those were the topics on the agenda of the latest meeting of the workgroup on coastal affairs of the Christian Democrats' faction within the German federal parliament, the Bundestag.

Strong position. Invited by the chairman of the workgroup, MP Wolfgang Börnsen, Germanischer Lloyd board member Rainer Schöndube explained the implications of the third EU package on maritime safety for the officially recognized classification societies in case the EU proceeds with the harmonization of the relevant technical standards. Competition among classes is necessary to drive innovation and technological progress, said Schöndube.

The importance of the tonnage tax for the successful development of the national maritime cluster became evident during the subsequent discussion. The tonnage tax has significantly contributed to the growth of the German commercial fleet. With over 14.4 CGT, German companies globally rank second among enterprises ordering new ships. Most vessels ordered are container ships.

German companies own more than 31% of the world's container fleet, and Germanischer Lloyd is the market leader in container vessel newbuilding classification, with a current market share of 44.2%. The introduction of the tonnage tax, said Schöndube, triggered a positive trend in raising the investment capital needed while strengthening Germany as a shipbuilding nation, boosting employment opportunities and securing tax revenues.

Approved system. The tonnage tax is not actually a tax but a method of determining earnings. The EU Commission has confirmed that this model is consistent with EU rules. The method has been applied in Denmark, Great Britain and other European seafaring nations for years.

At the fifth Maritime Conference in Hamburg held in December 2006 chancellor Angela Merkel made it clear that the tonnage tax is here to stay.

"BOOT" TRADE FAIR IN DÜSSELDORF

A Perfect Fit: GL Certification of Sports Boats

At this year's "boot", the international sports boat trade fair in Düsseldorf, Germanischer Lloyd showcased its comprehensive range of services for sport boats and sailboats. Besides the "GL Yacht Plus" certification offered for yachts shorter than 24 metres, GL also presented certification options for mega yachts.

"GL Yacht Plus" is mainly intended for shipyards building series boats. It goes beyond the scope of the existing, compulsory CE certification (Sports Boats Directive). The "GL Yacht Plus" voluntary certification programme includes verification of the engineering drawings, as well as production audits. It further enhances production quality, a benefit welcomed by leading yacht builders.

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MEGA YACHT. Eyecatcher at the "boot" in Düsseldorf.

Photo: renettlmann.com / Messe Düsseldorf

LEGISLATIVE BODY. European Parliament in Strasbourg.

SHIP SAFETY PACKAGE

European Parliament to Vote on Class Directive

In recent years, public interest in maritime matters has increased considerably. The global commercial fleet continues to grow, reflecting the steady process of globalization and the expansion of international trade. Larger container ships are transporting more goods across the seven seas than ever before. The value of ships and their cargo is increasing accordingly. At the same time, the number of sea damages has decreased noticeably.

Environmental disasters resulting from collision, grounding and other accidents have occurred less frequently in recent years. Compared with air or overland cargo, ships offer the most efficient, safe and environmentally friendly method of transportation. Classification societies contribute to the positive development of international sea trade by ensuring continuous optimization of ship operation, both technically and environmentally. By implementing specific, economically feasible and traceable measures in both of these areas, they practice preventive environmental protection.

Fundamental Questions. The future role of the accredited classification societies within the overall network of maritime safety responsibilities is the subject of intense discussion in Brussels and beyond. In February, the Transportation Committee of the European Parliament debated a new proposal submitted by the European Commission to change the current system of mutually recognized classification societies which was first introduced by Directive 94/57/EG. The draft directive, COM 2005/587, thus forms a part of the third maritime safety package submitted by the EU Commission in November 2005.

In this draft, the European directive defines the requirements for member states assigning compliance monitoring of national ship safety regulations to technical organizations. The legislative draft contains new regulations on the following:

1. the criteria that such organizations must meet;
2. the accreditation and supervision of these organizations;
3. their quality management and
4. the sanctioning of non-compliance.

Consequently, the draft directive raises fundamental questions, especially with regard to safety levels, quality, and competition in the maritime industry.

Jointly with the International Association of Classification Societies (IACS), Germanischer Lloyd supports the initiative of the EU Commission following EU expansion to enable technical inspection societies of the new EU member states to assume flag-state responsibilities.

Nevertheless, the proposal raises one elementary question. Will the EU Commission's chosen instrument of unifying the technical regulations of all accredited classification societies be able to reach its goal of ensuring continuous improvement of technical ship safety? As a matter of fact, it would eliminate a proven routine among classification societies that worked well for centuries, making them important drivers of innovation.

Competition Drives Innovation. By closely monitoring the floating fleet – to give an example, experts of Germanischer Lloyd performed more than 20,000 audits in 2006 alone – classification societies have accumulated a wealth of empirical data. Stringent analysis of this data has led to continuous adaptation of construction rules while driving technical innovation in ship design.

Competition among classification societies in drafting regulations has resulted in a high quality standard that is reflected in the auditing statistics of port states. A thorough discussion will be needed in Brussels to determine whether unified regulations and industry standards defined on a common-denominator basis will be able to achieve better results.

MARITIME TRENDS

Shipowners Slow Down

Bunker costs are a headache. Many shipowners therefore think it makes sense to slow their ships down drastically during long-distance trips to take advantage of over-proportional fuel savings. This is the outcome of an instant opinion poll taken by German HypoVereinsbank among large German ship operating companies during the 6th German Ship Finance Forum in Hamburg this February. According to the poll, alternative propulsion technologies such as sails or fuel cells are generally not being considered.

Asked about the current trend in container ship sizes, 67 per cent of the respondents said that 13,000 TEU was going to be the upper size limit for years to come. 42 per cent believe that 8,000 to 10,000 TEU ships will become the next standard. For now, this appears to answer the question what the optimum ship size is in economical terms. Due the current strong need for container tonnage, respondents are expecting the demand for mid- to large-size feeder ships to increase.

CEREMONY. Dr Hermann J. Klein, Member of the GL's Executive Board, his wife Irene and Gheorghe Bosinceanu, President of the Histria-Group (left to right).

ROMANIA

New Ship, New Orders

Build number 568, register number 112320 – these numbers conceal plenty of effort, work and sweat, said Dr Hermann J. Klein, member of the Executive Board, Germanischer Lloyd, in his speech on occasion of the launching of a 37,000 dwt tanker at Constanta Shipyard, Romania.

The actual naming ceremony was then handled by his wife, Irene. In glorious weather the lady vigorously thrust a bottle of champagne at the new vessel, giving it the name "Histria Agata". 180 m in length and 32 m wide, the chemical tanker is fifth in a series of 17 sister ships being built under GL class, 14 of them for Histria Shipmanagement.

Trustful cooperation. The subsequent festive reception provided an additional reason to celebrate: GL Executive Dr Klein and Radu Rusen, Managing Director of Constanta Shipyard, signed classing orders for two new, 50,000 dwt, IMO Type 2 chemical tankers.

TECHNOLOGY

"Light" Shipbuilding

What can light weight structures accomplish in shipbuilding? What are the benefits of new materials? These were the questions addressed during the 1st European Conference on Production Technologies in Shipbuilding. One of the lecturers at the industry conference held in Rostock-Warnemünde, Dr Hubertus von Selle of Germanischer Lloyd spoke about the weakest points in light-weight structures.

Dynamic strength. To demonstrate the importance of this topic, he explained the dynamic requirements for high-speed ships. Current design, he said, focuses on further reducing the weight of High Speed Craft (HSC), increasing the risk of structural damages unless special attention is given to specific aspects during manufacture.

The responsibility of the classification society, von Selle continued, is to ensure that the production processes of light-weight structures will safeguard static and dynamic strength when the ships are put to use.

Among others the Conference was organized by the mechanical and maritime engineering faculty of Rostock University and the Centre of Maritime Technologies (CMT). The lecture series will be continued in the autumn of 2007.

LIGHTWEIGHT CONSTRUCTION. The fast trimaran "Benchijigua express" consists entirely of aluminium.

Photo: Austal

VIETNAM

Container Manufacturing with Ideas

Two container production lines from Thailand were Tran Van Hung's opportunity to expand his business. He bought the installations in 2004, dismantled them, shipped them to Vietnam and put them up again in Ho-Chi-Minh-City. Since then, Hung Dao Container Joint Stock Co. has been the first, and so far, the only ISO-container manufacturer in the South East Asian country.

Today, the company has an output of 20,000 TEU per year. More than 90 % of new containers are certified by Germanischer Lloyd. Hung Dao has become an international business: Containers have been sold in Vietnam and to Europe, the US and Australia. Raw material is imported from Japan, Korea, China and Malaysia.

Business idea. When he was asked by his former employer, a shipowner, to check on container repairs, CEO Tran Van Hung had the idea for his own business. Hung Dao's first activities were pre-trip inspection and container repair.

Tran Van Hung also designed a special hanging equipment to be installed in containers for transporting garments. Apart from manufacturing and repairing containers, Hung Dao operates container depots in Ho-Chi-Minh-City and Hai Phong with 6,000 and 3,000 TEU, respectively.

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COOPERATION. At the Maritime Vietnam Exhibition in Ho Chi Minh City last November, Hung Dao CEO Tran Van Hung (left) showed one of his containers to Le Than Binh, Germanischer Lloyd Country Manager, Vietnam (right).

DMKN

A Network for Pros

Building a new network within the maritime industry to boost its social and economical influence is the goal of the German Maritime Competence Network (DMKN). Founded by the German Marine Institute, the German Association of Naval Officers, the German Naval Officers Support Organization and other partners, the DKMN fosters co-operation and the exchange of information within the maritime industry. It provides a knowledge pool and a list of experts for four competence centres dedicated to shipbuilding and maritime technology, naval and military technology, sea trade and maritime technology, respectively.

Exchange. In addition, it provides discussion forums, a marketplace with a supplier catalogue, and a career opportunity platform. DMKN users can quickly and easily research articles, press releases and product offers on maritime topics. Dialogue functionality supports networking and the exchange of information and knowledge, helping experts from shipyards, ship operators, suppliers, the navy, research institutions and politics collaborate effectively.

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MEETING. Karsten Fach, Head of GL's Engineering Services Competence Centre (middle), and Ulrich Behrens, GL Engineering Services, China (3rd from the left), with representatives from the Japanese shipbuilding industry.

KOREA/JAPAN

Engineering Services Make their Mark

Save costs, improve communications, reduce effort – in Asia, optimizing processes is a top item on the agenda just as it is in other countries. So when Germanischer Lloyd recently presented its Engineering Services in Japan and Korea, the focus was on software offerings enabling optimized processes in shipyards.

Intelligent software. The GL ShipModel and GL ShipLoad tools met with lively interest among the audience. "Our software was designed for efficient creation of global FE models and for generating global loads for strength calculations. It will be used for new container vessels in Korea," said Ulrich Behrens of Germanischer Lloyd Engineering Services in China. The events in Korea were attended by representatives of Hyundai Heavy Industries, Hyundai Mipo, Daewoo Shipbuilding & Marine Engineering, Samsung, STX and Hanjin Heavy Industries. In Japan, representatives from Mitsubishi, Ishikawajima-Harima Heavy Industries, Kawasaki, and Saiki S/Y came to learn about GL Engineering Services.

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BRAND NEW. The Beagle II just before delivery.

TRANSFER OF CLASS

Wisdom Line: Big in Japan

Beagle II" is the first addition to the GL register in 2007. The multi-purpose cargo ship built by Murakimi-Hide Shipyards in Japan is 124 m long and has a gross tonnage of 12,630. Taiwanese owner Wisdom Line had transferred the classification to Germanischer Lloyd under ship Manager Well Shipmanagement and Maritime Consultant Co., Ltd. The ship was delivered in early January.

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REFUGEES

All Safely Aboard

Saving human lives: that is the purpose of an initiative called "Humanitarian Challenge for Shipping Rescue at Sea – Refugees/Migrants". The project aims at raising public awareness of the global refugee problem, encouraging humanitarian intervention. "According to international law, captains must help people in distress," explains Dr Matthias-K. Reith, owner of Johann M. K. Blumenthal GmbH & Co. KG, a Hamburg, Germany, shipowning company. This ought to apply to refugees, in particular, he says. All around the world, thousands of refugees risk hazardous sea journeys to escape poverty and misery in their native countries.

Responsibility. The initiative has issued practical guidelines for rescuing shipwrecked refugees. Lists have been compiled to make sailors aware of regions where refugees might be encountered. The initiative wants to instil an increased sense of responsibility into captains and crews. Of equal importance however, says Reith, is the need to create political conditions that will avoid refugee streams altogether.

For further information: Dr Matthias-K. Reith, Johann M. K. Blumenthal GmbH & Co. KG, Phone: +49 40 8090605-36, E-Mail: mail@blushipss.com

FAST CONNECTION. The new high-speed catamaran made by US shipyard AUSTAL.

AUSTAL

New Dimensions for Hawaii

107 metres in length with a 23.8 metre moulded beam. Powered by four MTU 20V 8000 M70 main engines via four ZF 53000 gearboxes, with a top speed of 35 knots. Capable of carrying 866 passengers and 282 cars. These are the key specifications of a high-speed vehicle-and-passenger carrying catamaran designed and constructed by Austal for Hawaii Superferry. The vessel's design incorporates environment-friendly technology, such as hulls with a non-toxic coating or on-board storage of wastewater, refuse and other solid waste.

Classed by Germanischer Lloyd, the new ship is the largest aluminium vessel constructed in the US in recent years. On 18 January the first of two high-speed catamaran ferries on order was successfully launched in downtown Mobile, Alabama. It will be put into service in July 2007, connecting Honolulu with Maui and Kauai.

SOFTWARE

Full Life Cycle Control

FORUM. Volkmar Huxoll (GL) presenting the Hull Lifecycle Programme.

Ensuring the durability and technical safety of ships for their entire life cycle is the express objective of the Hull Lifecycle Programme (HLP), a new software tool first introduced during the GL Exchange Forum. And "GL Pegasus" is one of the modules used by the HLP. This tool is designed to make life easier for thickness measuring services and shipowners (refer to nonstop 04/06). Furthermore, HLP offers a 3D model for monitoring the technical status of a ship throughout its entire lifecycle.

"HLP is a monitoring application complete with data evaluation features that deliver the results needed for repair and maintenance work, such as checking the coating condition," explains Volkmar Huxoll from Germanischer Lloyd's assessment and auditing department. The Hull Lifecycle Programme helps to plan audits. It also allows shipowners to prepare and carry out internal audits. Once a specific model has been created, it can be used with HLP continuously until the ship is sold or decommissioned.

Versatile application. It can also be updated to account for modifications of the ship's structure, such as hull plate replacements. "Being able to access a detailed, up-to-date 3D model helps all parties involved work more efficiently – the shipowner, the thickness measuring service, and the classification society," Huxoll adds.

Another benefit: the model can be used for other services, as well, such as ERS, the emergency response service of Germanischer Lloyd. HLP can be ordered for any ship type.

Hotline: +49 40 36149-4900
Internet: www.gl-group.com/glpegasus

TRANSPORTATION INDUSTRY NETWORK

A New Member in the German Transportation Forum

Germanischer Lloyd has joined Deutsches Verkehrsforum, an industry association representing the interests of more than 170 companies from all segments of the transportation industry. The Berlin forum maintains a far-ranging network of contacts covering all aspects of the national transportation sector: key political decision-makers, scientific institutions, EU agencies and European associations. Subject-specific steering committees meet twice a year. Germanischer Lloyd will primarily participate in the Ports and Shipping steering committee under the chairmanship of Detthold Aden of the BLG Logistics Group.

SOCIAL RESPONSIBILITY

There's Music in the Air

An increasing number of enterprises consider social responsibility an essential part of good governance. They get involved in social projects dedicated to bringing people together or preserving the environment for future generations. Germanischer Lloyd is a sponsor of young talents in science, sports and culture. In particular, GL has assumed title sponsorship of an international youth orchestra called Orchestra Hammonia Mundi (OHM). Under the motto "Making Friends Through The World Language Of Music", young musicians from Hamburg and its eight international partner cities will join to make music.

Partnership. To mark the beginning of the orchestra's career, the "International GL Music Academy" will celebrate the 50-year anniversary of the city partnership between Hamburg and St. Petersburg in early May. The official one-week festival will be opened by a concert on 11 May 2007 in Hamburg featuring the OHM.

Photo: Austal

SPONSORSHIP. GL supports the Orchestra Hammonia Mundi.

ENVIRONMENT

New Guidelines

The updated guidelines for optional certification of the environmental properties of ships account for recent developments in environmental technology and legislation. With new, specific IMO regulations in effect, ships now have to comply with certain mandatory requirements that used to be optional to be issued an environmental passport (EP). In order to maintain their EP that documents compliance with above-average environmental standards, ships have to meet additional requirements, such as special stipulations regarding fuel tank systems.

High Standards. Based on internal GL analyses as well as customer feedback, customers may request certification of additional environmental properties in the EP to prove that a ship significantly exceeds environmental or legislative standards. The guidelines are available in print or as a download: www.gl-group.com > Client support > Rules & Guidelines

TRAMPKO

Mending Cracks by Cross-Stitching

Cracks in components such as diesel engine housings cannot be welded. Nevertheless they must be closed as quickly and reliably as possible when they occur. How do you do that? Norbert Erles, head of Germanischer Lloyd's damage and repair management department, explained the method to future ship operating business administrators, shipbrokers and shipbuilding engineers. One temporary fix for cracks is referred to as "cross-stitching". Special pins with standard threads are inserted in an alternating pattern into adjacent holes drilled above the crack. Then the heads are cut off. If it lasts, the fix may actually turn out to be a reliable, long-term repair. The lecture was presented during a continued education event of Trampko, an alliance of German shipowners.

LECTURE. Norbert Erles and his young audience.

Photo: Herrenknecht

BREAKTHROUGH. The Herrenknecht S-210 Gripper TBM (diameter 8.83 m) in the St. Gotthard tunnel.

COMPRESSED AIR LOCKS

Type Certification Below Ground

Compressed air locks for tunnelling machines are type tested according to the European EN 12110 standard. In Europe, basic, compulsory safety and health protection requirements for building and equipping tunnelling machines are set forth by the EC machine directive #98/37/EC. Germanischer Lloyd, a member of the EN 12110 standardization committee, tests the technical properties of air lock units on behalf of Herrenknecht AG, a leading global supplier of tunnelling machines.

Difficult Conditions. Air locks are used in tunnelling, among other applications, to allow people and material to enter the space in front of the tunnelling machine where air pressure is above normal atmospheric pressure. Applying air pressure stabilizes the ambient conditions in this space so the cutting wheel and cuttings below groundwater level remain accessible for servicing operations, such as tool changes. Any work performed under increased air pressure is subject to stringent safety regulations. Tunnel construction sites, including all equipment, have to comply with rules similar to those applying to diving gear and clinical therapeutic pressure chambers.

SHIPBREAKING. Workers in Chittagong (Bangladesh) while disassembling a vessel.

Photo: David Klammer

More Than Old Iron

The legislation on the recycling of ships will soon be tightened up – and it will affect not only the last shipowner in the line. Companies who prepare themselves for the new situation in good time stand to save time and money. Germanischer Lloyd is already offering qualified support today

The International Maritime Organization (IMO) is currently drafting a convention to regulate the breaking up of old ships. Goal: improved conditions for the workers at the yards and greater protection of the environment. Pictures showing women pulling apart asbestos parts with their bare hands; men entering tankers via the anchor chain, barefoot and without any securing line: these are the scenes at scrapping yards in Bangladesh or India which will soon be banished due to IMO regulations. In addition, the wrecking yards will be given an instrument with which they can better organize their working processes. “They must have the possibility of informing themselves in detail about the vessel they are breaking up at an early stage,” says Henning Gramann, expert for ship recycling at Germanischer Lloyd.

The core element of the new convention will therefore be a compendium of the potentially hazardous substances actually present in ship constructions, called the “Inventory List”. What this really means is that, in future, the shipowners will have to keep a list for each of their ships, showing the harmful materials and their precise locations. This will apply to newbuildings as well as ships already in service. “The list must be kept up to date through the entire operating life of the ship,” Gramann explains. In this way, the planned legislation will affect all shipowners, not just the last one in the line.

Playing It Safe

What technical resources will be needed? What protective equipment will the workers require? The scrapping yards are to use the data as a basis for their work planning, in order that many questions can be clarified ahead of time. Moreover, the IMO is demanding certification of the yards. For example, they will have to provide proof of proper waste disposal structures and ensure a “gas-free for hot work” condition onboard the ships they are currently processing. This term means that enclosed spaces and tanks must be free of gas before dismantling work may begin.

“When the new convention is in force, it will only be permissible for certified ships to be scrapped at certified yards,” says Henning Gramann. A consequence of this: wrecking yards that wish to continue doing business on a large scale will not be able to evade their own certification. Sooner or later, they will not be able to avoid implementing the requirements for the working and environmen- →

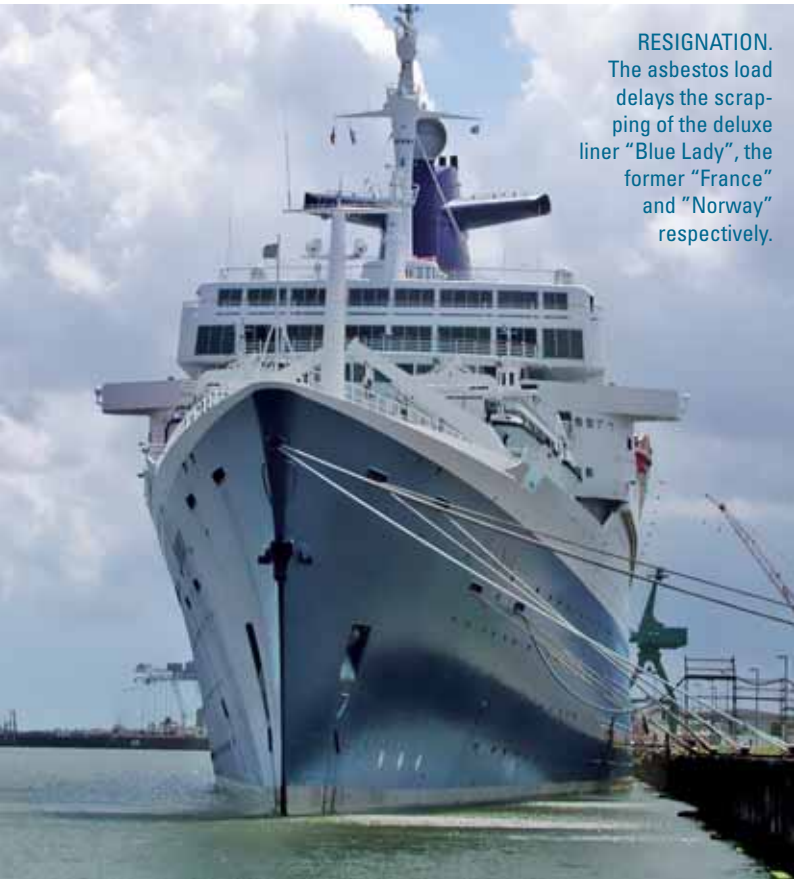
→ tal conditions and also having this certified. But what will happen to ships that are not certified? The lawmakers believe that the new dispensation will gain broad acceptance and yield no advantages for substandards.

In compiling the lists for the worldwide fleet and conducting the certification, as it is open to class, experts will go on board, take samples and analyze them. To keep the effort as low as possible, the examination may be performed on the basis of well-founded and clearly justified assumptions of a general nature. For instance, the inspectors can assume for ships dating back to the 1970s that many flange seals of the piping systems contain asbestos and that the cable insulation will have PCBs. "So I won't be examining everything in detail, but will rather take either a representative sample or document my assumption, and then categorize the corresponding components, if this is justified on the basis of the information available and has no undue effects on the recycling process," says Henning Gramann.

The aim here is to balance the costs and the benefits – although safety enjoys clear priority. On request of the shipowner, more detailed and in-depth examinations can also be carried out.

"In the long run, the goal is to ensure that workers are on the safe side," Gramann points out. It is always better to issue one warning too many than one too few, in case the scrapping personnel could come into contact with a harmful substance. "And even if the floor covering from the sixties turns out to be xylolite and not asbestos, playing it safe has at least never hurt anyone," he explains.

With newbuildings, the required data can be collected directly during fabrication. Manufacturers and distributors have to supply the information about the products to the yard. Here the onus is on the supply industry. "Many suppliers are already drawing up their own lists of hazardous substances and are just waiting for the starting signal," says Hauke Schlegel of the German Engineering Federation (VDMA). He is quite confident: "The companies will be prepared and there will be no delivery problems." In fact, Schlegel views the new regulations as being an opportunity for the trade. "Our recycling standards are high. For this reason, increasingly stringent laws will be good for German suppliers in the end." The industry here is better positioned than the competition from countries such as China. "The important aspect is just how quickly the matter is uniformly regulated and enforced." INTERTANKO, the International Association of Independent Tanker Owners, has published a proposal for a contractual supplement to the building contract, so that, for the current newbuildings, yards can already gather the data which will have to be acquired anyway in the next few years.



RESIGNATION. The asbestos load delays the scrapping of the deluxe liner "Blue Lady", the former "France" and "Norway" respectively.

Photo: Eckhard Herbert Arndt

The Dose Makes the Poison

So is it really not a problem any more? Japanese scientists have taken the notion of toxic inventory lists to its logical extreme. The possible data volume is gigantic: for a bulk carrier, far more than 40,000 items were obtained. "Of course, that's where it gets silly. Nobody can be expected to work with such a list," says GL expert Gramann. After all, the list is intended to make work easier for the yard, crew and recyclers. "For this reason, there must be threshold values to determine which substances must be included. And even then it will be necessary to structure the data in a meaningful way."

There can be no doubt: exchanging even a small pump will make it necessary to update the inventory. And yet the system cannot be expected to be implemented with the same level of perfection as for motor vehicles. "In the automotive industry, you have to list all the chemicals that are contained in the products," explains Gramann. One of the benefits is that even substances which are currently regarded as harmless can also be identified without any doubt later. Thirty years ago, who would have thought that the "wonder material" asbestos would later be put on the list of harmful substances? And today it is regarded as work of the devil.

Because ships are not mass-produced like cars, being more or less one-offs, the effort for a list of declarable substances would be incalculable. And any law that provided for such a list would hardly be practicable.

The draft of the new convention is due to be completed this year, so that the ratification process can begin in 2008/2009. The exact date when the law can come into effect depends on what conditions still have to be laid down. Henning Gramann does not expect an implementation before 2013: "However, when it is finally valid internationally, action must be taken without delay." At present, discussions are focused on defining the procedure in analogy to SOLAS (the International Convention for the Safety of Life at Sea): there is to be no permanent transitional period of, for example, five years. On the contrary, the cut-off date for the certificate will be the first Safety Renewal Survey to be conducted after the convention comes into force.

"There is a boom coming our way," says Gramann. It is clearly foreseeable that all ships from 500 GT will fall under the new regulations. The direction is clear: within a very short space of time, almost 50,000 ships in service will have to be certified. "For this reason, Germanischer Lloyd is already offering the corresponding certification, so that the shipowners can be prepared in good time," Gramann is pleased to announce. Otherwise there would be a risk that

Photo: realactionfilme

TORSO. Shipbreaking at Gaddani, Pakistan.

the owners might be left high and dry with an uncertified ship. The price for carrying out the certification and composing a list does not depend on the ship size, but rather on the complexity of the systems to be analyzed. Whilst a simple container carrier with its open holds may be found in the lower price segment, the certification of a reefer ship or research vessel with special equipment will have a higher price tag attached. With a view to managing the enormous volumes of data, the customer will be given access to a newly developed software package. Using a web-based application, the lists can be kept constantly up to date, without any necessity for excessive effort from the crew.

Get certified in good time – before the law makes you certify? "No problem and not a new task," says Gramann. "Germanischer Lloyd has been following all the developments most thoroughly, and can therefore offer its customers a forward-looking service," he asserts. "Should anything change in the time to come, we already have a reliable database and can therefore respond quickly."

The looming growth in demand is not the sole reason why Gramann is advising his customers to start compiling a list of harmful substances and to commence certification soon. The list can also represent a competitive advantage. Environmental protection is increasingly becoming a matter of image. And once a shipowner has made a commitment to quality management and thus also to continuous improvement of his environmental standards, he can present such a certificate as a public bonus.

Growing Pressure

To take a topical example, the shipping company AIDA Cruises is busy drawing up harmful substance lists for four cruise liners being built by Meyerwerft in Papenburg. The first of these vessels, the AIDAdiva, is to come under way in 2007. "We wish to be the forerunners in environmental protection," is how Denver Ehrlich, environmental officer at AIDA, justifies the extra work. But that is not all. "The new regulations are foreseeable, and we want to anticipate them." For a start, it is more economical to produce the lists in cooperation with the yard early on in the building process than to catch up later. In addition, the lists can also be incorporated in the emergency plans. "They provide us with a chart of the possible hazards," Ehrlich points out.

An important factor in the race for the inventory lists and a consensus on the new legislation is the pressure from outside. "Since it repeatedly happens that courts prevent the entry of ships destined for recycling into port, the level of uncertainty is high. The result: the ship scrapping business has almost come to a standstill," is how Gramann pictures the situation.

Prominent examples of this include the aircraft carrier "Clemenceau", which was towed back to France from the Indian Ocean, and the "Otapan". For seven years, this vessel, which originally came from Mexico, languished in the port of Rotterdam. Then a decision was made to break it up in Turkey, but the Turkish authorities refused to let it enter their territorial waters – there was much more asbestos on board than had been declared. As a result, the ship was towed in circles south of the island of Lesbos for weeks on end. Over and above the additional costs, there were the emissions and extra hazards caused solely through operation of the tug. Untenable cases of this kind will be prevented by operations in conformity with the new convention in future. ■ NL

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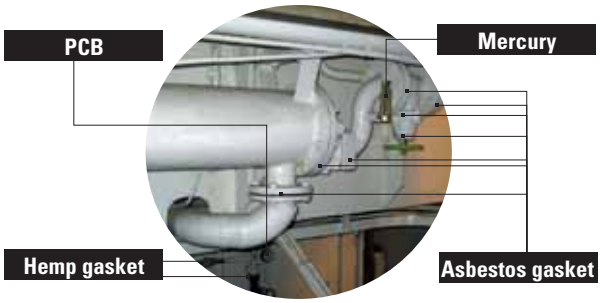
BACKGROUND: AWKWARD PIPE SYSTEMS

A look at the detail shows how complicated an additional capture of environmentally hazardous materials is.



A New Coat of Whitewash

Anti-fouling coatings prevent damaging growth on ship hulls. But they also have an impact on the environment. International conventions and audits try to stop the use of environmentally hazardous coatings. Experts help to enforce them

Smooth is good: a ship simply travels more smoothly when the submerged section of its hull is free of shells, algae and barnacles. Anti-fouling coatings prevent organisms from growing that would otherwise increase the frictional resistance, slowing the ship down or increasing its fuel consumption. “Even the slightest amount of growth can lower fuel efficiency of ships,” says Julia Hoeppner, anti-fouling expert at Germanischer Lloyd. Allowing shells and algae to grow also can compromise corrosion protection.

The battle against unwanted plants and animals on ship hulls is as old as seafaring. Since the Seventies, organic tin additives were used in anti-fouling coatings to kill living organisms, thus preventing any growth. Tributyl tin (TBT) proved to be lethal and therefore utterly effective. These inexpensive underwater paints kept hulls clean for years. However, the high toxicity of the ingredient had one critical disadvantage: the toxin accumulated in seafloor sediments began to influence the hormonal systems of sea animals. “Female common whelks near the North Sea coast suddenly began to grow male organs and became infertile,” says Hoeppner. Many snail and shell species are affected by TBT poisoning today.

In October 2001 the International Maritime Organization (IMO) pulled the emergency brake by drafting an international IMO-AFS convention called “International Convention on the Control of Harmful Anti-Fouling Systems on Ships”. However, this regulation has not become effective to date. To accelerate the ratification of the convention, the European Parliament and the Council passed EU regulation 782/2003 to ban the use of organic tin compounds on ships. This regulation aims at prohibiting the use of this type of

PROTECTIVE COAT.
The hull being painted with ecological paint.

Foto: Michael Bogumil

KNOW-HOW.
Daniel Engel and Julia Hoeppner are in charge of certification of anti-fouling coatings and TBT-free certification of ships.

anti-fouling coatings within the entire European Union.

To date, the IMO-AFS convention has been ratified by 19 countries, accounting for 16.15% of the global trade tonnage. "The convention will not become effective until accepted by 25 IMO member nations, jointly representing 25% of the global trade tonnage," says Daniel Engel, Head of the Competence Centre, Product Certification.

The IMO-AFS convention sets two important dates:

- As of 1 January 2003 organic tin compounds are no longer allowed to be applied or re-applied to ships.
- As of 1 January 2008 ships will be prohibited from having anti-fouling coatings containing organic tin compounds, or coatings sealing earlier toxic anti-fouling coatings, on their outer hulls.

To ensure compliance, the IMO has also developed auditing and monitoring guidelines. Flag states that have already signed the IMO-AFS convention implicitly entrusted classification societies, along with other organizations, as so-called Recognized Organizations (RO) with the tasks of auditing and monitoring. Successful audits are documented by an AFS certificate. Monitoring comprises two stages: an initial audit before the ship is commissioned or is issued its initial AFS certificate; and a follow-up audit each time the protective coating system is modified or replaced.

The Task of Auditing

Unlike the IMO-AFS convention, EU regulation 782/2003 did not require ratification but went into effect on the day following its publication in the Official Journal of the European Union on 10 May 2003. In its preamble, the EU regulation references the IMO-AFS convention. Both regulations are essentially consistent with each other.

The EU regulation defines three dates:

- As stipulated by the IMO-AFS convention, organic tin compounds are no longer allowed to be applied or re-applied to ships as of 1 January 2003.
- Contrary to the IMO-AFS convention, ships must have a coating that seals prior anti-fouling coatings containing organic tin compounds as of 1 July 2003.
- In addition, the EU regulation demands that as of 1 January 2008, ships with an active TBT hull coating that has not been sealed be banned from EU ports.

To verify compliance, the EU regulation stipulates the same rules for audits and certification as the appendix of the IMO-AFS convention. "The EU likewise entrusts the classification societies with the task of auditing," says GL expert Engel.

The Certification Procedure

To meet the auditing and certification requirements of flag states, Germanischer Lloyd developed a global certification system. "This allows us to seamlessly verify TBT-free ship coatings," says Engel. The certification procedure is based on the requirements of the IMO-AFS convention. An on-site audit verifies and documents compliance with all criteria that must be met to issue the respective certificate as stipulated by the IMO-AFS convention or the EU regulation, respectively.

To implement the regulation, a GL auditor checks and documents whether the anti-fouling coating is free of TBT. This can be done by taking a sample and running an analysis. If the anti-fouling coating is an approved, and therefore, TBT-free product, a check of the product identification is all that is needed. Following the audit and the evaluation of the documentation, a certificate is issued for the ship, including an antigrowth specification. The manufacturer of the anti-fouling coating may file for TBT-free certification of its products. The anti-fouling product certification process begins with a review of the manufacturer's documentation. This is followed by an audit of the manufacturing site, including the manufacturing processes. Samples of the anti-fouling coating to be certified are analyzed in a lab for their tin content. If all requirements are met, the anti-fouling coating is declared TBT-free and a certificate is issued, enabling the shipowner to prove that forbidden ship paint has not been used. ■ DE/JH

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Julia Hoeppner, Corrosion Protection and Anti-Fouling Systems, Phone: +49 40 36149 408, E-Mail: julia.hoeppner@gl-group.com

Photo: Deutsche Bundesstiftung Umwelt DBU

PEST.
Barnacles on a ship's hull.

ENVIRONMENT-FRIENDLY PAINT

To date, Germanischer Lloyd has confirmed 110 products by 14 different manufacturers to be TBT-free. A list of approved AFS products can be downloaded using the following link:
www.gl-group.com > Client Support > Approval Finder > Type Approvals > Anti-Fouling Systems

Photo: Hamburg Süd

Tomorrow's Technologies?

Steadily increasing oil prices drive innovation. Following a general trend, the shipping industry is developing a taste for alternative forms of energy. This not only benefits the environment – some innovative technologies that are still waiting for their breakthrough today may be commonplace tomorrow

Photo: Nees-Institut, Boris Striffler

AERIAL STORAGE. With its fine tiny hairs the fishing spider builds up a mantle of air.

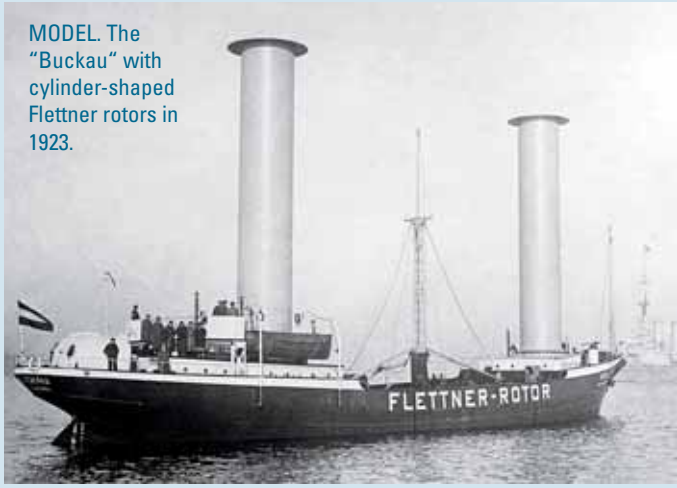
A Hairy Affair

A fishing spider elegantly crosses a swift-flowing stream, searching for prey. A unique, silvery coat of air surrounds its body. Yet, when it comes to capturing air, the unbeatable world champion is the unsightly saucer bug. It emerges from the mud only once in its lifetime to saturate the outside of its body with air. **The oxygen it captures will last a lifetime.** "We are not aware of any organism capable of capturing air more efficiently than this insect," says Zdenek Cerman from the Nees Institute of Plant Biodiversity.

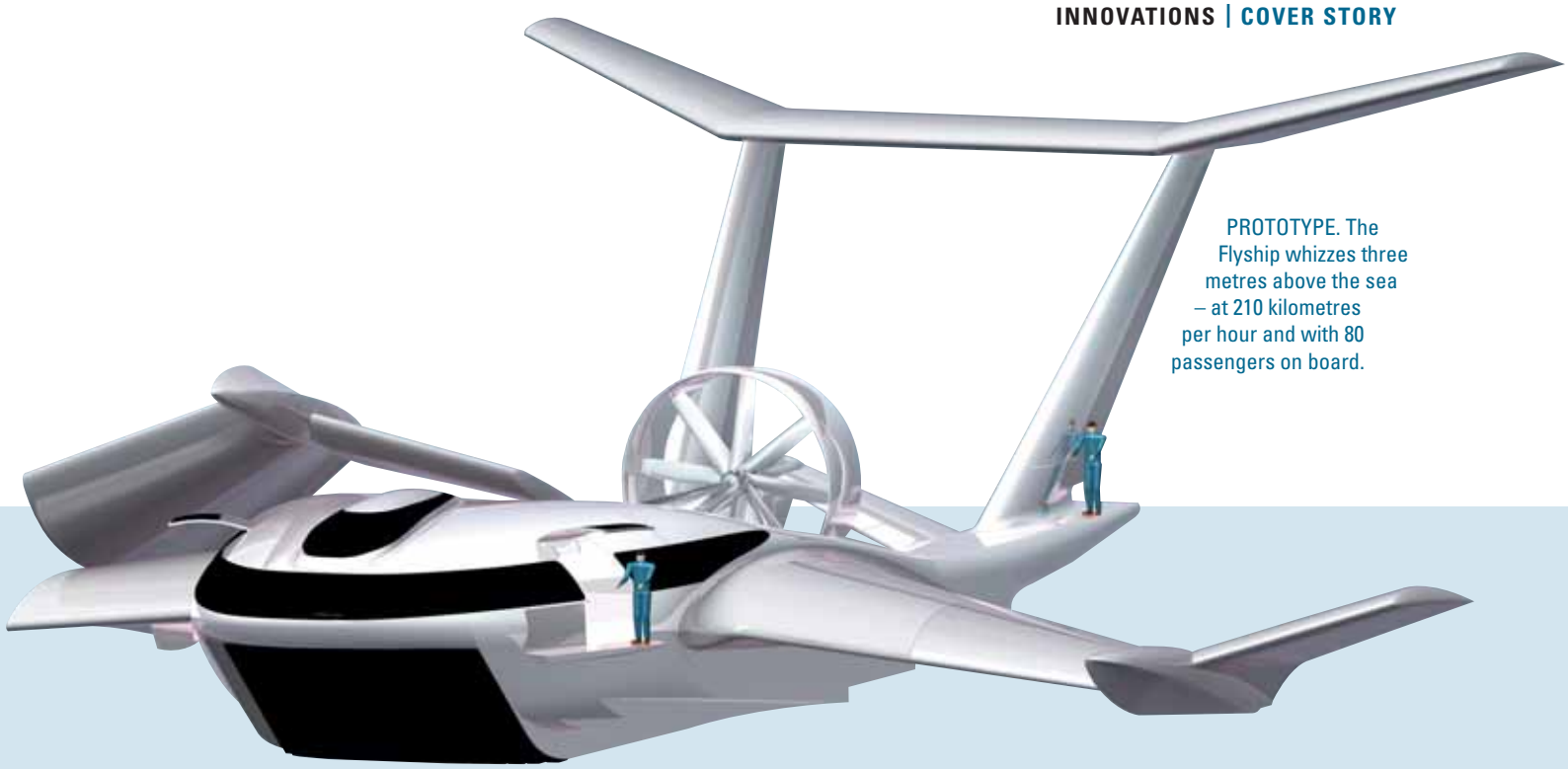
The biologists at the institute in Bonn, Germany, have discovered the secret of the saucer bug: short, curved hairs on the abdomen of the animal grab the air cushion like a cage, preventing it from being flushed away. Biologists now want to apply the same method to reduce friction. "A film of air coating a ship's hull, for example, could minimize friction," says Cerman. This in return could lower fuel consumption. Actually, the idea isn't even new. But the current state of the art requires compressors to constantly pump air under the bow. The technical effort involved is considerable. That is why the Bonn scientists are looking for a way to optimize the surface so it will hold the film of air for as long as possible, even at high cruising speeds. "**We are currently developing a fuzzy acrylic paint**," says Cerman. If his team succeeds, the compressors will only have to be switched on from time to time. The air film might even inhibit biofouling. The flexible hairs would probably prevent barnacles and other organisms from attaching themselves.

A Cylinder with a Future

On **28 February, 1925**, the GL-classed Buckau entered the port of Hamburg. The vessel was neither propelled by sails nor by steam but by two rotating cylinders as tall as a ship's mast. These **"Flettner Rotors"**, named after their inventor, Anton Flettner, take advantage of the so-called **Magnus effect**. Each Flettner rotor channels the surrounding wind to generate a lifting force. By adjusting the rotor speed, **the amount and direction of the lift can be tuned to the desired course and the direction of the wind** to create a forward force. The spectators at the Hamburg piers applauded enthusiastically. They were convinced they had witnessed what was going to be the future of shipbuilding. But then oil prices dropped – and the invention lost its economical appeal. **More than 80 years later**, wind turbine manufacturer Enercon of Aurich, Germany, has ordered a GL-class freighter from Lindenau shipyards, Kiel, equipped with Flettner rotors. At a gross tonnage of 12,800, the Enercon vessel will feature four cylinders. 27 metres tall and four metres in diameter, these rotors are predicted to save nearly half of the conventional fuel needed by the ship which is scheduled to be launched in 2008.



MODEL. The "Buckau" with cylinder-shaped Flettner rotors in 1923.



PROTOTYPE. The Flyship whizzes three metres above the sea – at 210 kilometres per hour and with 80 passengers on board.

Da Vinci's Successor

The **ground-effect craft** looks like a cross between a jet plane and a spacecraft. But it is neither one nor the other. According to IMO and MSC guidelines, it is actually a ship – albeit a flying ship. It relies on the so-called ground effect which occurs when wings fly swiftly across a plane at a relatively close distance. Once **the craft moves faster than the air mass can be displaced**, the positive pressure below the wings increases, causing the air to compress and form an air cushion. This increases the lift while decreasing the air resistance. As a consequence, less engine power is required to keep the craft airborne.

Centuries ago, Leonardo da Vinci designed a flying ship, too; his design was reminiscent of a bat and never made it beyond the drafting board. Various other designs and prototypes have been developed since. In 2001, **Germanischer Lloyd classed Flightship8**, a craft used in Australia. German manufacturer Flyship now wants to construct the first-ever ground-effect craft that is both ecologically and economically viable and therefore marketable. "An important factor is the craft's size," says Flyship managing director Ulf-Dieter Ulken, formerly with Germanischer Lloyd.

Fuel consumption divided by the number of passengers: this formula must produce a feasible result. Flyship80 is now in its pre-design stage. It will accommodate 80 passengers and burn between 1.7 and 2 litres per 100 km per seat – **much less than any conventional aircraft or ship**. According to the plans, its cruising speed will be 210 km/h, and the craft will fly 2 to 3 m above the surface of the sea. Thanks to its high speed it should be able to circumnavigate storm systems.

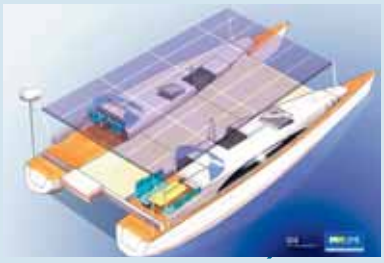
Photo: Peter Gartmann

SOLAR DECK. The solar catamaran is powered exclusively by solar energy.

The Power of the Sun

Five Swiss men are betting on solar power. They were the first humans to ever **cross the Atlantic Ocean on a ship solely powered by the sun**. On 16 October they left Basel on their catamaran called sun21. On 2 February, they reached Martinique. Their scheduled time of arrival in New York City is 8 May. The solar pioneers want to prove that even **ocean-going ships can travel at a constant speed** powered by solar energy only. Also for freight ships the technology offers interesting financial prospects. After all, diesel-electric drive systems are quite common already. "By combining them with a hybrid drive module, photovoltaics could soon become a feasible option," says Andreas Indlmann of the sun21 development team: a diesel generator capable of delivering an average of 50% of the total power consumed; a fuel cell providing 30%; and a solar generator accounting for the remaining 20%. This is what a freighter's hybrid propulsion system might look like one day. As an example, he describes a 110-metre long, 9.5-metre wide tanker travelling the Rhine powered by an 800 kW diesel engine. "With a total usable solar panel surface of 100 by 8 metres, and an output of 0.2 kW per square metre," he says, "**solar energy could provide twenty per cent of the motor power**."

The journey of the sun21 is a first step towards that goal. Built by Swiss shipbuilder MW-Line, the 14-metre catamaran was developed specifically for a solar-powered electric drive. The ship's hull was designed to minimize water resistance. The solar panels covering most of the deck like a roof have a total area of 65 square metres. Each day, the photovoltaic system yields approximately 40 kWh. **The ship covers roughly 100 nautical miles per day, at a speed of 4 to 4.5 knots**.



So far, "the persistent, fast cruising speed at varying seas and cloud covers has exceeded our expectations," says Mark Wüst, the sun21's captain. "But we should design a boat with solar panels that can be tilted towards the sun."

ANCESTOR. The Hamburg businessman August Behn is one of the foundation fathers of Germanischer Lloyd. The shipowner was also the first chairman of the board of administration.

140 years of Germanischer Lloyd stand for 140 years of technical progress, innovation, safety consciousness and the highest quality objectives. From the very beginning, the classification society had to stand up to strong competition. Its economic situation, especially in the first 90 years, was chiefly influenced by unstable political conditions. In the end, however, these historic challenges only made Germanischer Lloyd stronger than ever before: thanks to the persistent advancement of its Rules, the Society is now one of the world's leading technical supervisory organizations.
In a new series nonstop highlights the most important events in the history of Germanischer Lloyd. In this issue, we look at the beginnings of Germanischer Lloyd. How was the German classification society originally founded? What happened during the initial years?

140 Years of Certified Safety

In March 1867 Germany's significant classification society was founded. Already the beginning years stood completely in the sign of growing technical challenges

On 16 March 1867 at 2 pm, a group of almost 600 people came together in the Great Hall of the Hamburg Stock Exchange for the founding meeting of Germanischer Lloyd; with the signing of the articles of incorporation by August Behn in the name of the founding committee, an exciting and busy time of preparation had come to fruition.

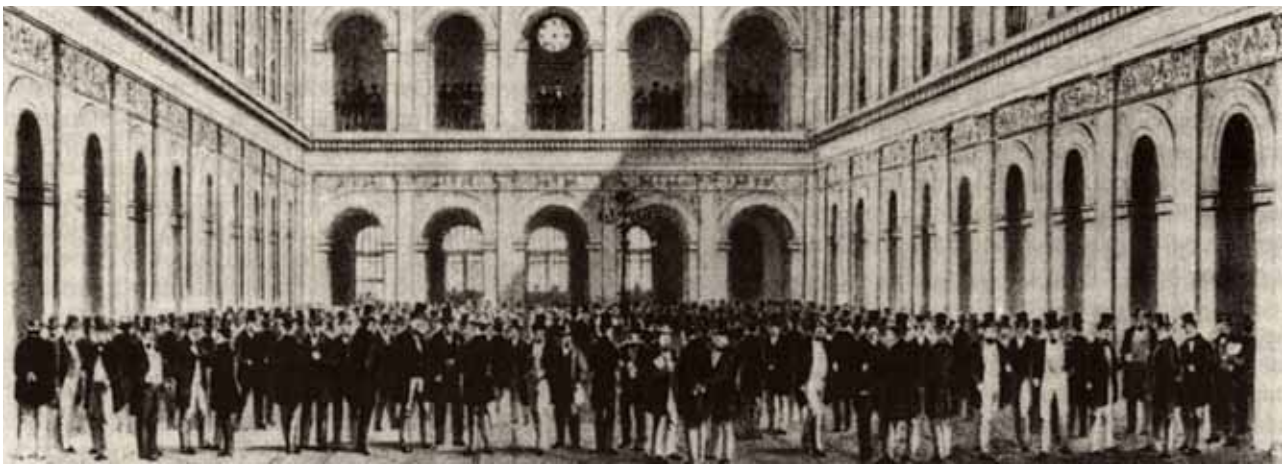
As early as 1850, a group of Bremen merchants and shipowners led by Arnold Duckwitz had taken the initiative to set up a "ship classification institute". The reason for this was purely and simply a lack of transparency. Owners and traders had no source of reliable and comprehensive information about the condition of ships. Although there was a federation of marine underwriters in the major ports, they did not divulge their findings to third parties.

The first in this field were the Hamburg insurers in 1797 with their association, called "Verein Hamburger Assecuradeure", whose experts surveyed the ships before the insurance contracts were concluded. In this way, the marine underwriters obtained the information they needed for an adequate appraisal of a ship and to determine the appropriate insurance conditions.

Unfortunately, merchants and shipowners were not given access to these findings. The classification societies from Great Britain and France, who were active on the German market, also kept their knowledge to themselves. Clearly, a German classification society was required to meet the urgent need for information.

A Suitable Name

And so, on 23 June 1862, a founding committee commenced work in Hamburg. Its members were the representatives of the shipping companies J. C. Godeffroy & Sohn, A. J. Schön & Co, A. J. Hertz & Söhne and R. M. Sloman, who had been encouraged to meet by the Hamburg entrepreneur and shipowner August Behn. From Rostock, vice-consul Franz Paetow used the "Volkswirtschaftlicher Verein" to promote the idea of a German classification →



MEETING. Almost 600 people came to the Great Hall of the Hamburg Stock Exchange for the foundation of Germanischer Lloyd.

OIL PAINTING. In 1886, screw steamboats like the "Bismarck" were state of the art in ship technology.

➔ society. A fitting name for the new institution was soon found: "Germanischer Lloyd".

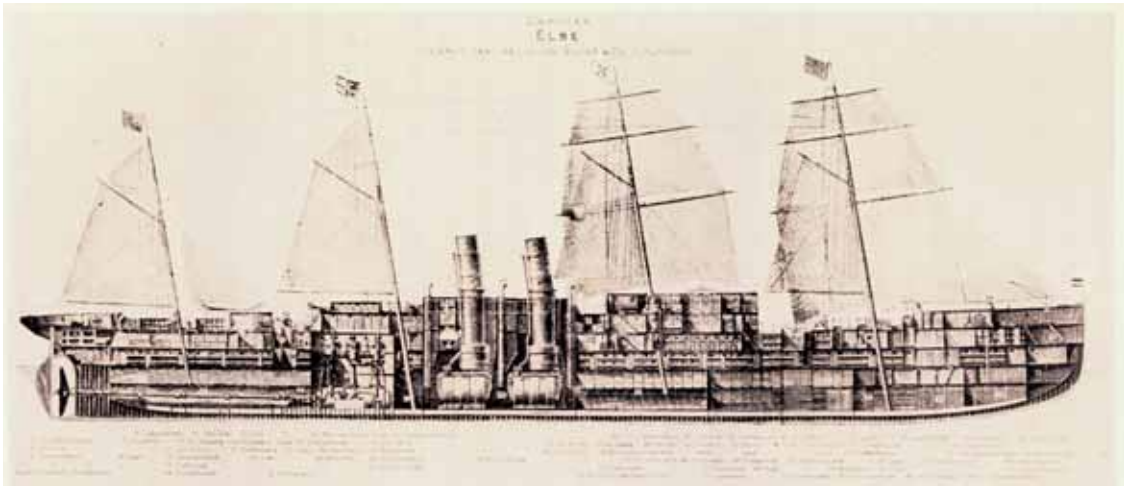
The new society was organized as a cooperative with its domicile in Hamburg. It consisted of a head office and nine district societies located in the port cities on the North and Baltic Seas. The district societies played an important role: they maintained the links to local shipping companies and individual members, and had the task of organizing a reporting service and a network of representatives and surveyors. Their delegates were then sent to the general meeting, the highest ranking organ of Germanischer Lloyd.

The declared goal of the new society, which had a non-profit orientation, was to foster the safety of shipping. No owner was actually forced to have his ship classified, but without "class" it was very difficult to find a marine underwriter who would be responsible in the event of loss or damage.

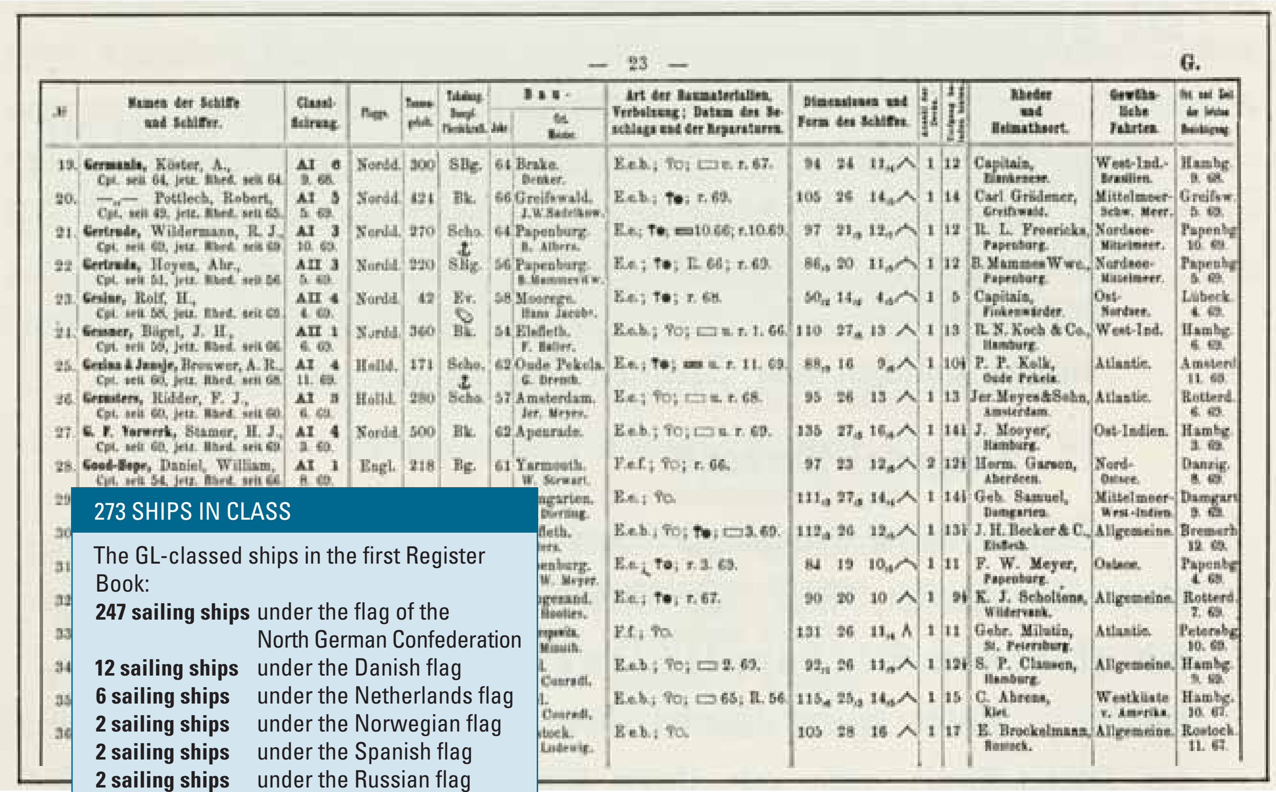
Hamburg remained the site of the head office as long as August Behn discharged his duties as chairman of the board of administration. On 15 May 1868, he handed over the helm to Franz Paetow of Rostock, who had drawn up the founding articles; as a result, the head office of Germanischer Lloyd was then moved to Rostock.

An Iron Ship

With Friedrich Schüler, who was a master shipwright from Stettin-Grabow, a competent expert was entrusted with the task of rule development. Soon afterwards, in October 1868, the technical director presented the fledgling society's own register together with its own construction rules.



PROFILE. After a collision in 1895, construction and safety defects led to the sinking of the quick steamboat "Elbe".



— 23 — G.

№	Namen der Schiffe und Schiffer.	Classificirung.	Flagge.	Tonnengehalt.	Takelung.	Bau- Jahr	Ort. Baumeister.	Art der Baumaterialien, Verbolzung; Datum des Beschlags und der Reparaturen.	Dimensionen und Form des Schiffes.	Anzahl der Decks.	Tiefgang	Rheder und Heimathsort.	Gewöhnliche Fahrten.	Ort und Zeit der letzten Besichtigung
19.	**Germania,** Köster, A., Cpt. seit 64, jetz. Rhed. seit 64.	AI 6 9. 68.	Nordd.	300	Sllg.	64	Brake. Denker.	E.e.b.; To; ▭ u. r. 67.	94 24 11_{4} ^	1	12	Capitain, Elsfleth.	West-Ind.-Brasilien.	Hambg. 9. 68.
20.	—„— Pottlech, Robert, Cpt. seit 49, jetz. Rhed. seit 65.	AI 5 5. 69.	Nordd.	424	Bk.	66	Greifswald. J. W. Sadelkow.	E.e.b.; To; r. 69.	105 26 14_{6} ^	1	14	Carl Grüdener, Greifswald.	Mittelmeer-Schw. Meer.	Greifsw. 5. 69.
21.	**Gertrude,** Wildermann, R. J., Cpt. seit 60, jetz. Rhed. seit 69.	AI 3 10. 69.	Nordd.	270	Scho. ⚓	64	Papenburg. B. Albers.	E.e.; To; ▬ 10.66; r.10.69.	97 21_{6} 12_{7} ^	1	12	R. L. Freericks, Papenburg.	Nordsee-Mittelmeer.	Papenbg. 10. 69.
22.	**Gertruda,** Hoyen, Ahr., Cpt. seit 51, jetz. Rhed. seit 56.	AII 3 5. 69.	Nordd.	220	Sllg.	56	Papenburg. B. Mammes Ww.	E.e.; To; R. 66; r. 69.	86_{6} 20 11_{6} ^	1	12	B. Mammes Wwe., Papenburg.	Nordsee-Mittelmeer.	Papenbg. 5. 69.
23.	**Gesine,** Rolf, H., Cpt. seit 58, jetz. Rhed. seit 69.	AII 4 4. 69.	Nordd.	42	Ev.	58	Mooregge. Hans Jacobs.	E.e.; To; r. 68.	50_{6} 14_{6} 4_{6} ^	1	5	Capitain, Finkenwärder.	Ost-Nordsee.	Lübeck. 4. 69.
24.	**Gessner,** Bügel, J. H., Cpt. seit 59, jetz. Rhed. seit 66.	AII 1 6. 69.	Nordd.	360	Bk.	54	Elsfleth. F. Baller.	E.e.b.; To; ▭ u. r. 1. 66.	110 27_{6} 13 ^	1	13	R. N. Koch & Co., Hamburg.	West-Ind.	Hambg. 6. 69.
25.	**Gezina & Jansje,** Brouwer, A. R., Cpt. seit 60, jetz. Rhed. seit 68.	AI 4 11. 69.	Holld.	171	Scho. ⚓	62	Oude Pekela. G. Drenth.	E.e.; To; ▬ u. r. 11. 69.	88_{6} 16 9_{6} ^	1	10½	P. P. Kolk, Oude Pekela.	Atlantic.	Amsterd. 11. 69.
26.	**Gezusters,** Ridder, F. J., Cpt. seit 60, jetz. Rhed. seit 60.	AI 3 6. 69.	Holld.	280	Scho.	57	Amsterdam. Jer. Meyes.	E.e.; To; ▭ u. r. 68.	95 26 13 ^	1	13	Jer. Meyes & Sohn, Amsterdam.	Atlantic.	Rotterd. 6. 69.
27.	**G. F. Vorwerk,** Stamer, H. J., Cpt. seit 60, jetz. Rhed. seit 69.	AI 4 3. 69.	Nordd.	500	Bk.	62	Apenrade.	E.e.b.; To; ▭ u. r. 69.	135 27_{6} 16_{6} ^	1	14½	J. Mooyer, Hamburg.	Ost-Indien.	Hambg. 3. 69.
28.	**Good-Hope,** Daniel, William, Cpt. seit 54, jetz. Rhed. seit 66.	AI 1 8. 69.	Engl.	218	Bg.	61	Yarmouth. W. Stewart.	F.e.f.; To; r. 66.	97 23 12_{6} ^	2	12½	Herm. Garson, Aberdeen.	Nord-Ostsee.	Danzig. 8. 69.
29.							…ngarten. …Diering.	E.e.; To.	111_{6} 27_{6} 14_{4} ^	1	14½	Geb. Samuel, Damgarten.	Mittelmeer-West-Indien.	Damgart. 9. 69.
30.							…fleth. …ers.	E.e.b.; To; To; ▭ 3. 69.	112_{6} 26 12_{4} ^	1	13½	J. H. Becker & C., Elsfleth.	Allgemeine.	Bremerh. 12. 69.
31.							…enburg. W. Meyer.	E.e.; To; r. 3. 69.	84 19 10_{6} ^	1	11	F. W. Meyer, Papenburg.	Ostsee.	Papenbg. 4. 69.
32.							…gezand. …Hoelies.	E.e.; To; r. 67.	90 20 10 ^	1	9½	K. J. Scholtens, Wildervank.	Allgemeine.	Rotterd. 7. 69.
33.							…rgewits. …Mauth.	F.f.; To.	131 26 11_{4} ^	1	11	Gebr. Milutin, St. Petersburg.	Atlantic.	Petersbg. 10. 69.
34.							…l. Conradi.	E.e.b.; To; ▭ 2. 69.	92_{11} 26 11_{6} ^	1	12½	S. P. Clausen, Hamburg.	Allgemeine.	Hambg. 9. 69.
35.							…l. Conradi.	E.e.b.; To; ▭ 65; R. 56.	115_{6} 25_{3} 14_{6} ^	1	15	C. Ahrens, Kiel.	Westküste v. Amerika.	Hambg. 10. 67.
36.							…stock. Ludewig.	E.e.b.; To.	105 28 16 ^	1	17	E. Brockelmann, Rostock.	Allgemeine.	Rostock. 11. 67.

TABLE. The most important data and facts relevant for security were listed in the register book.

273 SHIPS IN CLASS

The GL-classed ships in the first Register Book:

247 sailing ships	under the flag of the North German Confederation
12 sailing ships	under the Danish flag
6 sailing ships	under the Netherlands flag
2 sailing ships	under the Norwegian flag
2 sailing ships	under the Spanish flag
2 sailing ships	under the Russian flag
1 sailing ship	under the British flag
1 sailing ship	under the Italian flag

The “International Register” in German and English listed 272 wooden vessels and one of iron.

Whereas the British and French classification societies only determined the necessary sizes of the individual components in reliance upon the often vague measurement of a ship in tonnes, Schüler took a different path: he defined “scantling numerals” relating to the actual ship dimensions. For the first time ever, the principal dimensions of the ship – lengths, breadths and heights – were decisive parameters for the primary structural members.

This approach made it possible to assess the strength of a ship by comparing the relationships of these values. To lay the foundations for this system, Friedrich Schüler statistically evaluated a large number of existing ships, thus obtaining a load-related dimensioning system which took into consideration the many years of experience of the yards. This approach was extremely progressive for the time, and was rapidly adopted by other classification societies.

The network of ship surveyors also extended rapidly. By 1869, Germanischer Lloyd already had surveyors in a dozen German ports, as well as in St. Petersburg, Copenhagen, London, Liverpool, Amsterdam, Constantinople, Swatow, St. Thomas, Amoy, Penang and Singapore.

Despite the steady growth in the Register Book, Germanischer Lloyd had to contend with many difficulties in its early years. Many shipowners first had to be convinced of the new society’s worth, or were against a transfer of class on political grounds. It took until 1895 for the distrust shown towards the Prussian influence at the shipping companies to eventually wane. One of the milestones was a declaration of the government not to regard the classification of ships as being a statutory duty. In addition, the Reich Mail Steamer Law, according to which all ships built under subsidy had to be classified by Germanischer Lloyd, also promoted the expansion of the GL Register.

After many commercially difficult years, a turning point occured on 5 October 1889 at the annual meeting in Bremen. Germanischer Lloyd was transformed from a cooperative to a private stock corporation, although it retained non-profit character. This change in legal form made it possible to improve the company’s creditworthiness, better organize its financial relationships, and introduce a modern management structure. ■ SG/OM

WHAT ELSE HAPPENED IN 1867?

Russia sells Alaska to the United States of America.

Canada becomes independent of Great Britain.

The **Wright brothers**, who achieve the first powered flight in 1903, are born.

Karl Marx publishes “Das Kapital”.

Tokugawa Yoshinobu resigns as the 15th and **last shogun** of the Tokugawa shogunate.

Otto von Bismarck becomes Chancellor of the ”North German Confederation“.

Werner von Siemens invents the dynamo.

Maximilian I, Emperor of Mexico, is executed.

Paris is host to the **Exposition Universelle**, the World’s Fair.

Alfred Nobel obtains a patent for dynamite.

After 11 years of dredging, the first ships are able to pass through the **Suez Canal**.

What influence the establishment of the ”See-Berufsgenossenschaft“ had and just how Germanischer Lloyd won its international reputation will be revealed in the next issue of nonstop.

Under Stress

Reliability and durability are important benchmarks for the quality of engines. Intelligent maintenance strategies and active damage management are essential in safeguarding a long service lifetime

Ship's diesels are like people: both are increasingly operating under great stress nowadays. Ever greater performance and availability are demanded from modern workers and machines alike. With marine engines, this development can be linked to the strong growth in container traffic since the 1980s. The goods being conveyed must reach their port of destination "just in time". Exact sailing schedules leave no leeway for mechanical weaknesses.

In turn, this raises the requirements for active damage management. Of special significance here is the precise acquisition of the data on all components, so that the conclusions on the actual causes of the damage can be as accurate as possible. Only then can weak points be rectified during the design and manufacture of components. "It is therefore an important task of classification societies to analyze data on damage events and to process them in an appropriate and informative way," says Norbert Erles, who heads the Centralized Damage and Repair Management Department at Germanischer Lloyd.

Reinforcement as Weakness

Experience shows that many cases of damage are not due to errors in design but to material flaws, faulty workmanship and poor quality control. A typical example of production-related damage is the crack initiation at the horizontal reinforcement rib of a welded engine frame. In a specific case, the experts first identified three crack types at the reinforcement rib, tie rod tube and crosshead guide rail of the ship. The in-depth analysis of the damage was then set in motion.

Photo: Michael Bogumil

EXPERT. Norbert Erles, Department Damage and Repair.

At the beginning, there is a brainstorming session to compile a list of all the possible causes and influencing parameters. "Then we proceed by the error elimination method," says GL expert Erles. In the course of this procedure, possible sources of error can successively be ruled out through measurements of varying complexity, materials tests and analyses. No aspect is left out.

Step by step, the engineers track down the root cause. Does the reinforcement rib correspond in respect of dimensions and material with the components as designed and documented? If this is the case, perhaps the load profiles used as a basis for the design may be incorrect. This would provide a plausible explanation for the crack formation during normal ship operation. To test this hypothesis, the

ENGINE. Requirements for active damage management increases.

Photo: Michael Lange

experts used strain gauges in this particular case. These flat sensors are bonded to the components under loading and, through a change in electrical resistance with elongation, detect even negligible dimensional changes in the component. In this way, it is then possible to calculate the stresses – which in this case lay far below the values assumed by the engine designer. Success was finally achieved after further examinations, when the weld seams were opened up. Analysis showed that the reinforcement ribs were correctly dimensioned but had not been manufactured accurately. The result: welding gaps that were too large, weakening the structure and leading to the cracks in operation.

Digital Database

Since the end of the 1990s, Germanischer Lloyd has been using an electronic database, in which damages relating to both machinery and hull structure as well as other elements are registered. This database superseded the damage file introduced more than 30 years ago.

Establishing this collection of electronic data was tantamount to breaking new ground. “Initially, we created the Damage Database as a laboratory prototype,” Norbert Erles recalls. “Today, we have at our disposal practically all the conceivable variants in data capture and evaluation.” Data from the GL ship register and survey reports can be imported automatically to a large degree.

A decisive advance was achieved with digitization of the data. In a short space of time, it permits cross-references and evaluations that were hardly possible in the days of index cards. The first global analyses are already available. It was shown that the number of machinery damages for two-stroke engines in the period under consideration was in fact higher than for four-stroke plants. However, the corresponding susceptibility to damage for the two engine types has converged in the course of time.

Substantial differences between the two engine types are only to be found with the critical components: for the four-stroke engines, the exhaust valves, cylinder liners, crankshaft, crankpin and crank bearing are at the top of the list of weaknesses, whereas for the two-stroke engines the critical points are the lower main bearing shells, liners, piston crowns and piston rings. A particularly serious event for a four-stroke engine is the fracture or blow-through of an exhaust valve, crankshaft or crankpin. These faults can cause great consequential damage, up to loss of the steerability and manoeuvrability of the ship.

The data confirm the hypothesis that the majority of damages are not due to weaknesses in design, but rather to manufacturing defects and operating errors. The failure mode follows the so-called “bathtub curve”. In the early phase of the component’s use, the failure rate is still high, owing to quality flaws and assembly errors. Failures due to these reasons then decrease continuously. In the middle section of the product lifetime, the component may fail as a result of operating and maintenance errors – but this occurs much less frequently than in the early phase. The failure rate only rises again significantly in the final third of the life-cycle, because of ageing, material fatigue, and general wear and tear.

Design-related improvements may possibly prolong the service life of the components. However, the focus should first be on improving the maintenance strategy. Regular check-ups uphold the level of fitness – another thing ships and humans have in common. ■ JI

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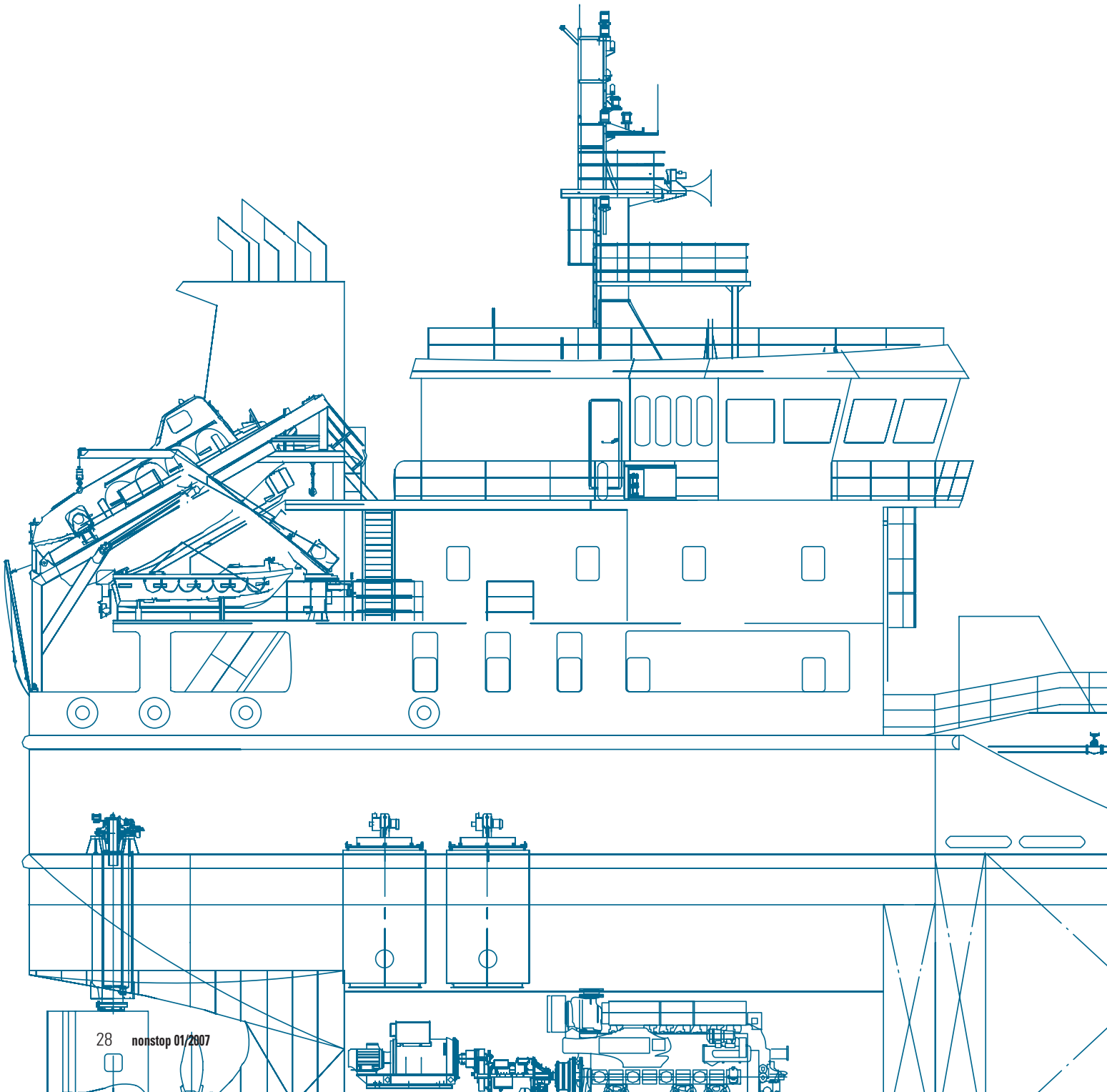
Russia on the Rise

Buoyed by strong shipping investments and a world-wide shortage in yard capacity, Russia's shipbuilding sector is flexing its muscles



Times aren't exactly easy for owners of small and medium-sized tonnages looking to invest in solid, straightforward vessels at competitive prices. Go to major shipbuilding countries such as Japan, Korea, China, Germany and others, and you will face the same difficulties everywhere.

The giants of today's industry hardly feel tempted to engage in ship projects that offer fairly low returns compared with post-panamax container ships or complex LNG tankers. They want big ships in their docks, preferably in large numbers, in order to derive the full benefits of specialization and economies of scale. You get rebuffed, once, twice, thrice, again and again. What do you do then?

Stockholm-based Svithoid Tankers, a very successful emerging tonnage provider and operator in the European oil-product trades, was no exception to the rule. The company had just raised the equity it needed for tanker investments by way of an IPO in Sweden, only to find out that none of the established shipbuilders around the world were interested in its projects. "We then turned to the Russian market and found that yards there were very open-minded and interested in specialized smaller tonnage," recalls Fredrik Zetterström, Executive Director – Treasury and Corporate Communications at Svithoid.

Attractive Alternative

Its quest for a reliable, high-quality yard with ambitions in this shipbuilding segment took his company to the Volgo-Caspian area of south-western Russia, the home base of the shipbuilding conglomerate MNP group. The company designs and builds ships at five sites in Russia, the Ukraine and the USA. In early 2004 Svithoid signed contracts for the construction of four 3,400 dwt tankers with MNP's Third International Shipyard in Astrakhan on the Caspian Sea, followed by another contract for two 4,500 dwt chemical/products tankers plus two options at the group's Volgograd Shipyard.

The latter are built under GL class. These ice-reinforced vessels, capable of carrying up to 14 different cargoes per voyage, measure 91.9 m in length, with a width of 16 m and a depth of 5.7 m. "There has been a lot of learning by doing for us in Russia. Of course we knew we were taking a risk initially, but we were very pleasantly surprised," notes Fredrik Zetterström. "We have not witnessed the typical problems often associated with Russia, such as corruption and excessive red tape.

Established Standards

Almost everybody we deal with at MNP is relatively young and the philosophy is, we have common goals. So let's achieve these together," explains Zetterström. Svithoid has sent two technical surveyors to Volgograd Shipyard while Germanischer Lloyd has one surveyor permanently on site, backed up by a second specialist during peak times. "Work tends to be more intense at the outset of the cooperation, because you have to establish the standards and procedures according to GL's rulebook. Both sides have to get used to each other. It's like learning how to walk to- →

IMPORTANT RUSSIAN SHIPYARDS

ADMIRALTY SY, St. Petersburg
AMURSKY SB, Komsomolsk
BALTIC SHIPYARD, St. Petersburg
CHKALOVSK SHIPYARD, Chkalovsk
KRAS. BARRIKADY, Astrakhan
KRASNOYE SORMOVO, Nizhniy Novgorod
NEVSKY SB, Schlisselburg
OKA SHIPYARD, Navashino
ONEGA SY, Petrozavodsk
SEVERNAYA SB, St. Petersburg
SEVMASH SMP, Severodvinsk
THIRD INTERNATIONAL, Astrakhan
VOLGOGRAD SY, Volgograd
VYBORG SY, Vyborg
YANTAR SHIPYARD, Kaliningrad
ZELENODOLSK, Zelenodolsk

BACKGROUND: ENTERPRISES INVOLVED

SVITHOID

Svithoid Tankers AB (publ), located in Stockholm, is a Swedish shipping company with a focus on smaller, state-of-the-art product and chemical tankers up to 10,000 dwt. The vessels always comply with all the latest environmental and safety requirements. They are primarily intended for long-term rental to industrial customers.

Currently, the company has six double-hull tankers from 1,800 to 8,950 dwt in operation, as well as double-hull tankers from 3,400 to 7,950 dwt under construction. Svithoid Tankers has over 2,000 shareholders. The company's B share is listed on the Nordic List at the Stockholm Stock Exchange (previously called O-list).

MNP

Morskye i Neftegasovye Projekty (MNP) is one of Russia's foremost shipyard groups. The holding includes five shipyards, as well as a manufacturing company specializing in drilling platforms. The shipyards are located at Astrakhan, Volgograd and Nizhniy Novgorod. MNP specializes in ocean-going ships, river ships and small tankers; the manufacture of liquefied-gas tankers is expected to be especially profitable in future years. Ship sizes are limited by the transit waterways: ships to be transferred to the Baltic Sea cannot exceed a width of 17.5 m. Besides Russian shipowners and the Russian government, MNP's customers include foreign shipping companies and the offshore industry. The tankers for Svithoid are built at Volgograd.

ZTL

The steel profiles are provided by Zavod Turbinnykh Lopatok (ZTL) of St. Petersburg, a company that has been specializing in manufacturing steam and gas turbine vanes since 1964.

Today, one of ZTL's main lines of business is the production of steel profiles for plate stiffening in shipbuilding.

Illustration: MNP

→ gether," says Guido Försterling, who as Country Manager oversees Germanischer Lloyd's Russian operations from St. Petersburg.

The service network managed by Försterling encompasses offices in St. Petersburg, Volgograd and Komsomolsk-on-Amur. Another site office will be opened in Vladivostok this summer. With nine surveyors across the country, the classification society offers the full range of services for shipowners from newbuilding surveillance to ISM and ISPS audits.

Local Skills

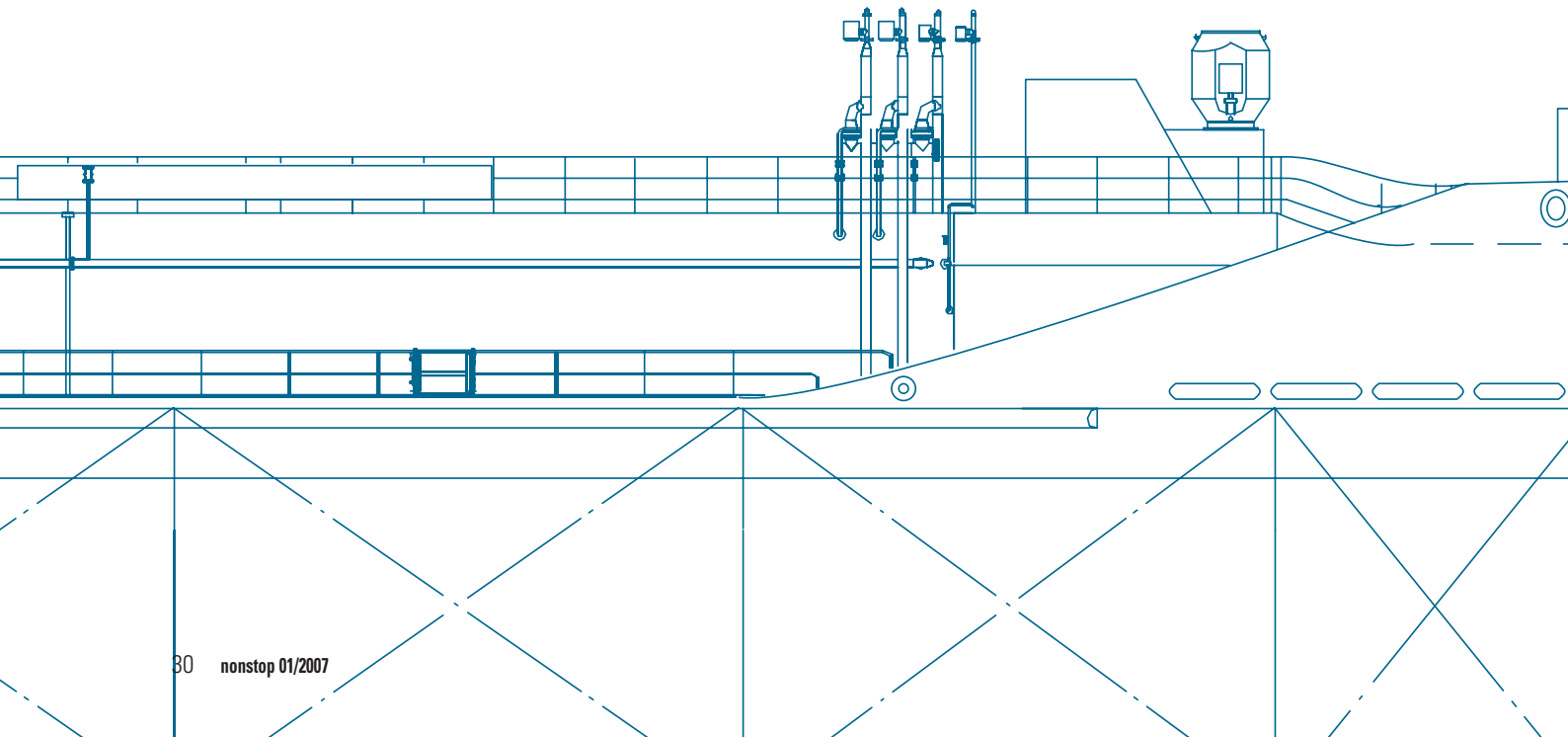
The service network is systematically enhancing its local skills by dispatching its Russian surveyors on missions to Korea, China, Poland and Germany. "We need all-round talents here in Russia with a profound understanding of the deck and engine as well as ISPS and ISM. We couldn't serve this vast market from a handful of offices otherwise," explains Försterling.

Russia is continuously narrowing the gap with its competitors in terms of quality and schedule reliability. "High-tech tools and machinery are missing in some cases, but they make up for it through solid workmanship," says Försterling. Good skills and workmanship in combination with competitive pricing also led Bremen-based shipowning company Hanseatic Lloyd to contract four 18,500 dwt product/chemical tankers at Amur SY in Blagoveshensk in far eastern Russia. "The country has a proven track record in shipbuilding, especially in naval vessels," says Nico Hansen, project manager at Hanseatic Lloyd. There is also a growing supply industry capable of producing various strategic components such as main engines. The MAN B&W two-stroke engines for the tankers contracted at Amur SY, for instance, are produced under license at Bryansk Engineering (BMZ), which is also an authorized spare parts supplier. "We don't have any concerns about quality here," stresses Hansen who joins the company's team of newbuilding surveyors on-site in Russia for four to six weeks per year.

The first hull will be launched this summer and then towed down to Vladivostok for outfitting, because ice con-

Photo: Svithoid

SHELL. Russian shipyards offer respectable craft.



ditions there are less onerous, allowing the ship to be delivered to the owner in winter time. Hansen says that Hanseatic Lloyd faced some delays at the outset of the project, but these were not due to local factors. "We had problems securing the crankshafts for the ships, but they are in short supply everywhere in the world today," he points out.

Detailed Cooperation

Another key reason for Hanseatic to go with Amur SY was its affiliation with the KCMK group of shipyards. After all, business is quite erratic in Russia. Shipbuilding projects pop up out of nowhere, while elsewhere they get bogged down for obscure reasons. "At least you want to make sure that the yard you rely on has the financial strength to cope with the ups as well as the downs", says Hansen. "With a group holding behind Amur SY, we believe we're on the safe side."

Germanischer Lloyd has made good progress in its first year at Volgograd with large-scale welding approvals now close to completion. "The co-operation is characterized by effectiveness, professionalism and mutual understanding," says Mikhail Aivazov, Director for Shipbuilding of the MNP Group.

Soon the partnership is going to be put on firmer footing when the Russian yard has fully implemented POSEIDON, Germanischer Lloyd's software for vessel strength analysis. Its use allows MNP to significantly reduce lead times for new projects by optimizing a large volume of analyses required by class. GL has arranged special seminars for the Russian group's design office Volgo-Caspian Design Bureau for effective implementation. ■ MPH

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RUSSIAN SHIPBUILDING: UNFAZED BY POLITICAL WRANGLING

Again and again reports about an impending restructuring of Russia's shipbuilding sector emerge in the Russian press. In 2005 Russia's federal industry agency Rosprom announced plans to merge the country's shipyards into two holdings, one for the production of submarines and another one for conventional merchant and naval vessels.

Plans for integration. Latest announcements by defence minister Sergei Ivanov, however, suggest that the government aims to create three holding companies, one to consolidate the military yards of St. Petersburg and a second one to unify the civil shipbuilders. A third group, Ivanov said, is to be located in the Russian Far East, where there is only one yard at work at present: Amur SY. No further details have been announced so far. Representatives of the yards have emphasized in the past that co-operations and mergers would be a matter for shareholders to decide on. There are no indications right now that the Putin government will enforce its plans against the will of the yards. Plans for integrating Russia's yards have been floated again and again since the mid-90s, as reported by Russian newspapers.

Meanwhile the number of orders and enquiries from international shipping companies has increased rapidly. Russia's main competence lies with tankers and dry cargo ships of all types. "The construction of vessels up to 8,000 gt can be handled with ease," says Country Manager Guido Försterling. Statistics compiled by London shipbroker Clarksons suggest that by the end of last year Russia's aggregated order book comprised 81 vessels in total, the largest ones being tankers of up to 70,000 dwt on behalf of domestic owner Sovcomflot at Admiralty SY in St. Petersburg.

Tanker in the pipeline. The overall order book is heavily geared towards tankers, with 41 units in the pipeline. The second most popular type are multipurpose/general cargo/container ships with 28 units on order.

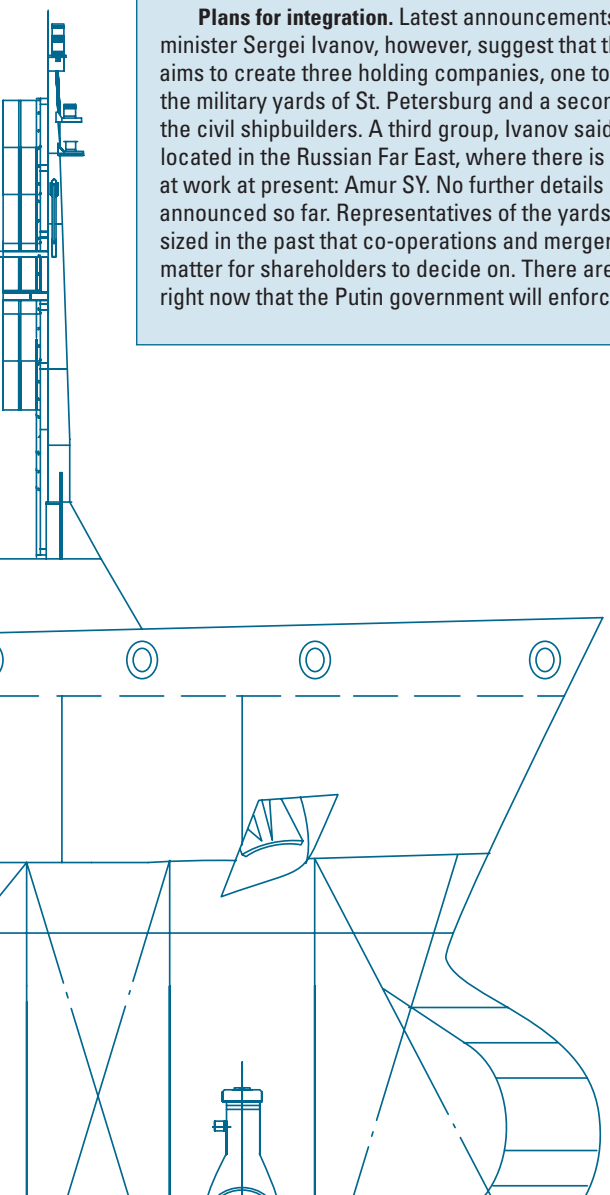


Photo: MNP

SPECIAL TANKER. Niche for the shipyard in Astrakhan.

Here's Looking at You,

Crewing staff need to have a broad knowledge of the global labour market and a good nose for people. A fine grasp of the diverse statutory requirements is obtained by maritime personnel managers at special seminars

Personnel turnover, certificates of proficiency, legal paragraphs – crewing is a real challenge. There are more than a million seafarers in the maritime labour market worldwide (see graph). And the demand is rising steadily: shipowners and crewing agencies are desperately looking for qualified officers and deck hands. "Crewing means taking on responsibility for the people who are sent to serve on board ships for months on end," says Torsten Schröder. Trained as a maritime sociologist, he conducts the "Introduction to Crewing" seminar at the GL Academy.

The battle already begins with the papers. As soon as a captain, a second engineer or a cook is to be hired or offered by a crewing agency, a flood of certificates and forms has to be tamed. Does the Filipino officer candidate have the certificate for advanced firefighting? He needs this extra training to be able to direct the firefighting efforts on board in an effective manner. "I look him straight in the eye, and then I know," a crewing manager reports from her everyday practice. Nobody in the crewing trade can do without the so-called soft skills, without lots of experience and without a sense of the motivation and suitability of an applicant.

High Standards

Whoever hires mariners nowadays must also be an expert on international maritime regulations. If the man from the Philippines has the necessary qualification, he will be given a certificate on advanced firefighting, one of the many essential qualifications for safe operation of a ship at sea and in port. "The fundamental suitability of a crew mem-

Photo: Eberhard Petzold

Sailor

ber is first ensured formally through the maritime licences and additional certificates," says Schröder. IMO, MSC, ILO, STCW, SOLAS, ISM, ISPS Code: these cryptic abbreviations stand for a profusion of international institutions and regulations safeguarding the safety of ship and crew as well as the interests of work safety and marine environmental protection. "The most important regulatory framework is STCW," says Torsten Schröder. The "International Convention on Standards of Training, Certification and Watchkeeping for Seafarers" (STCW Convention) and the related STCW Code are decisive for the work in personnel management.

Germanischer Lloyd has been offering seminars on this topic since 2003. The participants come from the human resources departments of shipping companies, are quality managers, inspectors or ship's officers, or are possibly staff members from crewing agencies, training facilities and shipping administrations. Here they all learn the theory and practice of the international guidelines and are motivated to participate actively by a range of interesting case studies. The course covers normal ship operation, port state controls and flag state inspections as well as the personnel-related aspects associated with a change of flag.

The STCW Convention defines uniform and mandatory minimum standards for maritime personnel worldwide. It is intended for authorities issuing licences, maritime training institutes, shipowners and the seafarers themselves. "Frequently, additional national regulations are in place to supplement the STCW requirements," says Schröder. The minimum standards demand certain capabilities and skills on all hierarchical levels on board a ship: from the shipmaster through to the technical and nautical officers down to the crew members on deck and in the engine room.

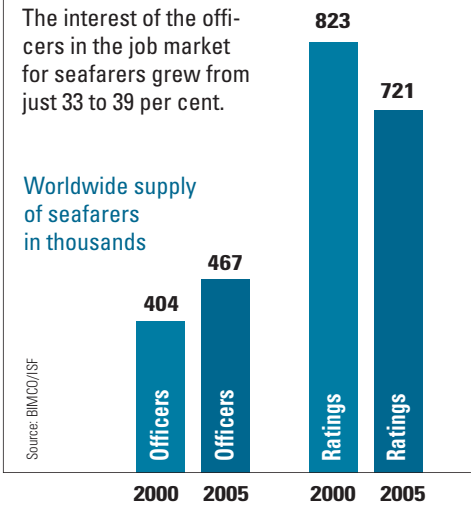
In all cases, international and flag-state legislation applies when, for example, a chief nautical officer is needed. Are his certificates and papers complete, and how long will they still be valid? Does the applicant have an adequate command of English? Are his health certificates in order? Can he come on board in the relevant port as planned, and does he have his passport and the necessary visas? Is the candidate familiar with the safety management system of the shipping company? Is there an assessment system? This is also of interest to the Port State Control (PSC). Vessel, crew and shipowner must be prepared for a visit from the port-state inspectors, who check not only the ship's technical condition but also the certificates of the seafarers →

TECHNOLOGY. The higher complexity requires more know-how.

Photo: Eberhard Petzold

EXECUTIVES ASKED

The interest of the officers in the job market for seafarers grew from just 33 to 39 per cent.



➔ on board and the minimum safe manning certificate. If any nautical licence is missing, the ship may be detained in the port, resulting in costly delays. And if there are any problems with the corresponding flag state controls, fines may also be imposed.

Correct Crewing

A particularly complex topic is posed by the change of flag. In the seminar example, the ship MV "Fast Trader" changes the Maltese flag for the Liberian one. What has to be done? The new ship register is contacted and the application for a minimum safe manning certificate is made. The minimum safe manning certificate governs how many crew members must be on board. For this aspect alone, several international laws are applicable: IMO resolutions, chapters of the International Convention for the Safety of Life at Sea (SOLAS), STCW Convention and STCW Code. The guidelines of the International Labour Organization (ILO) are concerned with ship logbooks and health certificates.

And the flag state of Liberia also has its own rules, manuals and forms. Hours of rest and watchkeeping, the correct number of ABs (able seamen) and OSs (ordinary seamen) with the prescribed times at sea and training courses in their working areas – everything is reviewed, checked, documented and organized ashore. Each ship register has its own special features. For instance, the British take legal appraisal very seriously. Exceptions from the minimum safe manning certificate necessitate special permits in all cases. "Liberia does it within a few hours," a seminar participant is able to report, "while other countries need several days."

In another example, the second engineer suddenly becomes very ill and has to be sent off the ship for speedy treatment in a hospital. How does the ship get to the nearest port safely and in compliance with the regulations? In the seminar, possible solutions are analyzed and discussed. Is there a stand-in or an inspector with a technical licence who can fill the position of the second engineer? Is the sick officer fit to travel immediately? What do the international guidelines stipulate? Time is money; the incident can become a costly affair, not so much through the travelling and payroll costs but rather as a result of the extended lay times and lost income when the ship "goes off-hire."

In the course of their work, the personnel teams are constantly torn between the crew and the shipowner. "At present, many shipping companies are carrying out extensive newbuilding programmes and need a lot more personnel. The seafarers are exploiting this situation by hopping to any shipping company offering higher pay," says Schröder, who himself worked in crewing for several years. "In the personnel departments, planning the operations and transfers is thus often very difficult." The expenses incurred by the shipowners for training and wages are increasing.

"However, the crewing pros must also keep an eye on the needs of the seafarers," says Schröder. Only in this way will ship operations run smoothly and the crews give positive feedback. As in other sectors of industry, job satisfaction ensures motivation and a high quality of work – and increases the level of loyalty towards the employer.

The duty to provide adequate information to the shipowner is also important, as he must be able to access the current crewing lists, with all changes in personnel properly documented – after all, the shipowner bears the final responsibility of ensuring that everything fulfils the regulations. At least once a year, a review should be undertaken by the shipowner, even if he is based in Hamburg, the crew manager in Cyprus, and the crewing agency in St. Petersburg.

What is more, new regulations are constantly being issued by the committees of the International Maritime Organization (IMO) and the International Labour Organization (ILO). On the agenda, they have minimum standards for occupational safety on board and a detailed definition of the qualifications of the ratings, i.e. the crew members on deck or in the engine room. Every initiative of the legislators, every amendment, no matter how small, affects the everyday life of the seafarers and the crewing departments on shore. Being constantly up-to-date is therefore the best foundation for effective personnel work! ■ CS

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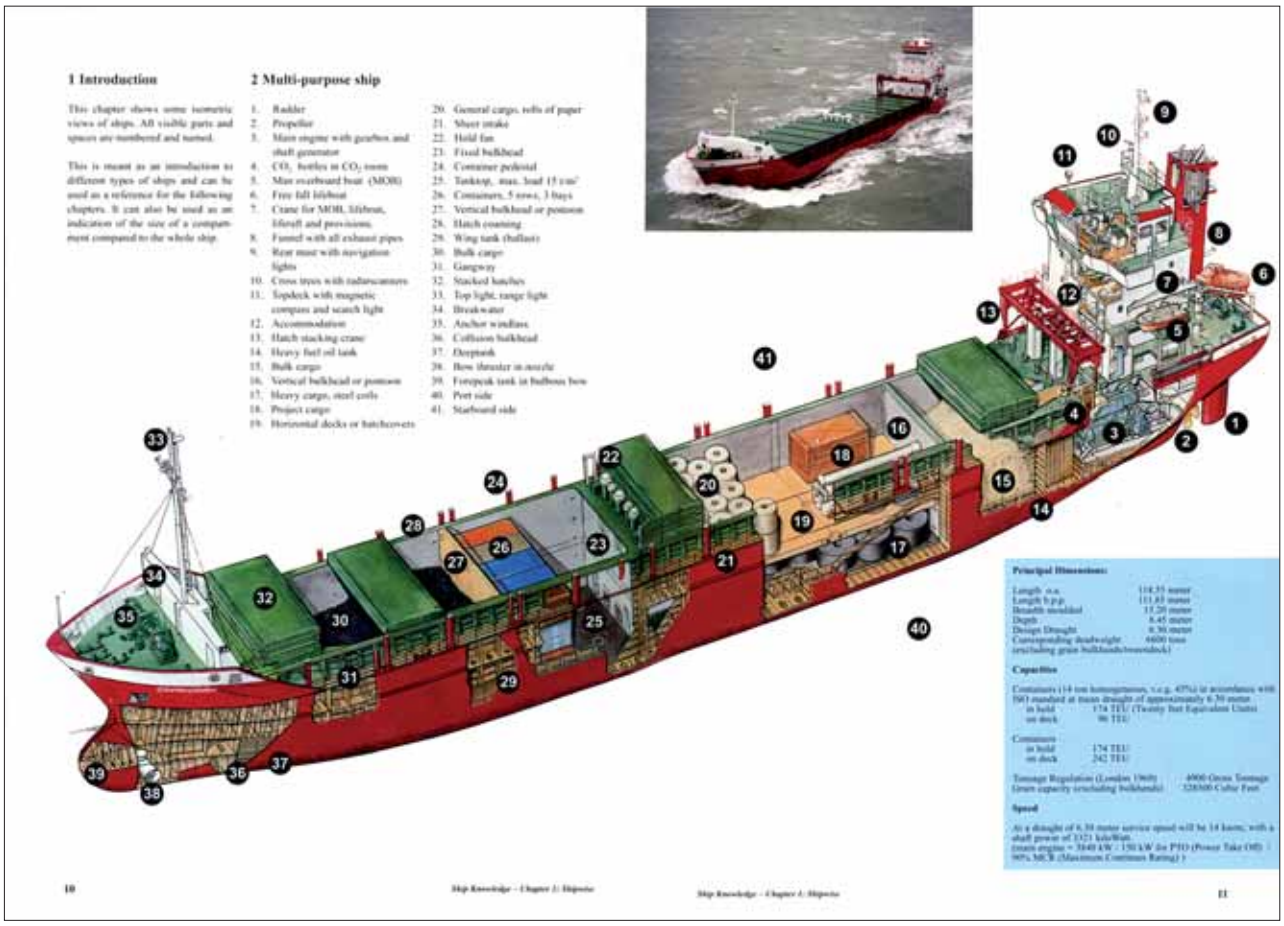
Seminars 2007 see overview page 36

IMPORTANT RULES

STCW Convention: International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (1978), as amended in 1995,1997 and 2000

STCW Code: Seafarers' Training, Certification and Watchkeeping Code, as amended in 1997, 1998 and 2000



"The Way Things Are" for Ships

With his book "Ship Knowledge", Dutch author Klaas van Dokkum has created a standard work

AUTHOR.
Klaas van Dokkum.

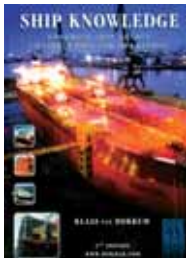
Accumulating the knowledge of seamen, engineers and scientists, "Ship Knowledge: Covering Ship Design, Construction and Operation" educates the reader on shipbuilding and ship equipment from a variety of perspectives, providing a fast, comprehensive primer on ship technology. "I want my books to be as easy to understand as possible," says the author, nautical sciences teacher Klaas van Dokkum. Consequently, the Dutchman gave his book a structure similar to that of the famous children's book, "The Way Things Are" by American author David Macaulay. Much like Macaulay, van Dokkum prefers concise text and a clear language. All information is first-hand and structured intuitively. Colour photographs and detailed illustrations on each page supplement the text.

A Must-Have – not Just for First-Term Students

The concept is obviously successful: The third edition was published recently. Van Dokkum expressly limits his book to products and developments that are relevant in a seaman's everyday life. 16 chapters discuss topics as varied as laws and regulations for the shipping industry, shipbuilding, electrical installations on board, ship stability and more. The reader can trace the building of a ship from the drafting board to the final touches. At 375 pages, the book is the most voluminous nautical reference work on the market today.

Originally published in the Netherlands under the Dutch title "Sheepskennis" (2001), the work is now available in English, as well. It is an excellent reference work for teaching and training. Shortly after it was first published, it found its way onto the required-reading lists for first-term students of nautical schools, shipbuilding schools and technical universities in the Netherlands.

But it is an equally valuable tool for corporate employee training programmes. Even for the interested novice, the uncomplicated language and clear structure and illustrations offer an excellent way to enter into the fascinating world of seafaring. ■



Ship Knowledge – Covering Ship Design, Construction and Operation
Hardcover, 375 pages, 3. Edition/June 2006,
Publisher: Dokmar (www.dokmar.com)

service

Dates at a glance

MARCH

12.03. – 14.03.2007
MEOS 2007
Bahrain

12.03. – 15.03.2007
Seatrade Cruise Shipping
Miami, USA
Lecture:
Fuel Saving and Environmental Issues,
14.03. Henning Gramann (GL)

13.03. – 15.03.2007
Terminal Operations Conference Asia
Hongkong, China

21.03. – 22.03.2007
Defence Technology Asia
Singapore

27.03. – 29.03.2007
Intertanko
Houston, USA

27.03. – 28.03.2007
4th European Green Ship Technology Conference
Antwerp, Belgium

28.03. – 29.03.2007
IMarEST Propulsion Conference,
IMarEST Headquarters /
London, United Kingdom

29.03. – 30.03.2007
SAFEDOR MUNICH
Munich, Germany

APRIL

02.04. – 04.04.2007
Sea Asia
Singapore

03.04. – 05.04.2007
CIOOE
Beijing, China

11.04. – 12.04.2007
Motorship Propulsion Conference
Hamburg, Germany

16.04. – 20.04.2007
Hannover Messe
Hannover, Germany

17.04.2007 – 20.04.2007
Underwater Defense Technology
Naples, Italy

17.04. – 20.04.2007
LAAD
Rio de Janeiro, Brazil

25.04. – 29.04.2007
Europort Eurasia
Istanbul, Turkey

30.04. – 03.05.2007
OTC
Houston, USA

MAY

07.05. – 08.05.2007
SAFEDOR BRUSSELS
Brussels, Belgium

07.05. – 10.05.2007
EWEC
Milan, Italy

14.05. – 15.05.2007
System Safety 9th Bieleschweig Workshop
Hamburg, Germany

21.05. – 24.05.2007
Cimac Congress
Vienna, Austria

JUNE

05.06. – 06.06.2007
Congress: Products and Systems Certification
Hamburg, Germany

05.06.2007 – 07.06.2007
Underwater Defense Technology
Naples, Italy

06.06.2007 – 08.06.2007
DST Fachtagung
Emden, Germany
Lecture:
Herausforderung für die Schiffahrt im maritimen Umweltschutz
08.06.2007, about 10:30 am
Dr Hermann J. Klein (GL)

12.06. – 15.06.2007
NorShipping
Oslo, Norway

13.06.2007 – 15.06.2007
OGA 2007
Kuala Lumpur, Malaysia

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Photo: Dreamstime

Rules for Classification and Construction

Our latest brochures, rules and guidelines are available on request. Order forms are available on the internet:
www.gl-group.com > Client Support > Rules & Guidelines

I – Ship Technology

Part 0

Classification and Surveys	2007-02-01

Part 1

Chapter 3

Electrical Installations	2007-02-01

Chapter 4

Automation	2007-02-01

IV – Industrial Services

Part 6 – Offshore Technology

Chapter 1

Classification, Certification and Surveys	2007-01-01

VI – Additional Rules and Guidelines

Part 11 – Other Operations and Systems

Chapter 9

Guidelines for the Condition Assessment Program	2007-02-01

Part 12 – Environment Protection

Chapter 1

Guidelines for the Environmental Service System	2007-01-01

GL Academy: Seminars

Information and registration: academy@gl-group.com

MARCH

Hamburg, 12./13.03.2007
Company/Ship Security Officer Training Course

Hamburg, 13.03.2007
Ship Technology Basics

Hamburg, 14.03.2007
Inspections, Surveys and Certificates

Hamburg, 14.03.2007
Hazardous Substances on Board

Hamburg, 15.03.2007
Packing and Stowage of Dangerous Goods

Hamburg, 19.03.2007
Maritime Casualty Investigation in Shipping Companies

Hamburg, 20.03.2007
ISM for Ship Management Personnel

Hamburg, 21.03.2007
Harmonization of Safety (ISM) and Security (ISPS) Management Systems

Hamburg, 22.03.2007
Bulk Carrier Basics

Hamburg, 23.03.2007
Bulk Carriers – Technical and Operational Aspects

Hamburg, 27.03.2007
ISPS Internal Auditor for Shipping Companies

Hamburg, 28.03.2007
Dealing Successfully with the Press in Maritime Emergencies

Hamburg, 29.03.2007
Practical Aspects of Corrosion Protection for Shipping Companies and Shipyards

APRIL

Hamburg, 03.04.2007
Bridge Design – Equipment and Arrangement

Hamburg, 04.04.2007
Quality Management Co-ordinator

Hamburg, 17.04.2007
Oil and Chemical Tankers – Technical and Operational Aspects

Hamburg, 18.04.2007
Methods of Technical Risk Analysis in Shipbuilding

Hamburg, 19./20.04.2007
Shipping Basics

Hamburg, 19.04.2007
US Coast Guard Regulations for Ship Operators

Hamburg, 20.04.2007
The Change of Flag, in General and Especially the Re-flagging of Ships to the German Flag

Hamburg, 23.04.2007
Workshop ISPS Exercise

Hamburg, 24./25.04.2007
Implementation and Internal Auditing of an Environmental Management System in Shipping Companies

Hamburg, 26./27.04.2007
Application of Risk Assessment in TMSA

MAY

Hamburg, 08.05.2007
High Speed Craft (HSC) – Technical and Operational Aspects

Hamburg, 08.05.2007
Basics about DIN EN ISO/IEC 17025:2005 for Test Laboratories and Industry

Hamburg, 09.05.2007
Fuel Tank Protection

Hamburg, 09./10.05.2007
Internal Auditor DIN EN ISO/IEC 17025:2005 for Test Laboratories and Industry

Hamburg, 10.05.2007
Managing Newbuildings

Hamburg, 14./15.05.2007
TMSA Workshop – Risk Assessment, Change Management, Incident Investigation

Hamburg, 21./22.05.2007
Internal Auditor ISM / DIN EN ISO 9001: 2000 for Shipping Companies

Hamburg, 22.05.2007
Shipping Basics for Banks

Hamburg, 23.05.2007
Quality Objectives and Continuous Improvement

Hamburg, 23.05.2007
Passenger Ships – Technical and Operational Aspects

Hamburg, 24.05.2007
Waste Management

Duisburg, 24.05.2007
Inland Navigation – National and International Regulations

Hamburg, 30.05.2007
ISM Basics

news

SPAIN

Always Cool

Food, flowers and plants, chemicals, pharmaceuticals, human blood – all these are temperature-critical products that come with special logistical requirements. The Cool Chain Quality Indicators (CCQI), established jointly by the Cool Chain Association (CCA) and Germanischer Lloyd (GL), is a standard for reliability, quality and required skills in temperature-critical logistics. It uses a benchmarking system to assess transparent and comparable quality measures. CCQI provides guidance and support to continually improve the logistics chain for temperature-sensitive product (PTSP) carriers, handling agents, forwarders, perishables centres, airports, and warehouses, as well as containerized and conventional ocean transport.

Photo: Integra

Competence. Now for the first time, a company located in Spain underwent a CCQI and management audit with a focus on "transport and logistic operations of goods": Integra2. Following the successful audit, Jose Manuel García Martín, Managing Director of Germanischer Lloyd Certification Services, S.L., handed over the two new certificates to Pablo Rebollo, Managing Director of Integra2. With CCQI, Integra2 is able to offer its customers a certified, precisely defined level of proficiency in the growing perishables and PTSP logistics market.

CERTIFICATE PRESENTATION (left to right): Jesus Javier Gonzalo Gracia (GLC), Maria Louisa Gambús (INTEGRA2), Pablo Rebollo (INTEGRA2) and Jose Manuel Garcia Martin (GLC) .

EUROPEAN UNION

New Technology Platform

Representatives of leading European wind turbine manufacturers and research institutions have joined hands with members of the European Parliament to create the Technology Platform for Wind Energy (TP Wind). According to Andris Piebalgs, EU Commissioner for Energy, the objective of the platform is to deliver a vision for wide-spread utilization of wind energy across Europe by the year 2030. To reach the goal of a 23 percent wind power share in the EU's overall energy mix by that date, a concerted research effort will be necessary.

New Member. Over the next few years, TP Wind should therefore be developed to provide an essential platform for informal collaboration. A major effort will be necessary to improve current technologies in the coming years in order to enhance the competitiveness of wind power relative to other forms of energy: extensive testing of new mechanical structures and rotor blades could increase efficiency by as much as 40 percent. In February 2007 the Wind Energy department of Germanischer Lloyd Industrial Services was awarded member status in the European Wind Energy Technology Platform Steering Committee.

MALAYSIA

In the Kikeh Field

Deep down in 1,400 m of water, the deepwater Kikeh Field is located offshore Sabah, Malaysia. Kikeh, situated in the southern part of Block K, is the first deepwater oil discovery ever made in Malaysia. The exploration represents a unique combination of first-time technology applications in South-East Asia, featuring the region's first spar platform, as well as the world's first Gravity Actuated Pipeline (GAP), connecting the spar to the FPSO.

Integration. Recently, Germanischer Lloyd GLM SDN BHD was contracted by Murphy Sabah Oil Co., Ltd. for asset integrity management and risk based inspection services for the deep-water offshore facility of the Kikeh Field development until 2009. The services rendered by Germanischer Lloyd represent the first all-inclusive implementation of an online asset integrity management and RBI system for all equipment, comprising the spar structure, anchoring, pipelines, piping, pressure vessels and safety valves, as well as safety and lifting equipment. Germanischer Lloyd will interface the latest version of its asset integrity management software "GALIOM" with the existing management systems at Murphy Sabah Oil Co., Ltd. (CMMS, MRP, SCADA/PI).

Integrity. GALIOM includes both, a risk-based inspection methodology, and a practical asset integrity management process, combined within a user-friendly software package. The API 580/581-compliant tool visualizes the technical and operational integrity status of the assets of a facility and includes anomaly assessment and work-scope preparation functionality.

For further information:

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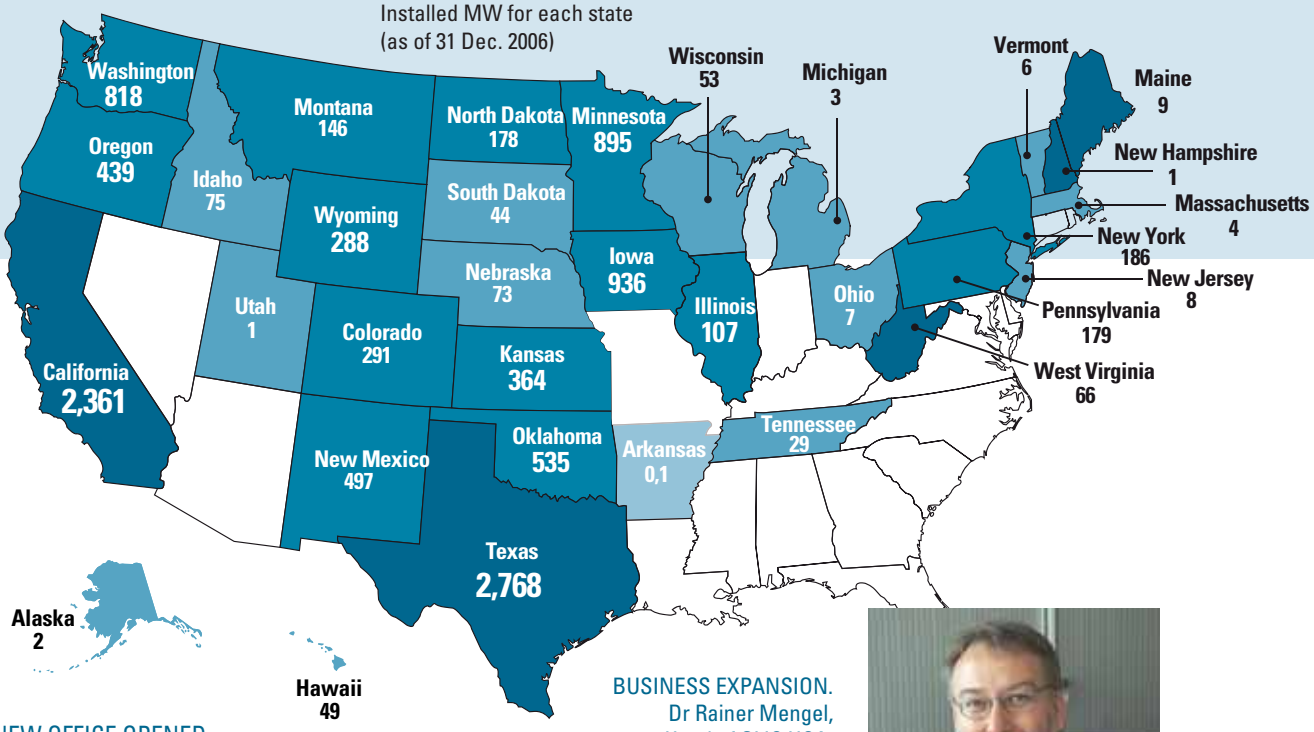
TOTAL INSTALLED U.S. WIND-ENERGY CAPACITY
Installed MW for each state
(as of 31 Dec. 2006)



source: AWEA

NEW OFFICE OPENED

A Fresh Breeze in the USA

BUSINESS EXPANSION. Dr Rainer Mengel, Head of GLIS USA.

The U.S. wind power market is booming. Government subsidies and tax credits are fuelling a steady rise in the contribution of wind energy to the nation's power supply. "Our new office in Wisconsin will help us focus on this expanding market," says Rainer Mengel, manager of Germanischer Lloyd Industrial Services (GLIS) in the USA.

A Broad Range. He is a doctor of engineering and has been an expert consultant with the rotor blades and engineering technology department of the wind power section of Germanischer Lloyd Industrial Services (GL Wind) since April 2003. "We are excited about being able to offer a full range of certification services for onshore and offshore wind energy products and projects in the United States," says Mengel. As an expert in fibre-reinforced plastics and adhesives, he was previously in charge of certifying rotor blades, as well as monitoring blade production and repairs.

Supported by a staff of four, he is now busy measuring performance characteristics and noise emissions and checking power grid connections across the USA.

Boom. The market offers an enormous potential: by 2020, wind energy is expected to contribute up to six percent to the country's overall power generation. The current share is close to one percent. In 2006 alone, the amount of electricity produced by wind rose by 27% compared to the previous year.

For further information: Dr Rainer Mengel, GL Industrial Services USA, Phone: +1 262 7549-470, E-Mail: glis-usa@gl-group.com

GL WIND

Certification Opens Doors

Using transformers in offshore wind power plants confronts engineers and operators with new challenges: besides salt and dirt deposits on the cooling surfaces, condensation combined with salt causes leakage currents within the insulation system. Leakage currents use the shortest possible distance between two conductive components, flowing across an insulation material surface.

Engineering design checks for certification purposes frequently include entire wind-power generating plants, serving as a basis for type certification. But component manufacturers may also choose to have their products certified separately without reference to any particular wind turbine type. This can simplify co-operation with several different wind turbine manufacturers later on, opening doors leading into new business relationships.

Guidelines. Electrical components are rigorously tested for their susceptibility to ambient conditions, among other factors. Component certificates issued by Germanischer Lloyd meet the requirements of the "Guideline for the Certification of Offshore Wind Turbines" which is globally recognized.

Photo: DEWIND

MATERIAL. Engineers laying cables in the tower of a wind power plant.

One Safe Step

Offshore wind farms are a major hazard for maintenance personnel. The SASH docking system enables safe and easy access

With one safe step, a technician leaves the MS SVEA in the open sea. An innovative gangway, installed right above the ship's navigating stand alt wheel house, forms a walkway connecting the small vessel with the Utblicken Research Station lighthouse. Unlike a pilot entering a ship, the technician does not have to ride a wave's crest to grab and climb up a ladder on this cold April morning. Instead, he comfortably steps from one horizontal surface onto another. A short glance back to the ship, and he is ready to begin working.

Utblicken Research Station is located ten kilometres off the Swedish coast in Kalmarsund, a part of the Baltic Sea situated between the Kalmar region of the Swedish mainland and Öland island. In early 2003, the prototype of the SASH system was installed on this lighthouse. The Swedish acronym SASH stands for "safe access to offshore structures". "This system ensures safe transit of maintenance personnel between the ship and the platform, even in higher seas," says inventor Mikael Jakobsson.

Dangerous Access

Apart from hydroelectric, photovoltaic and biomass power generation, wind power has gained momentum as an alternative source of energy, especially in coastal areas. Countries such as Denmark, the Netherlands or Germany are advocating wind power to help cover their energy needs.

But suitable sites for building wind turbines are few. Noise emissions and shadows cast by the enormous rotors are unwanted side effects onshore and critics find fault with scenery spoiled by wind farms.

Offshore wind farm projects, on the other hand, have no above sea or sub-sea effects. They therefore offer an alternative and are being pursued with resolve. The first units were installed several years ago (1990/1991). But taking wind farm technology to the open sea causes new logistical challenges. While inland and onshore wind turbines are easily accessible for maintenance personnel, servicing offshore systems is far more complicated.

Helicopters are expensive and cannot be deployed in adverse weather conditions. Using ships to transfer maintenance technicians can put people and equipment at risk. Technicians have to reach a vertical ladder attached to the platform, a risky endeavour, especially in high seas. First, the ship must navigate to the offshore unit, then be held in position until the technician has safely reached and grabbed the ladder. His return is even riskier. With his back towards the boat, he has to descend from the ladder, before trying to jump back into the boat. This may be especially difficult when tired after a long workday and with the cold water of the North or Baltic Sea raging below.

SASH offers a safe solution to the this problem. The system is designed to keep the critical moment of transfer from the ship to the offshore installation as brief as possible. The SASH system consists of a steel post attached to the offshore platform, as well as a fender and an adjustable bridge system mounted to the ship. The steel post and fender function like a key in a lock: The steel post is the "key" that serves as a mooring bollard which the crescent-shaped fender attached to the ship's bow locks on to.

The ship's propeller pushes the boat against the steel post, creating a secure connection between the post and the ship compared to the conventional system in which the connection is fairly unstable because it has two connecting points instead of one. The ship can rotate 180 degrees around the post, allowing a sufficient amount of freedom to navigate even at high winds and seas. So far, SASH has been used in seas up to 2.5 m high. Experts are convinced that the docking system is fit to tackle seas up to 3 m high.

Says Jakobsson: "The real key question is, up to which wave height will the transport vessel be able to transfer personnel to the offshore turbine comfortably?"

From the Idea to Certification

SASH System AB, located at Bergkvara, south of Kalmar, Sweden, was founded in 2001 by Jakobsson under the name of Mistvind AB as a company specialising in transporting personnel and materials to offshore wind turbines. The original idea for the SASH system dates back to 1990 when Mikael Jakobsson was involved in the construction of the first offshore wind turbine. Already then Jakobsson experienced the problem of safe transit first hand, and again later with the execution of the Utgrunden project.

In the following years Jakobsson acquired further expertise in wind power generation in Germany, the USA, France, and his native Sweden. It was not until 2002 that he proceeded to put his idea into practise. With sponsoring from the Swedish Ministry of Energy, the first prototype was built. It was installed in 2003 with support from Swedish Airicole AB, as well as the Ministry of Energy. In the manufacturing and assembling of system components, SASH Systems closely cooperates with other companies, like Broson Boat Designs, the shipyard that built SVEA, now the first ship that is equipped with the SASH bridge system and with the local company CalmarCompentence, a steel design outfit with manufacturing facilities.

Late last year the system was certified by Germanischer Lloyd. This had become necessary because of safety considerations. Furthermore, GL had to determine the additional load acting on the foundations of the offshore installation because of the added SASH structure. The type certification issued by Germanischer Lloyd confirmed that the structure is indeed safe. The certificate was presented to Mikael Jakobsson just a few months ago during the Hamburg Offshore Wind conference.

The SASH system can be used on virtually any offshore unit. Unlike the traditional method, it can be operated even in difficult weather conditions, offering the best possible level of safety for personnel. At Utblicken Research Station, SASH has been performing reliably for four years now, pointing the direction toward new projects and away from the conventional ladder. To date, 1500 people have entered the Kalmarsund lighthouse using the SASH system in various sea conditions. Without any incidents – just by taking one safe step from the ship onto the platform. ■ SB

For further information: Peter Dalhoff, Head of Department, Projects, Phone: +49 40 36149-117, E-Mail: peter.dalhoff@gl-group.com

DOCK: SASH allows the safe access to platforms.

Photo: Courtesy of Vestas Wind Systems A/S

INTERVIEW

„Improving Safety"

PIONEER. Mikael Jakobsson invented SASH.

nonstop: Are offshore wind turbines the technology of the future?
Mikael Jakobsson: With the increasing need for affordable energy sources that do not increase CO_2 emissions, offshore wind turbines can make a significant contribution to our energy supply at reasonable costs.
nonstop: Why is the construction of new offshore wind farms stalling?
Jakobsson: Offshore is still too risky, too expensive and not a mature technology. Furthermore there are delivery bottlenecks because wind turbine manufacturers have been focussing on large orders ranging from 1.5 to 2.5 MW. Those aren't offshore projects but more profitable inland wind farms.
nonstop: Your accessing system has been a great advance with regard to safety and economical feasibility. When was the SASH idea born?
Jakobsson: In 1990, during the construction of the first true offshore wind turbine off the coast of the Swedish village Nogersund. But in those days, losing one day of production cost less than 200 euros. That is why the accessibility issue hardly mattered.
nonstop: Does the ability to easily access offshore wind farms matter more today?
Jakobsson: Yes, indeed. Logistics and accessibility are key factors for operating offshore wind turbines. With more offshore units in operation, more personnel is needed for maintenance. The risk of delays or accidents caused by the outdated, hazardous accessing system is considerable, and it is an economical factor, as well: one day lost on a 5-MW machine will cost anywhere between 12,000 and 15,000 uros.
nonstop: Why did you have the SASH system certified?
Jakobsson: Because the safety of people and assets is at stake – I believe any accessing system should be certified. This industry cannot afford to operate in a wild-west manner with undocumented, incalculable risks.
nonstop: What are your future plans with SASH?
Jakobsson: We will market the system and install two demonstration posts by June. We are also looking for a more suitably sized ship. As for engineering, we will then address the SASH Flex post. This design is intended for tidal waters and will ensure safe access and return even in seas in excess of 3 m.
www.sashsystem.com

Attack of the Microbes

Small as they are, bacteria are able to bring the gigantic plants used for refining crude oil to a grinding halt. Microbiologists are showing how these organisms can adapt to very hostile environments – a topic that is also of vital interest to shipping

Rust and bacteria have a lot in common. Although corrosion is usually a result of inorganic mechanisms, biogenic processes can speed up the rate of material decomposition quite dramatically. While biocorrosion has not yet met with wide acceptance as a possible cause of damage, this could change as a result of new research findings.

At the sixth conference on "Corrosion Protection in Maritime Technology" in Hamburg, the agenda included a paper on microbially induced corrosion. At first glance, the subject does not sound particularly exciting. A serious error, as demonstrated in the lecture by Dr Matthias Graff, managing partner of the consultancy TMH. Using a specific example, the expert describes the dramatic consequences of bacterial attack.

The scene: 150 metres below sea level, in the middle of the North Sea.

The crime: In an offshore oil field, emergency shutdowns had led to substantial outages at several production wells. It was found that valves in the hydraulic controls had failed.

The suspect: Microbial colonization.

Microbiologist Graff explains the basic concept of the examinations: "The study covered the underwater components and the relevant parts of the hydraulic system installed on the production facility. Furthermore, the hydraulic fluid – to which biocides had been added – and the recirculated reservoir water were analyzed in detail." Under the scanning electron microscope, the damage was clearly visible: at many points, the valve tappets were coated with a deposit. "This layer contained the oxidized corrosion products of iron, nickel and chromium, together with various elements and chemical compounds, such as long-chain carbon compounds and amino groups, in all probability produced by an organic matrix of the encrustation," says Graff. All the signs pointed to bacteria or fungi as the culprits. Underneath the film, the corrosion was far advanced – this was especially evident by the intercrystalline corrosion at fracture lines.

DR MATTHIAS GRAFF

- Studied microbiology, biochemistry and geology at TU Braunschweig
- Managing partner of the consultancy firm TMH® – Dr. Graff und Partner ("Gesellschaft für Technische Mikrobiologie und Hygieneüberwachung")
- Officially appointed and certified expert for technical microbiology, environmental hygiene, microbial material damage and corrosion

www.tmh-drgraff.de

Like Cows around a Trough

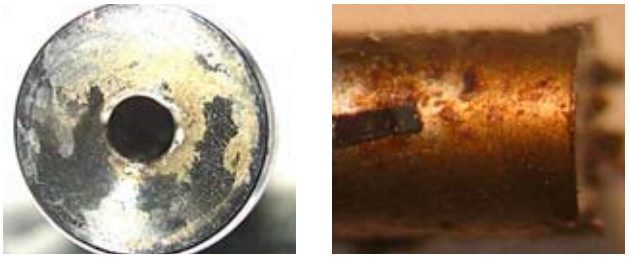
To learn more about these organisms, the scientists conducted cultured microbiological examinations and biomolecular tests. In the cultured examinations, various bacteria groups were analyzed.

Two types were conspicuous here: in almost 60 per cent of the samples, there were bacteria that digest carbon, the basic constituent of crude oil. In a fifth to a quarter, glycol metabolizers and other heterotrophic bacteria were found. Here it is important to know that glycol is added to hydraulic fluid. "This proved that the bacteria were active within the hydraulic control system," says Matthias Graff. Strange as it may seem, they live off the oil and hydraulic fluid. A microscopic film shows just how comfortable the little creatures feel: they cluster around the oil like cows around a feeding trough.

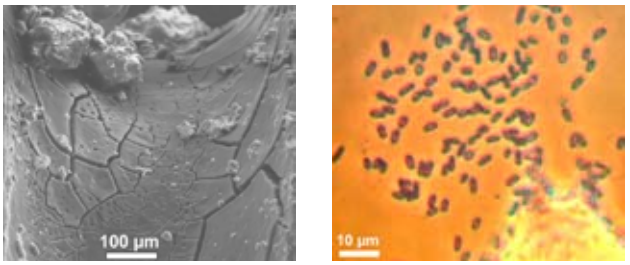
The biomolecular examination also involved cellular disruption to obtain the DNA. By checking the specimens against a database, 58 different organisms were identified. No fungi or algae were found, however. All the organisms were bacteria, and all had one thing in common: they originated from seawater. Some already had a bad reputation for being corrosive. And many of the bacteria were known to come from warm-water regions, hydrothermal sediments and hot-water vents in the mid-oceanic ridges. They seemed to have found a new habitat in the oil production facility – although such an environment is anything but hospitable. After all, the bacteria must withstand a hydrostatic pressure of 200 to 500 bar and temperature fluctuations ranging between 4 and 80 °C. As if that were not tough enough, the

DRILLING RIG.
Offshore production in the North Sea.

Photo: BP



FUNCTION. Bore head hydraulic control valve.



CORROSION. Layer on valve pestle of a hydraulic control valve.

hydraulic fluid had been laced with a biocidal agent that should really have killed off all of them – but, as it turned out, without any appreciable success.

Comfy Cavity

Indeed, the bacteria had really made themselves at home, as was shown by the deposits on the surfaces. This was not just a loose congregation of organisms, but a so-called biofilm, a type of "protective shield" of bacteria. Such biofilms are formed out of the metabolic products of the bacteria and surround them like a slimy adhesive. A typical example from everyday life is dental plaque, which offers protection to the caries bacteria. In a way, tooth decay may be understood as being corrosion of the teeth.

A similar process occurred at the valve tappets: during installation and operation of the control units, bacteria were able to pass into the hydraulic system. In areas of low flow velocity, they managed to build up a biofilm, which then afforded them a comparatively undisturbed life. Microbial metabolic products, especially organic structures, then reached a concentration that led to the intercrystalline corrosion.

The scientists from TMH confirmed the suspicion: microbial colonization had indeed put the oil production facilities out of action. What now? Add more biocides to the hydraulic fluid, and try to exterminate the bacteria?

Graff does not believe that this is an effective remedy. As soon as the creatures have formed a biofilm, it is simply too late. "The biocides do not penetrate the film," says the microbiologist.

Biocides cannot suppress growth in a biofilm; it can only be checked as long as the bacteria are floating about in the fluid.

A different approach is needed. "The deciding factor for the colonization by bacteria is the contamination with seawater. It is therefore important to avoid all ingress of seawater," Graff advises. Until now, the water had not been regarded as critical by the operator of the plant, owing to the small quantities – particularly as biocides had been added in any case.

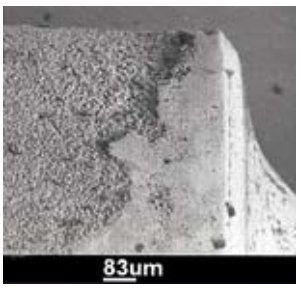
Here too, the expert sees a need for action: "The types of biocides should be changed on schedule. It's like antibiotics: if you always use the same one, a certain resistance develops after time." For the bacteria under the microscope, this was already the case – they were able to thrive in the biocidal agent.

The research findings obtained by TMH can be applied to other industries. Biocorrosion is also an important topic in shipping. In particular, there is room for optimizing the use of biocides in the ballast water. Here too, resistance is an adaptive process of evolution. A few individuals survive and are then even harder to combat. ■ NL

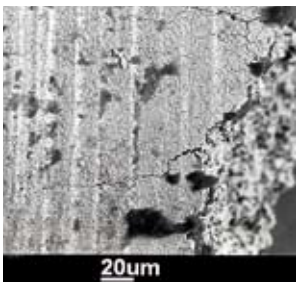
BACKGROUND: INTERCRYSTALLINE CORROSION

The higher the carbon content of metallic materials, the more susceptible they are to corrosion. One form of decomposition is intercrystalline corrosion, which occurs in high-alloyed grades of steel. During welding, the chromium bonds with the carbon, leading to a precipitation of chromium carbides at the grain boundaries. Because of the chrome depletion, the lattice structure of the material along the grain boundaries is significantly disrupted. The material properties in these areas differ from the conditions in the grain interior.

As a result, the steel is very corrodible and frequently disintegrates into individual grains at the incoherent zones. In steels with a low carbon content in conjunction with titanium or niobium, intercrystalline corrosion does not have a chance.



SURFACE. Use after elimination of the layer.



FRACTURE LINE. Intergranular corrosion attack.

For further information: Daniel Engel, Head of Competence Centre, Product Certification, Phone: +49 40 36149-923, E-Mail: daniel.engel@gl-group.com

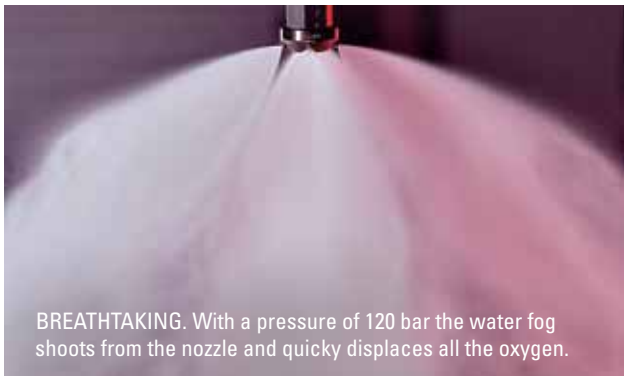
Built-In Fire Brigade

Wind turbines are unmanned power stations; the lofty towers are only climbed for inspection and maintenance work. For this reason, it is essential that early warning systems and, if the worst comes to the worst, fire extinguishing units are able to operate autonomously

An absolute nightmare for firemen: a burning nacelle at a height of 100 metres – unreachable for any turntable ladder and water jet. "That is a real challenge," says Walter Köhne, a fire protection expert at Germanischer Lloyd Industrial Services GmbH, Business Segment Wind Energy (GL Wind), who focuses on the fire risk posed by wind turbines. For him, the answer lies in a combination of passive, preventive fire protection and intelligent systems for the rapid detection and suppression of an incipient fire.

Beyond the Reach of Fire Ladders

The heart of any wind turbine is the nacelle perched on top of the tower. Not only does it contain the core components of the turbine – such as hub, rotor shaft, gearbox and generator – but also the electronic control elements and electrical units that transmit the electrical power. By now, the nacelles used for modern wind turbines of the multi-megawatt class have reached the dimensions of a single-family home. But inside they are anything but spacious: machinery components weighting tonnes rotate in oil baths surrounded by bulky switchgear cabinets and cables several centimetres thick. If a fire were to break out as a result of overheating in the devices, electrical malfunctions or a lightning strike, the flames would find plenty of fuel in the mineral oils, lubricants, plastics and electronic components.



BREATHTAKING. With a pressure of 120 bar the water fog shoots from the nozzle and quicky displaces all the oxygen.

Photo: Fogtec

Although fire in a wind turbine has serious consequences, active firefighting systems are not very widespread. Worldwide, Köhne estimates, such systems have only been installed in about twenty plants. Up until recently, fire protection was not a topic of discussion – but that has changed. The increase in hub heights up to between 80 and 160 metres have made effective firefighting from the outside all but impossible. To make matters worse, there is a danger of total loss – and the costs for a multi-megawatt plant are considerable. The discussion on active fire protection is likely to increase with the rising number of offshore installations. After all, the follow-on costs of fire damage at sea are much higher than on shore.

Photo: Fotolia

WATER JET. Conventional fire extinguishing methods have little effect.

Hot Topic

Active fire protection is increasingly coming into the focus of attention for the underwriting industry. Various insurance companies have already announced that they will offer reduced fire-risk premiums for turbines that have an automatic fire protection system. The experts at GL Wind are currently working on guidelines defining the minimum requirements for fire protection in wind turbines. The prerequisites for the fire protection systems are being developed and established in cooperation with the Allianz Centre for Technology (AZT). Furthermore, the insurance industry is preparing a guide to fire protection in wind turbines.

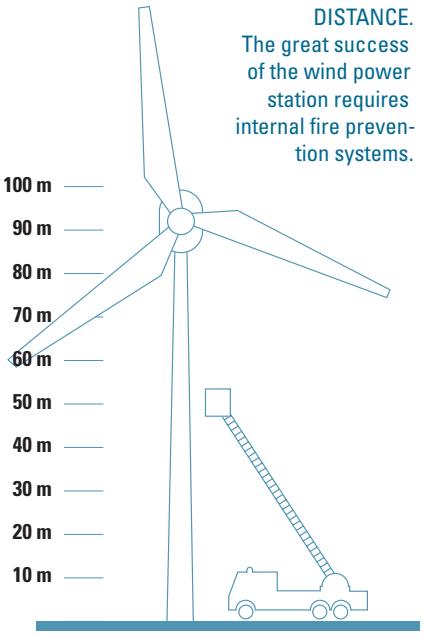
Two systems come into consideration for the combating of an incipient fire. First of all, they differ through the extinguishing agents that are used: nitrogen and water mist. Gas is an ideal extinguishant for electrical systems, because it displaces the oxygen needed for combustion, thereby smothering the flames. However, the place of application must be closed off against the outside air, to reduce the oxygen concentration from 21 to 13 per cent. The advantage of firefighting with nitrogen: unlike powder or water, it leaves no residues. As a result, the firefighting damages are usually lower than actual fire damages. Gas extinguishing systems are ideal for suppressing incipient fires – but only in combination with sophisticated sensors that "sniff out" the fire at an early stage. A drawback of the gas-based system is the relatively large space required. For each 15 cubic metres of space, a 30-kg gas cylinder weighing a total of 150 kg is needed. For a nacelle of the megawatt class, ten cylinders or more are required – often, these can only be kept in the tower base. Malfunctions of the system are hazardous for anyone who might be in the nacelle at the time: the concentration of nitrogen emitted is fatal.

The alternative to nitrogen is to douse the fire with a fog of water particles. The principle is simple yet effective: nozzles are used to produce a fine water mist which immediately and radically reduces the fire temperature. At the same time, evaporation increases the water volume by a factor of 1,640 times, displacing the oxygen. There is hardly any fire that can withstand the effect of the water mist, which is ejected suddenly at a pressure of 120 bar. According to information of the manufacturers, people who are present at the site of the fire survive the application of water mist unscathed. In contrast to gas flooding, water mist systems have the major advantage that it is not necessary to seal the nacelle interior off from the outside air. In addition, the water mist system acts much more rapidly – the fire should be extinguished 20 to 30 seconds after triggering of the alarm.

Disadvantages? On principle, say the critics, the use of water in electrical systems is problematic, owing to the high level of consequential damage. The suppliers of such systems contest this: the high-pressure water mist is so finely atomized that the electrical installations suffer little damage. GL expert Köhne is able to confirm the corresponding test results. What is more, it can be assumed that, by the time the water mist is triggered, the electrical systems have already been disconnected or have failed anyway – and are hence not energized.

Double Safety at Sea

Combined systems take the best of both worlds: nitrogen for the switch cabinets, water mist for the rest of the nacelle. The water required for the nacelle of a 1.5-MW plant is about 200 litres. This corresponds to the size of a domestic hotwater tank, which is not likely to create any space problems. The small reservoir of nitrogen for the switch cabinets – about three to five cylinders – can also easily be accommodated in the nacelle. This dual response in the form of a prefabricated unit is particularly well suited for offshore installations. "Such a firefighting system will probably become standard equipment here in the future," says fire protection expert Köhne. ■ JI



DISTANCE. The great success of the wind power station requires internal fire prevention systems.

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Photo: Vestas Central Europe

A Letter from Valencia

For the first time ever, a German boat, operated by UNITED INTERNET TEAM GERMANY, will participate in the qualifying regattas for the America's Cup. Germanischer Lloyd sends Hasso Hoffmeister as a rig designer. This is his report

For me, it's a dream come true: as you may know, the 32nd America's Cup will start in Valencia this summer – and I have been put in charge of designing and devising the rig for the "United Internet Team Germany".So I flew to our base camp in Valencia. My job was to test the completed rigging for our cup yacht, GER89, named "Germany I".

The brand-new, 35-metre spar is actually the second step of an evolution process. The mast is made of high-modulus carbon fibres. The laminate was cured under high pressure and temperature in an autoclave. The mast is fitted with components made from titanium, aluminium and high-strength, austenitic steels, and equipped with hydraulic, electronic and optical systems. The overall weight is 750 kg.

Our specialists were busy until very late at night putting on the finishing touches. On Tuesday, everything is finally ready to step the new mast. With apprehension, I ask myself: will everything fit? Are the shroud lengths correct? Even the tiniest problem would cause a delay, costing us valuable practising time.

Smouldering Laptops

The impressive mast is forced into its shrouds with hydraulic force. Conditions are ideal; our weather team is predicting 6- to 10-knot westerly winds. Tests are going well, but we will have to wait for our evaluations to see whether the performance expected by our sail designers has been obtained.

Until Thursday, "Germany I" will be taken on several trips to test her against her older sister, GER72. Laptops on the tender boat are smouldering; each test run takes up to ten minutes, and there are up to 25 per day. All relevant data is captured by telemetry. Friday morning: the analysis team presents the most important test data evaluation results to the entire team. The interpretation of the results confirms the progress achieved on our mission, helping to strategically plan the further optimization programme. The weather is unpleasantly cold and wet. The wind has picked up, blowing from the north-east at up to 20 knots.Quite a swell breaks on the pier. Today is an important day. The new rig must prove its reliability.

Feedback from the crew and the entire team has to be taken into account during the ongoing design process. As we depart at 12:30 p.m., the wind is soughing through the rigging. Both yachts and all three tender boats are on their way. The tension is enormous. The weather conditions are on the limit of what these boats were designed for.

The challenge for the rig designer consists in finding a perfect balance between minimizing the weight and ensuring operational safety while meeting the performance requirements. Each gramme of weight saved can be added to the ballast down low; more weight counteracting the forces of the rigging makes the sails more efficient and the boat faster.

Thumbs Up

The 220-sqm mainsail is now being set. The tension rises. The 100-sqm Genoa is set, too, the sheets are hauled. The first waves immediately roll across the deck but that doesn't matter. Looking up, I check whether everything is OK. Have we considered everything? Did we check everything? Even the failure of one little rigging component can have severe consequences, up to total loss.

Having fine-tuned the shrouds we pick up our heading again. The sheets and runners are now hauled 80 or 90 per cent, then to competition level. The yacht leans over, a 30° heel is normal. Moving on board becomes difficult. I sense the enormous forces inherent in this sailing machine. I am still looking upwards - and thumbs go up. Everything is holding up! We have passed the test.

I am returning to Hamburg. The next challenge is waiting. The qualification regattas for the world's oldest sports trophy will begin on 16 April. Until then, a third rig will be built. ■ HH

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