

A close-up photograph of two surgeons in an operating room. They are wearing blue scrubs, surgical masks, and glasses. The surgeon on the left is wearing a blue surgical cap. They are both focused on a surgical procedure, with their hands visible in the foreground holding surgical instruments. The lighting is bright and focused on the surgical site.

## Managing risk in a complex world

## CONTENTS



3 Editorial: Building trust and confidence

4 EU pushing for a greener, cleaner environment

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6 Lafarge meeting new regulations head on

9 Farchioni taking quality management to new lengths

12 Risk management in the healthcare sector

---

16 Gassco: Raising the stakes, not the risks

18 Placer Dome: Going for gold

20 Statoil safeguarding the pioneering spirit

22 Windpower set for offshore boom

24 China building for the future

---

27 NITC: Making waves in China

28 Graig: The Chinese connection

29 Viewpoints on China

30 DNV managing cold-climate risks

---

32 News

34 Last Word: Are Chinese shipbuilders painted in an unfair light?

35 DNV Worldwide

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# Building trust and confidence

Staying competitive in a rapidly changing business environment places high demands on companies. The need to make organisational changes, enhance cost efficiency and meet new and increasingly strict laws and regulations are some of the challenges that companies have to address on a day-to-day basis. From health services to oil tankers, cement factories to olive oil producers, today's executives face a new challenge: Integrating environmental policy and performance into their company's business model.

"Companies are increasingly called upon to be responsible and transparent when it comes to the environmental effects of their operations," says Henrik O. Madsen, chief operating officer of DNV's Business Area, Certification. "As the global community moves away from the debate on global warming to a concerted effort to develop viable solutions, the demand for DNV's climate change services is rapidly increasing."

According to Madsen, DNV's work in this field over the past six years has enabled the company to gain experience and develop sound methodologies to meet present and future demands. "With governments and business anticipating that the Kyoto Protocol will come into force shortly, some companies, like the multinational Lafarge (see pages 4-8), are moving quickly to implement policies and programmes to reduce greenhouse gas emissions in a cost-efficient manner," Madsen says.

"In today's competitive business environment, accountability and transparency are expected from companies. Environmental awareness is just one of the many areas that companies now need to address. From our point of view, having an effective management system in place is critical to maintaining, improving and attaining corporate business objectives."

In this issue of *DNV Forum*, we take a closer look at how DNV is helping its customers to manage their challenges. DNV, through its certification, consulting, classification and technology services, continues to play a vital role in helping its customers and other organisations build confidence and integrity, enhance the quality and safety of products and operations, and manage their environmental and social responsibilities.

Says Madsen: "This means that the more DNV's activities can be seen to be part of the customer's value-adding chain, the more impact DNV's work to safeguard life, property and the environment will have. We can thus both help to realise DNV's vision of becoming the customers' first choice in providing services for managing risk and assist our customers in achieving their business goals."

We hope you enjoy this issue of *DNV Forum*, and that its contents will inspire innovation and help you meet the challenges that lie ahead.

Stuart D. Brewer  
Editor



Henrik O. Madsen, DNV's chief operating officer of DNV's Business Area Certification

**"In today's competitive business environment, accountability and transparency are expected from companies."**

# On the runway to a carbon

With the establishment of the EU Emissions Trading Scheme, Europe is calling for companies to manage their greenhouse gas emissions, meaning that CO<sub>2</sub> emissions shortly will have a direct impact on a company's financial performance.



Alexander de Roo, a Dutch member of the European Parliament, serves as vice-president of the committee on the environment. He is responsible for the linking directive, which connects the flexible mechanisms of the Kyoto Protocol with the EU Emissions Trading Scheme.

Managing risk associated with climate change presents an enormous challenge to all mankind, from the man-in-the-street to business executives. But like many difficult issues, it falls to politicians to draft the appropriate legislation – a long and complex process. Today, six years after Kyoto, the measure has yet to be ratified by Russia.

The Kyoto Protocol comprises many aspects, for instance trading schemes, and the EU is now implementing its own Emissions Trading Scheme, abbreviated as the EU ETS, regardless of the Protocol ratification process. According to Alexander de Roo, a Dutch member of the EU Parliament and vice-president of the committee on the environment, "The climate change issue will be the significant challenge for the next generations."

De Roo has been engaged in environmental questions his whole professional life, and serves today as Coordinator of the Green Group. Having completed more than ten years of studies in chemical engineering and political science, de Roo joined the Green Group in 1985 as staff member. From 1994 to 1999, he was environmental advisor to the group, which has since grown to 48 deputy members, making up 8 percent of the Parliament.

Supported and ratified by the politicians in record time, the new trading scheme will go into effect 1 January 2005.

"It was a very interesting and comprehensive process. Huge pressure was put on the Germans, then on the Parliament. The discussions went back and forth as we negotiated compromises, before the directive was finally approved this summer," he explains.

The scheme includes energy activities covering combustion activities, mineral oil refineries and coke ovens, production and processing of ferrous metals, mineral industry and the pulp and paper industry.

Companies will be given an annual CO<sub>2</sub> emissions cap in the form of emission allowances. During the period 2005-2007, at least 95 percent of all allowances will be issued free of charge. It is up to the member country to decide if the remaining allowances will be auctioned. Failing to hand over allowances matching their CO<sub>2</sub> emissions will invoke a penalty or require companies to buy allowances from other participants which, under the terms of the scheme, have surplus allowances.

The Kyoto Protocol allows for the creation of transferable greenhouse gas emission reductions through investment in mitigation projects operated under so-called "flexible mechanisms". One of these is the Clean Development Mechanism (CDM), where industrialised countries or companies are permitted to finance emissions-avoiding projects in developing countries and receive credit for doing so. Thus, companies can supplement their commitments at home by purchasing lower cost emissions, and thereby contribute to sustainable development in developing countries.

## Linking directive

The EU Commission has confirmed that credits obtained through flexible mechanisms will be recognised as being equivalent to EU emission allowances from an environmental and economic point of view. As a result, a coming directive (known as the linking directive) proposes that such credits can be converted to EU allowances from 2008 on a one-to-one CO<sub>2</sub> equivalent basis. It is estimated that mitigation costs for European companies will be halved by the possibility to import such credits.



# restricted future



The Parliament building in Strasbourg. The EU Emissions Trading Scheme was accepted by the politicians in record time, and will start 1. January 2005.

Photo: Courtesy Scanpix

As a member of the EU Parliament, de Roo is responsible for the linking directive, which connects the flexible mechanisms with the trading scheme. "The EU ETS will be implemented as planned, whether or not the Kyoto Protocol is ratified. We will go ahead anyway," de Roo says. "But with regard to the linking directive, we are facing a problem. This directive will not function properly until the Protocol is ratified."

However, de Roo is optimistic about a future ratification of the Kyoto Protocol. He notes that if Russia ratifies, then the Protocol becomes valid. "I visited the Duma in September. Russian emissions have been dramatically reduced since 1990, which is the level the Kyoto Protocol defines as the base level. This means that Russia will have quotas for sale. In addition, Russia wants industrial countries to invest in their country. With the ratification in place, industrial countries are more likely to invest in flexible mechanism projects in Russia. So I think we will see this ratification take place within a year," de Roo claims.

## Developing countries

Another aspect of the climate change issue is the developing countries. All signs indicate that energy consumption in these countries will increase in the

future. The US insists that the developing countries take part in the effort to reduce climate change emissions, as well as the industrial countries, while other countries are willing to discuss this aspect.

"From my point of view, it would make sense to include the 20-25 biggest developing countries within 2020, provided that the US sign up, as well," says de Roo, naming Brazil, China, India and South Africa, as examples of developing countries that might cope with this issue and at the same time, represent a major part of the world's population. De Roo says that these countries should not be asked to reduce their consumption, but to stabilise it at per capita levels, like for instance in Russia. Education and new technology will also be provided by the industrial countries as well as CDM-projects.

Furthermore, the EU will have to reduce their consumption by 30 percent by 2020. However these complex issues are resolved, companies are starting to realise that they are on the runway to a carbon restricted future.

Eva Halvorsen

## THE EUROPEAN UNION EMISSIONS TRADING SCHEME:

- The scheme will cover CO<sub>2</sub> emissions from large emitters in the energy, steel and heavy industry sectors, pulp and paper industry sectors, as well as oil and gas related industries. The scheme will affect more than 12,000 installations.
- Each installation covered by the scheme will be allocated an allowance, i.e. a permit to emit a certain amount of CO<sub>2</sub>-equivalents during a calendar year.
- Each EU member state is expected to allocate emission allowances mostly based on the emitter's historic emissions and a small amount through auctioning.
- If a company's greenhouse gas emissions exceed its allocated allowance, it will need to offset the excess emissions. This can be done by either buying allowances from companies who have performed better than their allowance level, or obtaining credits through the flexible mechanisms of the Kyoto Protocol.
- If a company performs better than its allocated allowance, the reductions can be reflected into its emissions inventory. These reductions can be used to create allowances that can be sold on the market, or be registered into an emission registry, increasing the company's allowances for the coming year.
- Failing to comply at the annual deadline will cost companies €40 per tonne of emissions that have not been offset by allowances or credits. From 2008 this penalty will be raised to €100 per tonne.

# Keeping one step ahead of

Emitting 80 million tons of greenhouse gas emission each year – the equivalent to almost twice Switzerland's total annual emission level – Lafarge, the French, multinational global cement producer, is clamping down its own activities to create a greener, cleaner environment.



"One ton of cement discharges some 750 kilos of CO<sub>2</sub>. We also know that the market price of cement is less than that of bottled water." Christopher Boyd, general manager of Lafarge Cement, Italy.

According to Christopher Boyd, general manager for Lafarge Cement Italy, cement production is one of the most greenhouse gas intensive industries.

"Reducing harmful emissions is a fundamental issue to our business," he says. "Lafarge is a responsible company and wants to take action. While the Kyoto Protocol calls for 5 percent reductions in emissions, Lafarge's goal is 20 percent, worldwide."

Known as 'Mr. Environment' at Lafarge's headquarters in Paris, Boyd took up his new position in Milan six months ago. Prior to joining Lafarge, Boyd worked for the European Union's Commission in Brussels.

Lafarge's cement plants are often important business pillars in local communities worldwide. These enormous installations, complete with chimneys, towers and production premises, influence local environments, such as the facility in Exshaw, in the Canadian province of Alberta, near the Rocky Mountains.

## Social and environmental commitment

Central to Lafarge's business pledge are two main goals: To generate healthy profits while continuing to instill social values in its daily operations.

Says Boyd: "At Lafarge, we are committed to looking after our people and the environment. We often play a central role in the neighbourhoods around our plants. A focus on the environment and social responsibility is a high priority for us."

It will be a challenge for Lafarge to reduce its emissions. Temperatures of up to 1500 degrees are required to convert rocks to cement. This requires a lot of energy, which results in high levels of CO<sub>2</sub> emissions.

"In fact, one ton of cement discharges some 750 kilos of CO<sub>2</sub>," Boyd says, "We also know

that the market price of cement is less than that of bottled water." In practical terms this means that a future carbon tax would reduce Lafarge's profit margin dramatically.

The European Union is currently in the process of establishing the EU Emission Trading Scheme (EU ETS), the world's largest market for trading of greenhouse gas emissions allowances. This is the union's answer to the Kyoto Protocol.

"To meet our commitments, we need to use the mechanisms recognised under the Kyoto Protocol. These mechanisms are likely to be recognised under the European trading scheme as well," says Boyd.

## Pilot project in Malaysia

To take advantage of the new measures when the trading scheme comes into force, Lafarge has three pilot projects going on at different plants designed after the Clean Development Mechanism (CDM) criteria.

In principle, the CDM system allows governments or private enterprises to invest in emission reduction projects in developing countries to meet their own emission requirements, as stipulated in the Kyoto Protocol. CDM projects also promote technological transfer and contribute to the host country's sustainable development. It is expected that such projects will be inter-changeable with EU allowances.

One of Lafarge's three pilot projects is in Malaysia. "Through the Malaysian project we are meeting our emission quota, and CO<sub>2</sub> reductions can be sold to other businesses in Europe as credits, as part of the trading scheme," says Boyd.

# emission legislation



Photo: Courtesy of Lafarge

Converting rocks to cement requires temperatures of up to 1500 degrees. This requires a lot of energy, resulting in high levels of CO<sub>2</sub> emissions into the atmosphere. The Lafarge plants are huge installations, such as this facility in Exshaw, in the Canadian province of Alberta, near the Rocky Mountains.

The project is pre-validated by DNV, and has been developed over the past three years. For example, fibre waste from rice husks is a significant problem in Malaysia, and Lafarge believes that by developing methods whereby this waste can replace coal as fuel will significantly reduce the company's emissions.

"The end result of these projects may include improved revenues and help us establish an edge over our competitors. I would like to see these three pilot projects expand to 30 in the course of the next five years," Boyd says.

When the trading scheme is operational, it will require an independent, third party inspection to validate emission volumes. The validation also confirms that the projects, as designed and documented, are sound and meet all relevant requirements.

"DNV, and especially the business development manager, Trygve Røed-Larsen, is a leading authority within climate change issues. Lafarge and DNV are already doing several projects together," says Boyd.

and DNV have been members since IETA was established, in 1999. Boyd is scheduled to become chairman in 2004.

So far he is very satisfied with IETA's accomplishments: "We have made a lot of progress, and honestly, we can hardly believe how successful we've been. Five years ago, we expected to have carbon taxes imposed. Today, we have established the framework for an effective market-based trading system for greenhouse gas emissions that demonstrates fairness, environmental integrity, efficiency, accountability and global consistency. While we would all prefer not to be forced to change our behaviour, at least we are developing the most efficient option to control greenhouse gas emissions." concludes Boyd.

Ellen Kongsnes

## International Emission Trading Association

Chris Boyd also serve as vice chairman of the International Emission Trading Association (IETA), a business organization aimed at promoting a functional international framework for the trading of greenhouse gas emission reductions. Today, the organization has 70 international members. Both Lafarge

- Established in 1833, Lafarge has become a 'multilocal' business
- Lafarge has 77,000 employees in 75 countries
- Annual turnover is Euro 14.6 billion

# Lafarge takes the proactive approach

Gäelle Monteiller, senior vice-president for public affairs and the environment at the French cement manufacturer Lafarge, is very clear about the challenges facing the company once the European Union Emissions Trading Scheme is implemented.



Gäelle Monteiller, senior vice president public affairs and environment, Lafarge: "We intend to pursue our ambitious programme of CO<sub>2</sub> emission reductions."

"We realised at an early stage that carbon constraints would soon be a reality, and decided to be an 'early mover' and face climate challenge issues right away," she says. "We began a programme of CO<sub>2</sub> emission reductions several years ago."

According to Monteiller, implementation of the EU ETS brings new challenges. How to seize all the opportunities found in allowance trading? How to ensure consistency between the company's voluntary commitment and the level of quotas they will receive? How should companies avoid being penalized for early actions? "We know now that many member states are to allocate CO<sub>2</sub> allowances on a historical basis, with a very recent reference year, between 2000 and 2002. The result of this will be that big emitters will receive more credits than those who have made efforts to reduce their emissions before the reference year."

Monteiller is quick to point out that Lafarge is a multinational company, which gives it the flexibility to meet all the requirements established by the Emissions Trading Scheme. But she says the company

is still waiting for clarification regarding the effort that will be required from the cement industry. "We are confident that this will take into account our previous voluntary commitment on a global scale and in specific countries, such as France, so that we will remain competitive."

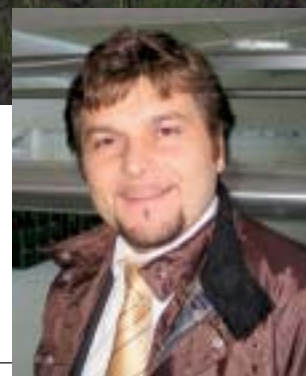
Monteiller also says that Lafarge is committed to meeting the Clean Development Mechanism (CDM) requirements. "We intend to pursue our ambitious programme of CO<sub>2</sub> emissions reductions, and we will also develop projects to meet the CDM proposals," she says. "At the same time, we will continue our research into reducing CO<sub>2</sub> emissions from the production of cement and concrete."

Finally, Monteiller stresses the importance of the linking directive. "The linking directive is crucial for the entire industry to introduce flexibility in meeting emission-reduction demands," she says. "The potential for greenhouse gas reductions in developing countries is huge; it would be absurd not to use this flexibility to reach our common global objective of emissions reduction."

Eva Halvorsen

# An Italian tradition since 1780

Farchioni Olii SpA, the Italian Extra Virgin Olive Oil producer, has implemented traceability and quality management systems in order to strengthen the Farchioni brand. In a growing and highly competitive industry, the company is committed to further developing consumer confidence in their product.



Quality and information systems manager of Farchioni Olii SpA, Andrea Violetti.

The late October evening sun is reflected in the glossy leaves of the olive trees in the valley of Umbria. The pouring rain has finally stopped, allowing Andrea Violetti, quality manager for Farchioni Olii SpA, a chance to sample his product. He reaches for an olive and crushes the delicate skin in his mouth, sucking out the pulp. "Just as juicy as only the best Farchioni olives can be!" he declares. Behind a mask of concentration, Violetti smiles and gently rolls the olive between two fingers, looking for damage.

## Local ownership

This is where Farchioni's 223 years of tradition and experience make a difference. Farchioni has built its reputation on its knowledge, creating consumer confidence and trust in the marketplace.

Farchioni is located in Umbria, two hours drive north of Rome in central Italy. With about 800,000 inhabitants living mostly in small, agricultural →



villages tucked into rolling hills, Umbria remains a vital region with its own strong cultural identity. No less than 100,000 farmers supply Farchioni with olives. About 100 local olive presses, organized into 50-60 press companies, supply Farchioni with cold pressed, natural oil. Once delivered, the Farchionis complete the process of blending, storing, bottling and branding the oil before distributing it to the marketplace.

Farchioni's decentralized production supply requires a high level of quality assurance to secure quality consciousness at every point of the olive oil production chain. This focus embraces both Farchioni factory and the suppliers.

### **Traceability**

"The numerous phases of production are the most important reason to establish a traceability system," says Andrea Violetti. The traceability system at Farchioni's is certified by DNV.

Food safety issues should be met with a systematic approach designed to minimise the possibility of unsafe food. The process is most successfully and effectively implemented when it is integrated with a quality management system. Farchioni's system is certified by DNV in compliance with the ISO 9001:2000 standard.

Every bottle of Extra Virgin Olive Oil produced at Farchioni can be traced back step by step from the table to the fields. Printed on the label of every bottle of extra virgin olive oil is a number. By punching the number into the olive factory's website, the consumer can obtain information about the olive, the farmer and the press.

As of January 1 2005, food chain traceability, the assessment of the entire production chain, will become part of European Union legislation. It works both on a company level, concerning all the food ingredients, as well on a food chain level, identifying all the operators involved. Farchioni will implement a declaration which places the threshold of quality far beyond the European Union's (EU) regulations.



In this Italian olive field, near the village of Assisi, Europe's oldest olive tree, dating back to the 12th century, is still bearing fruit.

### A second signature

According to Pompeo Farchioni, the company's chief executive, "Extra virgin olive oil is a natural product, produced in large volume. The challenge is to achieve qualitative stability. The Farchioni brand should guarantee quality, and DNV constitutes the second signature."

Farchioni sees DNV as a necessary resource for the market and customers.

"DNV has developed a range of services in the food and beverage industry, offering a comprehensive response to these quality and safety requirements in order to increase safety in the production process and retain consumer's trust," says Stefano Crea, DNV's global food product manager.

### Tradition and continuity

Pompeo Farchioni is committed to maintaining the traditions established by his family over four generations. Even his father, Lanfranco, the previous chief executive, still makes frequent visits to the factory floor. Pompeo notes with

satisfaction that the next generation, two sons and a daughter, are currently being trained to assume control of the family business when he retires.

In February next year, Farchioni will relocate to new premises. The 22 million euro investment will make Farchioni the largest extra virgin olive oil factory in Europe.

"I'm concerned that the amount of customers, not the volume of sales, is getting lower. The concentration in the wholesaler's business gives them the power to affect product quality as well as prices," Pompeo says.

"Today, consumers are more demanding and increasingly aware of food quality and food safety issues. Certification is the answer to this growing demand, as well as a helpful tool we can use to distinguish our products," says Gaetano Trizio, DNV's global food project owner and regional manager for South Europe certification.

Ellen Kongsnes



# Risky by



Sue Osborn, Joint chief executive, NPSA

**“Studies indicate that in Britain, there are 40,000 deaths annually caused by errors.”**

Why is The National Patient Safety Agency using DNV, a risk management company with roots in shipping and the oil and gas industry, as consultants integrated in NPSA’s leadership team? Probably because the NPSA is rather particular in its choice of risk management expertise.

**I**n their efforts to improve risk management, NPSA has sought advice from some of the best organizations in the business, including NASA, British Airways and representatives of the nuclear industry.

“It’s all about a serious and professional approach to one of the most risky businesses in the world,” explains joint chief executive Sue Osborn. Together with Susan Williams, Osborn heads the NPSA, which is a relatively new national organisation within the National Health Service (NHS), working to promote patient safety. Sue Osborn illustrates the risks saying that “If you do a comparative risk assessment on health care, you will find that it is generally as safe as bungee jumping.”

# nature

## 40,000 accidental deaths

Even though more than one million patients are treated safely by the NHS every day, health care is far more risky than most industries. Osborn illustrates this with some frightening statistics: "In the western world, 10 percent of all patient care is marked by error, of which five percent are fatal. Some 350 million patients are treated in Britain each year. Studies indicate that in Britain, there are 40,000 deaths annually caused by errors – it is estimated that up to half are preventable."

Treating patients who are ill with potentially harmful drugs, increasingly complex technology, and a large number of people involved creates an exponentially rising risk picture. Fatal accidents, misdiagnoses and mistakes are unavoidable. Indeed, the NHS spends some £450 million on clinical negligence expenditure – annually.

"No one likes to think of it on the operating table, but health services are an error trap for staff to fall in and take the patients with them," says Osborn. Osborn explains, "As health care professionals often literally hold our lives in their hands, we need to think of them as perfect. At the same time, they need the confidence we place in them to work effectively." →

## THE NATIONAL PATIENT SAFETY AGENCY

The NPSA is a Special Health Authority created in July 2001 to co-ordinate the efforts of the entire country to report and learn from errors that affect patient safety.

As well as making sure errors are reported, the NPSA is trying to promote an open and fair culture in the NHS which encourages all healthcare staff to report incidents without undue fear of personal reprimand. It will then collect reports from throughout the country to develop preventative measures and learning tools that will improve patient care offered by the NHS.

### NHS FACTS AND FIGURES

The UK's National Health Service (NHS) is the world's third largest employer. The National Health Service was set up in 1948 to provide healthcare for all, regardless of their ability to pay. It is made up of a wide range of health professionals, support workers and organisations. Around one million people work for the NHS in England, which costs more than £50 billion a year to run. This will rise to £69 billion by 2005.

In a typical week:

- 1.4 million people will receive help in their home from the NHS
- more than 800,000 people will be treated in NHS hospital outpatient clinics
- over 10,000 babies will be delivered by the NHS
- NHS ambulances will make over 50,000 emergency calls
- NHS Direct nurses will receive around 25,000 telephone calls from people seeking medical advice
- pharmacists will dispense approximately 8.5 million items on NHS prescriptions
- NHS surgeons will perform around 1,200 hip operations, 3,000 heart operations and 1,050 kidney operations.

Photo: Courtesy of Taxi



Helen Hughes, Director of operations at the NPSA

**“Things can be changed without additional costs, save thousands of lives and improve safety at the same time.”**

Traditionally, medical education usually focuses on how to do things right, and not so much on the risks and mistakes that are also part of the profession. In Britain alone, 1,800 million clinical decisions are made each year, and systems must be developed to manage the unavoidable fact that a certain percent of these decisions are wrong.

#### **Building a risk culture without fear**

Working to build a risk - aware culture where the risks are quantified, qualified and understood is paramount in order to start creating a system where trust and confidence can be established. Both patients and staff need to be sure everything is done to prevent avoidable accidents. A scientific approach based on experience from high risk industries might help the individuals' fear of blame and guilt, which sometimes gets in the way of adequate reporting and learning from mistakes.

Helen Hughes, director of operations at the NPSA is responsible for developing a national reporting and learning system: “We have learned from high-risk industries that a steady increase in the number of reported incidents usually results in a decrease in the number of serious accidents that occur. Understanding what goes wrong, combined with systematic learning from such incidents is at the core of a good risk - aware culture. Implementing a culture where it is natural and safe to report incidents without fear takes time. Therefore, we will enable staff to report anonymously if that is the only way they will report to us, so that we can use this information to learn about the most difficult issues in the healthcare system.”

The NPSA was established in 2001 to co-ordinate the efforts of reporting, and more importantly, to learn from mistakes and problems that affect patient safety. From the start, it was clear that

the NPSA wanted to pioneer a different, somewhat unusual approach. “We couldn't have done this work without the risk assessment expertise from the industry,” says Osborn. Following a strong drive from the two Joint Executives to learn risk management from the best, the NPSA tendered for a risk management consultancy. DNV Consulting was chosen.

“By including DNV Consulting on the team, we have been able to identify and quantify the risks, creating an overview before we start working on solutions. And DNV Consulting also takes part when we work out solutions,” explains Osborn. Changing a big organisation such as the NHS is a risk in itself, one that calls for risk assessment and cost benefit analyses to find ways of making things work. “We don't want to just send out directives telling everyone what to do. When we find good solutions we want to make sure they work, and this means active support and co-operation with everyone involved.”

#### **A risk approach versus an alphabetical one**

In practice, this means close co-operation with healthcare professionals in order to find the risk areas that demand attention. For instance, medication errors account for 25 percent of all the errors. Medicines are often stored alphabetically, which means that harmless medicines are placed next to lethal doses of medicine with almost identical names. This illustrates how one system might actually facilitate errors. Such errors can easily be avoided by using a system that is based on risk categories.

Improved methods of labelling, packaging and storing medicines can reduce risks so that hospital staff have one less trap to fall in during a busy day. “Making the right thing the easy thing to do is what this is all about,” says Osborn.



Photo: Courtesy of Taxi

In a typical week over 10,000 babies will be delivered by the UK's National Health Service

As in all industries, new rules and regulations can add to the risks. The convention for drug names is changing to a common naming system for the whole of the European Union. Many generic drug names will change. This may result in confusion among doctors and pharmacists in prescribing and dispensing drugs, and could result in potential adverse effects for patients using drugs. DNV is therefore supporting the NPSA's assessment of risks during the period when drug names change.

#### **When Mrs. Smith is treated as Mrs. Brown**

To manage the risk of misidentification, the NPSA is leading a project to develop ways of reducing the risks of wrongsite surgery patient incidents. DNV has supported this work by process mapping the activities before, during and after an operation, facilitating a risk assessment of the process and providing human factors expertise into the process.

Health Care Associated Infections (HCAIs) are resulting in increased stays for patients in hospitals, and in extreme cases, patient fatalities. The estimated cost to the NHS of HCAIs is one billion pounds a year. The NPSA is leading a programme to roll out the use of alcohol hand rubs in NHS hospitals, to improve the hand hygiene of staff and to reduce the incidents of infection. DNV has supported this programme by leading a risk assessment of the usage of alcohol hand rubs and a risk assessment of the proposed test phase of the rollout.

#### **Standardisation of equipment**

As is the case with decentralised and big organisations, the various needs and lack of co-ordination across the organisation at some point leads to inefficient solutions. For instance, the NHS' infusion pumps (used to give liquid and medicine intravenously) come in many different varieties and

from different vendors. "If we can rationalise, standardise and centralise the purchase and use of these, there is a far better chance that proper training can be given to those who need to operate them. It is just one example of how things can be changed without additional costs, save thousands of lives, and improve safety at the same time," says Helen Hughes.

#### **Shaping an organisation**

DNV Consulting's scope of work is general risk management support on a day-to-day basis. This has included participation in the management meetings, risk management advice to the Joint Chief Executives, Directors and NPSA's staff and support and training. Supporting the risk assessments and development of the NPSA's risk management systems and organisation has been an important task.

At the same time, an enterprise risk assessment has been carried out to assess the risks to the NPSA and its ability to reach its goals. The NPSA is a young and fast growing organisation eager to establish a safety culture that can set the standard and support the rest of the NHS in its work to improve patient safety. Joint Chief Executive Sue Osborn is well aware that there will be setbacks and obstacles. Still, she sees this work in a ten-year perspective and is confident that the changes brought about in the first three to five years will give further momentum to this work.

Kristian Lindøe



"If you do something wrong on a process plant, damage is likely to be to the equipment and escalation is needed to impact the general public. In health-care, the risk is more direct. It's been great to see the NPSA picking techniques from other industries and to successfully adapt and apply them to their own circumstances," says DNV Consulting's project manager Mark Boulton.

Photo: Courtesy of Stone

# Raising the stakes, not the risks

Expanding the world's third largest producer of liquefied petroleum gases is a complex and demanding process. Plant production must go forward as normal while the construction work, such as installation of new equipment, welding and tie-ins continues.



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While the Kårstø facility is usually operated by about 75 people on site, the expansion project will flood the plant with up to 1200 workers. As the number of workers on the site increases, so does the risk potential. "The sheer size of the project has implications on the overall risk picture at Kårstø," says Statoil's staff engineer Finn Roar Berg.

"Statoil is committed to zero tolerance for accidents at Kårstø. So far, we have succeeded," says Berg. "In order for us to continue to operate safely during the expansion project, we must have a clear and quantifiable risk overview. DNV has carried out several risk assessments, enabling us to project how our methods to manage and minimize the risks affects the overall safety level."



"A brown field development is never as easy as a green field development," agree Finn Roar Berg and Arild Samuelsen, referring to the development of an existing plant to higher capacity, compared to building a whole new plant from scratch.

The Kårstø complex, located north of Stavanger on the west coast of Norway, plays a key role in the transport and processing of gas and condensate (light oil) from the Norwegian continental shelf. It receives and refines gas from fields in the North Sea via the Statpipe trunk line system and from the Norwegian Sea via the Åsgard Transport pipeline.

"By using DNV's risk assessment methods, we can calculate how many people can be at the site at the same time and what type of work they can carry out at certain stages without exceeding the accepted risk levels. This allows us to carefully plan how and when to do the necessary construction work during operation," says Berg.

## The benefits of careful planning

According to Arild Samuelsen, sector manager of processing technology in the Natural Gas Business Area, Statoil spent a lot of time and energy on the concept design phase. "With strict safety criteria, often demanding up to three safety barriers, the solutions and workarounds are carefully analysed and compared to other solutions," he says. "By basing our planning on risk calculations, we have been able to identify risks that we can manage by going for optional solutions, such as prefabrication of parts. This reduces the amount of work that actually takes place at the site."

However, Kårstø is currently being equipped to take on even bigger tasks. A project called the Kårstø Expansion Project 2005 (KEP 2005) is now in place and the construction phase has already begun.

With a budget of NOK 5.75 billion, KEP 2005 is Norway's second largest industrial project on land after the Snøhvit development, another Statoil project currently underway in northern Norway.



Photo: Courtesy of Øyvind Hager, Statoil

During construction, some parts of the facility will be shut down and in the summer of 2004, the entire plant will be shut down for 22 days. Shutting down such a complex facility is a complicated and expensive solution, one that Statoil seeks to avoid. But Samuelsen explains that, "There are certain things that can only be carried out safely when the plant is shut down. In such cases, we don't hesitate to do it, but we make sure that the work is well planned, well executed and moves forward without any surprises."

#### Simulating and calculating scenarios

"The ability to simulate many different scenarios for the work progress allows us to be up front in planning the project," says Berg. "With projects as big and complex as these, no one can afford to go for a solution and then decide to abandon it when the project is underway. Every solution must be verified in advance according to the variables that might occur."

Through a frame agreement, DNV carries out a number of various risk management work for Statoil at Kårstø, from risk assessments to the day-to-day planning and execution of Risk Based Inspection. Berg says there are several benefits to working with DNV. "First, they are familiar with our work processes and systems. Second, they provide excellent services, and we appreciate their continuity and stability. Knowledge and competence is dependent on

the expertise of individuals, and we recognize the advantages of working with the same people on a long term basis."

The KEP 2005 development project has been designed to equip the Kårstø processing complex with the capacity to handle gas from Statoil's Kristin project in the Halten Bank area of the Norwegian Sea. Rich gas from this field will be piped to the complex through the existing Åsgard Transport trunk line. By late 2005, the processing capacity for rich gas at Kårstø will be expanded by 44 percent. KEP 2005 will also increase annual ethane recovery capacity from 620,000 to 950,000 tonnes. After commissioning and start-up, the new facilities will come into operation on 1 October 2005.

Kristian Lindøe

#### FACTS ABOUT KÅRSTØ:

The state-owned company Gassco AS is the operator for the Gassled partnership, which owns both Kårstø and the KEP 2005 project. Gassled comprises ConocoPhillips, Eni Norge, Esso Exploration and Production Norway/Mobil Development Norway, Norseas Gas, Norsk Agip, Norsk Hydro Produksjon, Petoro, Shell International Pipelines, Statoil and Total E&P Norway. Statoil is the technical services provider at Kårstø, and is implementing KEP 2005 on behalf of Gassco.

# Going for Gold

The processes required to mine precious metals dictate the management of a variety of major accident hazards. Consequently, the successful delivery of a robust and comprehensive risk management programme is a critical business performance indicator.

As the fifth largest gold mining company in the world, the Placer Dome Mining Corporation is committed to delivering world-class performance in the areas of managing health, safety, the environment, community-care and employee welfare.

To assist Placer Dome in achieving their corporate objectives, DNV consultants have conducted comprehensive management systems reviews for the company in Canada, South Africa, the USA and Chile. These system reviews have been supported by Leadership Risk Management workshops and training courses for senior managers throughout the Placer Dome organisation. Further comprehensive system reviews are planned this year for mines in Australia and Papua New Guinea.

Placer Dome's safety directors Tony Anderson and John Scott have a long association with DNV. As early as 1997, they both recognised the benefits of DNV's International Safety Rating System (ISRS) and the International Environmental Rating System (IERS). These safety management and rating systems were taken on board by the Asia Pacific region of Placer Dome in 1997 after a thorough evaluation of other system audit tools available in the region.

## Drop in injury numbers

"We felt that the ISRS and IERS were a better choice to meet our needs because they allow us to control the programme. Also, they come with introductory training and support, provide us with a map that assists with identifying the way forward, and help us identify our priorities and areas for management attention," says Tony Anderson.

He continues: "Starting at safety levels around zero and one, the Asia Pacific sites have since progressed to rating levels five and six. With this progression there has been a consequent drop in injury numbers, resulting in a decision in 2002 to use the ISRS and IERS as the measurement tool across all of Placer Dome's sites worldwide. We have noticed that sites which have used other audit tools, or have not been audited before, are returning levels at zero or one. Typically the same as sites in Asia Pacific when the protocols were first introduced."



Placer Dome's Walter Benko (far left) and Tony Anderson (third from left) working together with DNV consultants to develop a risk based customised audit/improvement protocol.



Photo: Courtesy of Placer Dome

A spectacular mountain backdrop greets visitors to the Placer Dome Cortez Mine in Nevada USA

### Good collaboration

The use of these systems has significant impact on the operations and overall site safety. "Now sites are actively using the ISRS and IERS audit reports and documents to assist the development of their programmes. Internal auditors find the protocols simple to use and report that the extended guidelines are of invaluable assistance," adds Tony Anderson.

Keith Ferguson, Placer Dome's vice president for safety and sustainability, underlines the benefits of cooperation with the DNV consultants, saying: "DNV made a significant contribution to improving the safety management systems in Placer Dome in the last year. The ISRS audits were well-managed and helped us prioritise our improvement plans. We look forward to working with DNV throughout 2003 to complete the reviews at our operations worldwide."

Tony Anderson adds: "We are very happy with the assistance, support and level of expertise provided by DNV in the area of systems auditing, coaching and development."

The Placer Dome/DNV collaboration has resulted in a joint working initiative to develop a risk-based customised audit/improvement protocol for the organisation. DNV consultants and Placer Dome personnel have formed a development team to work together to ensure that DNV's major hazard experience and Placer Dome's mining expertise are fully optimised.

Kristian Lindøe

**PLACER DOME** is the world's fifth largest gold mining company and largest gold producer in Australia, pursuing quality assets around the world. Its core gold business is strengthened by the contributions of its copper and silver assets.

Headquartered in Vancouver, Canada, the Placer Dome Group (PDG) now has interests in 18 mines employing 12,500 people in six countries around the world.

PDG is also actively involved in major exploration and construction activities on a global scale. With a market capitalisation of US\$4.7 billion as of December 31, 2002, Placer Dome is traded on the New York, Toronto and Australian Stock Exchanges, as well as Euronext-Paris.

Placer Dome expects to produce 3.5 million ounces of gold, 427 million pounds of copper and 4 million ounces of silver in 2003.

# Safeguarding the pioneering spirit



New projects need new technology. To stay a world-class oil and gas company, Statoil's executive vice president, technology, Terje Overvik actively encourages the spirit of innovation that has been a Norwegian tradition for centuries. Statoil's corporate technology strategy has been designed to ensure that Statoil achieves a 40 percent share of international production by 2012.

**S**tatoil's recently appointed executive vice president, technology, Terje Overvik, has high ambitions: an oil and gas production of one million boe/d in Norway and further 0.7 million abroad by 2012. With an annual research and development budget of one billion NOK, he believes this target can be reached.

"I know our goal is ambitious, but we have to set high goals to have something to reach for," says Overvik. He has worked for the company for 20 years, gradually working his way up the ranks to his current position. After having his doctorate in stochastic dynamics, he started out as a project engineer in field development projects such as Haltenbanken, Troll and Zee-pipe. Subsequently, he worked offshore for five years, including a couple of years as platform manager. He has also led the Statford unit for three years before being appointed to his new position as executive vice president, technology last year.

"I am a practical person, I like to see things realized and functioning," he says, praising Statoil's platform manager school. "It improved my ability to make fast decisions and trust my gut feeling."

DNV Forum met him at the OG21 meeting – Oil and Gas in the 21st century – this autumn. This initiative was established by the Norwegian Ministry of Petroleum and Energy to develop a national technology strategy to create added-value and a competitive advantage for the oil and gas industry. Representatives of both the industry and the government participate, and Terje Overvik is chairman.

## **Business driven strategy**

Under Overvik's management, Statoil has recently revised its corporate technology strategy. This strategy focuses on short to medium term efforts to stimulate more business, and addresses medium and long term efforts to create sustainable, profitable growth throughout the company's entire value chain.

"The Technology Division's main objective is to build Statoil's business," he says. Overvik outlined five central business challenges, all of them illustrating the diversity and complexity of Statoil's current portfolio: Tail production, subsea IOR, develop assets, finding hydrocarbons and developing new business options. "I expect this strategy will become more complex as Statoil expands," he says.

Regarding tail production, Statoil is determined to perform as well as the smaller companies which dominate this sector. Statoil must develop advanced recovery methods and find new ways of imaging and monitoring 100 percent of the reservoirs. Today, Statoil is second largest operator of subsea wells. Indeed, half of their production comes from such wells. "Our goal is to increase the recovery factor from today's 40 percent to 55 percent by 2008," Overvik says.

Overvik also stresses the need for Statoil to 'develop assets'. Statoil remains committed to the utilisation of new technologies which can help them in new areas, such as subsea-to-bed and all the new challenges connected to carbonate reservoirs. "We also need to improve our skills in finding new hydrocarbons," he says referring to seismology and data interpretation. He hopes that the initiative will reduce the number of dry drilled wells.

Melkøya off the Northern coast of Norway, October 2003: With regard to subsea installations and pipeline transport, Snøhvit is the most challenging field planned today. But Statoil realises that they have to stretch their technological capabilities even further to achieve their future production goals.

"There is still time and opportunity for optimism, but we're in a hurry. There's no time to lose," says Statoil's executive vice president, technology, Terje Overvik.

Photos: Courtesy of Statoil



Finally, Overvik seeks to develop Statoil's new business options by creating a long term R&D strategy that will position Statoil for future growth. "I have not yet identified the issues for this activity, but new projects require new technology and I'm sure that new topics will turn up along the way. My job will be to prioritise."

### Six focus technology areas

To meet these business challenges, Overvik has identified six focus technology areas: exploration and reservoir management, well construction, sub-sea field developments, cost effective safe and regular operation, gas chain management and environmental technologies.

Overvik notes that several of these technologies are relevant for more than one of the business challenges. "The ability understand and adapt technology needs related to the developing portfolio is vital for our success," Overvik says. Consequently, it is important for Statoil to identify both immediate technological needs as well as long term future needs, which are more difficult to predict.

Reservoir management will continue to be one of Statoil's flagship technologies. The company's skill in this area may also prove to be an important access tool internationally, especially in collaboration with other national oil companies.

"We cannot do it all alone. Oil companies are notoriously slow to share technologies. But we will search for excellence and enter into partnerships to reach our goals and stay competitive," he says.

From an international perspective, Statoil is a leading provider of subsea technology, multi-phase flow and floating production. "About 80 percent of subsea technology deliverables are Norwegian," says Overvik. It is likely that Statoil's future development portfolio will be dominated by subsea developments offshore Norway.

"Looking beyond the Snøhvit gas reservoir, subsea developments will be an important tool for accessing hydrocarbons in the Barents Sea and in deep water developments. Snøhvit is the most challenging field planned today when it comes to remote operated fields, but I realise that we have to stretch our technology even further to achieve our future production goals."

### Lighthouse projects

Terje Overvik's plan is to establish six or seven lighthouse projects which will focus on developing key technologies. The idea is that one person will be responsible for the results for each project and have the freedom to build up interdisciplinary core teams. "Traditionally, Statoil has allocated 65 percent of the budget to such projects, but our goal is to reach a 50/50 level between internal and external financing," he says.

"By tradition, Norwegians are innovative, and in Statoil we have our own tradition for embracing new technologies. We intend to stay that way," says Terje Overvik

Eva Halvorsen

# Windpower set for

Windpower development is gaining momentum across Europe – both on land and at sea. Determined to establish a strong market position, a British company, Mayflower Energy, has built a special ship for installing wind turbines at sea.

The *Mayflower Resolution* has been designed primarily for use in the hostile environment of the North Sea around the coast of the UK. The ship will also be used for similar projects under consideration in other areas of Europe, the USA and other regions where wind energy can be utilised. Mayflower Energy's managing director, Keith Runnacles, has great faith in this ship, which will optimise and enhance the efficiency of the instalment process.



"The market has enormous growth potential," states Keith Runnacles of Mayflower Energy.

## Six legs

The six-leg vessel, which uses a hydraulic jacking system and is equipped with a 300t crane, has the notation DNV class +1A1, Self-Elevating Unit, Crane, Dynpos AUT, E0. This has been prepared and approved by the DNV design team in London with support from Norway and the DNV Nauticus Modelling Centre in Poland. A full and complementary team of engineers and surveyors from Mayflower Energy Ltd and DNV China were present in the shipyard throughout the building and commissioning period. The vessel is a unique combination of known technologies applied in innovative ways. For DNV, it has been a challenge to apply the DNV Rules to a vessel that has the mixed characteristics of a ship, a floating crane, a DP and self-elevating unit.

## Seizing opportunities

"This is a very exciting project," says Runnacles, who has been working on the project for more than three years. "If wind energy is to be profitable, the offshore installation of wind turbines has to be cost-effective. In order for offshore windpower to succeed, the industry has to have access to purpose-designed equipment."



According to Runnacles, Mayflower Energy used a total of nine different vessels to install 30 turbines at North Hoyle near Rhyl in North Wales. The *Mayflower Resolution*, would do the same job with no support vessels and far more efficiently.

## 10 wind turbines

The ship will carry 10 full sets of turbines and foundations and whatever else is needed to install the 10 turbines during each 14-day trip. At the same time, a ROV will install the cables that go between the various turbines and connect the wind-energy field to the power grid onshore. The *Mayflower Resolution* is able to maintain a speed of 12.5 knots in the water.

"This is faster and more efficient than we expected," says Runnacles. As soon as it arrives at the installation site, the *Mayflower Resolution* is manoeuvred into place using dynamic positioning, the vessel is then jacked clear of the water (one meter a minute) and

# offshore boom



The vessel *Mayflower Resolution* has been designed from scratch and is the only one of its kind.

turns from a ship into a completely stable working platform. The *Mayflower Resolution* has a regular crew of 34. With the addition of the erection team, the vessel will hold between 60-70 people during the installation process.

## From dream to reality

Runnacles is clearly proud of what he and his staff have achieved. "The vessel has been designed from scratch and is the only one of its kind. Several naval architects were offered the chance, but we chose Knude Hansen in Copenhagen, who impressed us with their response to the brief we'd prepared. Hansen has experience not only designing cruise liners and ferries, but more unusual vessels. And the *Mayflower Resolution* is certainly unusual," says Runnacles.

Prior to awarding the contract, Runnacles and his staff spent a lot of time with various turbine manufacturers and Wind Farm developers to find out what was needed – and what difficulties they would encounter. They also checked

the market. "The information we gathered was reduced to what we required to install one windmill a day. We had to create a production line approach that was totally self-sufficient with regard to both installation and sea transport and we've managed to do that successfully," he says.

## Built in China

The vessel has been constructed in China's Shanhaiguan shipyard in Qinhuangdao, located 300 kilometres east of Beijing. Following its completion, the *Mayflower Resolution* is on its way to the UK ready to start installing wind turbines offshore. The flag of registry is the Isle of Man and the marine crew will be of European origin and hold the superior class of competency certification necessary for all marine operations associated with passage, dynamic positioning, control and jacking operations.

## High growth potential

Mayflower Energy is a subsidiary of the Mayflower Corporation plc, which has approximately 10,000 employees and annual sales of circa GBP 700 million. The company wanted to explore renewable energy sources and has established a separate environmentally-friendly products division. With the construction of the *Mayflower Resolution*, the company has a vessel that is at the forefront of technology competing with the traditional operators for future contracts. "The market has enormous growth potential," states Runnacles.

With the second round of offshore wind farm licence awards under consideration, Mayflower is more optimistic than ever before. The British government wants to have renewable energy and is giving developers large subsidies. GBP 260 million has been granted for the coming three-year period in order to achieve 10 percent of the total energy consumption by 2010 from renewable energy. A second vessel is currently under consideration by Mayflower Energy.

Harald Bråthen

# Building for the future

China is beginning to flex its shipbuilding muscles. The China State Shipbuilding Corporation (CSSC) and China Shipbuilding Industry Corp (CSIC), the conglomerates in charge of most of the country's shipyards, plan to reach the summit of world shipbuilding by 2015 through shipyard modernisation and increased efficiency and rationalisation.

China's leaders are confident that the country can overtake Asian shipbuilding rivals Korea and Japan by 2015. Indicating the explosive growth of Chinese shipbuilding, its output has more than doubled in the past three years, and the number of ships ordered from China so far in 2003 is twice the number ordered last year. Chinese-built vessels are today sold to 40 countries on all five continents, with Germany, Greece, Canada and Hong Kong as the major customers.

"There is ongoing development and fundamental change at most Chinese shipyards and I firmly believe they will expand their capacity and win the confidence of even more overseas owners in the future," said DNV maritime's regional manager for Greater China, Andy Westwood.

## DNV IN CHINA

DNV is one of the leading classification societies in China's rapidly expanding shipbuilding industry, accounting for 24 percent of all new vessels currently on order. It opened its first permanent office in China in 1981. Today, from its principal offices in the cities of Shanghai, Hong Kong, Dalian, Guanzhou and Shenzhen, as well as numerous site offices, 285 staff deliver DNV's marine, industrial, offshore and certification services.

### Improved quality

According to Westwood, those overseas ship-owners who have invested appropriate new-building supervision for projects in China, have come away with good quality ships at very competitive overall cost. He used the NITC VLCC orders as an example: "Whilst the build time for the first of these ships (first-ever VLCCs in China) has been almost two years, the pace of construction is quickening, and NITC's management is very pleased with the performance of the delivered vessels.

"Generally speaking, the larger Chinese yards have a very good track record for standard ships, but owners should be more careful about work done by smaller yards where design and particularly supervision become more critical," said Westwood, and added, "Some yards can also have problems with first-time construction of high-specification/complex vessels."

### Focus on efficiency

In spite of these imperfections, Westwood believes the real reason for the recent success of Chinese yards is improved steel-cutting and shipyard-layout and management practices.

"New production lines have been installed in old Chinese facilities, thereby improving the way steel is moved in order to be made into blocks," he explained. According to Westwood, the improved use of steel and workshops leads to bigger blocks being used in assembly work, thus shortening the construction time in the berths.

"A major bottleneck is berth space," said Westwood. The problem of berth space is greater in China since most yards still use old-style slipways rather than gated dry docks. Dry docks allow shipyards to transfer ships to outfitting docks after the major work has been completed." →



CSSC has accelerated its shipyard development phase with the construction of the modern Shanghai Waigaoqiao Shipyard.



Andy Westwood, DNV Maritime's regional manager for the Greater China area.

### Two competing strategies

A decision was made by the Chinese government to divide the two main shipyard groups (CSSC and CSIC) and create more domestic competition. These organisations have since adopted two competing strategies in their efforts to add large containerships, VLCCs, ro-ro vessels, FPSOs and more recently, LNGs to their bulker/-tanker portfolios.

CSSC's ambitious plan has been to expand its current 4m dwt capacity to over 14m dwt by 2015. To achieve this, along with other major developments, the Group is scheduled to build the world's biggest single yard at Changxing Island, allowing it to become the world's number one shipbuilder by 2015.

The more conservative approach adopted by the CSIC is to expand its 1.8m dwt production in 2003 to 9m dwt by 2015. Although VLCC docks are being expanded at CSIC's Dalian New Shipyard, the company's growth strategy is focussed more on restructuring its production capacity. Up to five ship-assembly plants will be built in Dalian, Bohai, Shanhaiguan, Tianjin and Qingdao (Behei) City. The group is also committed to developing further as a block assembly operation.

Both shipyard groups agree that if China is to succeed in specialist market sectors and become a dominant force in world shipbuilding, management systems, quality assurance, automation and design software must be developed to maximise opportunities created by expanded yards.

### Realising its vast potential

"This nation (China) has still to overcome some obstacles, but that said, there's a growing realisation around the world that Chinese yards, by and large, build very decent ships at competitive prices."

Westwood summed it up this way: "The fact is, there's a train coming through here and you have to ask yourself, do you stand on the platform and watch it, get on as a passenger or get in and help drive? It is my experience that the majority of Chinese yard managers are quite willing to ask for help, readily accepting that their productivity and yard-management skills are still not as good as those of South Korea and Japan. They are also applying market economy principles when building and staffing new, more productive facilities that will relatively soon have an enormous capacity."

Stuart Brewer

## EXCERPT FROM 'CHINA SHIPBUILDING: THE EMERGING GIANT'

A study from Matthew Flynn and Potem & Partners

It's official. China has declared its intention to reach the summit of world shipbuilding by 2015. The core of this ambition is a Greenfield site on an eight-kilometre (five-mile) waterfront on Changxing Island at the mouth of the Yangtze River.

The announcement in early August will see the dismantling of the 130-year-old Jiangnan shipyard on prime downtown Shanghai real estate. As a 21st century replacement, China State Shipbuilding Corp (CSSC) will spend up to RMB 30 bn (USD 3.6 bn) over ten years to build what it intends to be the world's largest shipbuilder in combination with other CSSC yards.

When completed, the Changxing Island shipyard should be able to assemble a total deadweight tonnage each year of 8m dwt, according to Guo Xiwen, the CSSC director in charge of the project.

Together with other CSSC yards in Shanghai, capacity would be 12m dwt, while counting other CSSC yards outside



Need for more bigger standard ships

Shanghai, the CSSC capacity number would actually hit 15m dwt.

To date, contracting in China has been fast and furious, allowing it to capture 2m gt in new orders for the first six months of 2003, according to LR-Fairplay statistics. While impressive, this is still a distant third to South Korea's 17.1m gt and a fraction of the 9m gt won by Japan. The question is not whether China can build bigger ships to meet owner standards.

The question is whether it can move to a higher volume of bigger standard ships.

China needs to invest heavily in productivity improvements rather than pure expansion and certainly should consider concentrating efforts in key facilities as it is for Changxing Island.

Management skills will determine whether Chinese shipbuilding has a tail wind or head wind on its journey to become an industry leader.

Leadership ETA for China is likely sometime after 2015 and possibly closer to 2020, sharing the market with South Korea and Japan in a triumvirate of Asian shipbuilding.

Rome was not built in a day.

For more information on this report, contact [tankerresearch@potem.com](mailto:tankerresearch@potem.com)

# NITC: Making waves in China

The National Iranian Tanker Company (NITC) has recently taken delivery of the first VLCC vessels to be built in China. Chairman and managing director Mohammad Sourì gives “thumbs up” to the Dalian New Shipyard, describing the vessels’ quality and performance as “highly satisfactory and exceeding our expectations.”



Mohammad Sourì, chairman and managing director of National Iranian Tanker Company

“This is a unique situation for us,” explains Sourì. “It is an opportunity for us to build ships exactly as we want them, from start to finish.”

Dalian New Shipbuilding (DNS) is the first Chinese shipyard commissioned to build a very large crude carrier (VLCC). The shipyard is currently building a series of five vessels for NITC, three of which have already been delivered. All the vessels have been built to precise specifications, including forty-year global fatigue on the hulls. The designs are Korean supplied, with extensive assistance from DNV.

According to Sourì, there were many factors influencing the choice of shipyard, including affordable local labour rates. But the deciding factor was that DNS allowed NITC the freedom to control the design of the ship.

## A solid team

Sourì explains, “One of the key reasons for the success of this project is the use of the same 15 member project team who had already worked together in Korea on NITC’s Aframax and Suezmax newbuildings. Their experience, coordination and knowledge were key to making this project such a success.”

Echoing NITC chairman Sourì’s words, the company’s technical project manager Parviz Sangin said NITC enjoys an excellent cooperation with the yard, a relationship that has benefited both parties. He attributes flexibility and control as underlying reasons for the positive working relationship with the yard.

While Sangin acknowledges that problems occurred during the newbuilding process and felt

the yard might benefit from a more efficient organisational structure, he says NITC gained a lot from the experience. “Working with the Chinese over a period of several years has raised the level of our professional work techniques, experience which has enabled the whole building process to run more smoothly,” said Sangin.

## Quality control

“As in most yards, efficiency could be improved, but the main key to success with foreign yards is to run control checks to monitor the degree of ‘total understanding’ of the project or task at hand,” said Sangin. He was also quick to note the ‘solid and reliable support’ NITC received from DNV, a key factor to the successful series construction. “Some aspects of the ships are very complex, and DNV has given us the confidence to forge ahead with structural configurations which have not been used on ships of this size before.”

## Upgrading the fleet

NITC has been vigorously improving and modernising its tanker fleet in recent years in order to become more competitive in the oil transportation business, where double-hull tankers are now the preferred design for environmental reasons. In the past five years alone, NITC has ordered or built five Aframax, five Suezmax, ten VLCCs and five product carriers.

“By the end of our newbuilding programme in 2003, the average age of the company’s tanker fleet will be less than four years,” says NITC chairman Sourì. “As a result, NITC will soon own and operate the most modern and efficient tanker fleet in the world.”



Parviz Sangin, NITC’s technical project manager

Stuart Brewer

# Graig: The Chinese connection

With about 40 ships ordered at Chinese yards, no other western company has as much experience of building in this country as the UK's Graig Group.

“Since 1995, Chinese shipbuilding has evolved markedly,” says Hugh Williams, CEO of the Graig Group. “China is the place to build vessels today.” At the recent Mare Forum in Rotterdam, Williams expressed confidence that China would be able to deliver the twelve firm orders for the Group’s Diamond 53 carriers “on time and to standard.” And Graig has set a high standard: the company’s ships will be 53,000-dwt bulk carriers with double hulls and a number of other innovations incorporated by their designer, Carl Bro of Denmark.

According to Williams, Graig identified the advantages for owners and charterers in building double-hull bulkers. It also saw that Chinese yards could build new designs cost effectively and yet still be prepared to offer a degree of flexibility not found in other major Asian yards. Graig Group was eager to do business with Chinese shipyards, but instead of going alone, the Group assembled a coalition of partners whose individual strengths could be focused to create a stronger project.

## Strength in numbers

“We started by getting together a designer, class, owners and yards then added a finance package, both local and international, and a newbuilding supervision package,” he says. “The first benefit was that we got an owner-friendly design, rather than something a yard has come up with to simplify its work.” Williams explains that Graig had the technical expertise and market support of the major class society active in China. “We were able to offer a package with excellent finance terms and attractive delivery slots. Then we involved a major broker and we had a project which was much bigger than we could have managed alone. In this way, we were all able to input experience and expertise, and each of us benefited.”

To date, there are 12 Diamonds on order for four owners, and Graig will soon be launching new, larger Diamond designs based on the same sharing philosophy. “Our only current limitation is the production capacity of yards that we deem to be acceptable as regards to quality,” says Williams. But he is quick to add that Graig has confidence that both the quality and capacity of China’s shipbuilding sector will continue to improve rapidly. “Providing there is unrelenting yard supervision and correct documentation, companies can get a high-quality product at a good price,” says Williams.

Stuart Brewer



CEO of the Graig Group, Hugh Williams (left), shakes hands on a newbuilding contract with Li Chang Yin, president of the China Shipbuilding Industry Corp during last year's SMM exhibition

# Five on China

During a recent visit to China, editors of some leading shipping publications got a closer look at China's dynamic shipbuilding market. Here are some of their remarks.

## **SAM CHAMBERS**

**Editor, Maritime Asia**

Significant developments pointing to China's growth include: the successful series construction of the country's first VLCCs, more export orders of higher value ships, plans announced for the largest shipyard in the world and a growing realization around the world that Chinese yards build very decent ships at competitive prices. One area that the Chinese could learn a lot from the Japanese is making their 25 plus year old yards more efficient, while the new ones (such as Shanghai Waigaiqiao Shipyard) don't have to worry about such constraints.

## **HUGH O'MAHONY**

**Technical Editor, Lloyd's List**

China's two main shipyard groups, the southerly China State Shipbuilding Corp (CSSC) group and the north's China Shipbuilding Industry Corp (CSIC) have adopted different growth strategies. CSSC ambitious plans include expanding its current 4m dwt capacity to over 14m dwt by 2015, creating the world's biggest single yard, and becoming the world's number one shipbuilder by 2015. The CSIC's principle path to expansion will be based on restructuring of production processes. Four or five ship assembly plants would be built in Dalian, Bohai, Shanghai, Tianjin and Quango City, and yard work will be more of a block assembly operation.

## **PAUL GUNTON**

**Editor, Fairplay**

Every shipowner I have met who has ordered ships in Chinese yards brings up the question of quality. Andy Westwood, DNV vice president and maritime regional manager for the Greater China area, says that concerns over quality should be more specific. "There's a train coming through here," he says. "Do you stand on the platform, get on as a passenger or get in and help drive?" Chinese yard managers readily accept that their productivity and yard management skills still lag behind those of South Korea and Japan, but are applying market economy principles as they build and staff new facilities.



## **BOB JAQUES**

**Editor, Seatrade**

One Chinese yard boss has likened shipbuilding in Japan and Korea to "people of 35 to 40, who are very strong and at their prime, while my industry is 16 - 17." With their coming of age in sight, many larger Chinese yards are proving less malleable to owners' wishes than before, now stipulating which types of ship they will build and seeking better prices. Some foreign owners wanting smaller, one-off vessels have even complained of being unceremoniously 'bumped' from building slots on the eve of signing. But Chinese yards feel they are merely adopting 'adult' market practices.

## **PATRIK WHEATER**

**Editor, Marine Engineers Review**

Talk to the President of any shipyard in China from Dalian to Guangzhou and you will hear how China's shipbuilding capacity is expected to be comparable to that of Japan and Korea by 2015. CSSC has accelerated its shipyard development phase, which began in 1999 with the construction of the modern (by Chinese standards) SWS yard, and will follow in 2007 with the relocation of Shanghai's Jiangnan, and other CSSC-operated shipyards, to Changxing island. CSIC, meanwhile, has big plans for its yards. The Mayor of the Dalian Municipal People's Government, Xia Deren, declared that the "state government has made it clear it will build Dalian into a very important shipbuilding, manufacturing, petro-chemical, electronic and information technology base". But that expansion must go hand-in-hand with improvements in quality assurance, management systems, automation, and design software packages to help meet China's vast potential.

Sitting (L-R) Patrik Wheeler, Sam Chambers, Bob Jaques. Standing (L-R) Hugh O'Mahony, Paul Gunton



# Cold comfort



"Managing cold-climate risks is increasingly important both for tankers and for commercial vessels," says DNV marketing director Wilhelm Magelssen.

In the winter of 2002-03, temperatures in the Baltic sea fell to a ten year low. These icy conditions, combined with increased tanker traffic, have raised concerns about environmental safety. Oil tankers operating in cold climates, in particular those serving Russia's Primorsk terminal near St Petersburg, create risk management challenges far more complex than those faced by tankers operating in warmer conditions.

Coastlines in both Arctic and Baltic areas are especially vulnerable to oil pollution. Several regulatory administrations, Finland and Russia included, are emphasising the enforcement of Ice Class rules to ensure that ships operating along their coastlines have sufficient capability to operate in ice. DNV has been co-operating with other societies and flag administrations, such as those of Finland, Canada and Russia, to ensure that they are sufficiently stringent.

"Managing cold-climate risks is increasingly important," says DNV marketing director Wilhelm Magelssen, "both for tankers and

for commercial vessels." He points out that the competence to operate safely in cold climates is not just linked to interaction between ice and the hull, propeller and rudders, where there is an obvious need to comply with special technical standards. Extremely low temperatures can cause air and water pipes to freeze, navigational and emergency equipment to fail, and crew performance to deteriorate. Ice formation on the deck, superstructure and cargo, threatens both the performance of deck equipment, and the vessel's stability.



Ice formation on the deck, superstructure and cargo threatens both the performance of deck equipment and the vessel's stability.



Photos: Courtesy of Anders Utkilens Rederi as

### Rules to suit the operations

Studies performed by the Finnish regulatory authorities, and DNV's experience of operations in Arctic areas, have identified a number of challenges to vessels operating in cold climates.

They include the threat of drift ice, entrapment in ice due to engine failure, and ship manoeuvring capability. Navigational issues must be considered as must oil spills, and the greater likelihood of leakage in icy conditions. Crew training, and managing rescue operations, are also important.

DNV offers a number of class notations corresponding to different functional needs when operating in cold climates or ice-infested waters. As the major class society for tankers with ice strengthening, and with almost 1,800 classed vessels of different types prepared for operation in cold climate, DNV has gained many years of valuable experience for developing rules covering different operational needs:

- Rules for soft ice
- Baltic rules, assuming support from ice breakers
- Arctic rules for more independent operation
- Ice-breaker rules for service in heavy ice conditions
- Rules for materials taking into account low temperatures
- Deicing rules for proactive preparedness to ensure operational safety.

### Planning for the future

The additional risks of operating in cold climates require a systematic approach, focusing on planning and preparations. Ongoing development takes into account additional risks such as how to ensure sufficient firefighting capability in extreme temperatures, and how to cope with new propulsion alternatives in a robust, safe and reliable manner.

Wilhelm Magelssen warns that regulations alone are not enough. "We must make shipowners and crew recognise the challenges of operating in cold climates and icy conditions. DNV is prepared to support and be a discussion partner for owners, yards and authorities in the further development of shipping activities in cold climates. Such communication becomes increasingly important when one realises that one-third of all DNV-classed tankers currently on order are specified with ice strengthening, and this proportion seems to be increasing."

Stuart Brewer



## Prestigious award for the SOHO team

The International Academy of Astronautics (IAA) has presented the SOHO spacecraft team with the prestigious Laurels for Team Achievement Award. The award recognises both the outstanding achievements in designing and building the spacecraft, operating the mission, as well as the science it has performed.



Photo: Courtesy of Astrium EADS in Toulouse

Head of section in DNV Consulting, Toulouse, Nils Harald Hansen, standing in the clean-room next to the MetOp-satellite at Astrium EADS. MetOp, where DNV is also involved, is part of an US/European cooperation within meteorology, and like SOHO its payload includes both US and European instruments.

SOHO is a project to study the sun from its deep core to its outer corona, including the solar wind. SOHO is a shortening of Solar and Heliospheric Observatory, and was built by Astrium EADS in Toulouse on behalf of the European Space Agency (ESA) and the National Aeronautics and Space Administration (NASA) in cooperation.

The SOHO spacecraft, which was launched on December 2nd 1995, was specified for a two years lifetime in operation, but thanks to an almost perfect orbit injection by the ATLAS 2AS launcher (requiring only small amount of fuel for delta-orbit correction), good spacecraft design and operation by the SOHO team, SOHO is still going strong eight years later. In December there will be a eight anniversary celebration since the SOHO satellite was launched.

"We can be proud of having been involved from 1990 to 1996 in the design, construction, testing, launch and finally in-flight testing of SOHO – before it was officially taken over by ESA/NASA in the early summer of 1996," says Nils Harald Hansen at the DNV-office in Toulouse.

Though the SOHO spacecraft was designed for a two-year-mission, its spectacular success has led to two extensions of the mission, firstly until 2003 and then until March 2007. The award is a tribute to a team that has contributed to one of the most successful space missions in history.

All the SOHO science data is available for everybody that has Internet access, and every day you can collect the latest pictures taken by SOHO through the different instruments (Coronal spectrometer, Energetic particle analyser, Ultraviolet imaging, Spectrometric coronagraph and others).

For more data, pictures and information, please consult the SOHO home page:

<http://sohowww.estec.esa.nl/>

## Stena newbuilding orders

Sweden's Stena Bulk has contracted with Hyundai for two 116,000-dwt ice-class tankers.

The two DNV-classed Aframaxes, to be named the *Stena Arctica* and *Stena Antartica*, are due to be delivered in the 2005/06 ice season. Both vessels will be further strengthened to Swedish/Finnish Ice Class 1A and mainly carry Russian export oil cargoes in the Baltic.

Wilhelm Magelssen, DNV Maritime's marketing director describes the newbuildings as among the largest and most powerful ice-strengthened tankers ever to be built.

"Both ships will be able to navigate in 1m thick ice and will have 85% more engine power than ordinary Aframax's," he said.

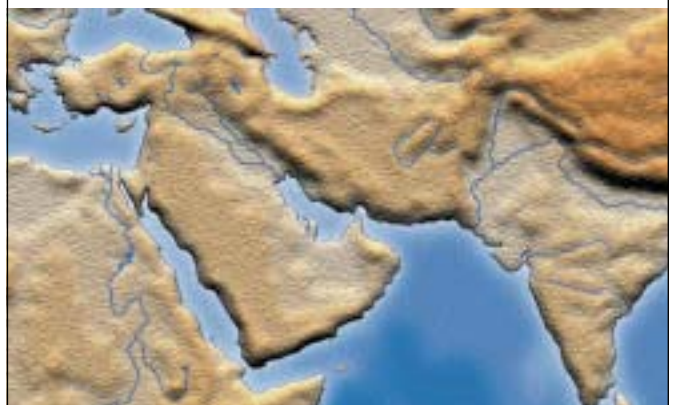
Earlier this year Stena's sister company Concordia Maritime ordered four 49,000-dwt P MAX product tankers. Croatia's Brodosplit shipyard was tapped for the job, with delivery of the first ship scheduled for 2005.

Jan Koren, DNV's business director for tanker ships, said Stena is ordering the high spec, ice-class newbuildings to help meet the growing demand for good tonnage to carry Russia's burgeoning oil exports through the icy waters of the Baltic.

The P MAX double hulls will be further strengthened to DNV enhanced fatigue Class Notation Plus 2, and Swedish/Finnish Ice Class 1B.

## UN standardises regional names

While the United Nations (UN) is chiefly recognized for its efforts to resolve conflicts and manage the distribution of international aid, representatives have also worked hard to establish international standards to avoid confusion between nations. Part of this work includes drafting resolutions to make sure all nations refer to regions by the same name. For example, the body of water that separates Saudi Arabia and Iran is now referred to as the Persian Gulf, not to be confused with the Arabian Sea, which feeds the Gulf.



## DNV certifies Italian restaurants outside Italy

In the future, Italian restaurants have to fulfil defined standards to be able to call themselves "Italian". Strangely enough, up to now, there has been no form of protection or classification of "brand Italy" in the restaurant business.

Recently, DNV Certification signed a contract with the Italian restaurant's association. The project targets approximately 60,000 Italian restaurants outside Italy, even though no more than 10,000-15,000 are truly Italian restaurants.

DNV has participated in the study and design of a new quality standard that will determine whether Italian restaurants abroad offer genuine Italian cuisine to their guests.

This work is done together with the Italian Ministry for Agriculture and Forestry, the Italian Trade Commission (ICE), the Association of the Italian Chambers of Commerce abroad (Assocameraestero) and the Italian restaurants' association (Associazione Internazionale Ristoranti d'Italia (ARDI)).

First of all, the technical standard requires the use of authentic Italian ingredients, although deviations will be allowed from country to country. Mostly Italian wine in the cellar, a head chef who has been formally trained in Italian cuisine or has spent at least six months training at a restaurant in Italy, and at least one Italian-speaking waiter, are among the other criteria.

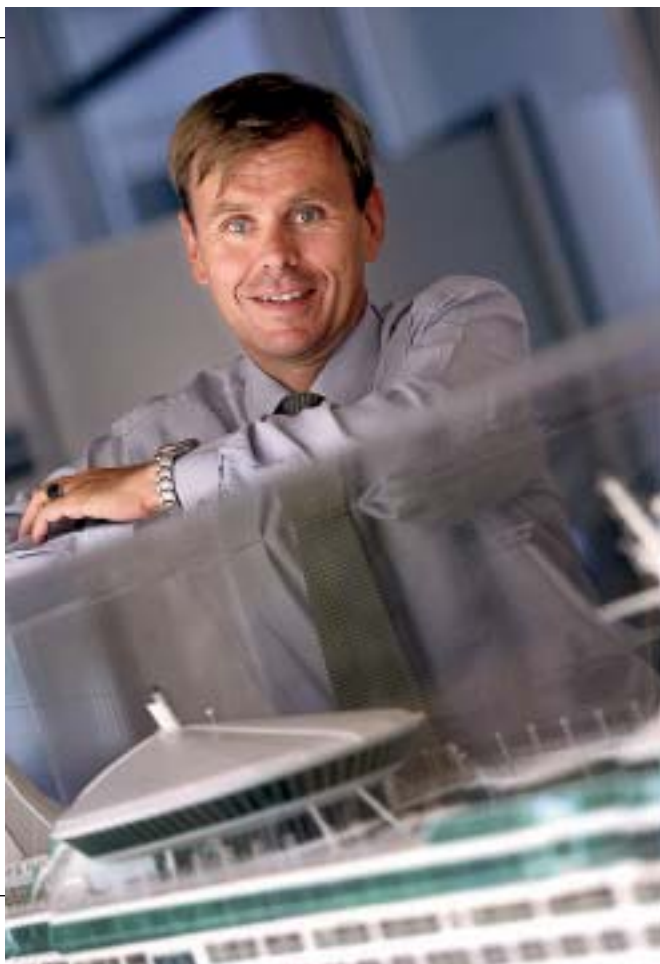
On February 28, a pilot project with the voluntary participation of more than 50 restaurants in Belgium started up. A number of Italian restaurants in Luxembourg then joined the project.

The next step over the following 3-4 years is the certification of the truly Italian restaurants in France, Germany, Great Britain, the Netherlands, and then moving on to the capitals of the rest of Central Europe and then Scandinavia.



Photo: Getty Images

The aim of the project is to create an international Italian food and wine circuit promoting the Italian identity.



## DNV to class seafarers

In a further expansion of classification business, DNV is targeting maritime colleagues and seafarers

A new global system of competence standards to ensure that ships' crews from different nations, cultures and training institutes all have a common, acceptable level of knowledge, skills and attitudes is currently being developed.

As reported in TradeWinds, DNV will not provide the training but, based on its standard for certification of learning programmes, will ensure that the content of the training process and the result of the final examination meet an acceptable common level set by the standard.

Tor E. Svensen, chief operating officer of DNV Maritime says: "This will be the first global system for classifying maritime competence. It includes competence standards that can be applied globally and certification which is internationally recognised."

The new standards will incorporate the requirements for safe and efficient operations set out in statutory requirements of the IMO and other authorities, including the Standards of Training, Certification and Watchkeeping for Seafarers (STWC)

Tor E. Svensen, COO DNV Maritime.

# Time to appreciate quality of Chinese built ships



Sam Chambers is the editor of Maritime Asia and the East Asia editor of Lloyd's List

**“You don’t become the third largest shipbuilder in the world by building tin cans”**

Are Chinese shipbuilders painted in an unfair light that allows shipowners to scramble all over them? Sure, the yards are desperate to increase both their repertoire as well as volumes and will naturally offer tempting incentives to build a new ship type, but are they going too far?

Japanese and Korean yards, who let’s face it the Chinese want to replicate in a hybrid mega fashion, confide to some of their Chinese counterparts how shocked they are that the mainland builders give owners such flexibility and room for manoeuvre, even after contract signing, which often results in severely dented profit margins.

It’s a well-known fact that many of the Chinese yards’ first ships in a new series are often produced at a loss. This is believed to be done to ensure that whatever the landmark deal is, it goes to them. But surely this is wrong. All the Chinese yards now talk a good game about the need to be market-orientated and, more pertinently, profitable, something that was not necessarily in the Chinese lexicon a decade ago. Empowered by yet another record year, with export volumes jumping massively and breakthrough moments including Kawasaki Kisen Kaisha’s car-carrier order, Transmed’s two 174,000 dwt double hull cape order at Bohai, and Shanghai Waigaoqiao’s first ship delivery, the CSK Fortune, now is the time to correct international perceptions regarding quality. You don’t become the third largest shipbuilder in the world by building tin cans.

#### Exacting standards

Strong blue chip owners, such as Stena, Gotland, AP Moller and the National Iranian Tanker Company, have been ordering in China for a number of years and, more importantly, they are returning. All these companies have exacting standards. Perhaps the reason why they themselves don’t blow the China yard trumpet so loudly is that they believe they have a temporary competitive advantage over others ordering at more expensive yards elsewhere.

Certainly there are areas where the Chinese need to improve, and to be fair, the top executives in the industry appreciate there is still plenty to be done to overhaul the South Koreans and the Japanese, as Beijing has stated is its intention within the next 20 years. The president of China’s largest shipyard has highlighted three key areas where the country’s shipbuilders can learn from their neighbours in Japan and South Korea. Boosting domestic marine equipment production, research and development and information technology were all considered ways to improve competition by Paul Sunbo, boss of Dalian New Shipbuilding Heavy Industries (a finalist at this year’s Lloyd’s List Maritime Asia Awards alongside Korean heavyweights Daewoo and Hyundai Heavy – a further sign of boosted credibility) in the northeast of the mainland.

#### World’s largest shipbuilder

There can be no doubt that the Chinese yards will overhaul their east Asian rivals some time around 2020, with plans unveiled this year for the largest shipyard in the world on an island to the north of Shanghai, plus four other large greenfield yards. By building on a clean slate, shipbuilders will be able to construct more modern, better laid out facilities, more Korean in nature as such than many of the present inner city cramped places. Shanghai Waigaoqiao is a forerunner for these new look shipbuilding areas.

Watch this space as Koreans and Japanese flock to invest in Chinese shipyards in the coming years. With LNG carriers on the way from Hudong-Zhonghua, how much longer will it take before China’s shipbuilding skills are universally appreciated?

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