

Issue 48, April 2019

Horizons.

Connecting tomorrow's thinking to the challenges of today.

WHAT'S ON THE HORIZON FOR:

Innovation	and the second se
Technology	
Regulation	10



On trend

Tim Wilson discusses why a proactive mindset is required for managing the 2020 sulphur limit.

Sulphur 2020 – Countdown to the switchover.



In focus

2 Contents

Horizons catches up with Piet Mast, our voice on SAMEA, and John Hicks, our voice on The Americas

Our people - East and West.



Innovation

Luis Benito talks about definitions, benefits and the opportunities for the shipping industry.

Shipping's digital shift: classification, twins and health management systems.



Technical matters

14

A selection of technical investigation case studies that demonstrate assurance beyond Class.

News

Catch up on the latest developments at LR from our teams around the globe.

What's happening in our world.



Meet the team

Assurance beyond Class.

The team behind Horizons is expanding (in more ways than one!). Current Global Head of Brand & External Relations - Nicola d'Hubert - is off on maternity leave later this month and the team is delighted to welcome industry veteran Nicola Good as her replacement. Nicola is supported by LR stalwart Paul Carrett and newcomer Viv Lebbon - who joined the team in late 2018.

16

If you have any feedback or suggestions for upcoming issues of Horizons, we'd love to hear from you. Please get in touch with Paul at Paul.Carrett@lr.org

Lloyd's Register and variants of it are trading names of Lloyd's Register Group Limited, its subsidiaries and affiliates.

Care is taken to ensure that all information provided is accurate and up to date. However, Lloyd's Register accepts no responsibility for inaccuracies in, or changes to, information. Lloyd's Register Group Limited, 2019. A member of the Lloyd's Register group.



Technology

LR Chief Surveyor, Jain Wilson, explains how hipowners have been weighing up the efficiency benefits of remote surveys.

Surveys without attendance aking it case-by-case.

Regulation

SOLAS damage stability, EU MRV and IMO DCS and MARPOL ANNEX VI: what you need to know to prepare and comply.

10

12

18

6 IMO adopted regulations in 2019. Forthcoming IMO legislation.

6

We need to see change coming, learn and equip ourselves with the new capabilities required to face it...

Welcome to the

Horizons.

first edition of the

newly re-launched

Our world today is one of increasing complexity and uncertainty, where we are overloaded with information and competing interpretations of challenges and their solutions. At LR we are concerned with how our industry successfully navigates this changing landscape, capitalising on new opportunities whilst mitigating against emerging areas of risk.

changes that are affecting the maritime industry?

We need to see change coming, learn and required to face it – or know who to turn to decisions today that will help secure the

Following a break last year, we have refreshed the magazine and hope to now deliver a read that helps you better prepare for all the challenges facing our industry. From those that are imminent,



to those that seem a long way off, but actually impact decision-making today.

Horizons now brings together LR's insight into current trends and hot topics in maritime alongside expert views from our people on regulation, technology and innovation. We hope to shine some light and applied to solve tangible problems of what work LR is doing, you will see how this could impact/improve your own situation and how LR might better support your business.

Enjoy the read.

Nick Brown Marine & Offshore Director

Sulphur 2020 – countdown to the switchover.

Tim Wilson, our voice on Sulphur 2020, on why a proactive mindset is required for managing the 2020 sulphur limit on marine fuels.

Tim Wilson Our voice on Sulphur 2020

All ships should have a fuel management protocol on board... shipowners and operators need to go beyond this and ensure their crew have a proactive mindset to comply with the Sulphur 2020 limit. Sulphur 2020 (MARPOL Annex VI Reg. 14.1.3) is still dominating headlines and, as we draw closer to the 1 January 2020 deadline, it's clear that this is a big challenge for numerous players within the industry, from supplier to the end-user.

At this point owners and operators should have chosen their compliance option. We're now seeing major fuel suppliers announcing their availability of 0.50% compliant fuel. Last month, BP announced that they have successfully tested Low Sulphur Fuel Oil at sea and will be selling 0.50% before 2020. This came shortly after the International Energy Agency projected that almost half of the global fleet will use marine gas oil in 2020 and eventually, 40% will burn Very Low Sulphur Fuel Oil (VLSFO). We've also seen that compliant fuel is available in ports such as Rotterdam. Importantly, this gives shipowners and operators the ability to plan ahead – as they learn which suppliers have what fuel available and where helping them to get their fleets and crews ready for this regulation.

The biggest challenge

For shipowners and operators, the biggest challenge is to prepare their ships for the switch from High Sulphur Fuel Oil (HSFO) to Low Sulphur Fuel Oil (LSFO). They will need to work out how much investment is needed to prepare the ship's fuel systems and tanks; this might involve cleaning tanks, which takes time, effort and money as the ship will need to be off-hire. Owners and operators also have the option to leave their tanks and hope that this change of fuel will not damage them or affect operations. Or, they can consider the implications of the diversity of fuels that might come with this regulation. For example, will this require segregation? If so, does the owner or operator have spare tanks to segregate the fuel?

Test, prepare and plan

Our Fuel Oil Bunker Analysis and Advisory Service (FOBAS) team have been analysing 0.50% fuels to set a baseline understanding of composition and compatibility. From a technical perspective, we would recommend implementing a fuel segregation plan. Whether that's considering loading a light product compared to a heavy one, or making greater efforts to segregate and avoid co-mingling fuels, industry experts warn against mixing one bunker with another as there's a high risk of destabilising the fuels and in most situations, crews can't easily assess the degree of risk of this happening until the fuel is already onboard, so segregation of bunkers is important.

The next step is managing the diversity of the viscosities of the fuels and managing

any incompatibility thus observed between the different bunkers onboard: if crews must mix, then working out the ratio's involved and any potential resultant properties is key. These are all important considerations and decisions to be made now as part of the ship implementation plan, as recommended by the International Maritime Organization (IMO), allowing owners and operators the time to test, prepare and plan.

Some crews have had limited or no experience of using LSFO, so crews need to be prepared for this, particularly when it comes to fuel management onboard. All ships should have a fuel management protocol onboard, which is likely to be a procedure covered in the company's ship management system. However, shipowners and operators need to go beyond this and ensure their crew have a proactive mindset to comply with the Sulphur 2020 limit. This should address an additional fuel change plan, for which the ship implementation plan will include key preparatory milestones, so considering whether there is a need to update their fuel management strategies to include bunker segregation and fuel compatibility.

A word of caution

There is some speculation that, because we're going to have a diverse range of fuel blends, there will be quality issues, so owners and crew will need to make sure there are barriers in place to protect against contamination if it occurs. This might not necessarily happen because all residual fuels are for the most part blended and blending has been a common practice in the shipping industry for many decades, but it's right to be cautious. Reputable suppliers should meet the standards set out in ISO-8217. the marine fuel standard that gives the criteria of the core parameters which must be met by any fuel if it's to be used onboard a ship. We recommend purchasing against the latest revision of the international marine fuel standard ISO-8217:2017. With this, the supplier



knows the parameters and targets set out in ISO-8217 and understands that there are clauses in the standard that expect the supplier to have quality assurance within the supply chain and consequently their responsibilities to heed to that.

When it comes to Sulphur 2020, planning is critical. Approximately 50% of the world fleet have little or no experience operating in an Emission Control Area (ECA) and having to switch to working with low sulphur fuel. Nor have they experienced this type of change before, so awareness for crews and preparing fuel systems and tanks is fundamental to get this change safely and effectively implemented. Yes, there are risks and safety concerns, however the industry can tackle these with a sense of confidence if sufficient planning, testing and stakeholder engagement is implemented.

If you have any questions or need support, please visit: <u>www.lr.org/sulphur2020</u>

Shipping's digital shift: classification, twins and health management systems.

Luis Benito, our voice on innovation, talks definitions, benefits and the opportunities for the shipping industry.

The maritime and offshore industry is undergoing a digital transformation that has changed the way the industry thinks about traditional classification. Technology has underpinned so much of this recent evolution and there has been a lot of discussion about digital twins, digital class and digital health management (DHM) systems, sparking a lot of interest and some confusion too. At LR, we have worked to better define these terms for the industry, understanding that these might develop over time as the technologies become more established and as classification evolves to further support them. It is important for us to understand the value digital can bring to the industry and our clients, and how we build confidence in these technologies going forward.

The benefits of digital twins

We define digital twins as a 'multi-physics, data-driven representation (or model) of a physical asset, often residing in a cloud-based environment using data streamed from the physical asset (e.g. a gas turbine, diesel engine, compressors, pumps etc.)'. These can help owners and operators improve aspects of their operational performance and maintenance regimes through insights generated by the twins. Another benefit of digital twins is that their data can provide greater transparency and repeatability in demonstrating compliance, making it more convenient for owners and operators to provide data to class societies and other regulatory bodies. Digital twins learn and improve their insight over time by gathering data on how an asset performs under different operating conditions, which is supported by mathematical rules based on the physics of the real world.

Digital twins can also be used to better understand current asset health (fault detection and diagnostics) and create predictions of asset health in the future (prognostics).

Digital health management

LR has established the term DHM to describe digital technologies and systems that are used to gather data and insights on an asset's health, which could be in the form of a digital twin. DHM systems provide functionalities such as fault detection, diagnostics or prognostics, and will have an increasing role to play

Digital Class

LR's Digital Class is our vision of how advanced technology and analytical techniques will allow the demonstration of compliance with Class requirements in the future, remotely, periodically and/or continuously. Digital Class will also allow the submission of Class relevant insights and data either continuously or periodically to demonstrate compliance, leading to a more targeted and flexible approach to physical survey. Our first step towards this vision, the first ever in our industry, is titled Digital Compliance – establishing a process for the Assurance of Digital Twins and how to use the technology in demonstrating compliance with Class requirements.



It is important for us to understand the value digital can bring to the industry and our clients and how we build confidence in these technologies going forward.

Luis Benito Our voice on innovation

in operating assets safely, reliably and economically. They will also become a key feature of autonomous and remote systems and vessels as the vessels grow in size, sophistication, range endurance and operational capabilities.

a trusted digital twin and DHM systems,

such as improving insurance or charter

rates through greater trust in asset

reliability and the possibility that the insights generated from digital twins during operation could be fed back into new, more efficient and reliable equipment and ship designs.

LR's digital compliance framework

There may be additional benefits of having Inspired by the potential value to the industry provided by digital twins and DHM systems, and the need to develop

Stage	Description	Meaning	Audience
Stage one	Digital Twin READY	This means we approve the vendor or provider of a DHM system based on a process and capability assessment.	System providers
Stage two	Digital Twin APPROVED	This means we approve a digital twin developed for a specific asset by the approved vendor or provider for a marine client.	System providers
Stage three	Digital Twin COMMISSIONED	This means the twin and the DHM System is now connected with the ship's/asset's systems.	Owner/operators
Stage four	Digital Twin LIVE	This means that the owner maintains the approval of the digital twin insights through its life.	Owner/operators

Stage one, Digital Twin READY, gives digital twin providers LR's 'seal of approval' as a twin builder, helping them demonstrate to potential clients that they can develop such technologies. If a twin provider reaches stage two, Digital Twin APPROVED, it means LR has officially approved a twin or DHM that has been developed and deployed for a specific asset. For owners and operators, stage three of the framework, Digital Twin COMMISSIONED gives them the confidence that the twin and DHM system works with their ship or asset properly and is commissioned with the ship's/asset's systems. Stage four, Digital Twin LIVE, is

an ongoing process which provides the owners and operators with confidence that the twin is working as it should, which in time will encourage them to trust the insight that's generated through the physical asset's operational lifetime.

Our digital compliance framework was first validated through a co-creation project with GE, resulting in an AiP to Digital Twin READY for GE's Predix Asset Performance Management, which is a DHM system that uses digital twins and advanced diagnostic/prognostic techniques.

confidence and understanding in these technologies. LR has collaborated with industry leaders in this area to develop a process of providing assurance of digital twins and digital compliance through a data-driven compliance framework. The digital compliance framework consists of four approval stages for the system providers and the owners:

In conclusion, we've talked through meanings and benefits of introducing digital twins and DHMs into day-to-day operations, as well as how suppliers and owners and operators alike can use our digital compliance framework to build confidence in these technologies and use the insight they generate to improve maintenance regimes and operations. For LR, our work is about supporting the industry's digitalisation journey to realise new value and, more importantly, supporting our clients to build confidence in these technologies so that they can be trusted within the industry to make better, more informed decisions safely.

Surveys without attendance – taking it case-by-case.



LR Chief Surveyor, Jain Wilson, speaks to Horizons on how shipowners have been weighing up the efficiency benefits of remote surveys since LR issued its 2018 guidance.

Remote survey techniques have been in use for many years, but advances in technology, as well as data storage and transfer, have provided more options. As the benefits of this capability have become clearer, applications of these technologies have become more widespread, spurring LR's decision in 2018 to issue guidance notes on requests for surveys without attendance.

The classification society has now undertaken several hundred remote surveys, says LR Chief Surveyor lain Wilson, with the "people who understand the technology pushing for it and using it".

At present, a remote survey, which LR defines as a survey without surveyor attendance, can be used for smaller tasks such as verifying a repair has been undertaken or ensuring minor damage has been rectified.

Speaking to Horizons, Wilson explains that while remote surveys aren't always

the answer to everything, they can ensure that there are fewer attendances on a vessel and a reduction in the number of interventions that may be required through the year. This is a huge advantage for owners and operators and has significant benefits for LR's surveyors, he says.

A surveyor's skill is rooted in analysing the collected data

Undertaking an inspection can be time consuming and remote surveying techniques can facilitate a more efficient collection of data while allowing surveyors to focus their energies on the interpretation of the evidence, he explains.

Remote surveys can also spare a surveyor from the rigours of travel – eliminating the scheduling and safety risks from flying, driving, or a boat transfer that may be involved in getting an expert to the right location. Removing these travel

uncertainties means that a 30-minute job can be completed much more efficiently for all parties.

According to Wilson, a wide range of surveys can be managed through video and picture evidence using everyday technologies. He believes that the scope of remote surveys will continue to increase as the capabilities of the technologies increase and their cost effectiveness is improved.

"It is important, however, that the right technology is used in the right situation," he stresses, adding that he expects that the greatest adoption of remote survey technology will be for assets where access is most difficult, and the downtime costs are high.

LR's Marine and Offshore Director. Nick Brown confirms that the introduction of enhanced surveying practices utilising modern communication tools and technology, such as live video feed etc, is an area that is commanding significant interest from the organisation's customers.

"This technology expands upon what our surveyors have been using for years,

but greater ability to stream high-quality images and video around the world enables our surveyors to access the data they require in more reliable ways, sometimes without the need to be on site."

What about drones?

A common misunderstanding in maritime is that the use of drones can equate to a survey without attendance, which it does in respect of the surveyor. Yet the use of unmanned aerial vehicles (UAVs), for example, still requires a skilled technician onboard to pilot the craft.

Drones are part of the answer, but they are not the only answer, Wilson points out. While UAVs can be useful for accessing hard-to-reach areas of a vessel, the suitability of their use must be assessed on a case-by-case basis. They can be an effective alternative when other equipment that is traditionally used to reach difficult areas such as cherry pickers may not be readily available.

So, can the annual survey be conducted without attendance?

"Not yet," says Wilson. "The technology is evolving rapidly, but given the current range and the scope of the annual survey, skilled surveyors are still required onboard. However, remote surveying can be very effectively used for specific parts of the survey and for the follow-up on the original survey – verifying that minor repairs have been undertaken and validating deficiencies have been addressed."

However, despite the efficiency benefits of remote surveys, industry concerns exist around equivalence. According to Wilson, organisations like LR have a duty to confirm that remote surveys offer the equivalence to a surveyor being in attendance.

"For us to validate the evidence, the collected imagery must genuinely represent what is being seen," he says. At present the only person that can guarantee equivalence is the surveyor as they have the experience of knowing exactly what they want to see or are seeing, but we are building up experience now that remote surveying has gone beyond proof of concept and has been released to clients.

"We must keep our eyes open to the benefits and the potential risks," Wilson stresses. "It's important that all of us in the industry get this right given the regulatory scrutiny around this capability. Moving too fast and getting it wrong could be a huge a setback for everyone."

When are remote surveys used?

A remote survey may be appropriate when:

- are not available
- A minor statutory finding relates to the verification of documentation or the replacement of spare parts
- A Condition of Class (COC) relates to the verification of documentation or the replacement of spare parts
- The outstanding documentation can be readily verified using electronic

Circumstances under which LR would consider giving a remote survey:

- Where new damage is sustained, but it is not possible for a surveyor to attend onboard in the vessel's current location
- Deletion or revision of a Condition of Class of a minor nature
- Deletion/revision of a minor statutory finding
- · Provision/update of documentation.

What our customers say

"We are grateful for the remote support and assistance that has been provided by Lloyd's Register when the remote location of the port could have resulted in delays for vessel departure and serious commercial issues for our Charters and Dynagas as well. Remote support and assistance from LR Piraeus has been of great value for us and on some occasions, critical."

Christos Vlachos, Head of **Technical Dept, Dynagas Ltd**

"We would like to express our sincere appreciation and gratitude to the remote/ administrative survey service provided by LR Piraeus to our company. Your valuable consideration based on rational judgement for specific and rather difficult and peculiar cases has provided an invaluable assistance allowing owners/managers to properly follow up and resolve issues, avoiding unnecessary and costly delays."

Nikos Nitsopoulos, Technical Manager, Empire Bulkers Ltd

"We would like to express thanks for the remote assistance we have received in a number of cases for which, due to various reasons. normal survey practices could not be employed. The value of such remote assistance is considered of utmost importance for our smooth business operation and at the same time compliance with the LR Rules and Regulations."

Vassilis Moschovakos, Technical Manager, Eletson Corporation

IMO adopted regulations in 2019.

SOLAS damage stability, EU MRV and IMO DCS and MARPOL ANNEX VI: what you need to know to prepare and comply.



Andrew Sillitoe Our voice on regulation

2019 is a busy year in terms of adopted International Maritime Organisation (IMO) regulation. These include the forthcoming SOLAS amendments, significant milestones for the fuel oil consumption data collection system (DCS) along with the EU's Monitoring, Reporting and Verification (MRV) regulation, and the MARPOL Annex VI global sulphur limit coming into force in January 2020. Andrew Sillitoe, Principal Specialist of Regulatory Risk, Development and Compliance, talks about the key considerations and why these regulations are important to shipowners and operators.

Amendments to SOLAS Chapter II-1 on damage stability

Amendments to SOLAS Chapter II-1 to harmonise cargo ship and passenger ship damage stability came into force in 2009. These made probabilistic damage stability the main method for calculating damage stability for passenger ships and general cargo ships. Once the amendments came into use, the need for a number of revisions became apparent, so the IMO undertook a major review of the subdivision and damage stability requirements in Chapter II-1 of SOLAS. Significant changes include, amongst others:

- Requiring limiting stability information to include trim.
- Modifying the required subdivision index, R, for passenger ships.
- Amending the calculation for S factor.
- Providing limits on the distance between small wells and the keel line unless a damage stability check is made and introducing a minimum limit for the vertical damage extent.

• Permitting a butterfly valve at the collision bulkhead on cargo ships.

- Requiring testing of watertight hatches.
- Requiring air pipes which terminate in a superstructure to be considered unprotected openings unless fitted with a watertight means of closure.
- Removing the possibility of leaving watertight doors open.

These amendments need to be taken into account in the design of ships contracted from 1 January 2020.

Monitoring and reporting of fuel oil consumption and CO2 emissions

2019 brings significant milestones in both the EU's MRV regulation and the IMO's fuel oil consumption DCS requirements under MARPOL Annex VI. For EU MRV, the first year of monitoring ended in 2018 and the first reporting is taking place in early 2019. For IMO DCS, 2019 is the first monitoring period. In order to comply with the IMO DCS requirements, each affected existing vessel's Ship Energy Efficiency Management Plan (SEEMP) will by now

have been updated with a new Part II to provide the ship-specific methodology and processes to be followed for the data collection. New ships will need to have this upon delivery. After verified data has been reported, it will be transferred to the IMO Ship Fuel Oil Consumption Database where it will be kept anonymised. This will help the IMO to produce annual reports and evaluate the need for further technical and operational measures for enhancing the energy efficiency of international shipping.

For ships subject to the EU MRV regulation, the first monitoring period has now finished and the collected monitoring reports need to be submitted for verification. For LR clients, all documentation (monitoring plans and emission report evidence packs), except emission reports, should be submitted to <u>CO2 Verifier</u>. The regulation requires that clients submit emission reports directly to THETIS-MRV, which is operated by the European Maritime Safety Agency (EMSA). As the accredited verification body, LR will then retrieve the reports from THETIS-MRV for verification and upload them to CO2 Verifier along with related LR deliverables.

Global fuel sulphur limit reduction to 0.50% and associated carriage ban

From 1 January 2020, MARPOL Annex VI will require all new and existing ships to comply with the new global 0.50% sulphur limit using the most appropriate method for that ship. The options include low sulphur fuels and alternative fuels, or alternative arrangements such as an exhaust gas cleaning system (also known as scrubbers). The global limit means that this applies to all areas outside of Emission Control Areas (ECAs). Unless a

ship has an alternative arrangement such as a scrubber, shipowners and managers will need to consider debunkering any high sulphur fuel oil that is not used up before 1 January 2020.

The IMO has also adopted a requirement to prohibit ships from carrying fuel oil with a sulphur content above 0.50% if its purpose is for combustion for propulsion or operations on board, unless the ship has an approved equivalent arrangement in place. This is to help support full global compliance. Due to the IMO procedural requirements for amendments to MARPOL, this will enter into force on 1 March 2020, but it is worth clarifying that this does not change the sulphur limit reduction date.

 \bigcirc

For further information about these or any other upcoming regulatory changes, please contact your local LR office or visit <u>www.lr.org/imo</u>

Click <u>here</u> to subscribe to receive our bulletin with updates of IMO agendas, reports and our forthcoming legislation document.





Forthcoming IMO legislation.

The IMO's MARPOL Annex VI sulphur limit reduction has been dominating the industry headlines recently, but this is far from the only topic that has been on the IMO's agenda. A range of safety and environmental topics have been the subject of discussions and will impact on operations, crew and technology. We have listed some of the confirmed and adopted legislation that will have an effect in the next few years in the timeline below.

SAFETY REGULATIONS

IMDG Code 39-18: Articles with lithium batteries Samples of energetic materials for testing

Fire protection of boilers: Amending requirements for boilers <175kW if protected by a fixed water system

Evacuation analysis: Required for all new passenger ships

Damage control drills: Passenger ships

MODU Code: Drills, rescue boat, monitors

2020

A-0 wheelhouse windows: Removing requirement, IGC & IGF Codes

Lifeboats, rescue boats, launch/release: Maintenance, testing, repair

Annex VI fuel sulphur: 0.50% outside ECAs

from 1 Jan 2020, carriage ban from 1 March

Damage stability: Significant changes to the subdivision and damage stability requirements in SOLAS II-1

Intact Stability Code 2008: Anchor handling, towing, lifting, Part B remain non-mandatory

Automatic sprinklers: Water quality, corrosion

Vehicle carrier: Fire requirements

Firefighting for helicopter landing areas: Foam application systems

GMDSS: Recognising Iridium as a provider

2019

EU MRV: Monitor 2018, First reporting 2019

NOx: EGR bleed-off water discharge guidelines

Baltic sewage special area: Passenger ships only, New 2019, Existing 2021

Ballast Water Management Convention amendments: Retrofitting schedule, Guidelines for approval, Commissioning, Contingency measures

EEDI amendments: New reference line for ro-ros and ro-pax

Bunker delivery note: Amendment reflecting fuel sulphur limits

ENVIRONMENTAL REGULATIONS

2020 if no scrubber fitted

Industry viewpoint

Jonathan Spremulli, Marine Director, International Chamber of Shipping



EEDI: Linking future reduction targets to IMO's GHG strategy: Phase 2 (2020), Phase 3 (2025 or 2022), Phase 4 (year to be confirmed by IMO)

"The International Chamber of Shipping (ICS) is the principal global trade association for shipowners concerned with regulatory affairs and as such we particularly welcome and support regulatory measures adopted globally that will improve the safety of ships in the harsh environments that they frequently encounter during their daily operations at sea. ICS therefore looks forward to the amendments to SOLAS II-1, concerning damage stability requirements, that are entering into force in 2020 and which will further enhance the survivability of ships built in the future thereby protecting both seafarers and the environment. These amendments are only one example of the important detailed work that is often forgotten that ICS is involved with at IMO together with IACS and its members including Lloyd's Register."

Industry viewpoint

"The EU MRV will always be a nuisance to the shipping industry adding administrative burdens to shipping companies and ships' crews by requiring piecemeal information about ships' emissions and movements. The IMO has included mandatory requirements for collection of complete information about ships' emissions and movements, and alignment of the EU MRV requirements on monitoring parameters would at least make this regional requirement bearable A message from BIMCO to the European lawmakers is to turn to IMO if there are improvements to be made on monitoring parameters - not maintaining a regional

Lars Robert Pedersen, BIMCO Deputy Secretary General

BIMCO

2020

ECA-NOx Baltic, North Sea, inc English Channel: Tier III engine required for newbuilds visiting the area

2022+

Ballast water treatment systems: Latest retrofit deadline 2024

Ship Recycling Convention: 8 member states 21.32%

Our people – East and West.

Horizons catches up with Piet Mast, our voice on South Asia, the Middle East and Africa (SAMEA), and John Hicks, our voice on The Americas.



John Hicks Our voice on the Americas

6

John Hicks, LR Area Marine & Offshore Manager - The Americas (based in Houston)

John started his maritime career with the United States Coast Guard Academy where he studied for a Bachelor of Science in naval architecture and marine engineering. He followed up with a Masters in Naval Architecture at the University of Michigan. A keen hiker, who joined LR in 1997, John has impeccable transportation credentials because he also has an MSC in aerospace and a passion for rallycross. You have been with LR for 22 years. What's changed the most in maritime during this period?

There has been a large amount of growth in the industry since I started, and assets have got bigger, but the most significant impact has been the pace of regulation and the bureaucracy and administration that it brings. This can have huge business impacts.

What do you see as the most significant change ahead?

Without a doubt it's digitalisation. The connectivity and speed with which we can now share data has impacted on all of us in both our personal and business lives, but digitalisation still requires people with the knowledge to interpret and manage data.

Passenger shipping is one of your key focus areas. What opportunities and risks do you see in the sector? What is LR doing about them?

The cruise sector tends to grow in fits and starts. Things slowed down a bit around the global financial crisis in 2008, but it's come back with a vengeance and the sector boasts a very healthy orderbook. Cruise ships are among the most complex of asset types and the sector is embracing digitalisation, new materials and alternative fuels. Many in cruise will use LNG as fuel in the medium term but there is awareness that this technology is not the end-game and alternatives are required given that vessels being designed now are more than likely to be in service in 2050

LR has committed considerable effort and a significant chunk of its research and development spending on looking at the viability of zero-carbon fuels are as a scalable alternative. We're already piloting a range of innovative technologies and supporting clients as they deploy them.

What issues are most concerning for Americas clients? Where are they looking to LR for support?

The Americas is no different from elsewhere – the impact of the International Maritime Organisation's 2020 sulphur limit is the issue dominating shipping attentions. Most shipowners have made the decision regarding how they will comply and are now looking for support with making the required changes. People are actively looking for advice on compliant fuels and blending, compatibility issues and how to manage the switchover.

So, what's on your Horizon?

Digitalisation and how it could disrupt the standard class model.

67

As an industry, maritime must collaborate more. A holistic approach is required for meeting the challenges ahead.

Netherlands.

SAMEA clients?

to help.

Piet Mast Our voice on South Asia, the Middle East and Africa

You have been with LR for just over 30 years. What's changed the most in maritime during this period?

When I started at Lloyd's Register maritime relationships were very traditional, especially the way the parties interacted with each other. Now there is a greater focus on the commercial aspects of business relationships. Everyone used to do their own thing, but nowadays you see much more collaboration. Maritime companies are working much more closely to share information and data and they are actively looking for ways to improve the industry.

What do you see as the most significant change ahead?

Finding ways to reduce greenhouse gases (GHGs) to the International Maritime Organisation's required level by 2050 is a key concern for everyone. We are working with our customers to support them on this journey, assisting them in bringing their vessels into compliance while they navigate new and impending legislation.

Do you have a key message for shipping?

As an industry, maritime must collaborate more. A holistic approach is required for meeting the challenges ahead.



Have you had a favourite project?

I have always enjoyed my involvement with the heavy-lift sector and one of my career highlights was supporting Allseas Engineering with the design of their heavy lift vessel ship 'Pioneering Spirit'. I was engaged with the project for more than 25 years, from the initial design review to offering support when the vessel was built in South Korea and commissioned in the

What issues are most concerning for

Most of our SAMEA customers are shipowners and ship managers looking to control or reduce operational costs during the lifetime of their vessels while continuing to comply with impending regulation and preparing for decarbonisation. There is no one-sizefits-all solution on this because every customer has different needs. We have the knowledge, experience and network



Piet Mast, LR Area Marine & Offshore Manager - SAMEA (based in Singapore)

A Dutch national, Piet had wanted to become a farmer like his father, but was told he had to get a qualification first. He opted for a four-year marine engineering course at Rotterdam University of Applied Sciences, a move that kickstarted his maritime career. After 11 years spent at sea, Piet joined LR on 1 December 1988 and rose to leadership positions in the Benelux and Nordic regions before he moved to Singapore in July 2015 to take on his current role. While he didn't come from a shipping family, he has created one – his son is now a second officer working for Holland America Line.

Assurance beyond Class.

A selection of case studies that investigate assurance beyond Class.

CFD minimum power calculation.



There is a general concern that ships will be constructed with dangerously low installed power to comply with EEDI requirements. Because of this, the IMO's MEPC requires the installed power to be no less than that needed to maintain manoeuvrability in adverse conditions such as sea states. In this instance, the owner of a 55,600 DWT chemical tanker needed to demonstrate to flag, compliance with minimum power at short notice.

LR's Ship Performance Group (SPG) carried out a level 2 minimum power assessment of the chemical tanker according to MEPC 232 (65) applying Computational Fluid Dynamics (CFD) for the calculation of the added resistance in waves. The calculations were carried out for the ship sailing under self-propulsion at 4.0kn for scantling draught and JONSWAP (top plot) sea states of Hs=4.0m and wave periods from 7 to 15s.

The most adverse conditions were found for wave peak periods of 10.5s (lower two plots) for which the installed power complies with the regulations with a margin of 5%.

This study was submitted and accepted by the flag as proof of the minimum power performance for the first time, instead of towing tank tests.

The client benefited from a swift turnaround for solving their ship's minimum power challenge thanks to the experience and CFD capability of LR's SPG. The alternative approach was to use model tests that had three key disadvantages: they offer a slow turnaround time: their results have a much higher degree of uncertainty due to technical challenges of measuring the added resistance in waves and the cost would have been much higher.

Flotation cell damage assessment.

The client had to determine if a damaged flotation cell on an offshore platform could still support the design loads and remain in service.

The client suspected that an unintentional negative over-pressure loading had damaged the offshore platform flotation cell. Inspections showed evidence of yielding and permanent deformations in the cell walls.

In order to determine the structural integrity of the cell, LR's Applied Technology Group (ATG) performed a series of Finite Element (FE) analyses to reproduce the observed damage. However, the results from an analysis of the cell's response to the initial vacuum pressure incident did not match the observed permanent deformations.

As a next step, the measured permanent

deformations were added to the initial FE model, then analysed for the full allowable pressure range. The stress levels and deformations expected under normal loads were determined. The predicted stress levels were low and no significant deformations were predicted for this pressure range. Finally, a buckling analysis of the deformed configuration identified the load levels and locations at which buckling would be expected.

The conclusion from these analyses was that the structural integrity of the cell would not be compromised under normal load conditions and the over-pressure was not the cause of the deformations.

The client was given confidence that the flotation cell could stay in service and would function in a safe manner, avoiding the cost and delays caused by an immediate replacement.

Risk studies to support safe LNG bunkering.

As part of a regional development programme, the Port of Marseille is seeking to expand its existing services to offer LNG bunkering, to include ship-to-ship (STS) bunkering for LNG fuelled cruise ships and truck-to-ship (TTS) for LNG fuelled ferries.

LR supported the Port by:

- 1. Identifying and consolidating the applicable rules, regulations, standards and guidance documentation that form the framework for safe bunkering of LNG.
- 2. Completing a HAZID study to identify, assess and manage the risks associated with transit, mooring, preparation, connection, bunkering and disconnection operations. This included a simultaneous operations (SIMOPs) assessment in order to understand activities and operations that could be completed in

parallel, to ensure that they do not initiate a loss of containment (LOC) event or escalate the severity of one.

- 3. Using advanced 3D CFD modelling to assess the safety distances (flammable, cryogenic) of the unplanned LOC events identified by the HAZID and incorporating fluid structure interaction to determine port and operation specific (realistic) safety zone distances. This delivered a higher degree of accuracy when modelling the safety zones, providing the port and other stakeholder's with greater confidence in the results.
- 4. Completing a navigation simulation to understand the manoeuvrability capabilities of a 7,500 m³ LNG bunker vessel. This was used to define a weather envelope for safe transit and bunker operations and input into the Ports safe transiting practises.



Stern tube bearing failure.

A client approached LR's Technical Investigation Department (TID) to assist with a stern tube bearing failure that occurred on a 64,000 DWT bulk carrier. The single, plain, white metal lined bearing had suffered damage to the aft end where the bearing surface had been 'wiped'. A shaft misalignment was suspected as the cause and a quick turn

around for the vessel was required by the client.

Due to unavailability of suitable dry dock facilities to handle the vessel, the owner was faced with taking their vessel to a location that lacked the technical support to conduct the repair efficiently.



LR TID attended the remote location for the entire duration of the defect repair. Subject matter expertise was provided on propeller shaft misalignment and correction, and provided the owner with technical assurance with on-site rectification tasks being conducted by the inexperienced repair yard.

The measurements taken by TID identified that the slope mismatch between the bearing surface and the shaft did not meet Class requirements. TID advised that the replacement bearing should be machined with different offsets to correct the poorly aligned condition, which was the cause of the damage.

Having LR TID on-site throughout the defect repair provided the client with confidence and assurance that the stern tube bearing repair could be conducted at a less experienced ship repair and dry dock facility.

TID's knowledge and expertise on shaft alignment has been built up over the past 71 years, with processes and techniques that are tried and tested and highly respected in the marine sector.

What's happening in our world.

Our world doesn't stand still and neither do we. Catch up on the latest developments at LR from our teams around the globe.



LR and UMAS release 'Zero-Emission Vessels Transition Pathways' study.

In January, LR and University Maritime Advisory Services (UMAS) released 'Zero-Emission Vessels Transition Pathways', a study that examines three key energy pathways to help identify the actions required for the shipping industry to transition to a zero-carbon future by 2050.

The study aims to show what is needed to enable the transition, both at the ship and supply infrastructure level, to deliver zero-emission vessels (ZEVs) that are crucial to achieve the IMO's Greenhouse Gas (GHG) Strategy 2050 ambition. The study demonstrates to all stakeholders what action needs to be taken now and in the next three decades.

The 'Zero-Emission Vessels Transition Pathways' study found that:

 All pathways explored with the study will achieve the IMO's ambition of at least 50% reduction in GHG emissions by 2050 and go beyond to show that zero-carbon is possible.

2020 - 2030 is the most significant decade, stressing the urgency for early action

- There is still uncertainty when choosing one fuel, one technology and one route and therefore this decade will need to see full-scale pilots and prototypes, the development of policy, standards and rules, and will be characterised by first adopters driven by consumer pressure.
- Batteries in short-sea markets, or if used as hybrids, and on-shore power supply will play an important role in reducing the dependency on fossil fuels. Easy to store zero or low-carbon fuels (for example, sustainable biofuel and methanol) may also be an attractive solution as existing infrastructure and machinery can be used to ease the transition.

The 2030s - scaling up of zero-carbon solutions

The evolution of shipping's fuel mix is closely linked to the evolution of the

wider energy system, so a clear signal needs to be given to the potential fuel producers. We expect to see a consolidation of what the dominant technologies for use onboard will be and the interactions between end-fuel price, machinery costs and revenue loss will be better understood. We will start to see ships being designed to store less energy on board and changes to their operating profile to bunker more frequently.

Up to the 2050s

Although the likelihood of any pathway is difficult to assess, we may experience more than one switch. For example, a growing share of biofuels in the 2020s with on-going efforts to develop fuels produced from renewable electricity, referred to as electro-fuels, resulting in a major shift to electro-fuels in the 2040s and 2050s. We expect that by 2050, and beyond consolidation of the market, to see an end fuel mix dominated by one family of fuels.

Approval for verification activity on Norwegian Continental Shelf.

The Norwegian Maritime Authority (NMA) has approved LR as a recognised classification society for the construction of mobile units in the Norwegian Continental Shelf (NCS). This follows a change to section three of the Petroleum Safety Authority's (PSA) framework HSE regulations, which now permits mobile units employed in petroleum activities on the NCS to be designed in accordance with relevant maritime requirements.

The PSA's decision to list LR in its framework enables LR to perform verification services for facilities within the NCS for mobile drilling, well-intervention, multi-use and certain types of mobile production. This means LR can work with

potential and existing international clients in the NCS area. All can be confident that LR will perform verification activities safely and in compliance with the NORSOK regulations.

LR's Department Manager, Alain Doumit, says: "By working closely with the local government in Norway, we have actively built a strong relationship with the PSA and this long-term effort demonstrates that LR is a strategic, trustworthy partner that can deliver effective multi-service support. Our clients, international and local, will benefit from specialist support and greater choice as the market opens, particularly as the Norwegian government is keen to encourage international players to begin exploration activity in the NCS."

LR launches industry first airborne noise notation for ships in ports.

LR has released a new airborne noise emission notation (ABN) and ShipRight procedure to meet increasing demand for a standard and methodology to control airborne noise emissions from ships.

assist ports in determining which and

The new notation defines a set of limit levels for airborne noise emission from ships. This enables ports to better monitor overall noise levels from ship calls. It will

how many ships can access the most noise sensitive areas of the port. It will also allow ports to specify ships require a certain ABN notation to stay in a noise sensitive area of the port, for example those locations close to residential areas.

LR surveyor positioned in South Island of New Zealand.



LR now has a senior surveyor permanently based in Lyttelton Port, Christchurch, New Zealand, to better service local and global clients operating in the area. This initiative will provide increased levels of responsiveness, convenience and cost savings for clients requiring survey activity in the South Island of New Zealand.

LR surveyor Peter Hatton took up the post in July 2018 and has been with LR for 11 years, previously working in the Sydney and Perth offices.



Events

Meet our technical experts at these upcoming events:

OTC 2019 Date: 6-9 May 2019 LR stand: 3761 Location: Houston, Texas, USA

Nor-Shipping 2019

Similarly, the new ABN notation enables ship owners to demonstrate that their vessels have controlled airborne noise

emissions to gain access to noise sensitive areas, such as ports in city centres or natural sanctuaries.

Airborne noise levels present similar challenges for inland waterways. Directive (EU)2016/1629 specifies the maximum noise level from a ship in the EU when sailing and at berth, however, achieving the ABN notation will ensure that the ship complies with these requirements.

Pierre de Chateau Thierry, LR's Marine **Business Development Manager for** Australasia, says: "LR is the only class society with a full-time surveyor based in the South Island of New Zealand, demonstrating our commitment to ensuring we are where our customers need us to be, even in remote areas like Lyttelton. LR's combination of global reach and local presence makes a huge difference to our customers."

Lyttelton Port is the main port in the South Island of New Zealand and is visited by many global trade vessels along with local vessels such as fishing trawlers, tugs and work boats that operate in the area.



Get in touch

Please visit www.lr.org for more information



Lloyd's Register Group 71 Fenchurch Street London EC3M 4BS UK

Lloyd's Register is a trading name of Lloyd's Register Group Limited and its subsidiaries. For further details please see www.lr.org/entities © Lloyd's Register Group Limited 2019