

The future according to 5 top shipping players

Tech trends in cybersecurity and IoT

LNG starts to unleash its potential

SEAVIEW





















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MAGAZINE

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EDITORIAL

Welcome to Sea View, RINA's annual magazine focused on the merchant shipping market. Technology and the environment are major topics, reflecting current concerns and hopes for the future. This issue, we look at cyber security and the impact of the Internet of Things. Staying with technology, there are updates to RINA's InfoSHIP® EGO system and dynamic positioning additional class notation. Interviews with leading figures from various industry sectors reveal cautious optimism about future market conditions, as well as useful reflections on the potential of LNG and the impact of environmental regulations. Chief among these are the EU's MRV regulation on CO₂ emissions - which RINA is now accredited to verify - and the BWM Convention on ballast water management. We also offer insights into small sectors with big potential, like wind farm transportation, factory ships and livestock carriers. Many thanks to Caronte & Tourist, Cyprus Sea Lines, Polferries, Exmar and DFDS for their contributions.

Positive signals in uncertain times



It may be that we are finally seeing the light at the end of the tunnel. The shipping industry has experienced turbulent times over the last few months, but there are positive signals in many areas.

The passenger sector is strong, with ferry and cruise order books rising steadily. However, overall orders are down 30% from last year and are now equivalent to 11% of the fleet.

Despite modest improvements and positive demand trends in some sectors, surplus capacity is still a real issue. This is particularly true for bulk carriers and containerships, although bulk carrier and containership charter rates are slowly recovering.

The tanker market may still have stormy waters ahead if oil prices remain high, since supply is expected to grow and the demand-side risks are not going to go away anytime soon. On the other hand, high prices may well stimulate the offshore sector, which has been depressed in the last years.

Demolition activity is expected to be strong in the short term, driven by weak levels of seaborne trade. This will apply more to some sectors than others in 2017; the recent growth in bulk carrier rates and new liner alliances will lead to lower scrapping rates in these sectors. However, in absolute terms, the demolition rate will remain high.

Another incentive to recycle is that stricter regulations are coming into force, such as the IMO Ballast Water Management

Convention and emissions cap. These will impose considerable compliance costs on shipowners. Coupled with weak market conditions, the extra costs will lead to older ships being increasingly recycled rather than upgraded.

The most positive signals are currently coming from "specialised" sectors. One example is Europe's ferry market, where major operators are investing heavily in LNG-fuelled and "gas-ready" ships. RINA recently signed contracts to supervise the construction of two LNG-fuelled ferries for Baleària at Visentini shipyard in Italy and 1+1 LNG-fuelled ferry for Caronte & Tourist at Sefine shipyard in Turkey. These ships will operate in the Mediterranean Sea thanks to the GAINN project (see page 23).

Increasing use of LNG as a fuel will, of course, boost the LNG carrier market. Another growing niche related to alternative energy sources is offshore wind farm installations. RINA recently classed two ships designed specifically to transport wind power components: *Rotra Vente* and *Rotra Mare* (see page 19).

One positive aspect of the difficult market conditions is that it forces us all to innovate and be competitive. One way to enhance competitiveness today is to improve fleet performance with the help of specifically designed tools. These bring together software development, big data analysis, naval architecture, seagoing experience and regulation compliance to benefit the end user. A good example is InfoSHIP® EGO 3.0 (see page 16).

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Courtesy of Caronte & Tourist

Lorenzo Matacena

Family values drive bold move into LNG

The two families that own Caronte & Tourist, one of which is my own, have been operating ferries between Sicily and mainland Italy for over 50 years. We've always been a brave company that looks to the future and isn't scared to try to out ideas. Our boldest project right now is building the Mediterranean's first ever LNG-fuelled ferry.

Scheduled for delivery in 2018, it is a double-ended ferry with three dual-fuel engines. It will carry 290 cars and 1,000 passengers across the Strait of Messina and, thanks to an EU Class B certificate, possibly to the Aeolian Islands. It was designed by Norway-based LMG Marin and is currently under construction in Sefine Shipyard in Turkey.

Are we visionaries or are we idiots? I like to think that, with the help of RINA and other partners, we will overcome the challenges and pioneer the LNG-fuelled ferries of the future.

We accept that LNG ferries are currently more expensive to build, and we're prepared for the problems that first movers inevitably face. We hope that other shipowners will support our efforts, because ultimately, we all have the same problem: we need to burn less oil, produce less pollution and lower costs. I'm tired of hearing that LNG is a chicken-and-egg situation, with no ships without infrastructure and no infrastructure without ships. Someone needs to take the first step.

What's striking is that the barriers to LNG are not so much technical or financial but legal. Currently, no law to regulate LNG bunkering has been implemented in Italy, so there are no facilities. That is not the case in some of northern Europe, for example, where bunkering has been performed for years with an extremely good

BIOGRAPHY

Lorenzo Matacena, Managing Director of Cartour and New TTT Lines

Lorenzo Matacena graduated in Political Science at the University "L'Orientale" of Naples in 2006. At that time, he was already a member of the Italian Young Shipowners' Association and a member of the Board of Directors of Caronte & Tourist S.p.A. He was appointed Managing Director of Cartour Srl (Cabotage) in 2009, and of New TTT Lines in 2015. Among his other recognitions and activities are:

2008 - Chairman and Vice President of Kobold Technology Philippines, Inc.

2009 - President of Zhoushan Kobold Technology Ltd. Co. - P.R. China

2010 - Council Member of Confitarma

2010 - Member of the Board of Directors of EST (Europa Servizi Terminalistici)

2013 - Member of the Board of Directors of NGI (Navigazione Generale Italiana)

2014 - Member of the Board of Directors of Maddalena Lines

2014 - Vice President of the Italian Short Range Commission Shipowners' Association

2016 - Member of the Executive Committee of the Italian Shipowners' Association



Courtesy of Caronte & Tourist

NOFIMESTO

safety record. If Italy drags its feet in this matter it will be a pity, because we will have a ship that is capable of using LNG but not able to use it.

We are optimistic that the Italian authorities will implement bunkering regulations soon, and that this will encourage major players such as Eni and BSR Resources to develop the necessary infrastructure. Whatever happens, though, it's a win-win situation. We have optimised the ship's design to provide a 20-25% efficiency saving even when using MGO. We hope it will lower costs as well as emissions, but even if it's not more expensive than MGO, we will consider it a success. After a six-month trial period we hope to order more ships.

Some of these new ships will be for Siremar, a small ferry company we've recently acquired. It operates around the islands surrounding Sicily and we intend to upgrade the fleet. The ships will all be classed with RINA, like every other vessel in our fleet since we started working together 50 years ago.

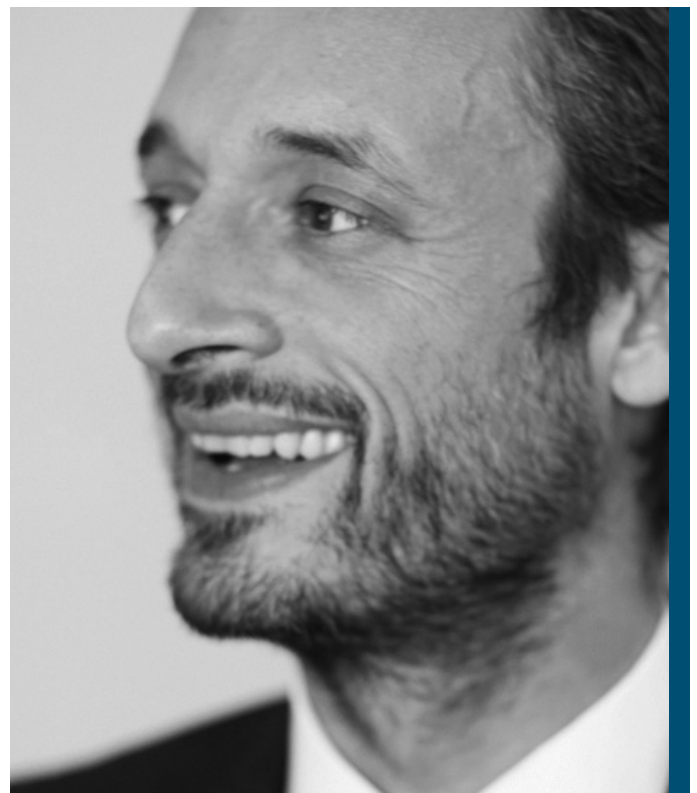
What we really value about our relationship with RINA is that we can sit down and collaborate to find smart solutions. Of course, a class society always has to check and implement rules and standards strictly. But the engineers are highly skilled and support us greatly in solving problems. RINA will help us test and improve the new LNG ferry and, hopefully, its sister ships.

It's interesting that RINA is providing more and more digital solutions to its clients, because this is also an area in which we see great transformation. When I started at Caronte & Tourist 17 years ago, people were manually double-checking computer calculations. We've come a long way since then, streamlining our processes for tasks like ticket sales and reporting. We also use technology to help provide better customer service.

However, I am concerned about the impact of too much digitisation on jobs. We only want to automate processes when it makes sense. And I don't just mean financial sense. We care about our employees and take their livelihoods into consideration when deciding which technologies to implement and how.

Perhaps this deep sense of social responsibility is one benefit of working in a company owned by two families. When families operate a company for many years - as is the case for many Italian shipowners - you learn a lot about close relationships and the importance of quality of life. I take great pleasure in discussing complex issues with knowledgeable colleagues and partners like RINA - who care about the company, our customers and our employees.

My grandfather always said there are three ways to do things - the right way, the wrong way and his way. We like to do things our way, and we hope it will turn out to be the right way. I'm looking forward to finding out.





Headquarters - Courtesy of Cyprus Sea Lines

Andreas Hadjiyiannis

Staying focused on key principles

The dry bulk sector and shipping industry in general are undergoing huge transformation, and there are many opportunities to look forward to as well as risks to look out for. Whatever changes and challenges we face, I remain passionate about offering the highest quality service. I also believe that, in times of turbulence, we should stay calm and focus on fundamental principles. Sensible reactions to long-term trends of supply and demand are the best response to uncertainty.

We think about the long term because we buy ships in order to operate them for many years. We're currently in the process of renewing our fleet, replacing vessels over 15 years old with newer ships that will provide a safe service for the next years. The present condition of the market has benefits for those who are interested in upgrading their fleet.

The basic equation of supply and demand tends to fix market imbalances. Although newly built bulk carriers have increased in previous years, deliveries are expected to fall over the next years, which will result in a market rebalance. Another important factor in reducing overcapacity is the increased demolition rate of older vessels which is expected in the years to follow, mainly due to stricter environmental regulations.

Freight rates have also been improving: in Q1, the Baltic Dry Index (BDI) rose to a five-month high. This is due to increased demand for imports such as iron ore, coal and grain. If the global political and economic landscape remains relatively stable, we expect rates to recover very soon.

One environmental regulation that affects the shipping industry is the BWM Convention on ballast water management. It is due to come into

BIOGRAPHY

Andreas Hadjiyiannis, Owner, Cyprus Sea Lines

Mr. Andreas Hadjiyiannis is a self-made shipowner. He is the founder of Cyprus Sea Lines Co. Ltd., Cyprus Maritime Co. Ltd. and Hellenic Tankers Co. Ltd. None of the three companies is publicly listed. The combined fleet of tankers, containers and bulk carriers consists of 42 ships in excess of 4m DWT.

Mr. Hadjiyiannis is a member of several major classification societies and international shipping organisations. He is a Founding Member and President of the Cyprus Union of Shipowners. Mr. Hadjiyiannis is also a member of the RINA Hellenic Advisory Committee.



Courtesy of Cyprus Sea Lines

force in September 2017, but there is some uncertainty about when exactly ships have to install the ballast water treatment systems. The sulphur cap enforcement in 2020 will also have a substantial impact on seaborne trade. For both issues, our technical team is working with RINA experts to be prepared for any eventuality.

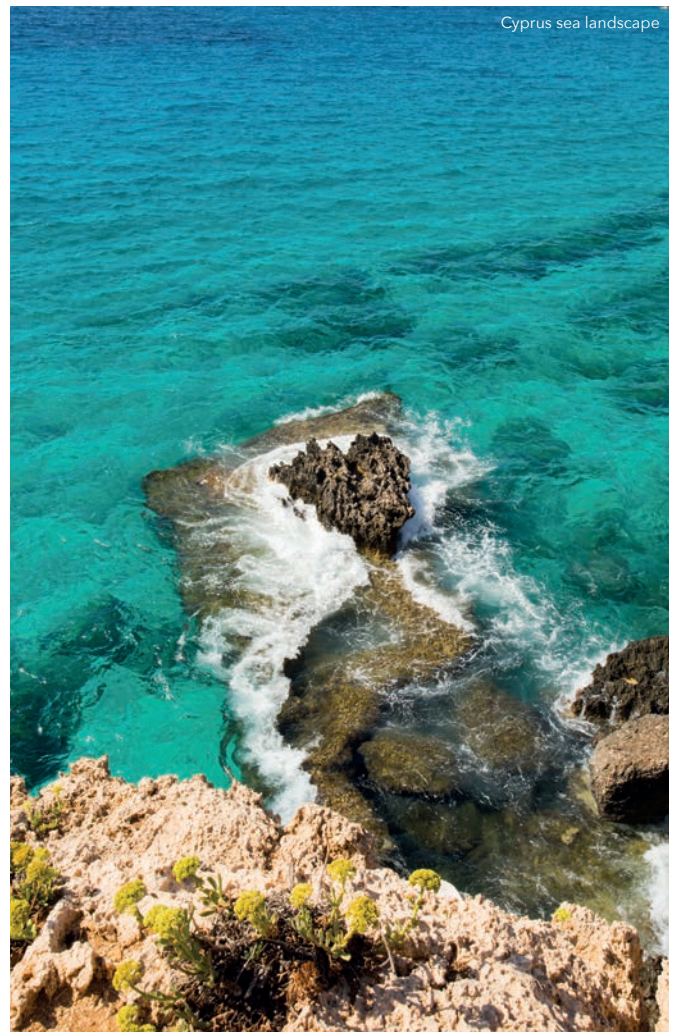
Making sensible and long-term decisions is a principle that applies to marine technology. Every marine-related invention or new software is screened and tested by our team. Decisions are based on one fundamental principle: Technology to help us provide safer quality services and protect the environment.

The oil sector is another area of transformation – although one thing that is unlikely to change is the low oil price. We are optimistic about the new routes from and to the refineries, particularly after the sulphur cap enforcement in the next years. New routes will be created for tankers to transport large quantities of crude oil to refineries, while there will also be increased demand for transportation of refined oil products by product tankers.

Our fleet includes over 40 vessels, and over the years we have worked with most IACS class societies. In recent years, we've developed a strong and fruitful relationship with RINA in particular. We've now started the process of transferring the whole fleet to RINA class and so far we are confident it's the right choice. We also work with RINA to help us prepare for the new MRV regulation and to implement smart DSS software to manage our ships' energy performance.

What we most value in our cooperation with RINA is the chance to share ideas about improving quality and safety. The collaborative approach of the dedicated RINA team in Piraeus allows us to face future challenges together. Their network is wide and able to support our projects all around the world, from Panama to China. It's efficient

and gratifying to have a team that understands the complicated marine issues and the technical problems we face every day. We look forward to "flying the RINA flag" at our new headquarters in Athens.



Cyprus sea landscape



Courtesy of Polferries

Bartłomiej Mazuruk

A positive future for Polish shipping

The outlook for Polferries and Polish shipping in general is optimistic. Trade between the countries of Central and Southern Europe and Scandinavia is subject to an upward trend and a further increase is expected. More trade, of course, means more demand for carrying goods across the Baltic Sea.

Current carriage capacity is insufficient to carry all the furniture, automotive parts and other products from Polish manufacturers to Swedish companies such as IKEA and Volvo, as well as other Scandinavian countries.

We've therefore ordered a new ro-ro ferry to meet the current and expected increase in demand. It will be built mainly in the Polish shipyard of Gryfia in Szczecin for delivery in 2020. We're currently considering all options, but it's likely to be LNG-fuelled for both environmental and cost reasons. Fuel prices will not always remain low, and we also need to comply with international emissions regulations. Retrofitting older ships in an existing fleet is not cost-effective, but for newbuildings we definitely consider LNG to be the fuel of the future.

We're not the only ones in Poland optimistic about LNG. Other market players and the Polish government are also focused on improving LNG infrastructure. The Świnoujście LNG terminal is an example of this.

On the passenger side, we've recently purchased the passenger car ferry "Cracovia" and plan to launch it this summer. At 180 m and 24,800 GT, it will carry around 650 passengers, 64 cars and 116 lorries on the Świnoujście - Ystad and Świnoujście - Ronne lines. Along with our existing ferry "Mazovia", this should be sufficient to absorb increased demand for passenger ferry transport while we focus on the cargo side. Although ferries are a convenient bridge between Poland and Scandinavia, there's a lot of competition from cheap flight operators.

BIOGRAPHY

**Bartłomiej Mazuruk, Shipping Policy
Deputy Director, Polferries**

A graduate of the Maritime University in Szczecin, Poland, Bartłomiej Mazuruk joined Polferries in 2001. Polferries is the operating name of the Polish Baltic Shipping Company, the largest Polish ferry owner. It has been connecting Poland to Scandinavian destinations since 1976, with four ferries currently operating on two routes: Świnoujście - Ystad and Gdańsk - Nynahamn.

Mr. Mazuruk began his career as a Ferry Line Specialist in the Ferry Line department, and continued his experience as Key Account Specialist. He then moved to the shipping sector, where he has served as Shipping Policy Deputy Director since December 2016.



Courtesy of Polferries

We maintain high standards of comfort and quality in order to keep attracting tourists and business travellers on these routes.

Polish ports are fast becoming infrastructure hubs, which is another reason to be positive about Polish shipping. The ports of Świnoujście, Gdańsk and Gdynia are strategically located on the Baltic - Adriatic corridor. Until now, road and rail infrastructure to reach the ports has been a limiting factor, so many goods have been shipped out of German ports.

Now, thanks partly to the European TEN-T project, the infrastructure is improving fast. For example, the S3 expressway to Świnoujście on Poland's northwest corner will be completed soon, while the A1 motorway will run south-north through central Poland to Gdańsk. The new and modernised infrastructure will certainly result in increased shipping of goods between Poland and Scandinavia, as well as more transit from neighbouring countries such as Hungary, Slovakia and the Czech Republic.

Thankfully, port authorities are looking ahead and attempting to deal with the expected increase in demand for capacity. The number of ferries operating each day from Świnoujście and Gdańsk is already nearly at maximum. Rather than add new departures, the solution is to operate larger vessels. For example, berth number 1 at Świnoujście Ferry Terminal is being adapted to handle ships of up to 220 m. Berths number 5 and 6 will also be connected to receive longer vessels. Similar modernisation works are under discussion for Gdańsk as well as Ystad in Sweden.

These changes and challenges make my job immensely varied. In the shipping policy department, we deal with everything from scheduling and freight tariffs to coordination with ferry terminals, forwarding companies and travel agents. It's a joy to be surrounded by specialists who understand the market, stay up to date with developments and drive our strategy forward.

Class societies support us in daily technical operations and planned drydockings, as well as helping us to fulfil all the forthcoming requirements for seagoing vessels. One area in

which their expertise is particularly helpful at the moment is meeting increasingly strict Port State Control inspections in the Baltic Sea.

RINA supported us in our 2015 modernisation of our "Mazovia" ferry, during which we added a new accommodation deck with passenger cabins and completely refurbished public spaces. The design and steel works were supported and surveyed by RINA, not only because the vessel was under RINA class, but because we knew we could rely on the professionalism and expertise of their surveyors. We look forward to continuing this relationship of trust and responsibility as we face the exciting times ahead.



Marc Nuytemans

Developing the right mindset

External ship management companies need to take a more proactive approach in order to play a more important role in the market. Our aim at EXMAR Ship Management is to integrate more closely with clients. Sometimes we enter into joint venture ownership of assets and operations, or build clients' processes into our own organisation. This helps us understand and serve their needs better.

Diversity allows us to integrate and understand. We hire people that reflect our industry and our world. In our head office in Antwerp, you'll meet an almost equal male-female staff ratio and many nationalities. Diversity brings different ideas and contrasting approaches, key to the creativity and innovation we need to succeed.

This international outlook applies to partners. We work closely with RINA on Italian-related ship management operations and legislation. We are also an active member of RINA's North European Advisory Committee. However, we appreciate that RINA is not just an Italian class society dealing with Italian ships and Italian issues. They have a truly international reach and outlook.

We don't see RINA as just a service provider, calling on them only when required to demonstrate compliance with a particular rule. Class societies should be stakeholders in ship management and an integral part of operations. Why? Let's say a company implements condition-based maintenance autonomously and something goes amiss. That company will then be liable. Seeking the support of additional experts in the first place means that things are far less likely to go wrong. Using class societies merely for audits or compliance issues is a missed opportunity. For this reason EXMAR Ship Management (ESM) works closely with RINA, also to innovate.

BIOGRAPHY

Captain Marc Nuytemans, Managing Director, EXMAR Ship Management

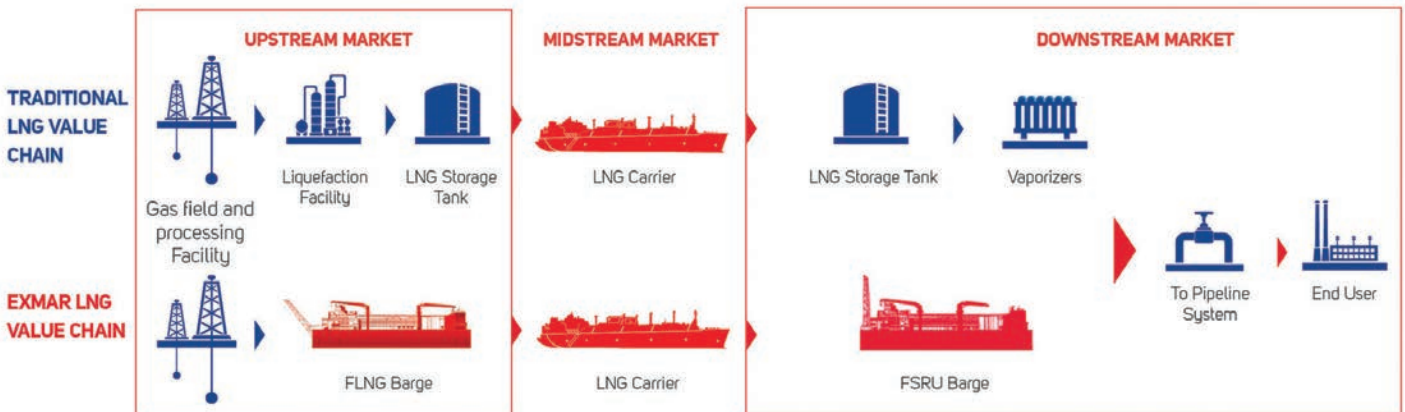
Marc Nuytemans obtained his Master Foreign-Going (Captain) from the Antwerp Maritime Academy. After an extensive career at sea on different types of vessels, he was Fleet Personnel Manager at EXMAR Ship Management (formerly Tecto) from 1997 to 2000. In 2000 he took up the position of managing director of the Royal Belgian Shipowners' Association leading the revival of the Belgian Register.

Captain Nuytemans has been CEO of EXMAR Ship Management since 2009.

He is member of the board of directors of ECOS spa, Brabo cvba, and Caritas International. He is also Executive Professor at C-MAT (Antwerp University) and member of the Royal Commission for the revision of the Belgian Maritime Law.

Marc Nuytemans is also a Fellow of The Nautical Institute (London, UK) and member of its executive board.

LNG VALUE CHAIN



Courtesy of EXMAR Ship Management



OLT's FSRU Toscana (right) with LNG carrier Trinity Arrow alongside. Picture courtesy of EXMAR Ship Management

The persistent focus on compliance – and compliance alone – needs to change or we will be like the student who studies only to pass an exam, not to truly learn. For example, is it enough simply to comply with safety requirements? Drivers who speed are punished with fines, but it is surely better if people drive more safely having been made more aware of the consequences of speed. Safety is about developing a safety mindset, not just obeying rules. This is the focus of our Taking the Safety LEAD programme, one of several training areas covered at our EXMAR Academy.

Training is another area in which we all need to step up and think smarter, and RINA is helping us with this. In the maritime gas industry, we see increased demand for complete energy supply chain solutions rather than point-to-point transportation of gas by ship. This changes not only the way ships are managed but the skill sets required by crew members and shore teams. LNG-fuelled ships also require qualified crew trained in handling LNG.

Technology is essential, of course, and we are currently testing our own ship management business solution. However, technology needs to serve people, because it is the human factor that makes the critical difference in terms of managing a truly safe gas tanker or FSRU. We are developing virtual reality modules and the results so far are encouraging. VR appears to be vastly more effective than regular computer-based training in preparing people for new roles and real-life emergencies.

Current market conditions are really challenging, but there are positive signs ahead. We see the emergence of the transformation and ship-to-ship transfer of gas on board as a growing trend, especially to meet energy demands in emerging markets and megacities. Together with our partner Accelerate Energy (EE), ESM remains the world's leading floating LNG regasification operator, having co-pioneered the world's first regas operation in the Gulf of Mexico in 2005. This same partnership also achieved the first commercial full cargo LNG ship-to-ship transfer in 2007. Since then, ESM and EE have performed 90% of all STS operations worldwide. We will soon

operate the world's first barge-based Floating Liquefaction Unit.

The emergence of on-board liquefaction is an example of how vital it is to constantly innovate across the entire LNG value chain. Innovation is drastically cutting the time needed to establish seaborne export liquefaction and import regasification terminals, which are far quicker to set up than land-based terminals. Innovations often need to be tested and type-approved by class societies and other certification bodies, which brings us back to the need to work symbiotically with these organisations. It's the only way not only to meet the challenges ahead, but to transcend them.



Poul Woodall

The courage to solve our energy issues

The European ferry sector is the silver lining in the grey skies over the shipping industry at the moment. We are fortunate that DFDS is enjoying reasonably strong financial performance, and we aim to continue in that direction despite storm clouds on the horizon.

My biggest concern for the future of the shipping industry is our impact on the environment. We need courage to solve our sustainability issues before it's too late. We need to accept some financial risk and support those who take the lead and pioneer new ideas.

Can digitisation help us? Maybe. There's a lot of talk at the moment about what this trend means for the shipping industry and how we can cope with it. On the plus side, better digital technologies will help us collect and optimise data in order to improve both our products and our bottom line. It's clearly beneficial to get closer to customers and streamline information flows.

Digitisation and automation will play a big role in our response to the EU Monitoring, Reporting and Verification (MRV) regulation, which comes into force in January 2018. This requires every ship calling at EU ports to record and report in detail on oil usage during each journey and while in port. However, the MRV regulation might be an example of recording big data for the sake of it, without looking at the question of how we use it. In my view, this massive reporting exercise will not save one tonne of CO₂.

Why? Energy is a major cost, so most companies already have systems to optimise performance and energy consumption. A new reporting system is just a new system, and in some cases a burden. It doesn't mean we will save

BIOGRAPHY

Poul Woodall, Director, Environment & Sustainability, DFDS A/S

Poul Woodall has over 40 years of experience within the maritime and transport industry. The first 36 years were spent with A.P. Moller-Maersk in various positions, mainly within the container and Ro/Ro segments. His career includes 17 years overseas experience with postings in Asia, The Middle East and Europe.

Since 2010, Poul has been with DFDS A/S in Copenhagen and in June 2013 he was appointed Director for Environment and Sustainability for the DFDS Group. Poul Woodall has a degree from Copenhagen Business School supplemented with management education at Insead and Stanford University. Poul is in the steering committees of the Trident Alliance and Green Ship of the Future and on the advisory board of IMPA-act. Marine environment policy work is conducted through his affiliation with Interferry and various ESSF working groups in Brussels.



Courtesy of DFDS A/S



more energy and I doubt decision-makers will make much use of it. Collecting and sharing data is a good idea if we want to reduce our environmental footprint, but only as long as we use it cleverly.

DFDS operates around 30,000 voyages per year, so we'll need significant amounts of data capture and processing automation. We'll also need good software solutions to get our documentation in order. As we approach the 31 August deadline for submitting the monitoring plan, a lot of practical problems and grey areas are surfacing. A class society or other independent verifier will be needed to check and certify our monitoring plan.

About 18,000 of our annual voyages are between the UK and France, so Brexit adds another layer of complication. It looks like we will have to monitor and report separately on every single one of these voyages. Brexit may bring opportunities as well as challenges, so due to our volume of business to and from the UK we're keeping a close eye on developments.

Environmental regulations obviously affect our strategy and operations. For example, we have installed scrubbers on a number of ships in our fleet in order to comply with the reduced sulphur dioxide emissions limits that came into force in January 2015. We have some new buildings in China that will also be equipped with scrubbers, but we've reached the limit of what we can do with scrubbing technology.

LNG has benefits in terms of emissions and air pollution, and is an interim option that could serve us well for the next 30-40 years. It's a fossil fuel, though, and suffers from the issue of methane slip. Eventually we have to get rid of it and find a fossil fuel-free method of propulsion to drive us forward into the second half of the century. On the financial side, retrofitting ships to run on LNG is an expensive exercise, and given current oil prices, I doubt LNG will bring much economic gain.

Fuel cells look like the most promising long-term solution. The technology is still in its infancy, so we need to work together

to overcome both legal and technical barriers. If we don't, we won't find the right solution fast enough - or at all. It's very much on the agenda of DFDS at the moment.

What other technologies could supplement the shipping industry's future energy mix? Wind propulsion is one interesting idea that we're currently looking at. Other potential ideas are rising up from small and medium-sized companies. Some projects will fly and some will flop. I truly hope that we, as an industry, have the courage to step up and invest serious attention and resources in these efforts. Not only to help the shipping industry run more smoothly and with a lower environmental impact, but to make sure it continues to exist and thrive.



RINA naval sector is growing globally

Since 2000, RINA has been deeply involved in the classification of warships and fast patrol vessels. It has gained considerable experience and remarkable capabilities in this important area.

The Society first entered the naval ships sector thanks to a cooperation with the Italian Navy. This led RINA to be the first class society to class an aircraft carrier, Italian Navy ship "Cavour". Nowadays, the Italian Navy remains RINA's principal partner in this area, as the Society has been appointed for the classification of all new projects currently under development.

In general, new developments in the naval sector are driven by Head Office in Italy. However, RINA is also making big steps on international markets. There are two recent and significant examples of naval business outside Italy that have been developed and carried out locally. These examples - in Indonesia and Brazil - illustrate how competence in the naval sector is growing globally.

INDONESIA

The Indonesian Navy and Customs Police are bolstering their patrol vessel fleet with a newbuilding programme that is expected to be completed by 2024. RINA Indonesia is playing a key role in this effort, becoming a point of reference for technical and advisory aspects for both shipyards and the Indonesian Navy.

Thirteen fast patrol vessels built under RINA class have already been delivered. Twelve more are under construction and expected to be delivered by the end of 2017. These range from 12m fast patrol vessels to 60m offshore patrol ships, and involve different shipyards including PT Dumas, PT Multiprima, PT Tesco Indomaritim, PT Surabaya Marine and PT Lims Nautical.

Further newbuilding contracts for vessels ranging from 30m to 110m are currently under discussion.

BRAZIL

RINA Brasil has been awarded a contract for plan approval activities in compliance with RINAMIL Rules for a patrol vessel designed and developed by the Brazilian Navy's Ship Project Centre (CPN - Centro de Projetos de Navios). The vessel, NPa-500BR, is intended for the Brazilian Navy and is the prototype of a series of vessels planned to be built in the near future.

Design approval activity will be handled by the Rio de Janeiro Plan Approval Centre with the support of the Head Office Naval Sector.

This contract represents the second project that RINA Brasil has won for Brazilian Navy ships. The first project was related to plan approval activities for the new Tamandaré-class corvette, a proposed upgrade to Barroso corvettes, developed by CPN and Vard Niterói shipyard.

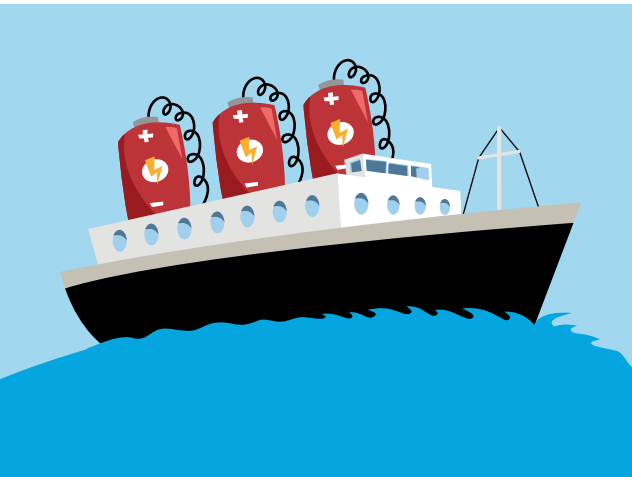
RINA's experience and know-how, gained during the Tamandaré project and the strengthening of relationships with the Navy at a local level, were determining factors in the successful award of the NPa-500BR contract.



Courtesy of PT Dumas Tanjung Perak Shipyard, Subaraya (Indonesia)

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The high-tech future of energy



Rapid developments in technology are transforming the marine industry, solving problems and improving processes in everything from communications to safety. The most fundamental area of technological advance is energy – how to create and harvest it, manage it efficiently and store it. Increasingly strict regulations and rising fuel costs are forcing ships to become more energy efficient and environmentally friendly, both at sea and in port.

Some energy technologies that emerge from R&D departments will never set sail and some will sink after launching. But some will propel the industry into a sustainable and economically feasible future. Which technologies will most shape the future of energy in shipping?

Reliable, affordable batteries with a large capacity for storing electricity for long periods of time will be a game-changer. If ships can supply all their energy needs in port with battery-stored electricity, there is no need for diesel generators. This cuts noise as well as emissions of pollutants like SO_x, NO_x and particulate matter. Batteries currently face many issues with cost, size and lifecycle. However, prices are forecast to fall sharply by 2020, so we can expect to see larger ships implementing this technology.

Smart power distribution systems are the key to optimise the energy consumption of generators operating at variable loads and to automatically, efficiently and simultaneously direct the battery recharging process while the ship is sailing. Smart systems such as this are one of several developments in digital technology that allow us to manage energy more efficiently, leading to lower costs, less wastage and fewer emissions into the atmosphere.

Improved batteries are essential for expanding the use of hybrid ships. For short journeys, hybrid ships can already operate in full electric mode. This produces zero emissions. Operating in hybrid mode allows the ship to use stored energy from batteries to cover its full range of power needs, reducing the engine capacity required.

Efficient battery storage and recharging systems can combine with hydrogen fuel cells to remove all carbon emissions from on-board energy production. The fuel cells can provide auxiliary or propulsion power for the ship. If the hydrogen is produced by renewable energy sources, the whole process is virtually zero-carbon – that is, no emissions of either carbon dioxide or the pollutants mentioned above.

Before hydrogen takes off, we expect to see greater diversification in fuels used by the marine industry. For example, liquid biofuels may replace oil-based fuels. If the infrastructure issues are solved, we can also expect a rise in the use of LNG and methanol.

New cybersecurity rules explained

In May 2018, two dramatic changes to data protection and privacy management regulations come into force. The EU's General Data Protection Regulation and Network Information Security Directive will affect almost every sector of the industry. Organisations that do not comply may incur fines and reputational damage.

The NIS Directive will require "companies, ships, port facilities, ports and vessel traffic services" to take demonstrable measures to manage cybersecurity risks. They will have to report any cyber incident that affects the continuity and privacy of their services to designated authorities without undue delay. The increased visibility of breaches will indirectly force companies to protect data efficiently.

The GDPR will have a huge effect on privacy protection and management of passenger information. It could also impact "individual vessels operated by coastal passenger sea transport companies" not included in the NIS Directive. The main obligations are:

- The introduction of **Data Protection Impact Assessments (DPIA)** and a **Data Protection Officer**;
- **Data portability** - individual right to transfer personal data from one organisation to another;
- **Security and data breach notification** - data is properly safeguarded against unauthorised access, theft or loss;
- Obligation to **track and maintain documentation** of processing operations;
- **Data protection by design and by default** - data protection management is taken into account from the early stages of the design process.

Several companies are already compliant with the new legislation. Others need to improve their systems or provide formal evidence of compliance.

One challenge is to identify how this legislation impacts a specific organisation. Consequences may vary. For shipping companies, according to IMO objectives, cyber risk management aboard vessels should be handled like other operational risks, namely, through a Safety Management System that complies with the ISM Code.

Organisations should perform a three-part assessment process. First, identify the "important assets and infrastructure" and "personal data" they manage. Second, identify the processes in which those data, assets and infrastructure are used. Third, develop a cybersecurity risk assessment.

RINA supports marine and maritime organisations with consulting services, helping them assess their compliance with cybersecurity regulations and fill identified gaps. RINA has the necessary in-house information and cybersecurity competencies to assist in every stage of the process and avoid potential financial or reputational harm.

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Internet of... what Things?



The so-called Internet of Things (IoT) refers to the networking of smart objects (“Things”). The term covers everything from simple products - like cars with built-in tracking sensors and homes with automated lighting and heating systems - to entire “smart cities”. “Things” contain different combinations of embedded electronics, software, sensors and actuators. Although physically separate, they connect with each other via the internet.

What are these “Things” in the context of the maritime industry? How will developments in the IoT affect us now and in the future?

For some time, ships have been equipped with sensors and devices that collect data to provide updates or alarms. The IoT means that such data can now be optimised and sent in real time to captains, crew members, other ships or headquarters. These sensors monitor everything from a ship’s speed to the temperature of a cabin, connecting hundreds of devices and combining new and existing data streams.

We only need to look at our smartphones to know how fast smart technologies are evolving. Similarly, it’s hard to predict how exactly IoT technologies will develop, which problems they will solve and what issues they will create. However, the fusion of data driven by IoT technologies will be able to improve ship health awareness and provide a valuable contribution to the safety of freight and passengers. IoT platforms will also be able to provide remote data acquisition and information exchange,

such as vessel route data exchange and broadcasting to other parties.

We can envisage many other innovative services, for example the evolution of vessel tracking and monitoring technology. This looks to a future of smart global trade and supply chains that exploit the satellite Automatic Identification System, IoT connectivity and big data to improve visibility and control.

There are two sides to every coin. Electronic systems and digital information are increasingly important to ship operations. Organisations must implement appropriate technical and procedural controls to protect the company, its operations, ship data and personal information about crew and passengers. Two areas are particularly important within this framework: IoT security and privacy issues, and certification of analytics software.

RINA offers a security assessment service of onboard IT systems and safety-critical cyber systems to address risks related to the system or supply chain. The assessment is based on ISO/IEC 20243:2015, or Open Trusted Technology Provider Standard (O-TTPS). An initiative of The Open Group, the standard defines best practices for secure engineering and supply chain integrity. RINA is currently in contact with The Open Group engineers to apply the standard to the IoT and maritime sector in a cost-effective way.

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InfoSHIP® EGO 3.0

analytics for all

Collecting large amounts of reliable data on board ships is no longer restricted to rich pioneers and technology enthusiasts. With numerous permanent monitoring systems now on the market, it's easy and affordable for all of us. The era of big data has reached the maritime sector.

Big data can help shipping in the same way that it helps other fields. In medicine, for example, doctors working with data scientists can draw valuable conclusions by applying machine learning algorithms to large datasets.

InfoSHIP® EGO, the fleet performance software suite developed by RINA, brings together software development, big data analysis, naval architecture, seagoing experience and regulation compliance to benefit the end user. InfoSHIP® EGO 3.0 comes with a plug-and-play hardware kit for even smoother installation. It includes ISO 19030 data validation and is capable of running any external script related to data analysis.

The Analytics and Reporting module has been revamped and offers various options for analysing areas such as dry dock intervention or hull degradation. It's the perfect tool for both

small companies with limited personnel and large companies seeking advanced technical and commercial fleet performance analysis.

InfoSHIP® EGO also offers the ability to acquire noon reports. This low-cost option can be a starting point for shipping companies to comply with MRV data collection requirements and perform basic analysis. It can also be the first step towards upgrading to automatic data acquisition on newer ships that are already well equipped with sensors.

Data from inhomogeneous data sources are merged in a database and filtered, processed and analysed by the Analytics and Reporting module. This can be done whether the data source is a noon report or the Data Collector module. Some features are:

- Create ship consumption models through machine learning algorithms
- Compare a ship with sister vessels
- Compare the performance of a ship over different periods of time (e.g. before and after dry dock)
- Filter the data
- Set and analyze specific KPIs
- Export specific data into standard templates for periodic reporting.

Users can manage the data transparently and independently from acquisition source and frequency. This provides a unique repository for technical and commercial analysis of fleet performance data.

Shipping companies are now free to invest more in ships that are considered a high-value asset, while keeping costs low on older vessels. Investment costs can be spread out over the years if required. Data can be protected from both manual error and sensor failure - data gaps in the reporting will never occur with InfoSHIP® EGO. For more information, see infoshipego.rina.org.

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DP class notation revamped

RINA has extensively revised its additional class notation for dynamic positioning, DYNAPOS, to help guide designers, shipyards and operators towards the correct system approach.

It is well known that dynamic positioning (DP) capabilities are essential for exploration, development and exploitation activities in offshore oil and gas fields. DP technology started to play a key role in offshore operations in the 1960s. It allowed drilling and diving operations in deepwater fields that were not reachable with anchoring or jack-up technologies.

Interest in dynamic positioning has soared in recent years, and the technology has become important in increasing the operational efficiency of all units involved in the offshore industry. Today, it is an integral part of charter contracts and its performance is continuously monitored

Station-keeping systems for offshore vessels are continuously improving. However, elements such as distributed computer-based systems, battery management systems for propulsion, DC links etc. increase complexity exponentially. Sound knowledge and a structured procedure are needed to handle all these aspects simultaneously.

RINA's dedicated team of experts in the offshore industry has extensively revised the chapter relevant to the DYNAPOS additional class notation. The revision is based on more than 60 years' experience delivering second-party and third-party services in areas such as near-miss investigations, DP assessments,



SAIPEM 7000 DP3 Unit - Courtesy of Saipem

condition surveys and marine operations surveys (procedure reviews and on-site surveys).

The aim of the revision is to provide designers, shipyards and operators with the correct system approach for DP activities. It draws on guidelines such as IMO MSC/Circ.645 (Guidelines for Vessels with Dynamic Positioning Systems), IACS Unified Requirements and feedback from clients and partners.

The revised additional class notation is based on a risk analysis approach. It involves every aspect from main machinery (diesel generators, thrusters, etc.) and reference systems to related auxiliaries including power management, control systems, networks and software. The DYNAPOS additional class notation can be associated with an environmental index called SKC, capable of providing information about the position-keeping ability of the unit at the most unfavourable heading for specified environmental conditions.

Thanks to the new DYNAPOS additional class notation, RINA has been shortlisted in a tender for the classification during construction of a brand new construction vessel that must meet the highest standards of DYNAPOS-DP3. The vessel will have a full redundancy of compartments and auxiliaries in order to guarantee its reliability, not only in the case of system failure but also fire or flooding of one of the compartments hosting machinery necessary to maintain its position.

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Courtesy of Wellard

Livestock carriers: custom-designed?

The first livestock carrier, Anchor Line's "Europa", set sail from New York to Scotland in 1873 with a cargo of 130 New Jersey cows. At that time, each cow cost \$50 to transport and could be sold for between \$100 and \$125. However, since the journey was hazardous and the cattle often shipped uninsured, livestock carriage was a risky activity.

Some years later, White Star Line took the lead in livestock carriage. The company converted two general cargo vessels into livestock carriers, and was so successful that it soon ordered new vessels. White Star Line's reputation was based on the good welfare conditions of the animals during transport, including first-class treatment for horses.

Today, livestock is still a niche in the shipping market, but a profitable one. It is driven by growth in food demand, which is in turn driven by population growth. The global population was around 1.85 billion in the days of White Star Line. These days, it is 7.5 billion and rising. Food consumption has increased by 50% in the last 50 years.

Two main types of operator dominate the livestock carrier market. The first is small shipping companies managing one or two small ships on fixed routes. The second is big companies with up to 15 large vessels operating worldwide. About 150 livestock carriers are in service, but the number of new buildings is very small. Most livestock carriers are converted containerships or

ro-ro cargo vessels. Recently, however, some main players have decided to build custom-designed vessels.

Livestock carriers have to be designed to store cattle in good conditions, ensuring that the animals have sufficient food, water, medication, cleanliness and ventilation. Unlike other cargo ships, livestock carriers also require a large crew and therefore more accommodation. A custom-designed ship can fulfil these requirements better than a converted cargo ship.

RINA works closely with major livestock carrier operators including Wellard and Livestock Express B.V. (Vroon group). We have supervised the biggest custom-designed livestock carrier, Wellard's "Ocean Shearer". Capable of serving long-distance routes, it can transport up to 20,000 cattle or 75,000 sheep or a combination of the two. It was built by STX Dalian Shipyard and delivered in 2016.

As well as being a profitable niche, the livestock carrier market still has a lot of potential to grow. The global population is projected to reach 8.5 billion by 2030, with food consumption increasing by about 25%. Assuming we don't all become vegetarians, we expect that the demand for cattle transportation will grow accordingly.

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Innovation in ship conversion



Courtesy of Concordia Group



Courtesy of Concordia Group

RINA has classed the last two Concordia ships designed specifically to transport heavy wind power components around Europe. The two ships, "Rotra Vente" and "Rotra Mare", confirm the trend towards highly specialised vessels designed to perform particular tasks with the utmost efficiency.

These sister vessels were originally built as container ships and repurposed using many innovative features. "Rotra Vente" is designed to carry turbine housings (nacelles), while "Rotra Mare" will transport wind turbine towers and rotor blades. Modifications include the removal of cargo hatch covers to create a flush main deck of 2,000sqm. Cargo holds were transformed into ballast tanks, support structures and void space.

The challenge of loading and unloading heavy components was solved by self-propelled modular transporters with multiple wheels. The vehicles roll onto the deck via a bow ramp, making the loading process more cost-effective and independent of both crane infrastructure and wind conditions. A hydraulic system extends the adjustable ramp from the bow to the quay.

A single nacelle weighs about 430 tonnes, so to avoid heeling during cargo operations, an automatic touchscreen-controlled heeling tank system has been installed. A manual forward/aft trimming system controls trim variations.

Ro-ro vessels are required to have a watertight compartment at the bow. This normally consists of a bow door and watertight door a few metres apart. On the "Rotra Vente" and "Rotra Mare", the whole forecastle is a watertight compartment that is lifted into place by hydraulic cranes and locked into position. Anchor pockets were shifted back and outwards.

Since this new design does not appear in the International Convention on Load Lines (ILLC), the Dutch Administration granted an exemption. The exemption was based on a "novel design" proposal presented by RINA, which was considered to have the same safety level as the convention's original philosophy.

Energy-saving measures included reblading and optimisation of the propeller for a lower trading speed of 15 knots. This reduces power demand by 14 percent and offers a return on investment of less than a year. In keeping with their innovative features, the ships have a modern look and feel. Completely overhauled, the wheelhouse of the "Rotra Vente" features 46-inch LCD displays.

As a container ship, "Rotra Vente" was just a bare hull that was never outfitted. Through extensive non-destructive testing and fatigue life computation, RINA succeeded in classifying the ship as a new building, with a keel laying date at the beginning of the conversion works.

New factory ship for processing fish

As investment in oil drilling drops in the Norwegian Sea, a new trend is rising: factory vessels designed to process fish on board. Newly established Norwegian company Hav Line Vessel AS, part of Haugland Gruppen, is currently new-building a fish processing factory vessel in Spain.

RINA will take part in this interesting newbuilding project in the classification role of plan approval and construction supervision. The complex process will take 18 months to complete, with the hull scheduled for delivery in May 2018. The project will not only add a new type of vessel to RINA's classification portfolio, but also provide the European marine industry with exciting possibilities to explore.

A design project of Wärtsilä Ship Design Norway AS, the 94 m, 5893 GT factory ship will mainly process salmon and trout. The idea behind a fish processing ship is to avoid the cost and delay of transporting caught fish to a factory on land. Instead, the ocean-going vessel acts as a floating factory, with all the equipment and machinery needed to process the catch before unloading it as finished products.

The basic process is as follows. Caught fish are pumped from the cage on the supplying boat into a vacuum tank on the factory vessel using a vacuum pump. Specially designed compressors ensure the fish arrive in the orientation unit for stunning and bleeding without wasting water. Oxygenation equipment can be

used to maintain good water quality and reduce the stress on the fish if necessary.

From the vacuum tank, fish and water are blown through pipes into two dewatering units in the stunning area. Here, the water is separated and returned to the sea. The fish are then registered before entering the electro-stunning area. After stunning, they slide to a new conveyor for manual gill cutting. They are then transported to the bleeding pipes.

A group of operators inspect and correct the size of the fish before feeding them to the gutting machine to start the gutting process. Gutted fish are then transported into refrigerated seawater tanks, to be stored until they are unloaded.

Unloading the fish onto land involves a suction nozzle connected to a system of pipes, creating a vacuum pump. As the ship moors at the unloading location, a hose from the shore connects the unloading pipe to the onshore facilities. The finished fish products are pumped ashore and are ready to be sold.

This whole process will take place aboard the new factory ship. Conceptually based on ships previously used for whaling, modern fish processing vessels are used extensively in Russia, Japan, Korea and increasingly the USA.

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Courtesy of Hav Line AS

New Qasim LNG terminal



Courtesy of EETL

Since RINA established its all-new engineering hub in the USA, it has been involved at various levels in some of the most challenging and significant LNG projects worldwide. To date, over 100 consulting engineering projects have already been completed satisfactorily. This underlines the deep domain expertise that the company now offers in this highly specialised sector.

Following an important new contract win in October 2016, RINA is actively working on providing engineering consulting within a framework agreement for the new LNG terminal design at the port of Qasim (Pakistan). The customer is a joint venture between Shell INTL EXP&PRO, ENGRO and Fatima.

The Port Qasim LNG project is a large-scale project with a huge specification. It includes a FSRU concept terminal with a capacity of 170,000 square metres and a nominal sendout capacity of 600 MMSCFD, side-by-side loading capability, HP unloading arms, and a berth receiving facility for the FSRU and 1 km HDD (Horizontal Directional Drilling) pipeline which will eventually be connected to the existing onshore gas network.

The project represents an important and fundamental step in Pakistan's energy strategy, which is one of expansion. According to recent consumption projections, in-country demand for gas will rise exponentially. Estimates indicate demand rising by a factor of 10 by 2022, from current 2016 import volumes. Most

of the important players in the Pakistani LNG market are in some way participating in the Port Qasim Project. RINA is proud to have been appointed as designer and engineering consultant, taking on the important task of demonstrating the overall project's viability, sustainability and safety.

In the role of engineering consultant, RINA is developing several specific studies and tasks with the goal of identifying the optimum terminal location and logistic/operability arrangements. These include the identification of project hazards (HAZID), the assessment and evaluation of risks (QRA) and the viable manoeuvrability criteria (Manoeuvrability Study).

A particularly interesting aspect of the project is a full-bridge simulation. This task will call upon the expertise of experienced LNG ship masters and pilots, who will conduct a number of tests covering all the mooring and unmooring safe manoeuvres and potential emergencies, taking into account the area's demanding environmental conditions.

Apart from the full-bridge simulation, there are further challenges at design level. For example, RINA engineers have designed the interconnection pipeline between the new terminal and the existing RLNG (Regasified LNG) receiving facilities at Port Qasim, including the Horizontal Directional Drilling (HDD) section.

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RINA's role in first ever CNG carrier

Natural gas is traditionally transported using pipelines and LNG ships. However, in limited gas fields, relatively close to end users, Compressed Natural Gas (CNG) transportation can be a competitive alternative. It avoids the challenges of pipeline construction and the costs of liquefaction and subsequent regasification.

The lower capital and operational expenditure required makes this approach particularly interesting for stranded reserves and other areas where the process of liquefaction, transportation and regasification is unfeasible. The CNG carrier ship concept uses high-pressure containment technology used in existing pipeline and gas storage systems. The gas is compressed and stored on board the ship in its concentrated form.

The first ever CNG carrier, "Jayanti Baruna", was launched in January 2016 for Indonesian power company Perusahaan Listrik Negara (PT PLN). Designed by CIMC Enric/Oric and built at the Hantong Shipyard in China, the 110m vessel flies the Indonesian flag. Its dual fuel engine allows it to reach sailing speeds of 14 knots. It is designed to offer a CNG capacity of about 26 MMscf. The ship is intended to transport natural gas from Indonesian gas fields in East Java to the island of Lombok. It would usually

not be feasible to supply the remote communities on this island using traditional means such as pipelines or LNG carriers.

RINA's role in the construction, testing and commissioning of the ship involved several key aspects. During the design review of the Detailed Engineering phase, RINA's tasks included reviewing the CNG vessel manufacturer design documentation, particularly the cargo containment systems, to assess compliance with contractual requirements. It also reviewed and confirmed the Hazard and Operability (HAZOP) and Health and Safety studies.

As part of the construction, testing and commissioning phase at the Chinese shipyard, RINA engineers supervised the installation of mechanical equipment and verified that the installation and testing procedures complied with approved ITP document. They also supervised and verified the installation and commissioning of the CNG tubing, cargo containment and loading/offloading systems. RINA also collected, organised and recorded documents from the EPC contractor and reviewed the project management and work plans.

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Courtesy of PLN Enjiniring

LNG bunkering safety studies



The Italian Ministry of Infrastructure and Transport has commissioned RINA to develop safety studies assessing the possibility of performing LNG bunkering operations inside major Italian ports. The scope of work extends to cruise vessels, large and small ferries and tug boats. The studies are part of the GAINN4CORE initiative, co-financed by the European Union within the framework of the Connecting Europe Facility (CEF) programme.

Activities included identifying potential accident scenarios, evaluating how often they could occur and assessing possible effects. The studies also covered mitigation measures to minimise risks and guarantee that passengers could transfer and/or stay onboard during bunkering. The studies were carried out by a multi-disciplinary team of RINA experts.

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MRV

plans & verification

RINA is one of the first bodies to be accredited for MRV verification. The EU's Monitoring, Reporting, Verification (MRV) regulation of July 2015 applies to all ships over 5,000 GT that call at EU ports. From January 2018, all CO₂ emissions from these ships must be monitored, reported and independently verified.

RINA is accredited to assess the monitoring plans that ship owners must submit by 31 August 2017. It is also accredited

to verify the detailed emission reports that must be produced to comply with the regulation.

"RINA will be able to help ship owners comply with the regulations. We have all the credentials and perhaps more importantly the experience," said Paolo Moretti, CCO Marine & Transport, RINA Services.

■ Taken from RINA web news



Showcasing RINA

RINA will be one of many leading players in the shipping industry to attend Nor-Shipping 2017. The biennial event is a major forum for discussing new technology, environmental debates and challenges facing the sector.

The biennial event takes place at Norway Trade Fairs, Oslo from 30 May to 2 June 2017. Visit us at booth D01-14 to meet us and find out more about our innovative services dedicated to the maritime industry.

You can also find RINA at the following key events and conferences in 2017:



MONACO YACHT SHOW, MONTECARLO, Monaco, 27-30 September

MARINTEC SOUTH AMERICA, Rio de Janeiro, Brazil, 15-17 August

INTERFERRY CONFERENCE, Split, Croatia, 7-11 October

MARINTEC CHINA, Shanghai, China, 5-8 December



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