

#### INTRODUCTION

## An ever-changing landscape

In a market where luxury is already taken to extremes, the yacht industry's pursuit of perfection and innovation never ends. When we look at the expectations of a growing number of potential clients, we can see they will push the concept of floating luxury even further. As a classification society, we are evolving our roles with the industry to meet the new dimension of digitalisation and decarbonisation challenges, without any compromise of safety and quality at the same time.

Alternative fuel solutions such as methanol, hydrogen and battery propulsion are among the needing developments catching the eye of a more environmentally conscious and forward-looking type of owners. As the size, sophistication and complexity of yachts have increased, improvements in overall performance and experience are not just about novel architectural designs and advanced construction techniques. More and more attention is also being paid to human engineering, and crew training, management and professionalism.

At Lloyd's Register (LR), we have been working with our yacht clients for over 150 years, delivering bespoke solutions at every stage, from concept and design to construction, and operation to resale. Evolving along the changing world, we are trusted by captains, owners and builders with their increasingly exclusive and technically challenging prestige yacht projects.

#### Trusted adviser for safety and quality

For the environmental and operational performance, the reliability and safety of the yacht and people on board is paramount. That's why we work closely with our clients at every stage of a vessel's lifecycle to achieve safety, compliance and efficiency. We ensure assets are designed, built and maintained to the highest standards. As the world's leading class society in yachts, we have developed our own requirements and procedures that go beyond the minimum statutory regime, reflecting our unique expertise.

#### Adding value through futureproof solutions

We add value at every stage of an asset's life and through the way we work and interact with you from innovation and concept design through to operation. Our dynamic approach in technology qualification and adoption helps you overcome various challenges you may encounter, such as improving operational efficiency, complying environmental requirements, keeping people and assets safe, and remaining secure physically and digitally.



OUR WIDER CAPABILITY  $\leftarrow \equiv \rightarrow$ 

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LEADING THE WAY

# New thinking and transformative technologies

We are working to redefine inspection, assurance and surveying with remote solutions to enable ground breaking data and digital technologies - drones are just one innovation area.

#### Digital transformation with



Lloyd's Register OneOcean is the digital solutions platform providing actionable intelligence to maritime professionals worldwide.

As a trusted solution for superyacht operations, the OneOcean<sup>LR</sup> Platform enables you to be fully prepared and confident that your obligations are met, while freeing up time to focus on your guests.

#### OneOcean Compliance: Regs4Yachts

We provide a specific Yacht forcused regulatory database, which displays the regulatory documentation specific to yachts, showing the information relevant to your unique compliance needs in one place.

Updated and managed by the OneOcean<sup>LR</sup> team of professional mariners and accessible via the Platform, it provides a single and convenient interface to access all official nautical documentation from multiple sources, including the IMO, ILO and numerous flag states. The solution replaces the manual tasks for crews to collect and process different data information.

#### **Technology Qualification**

Even in a sector that is hungry for innovation like the yacht industry, technology development can be difficult. We support you to quantify, qualify and communicate the deployment readiness of your novel technology.

Our Technology Qualification (TQ) is a goal-based approach to risk, using a simple 3-stage process of assessing the technology maturity and its risks, planning for its qualification, and executing the plan. This robust methodology and systematic process for managing technology-related risks, provides evidence that your technology will achieve its objectives with an acceptable level of confidence.

#### **Alternative propulsion**

#### **Hybrid propulsion**

Marine propulsion technologies are changing and innovating at a fast rate, with comfort, economic and environmental considerations at the forefront of this. We have experienced, specialist consultants to guide you on the novel electrical and hybrid systems, as well as those complex computer based systems.

#### Batteries

We are continuously looking at new technologies in large battery aboard. Our experience is now captured in our Rules and a guidance document, which provides more information on our risk-based approach of battery installations.

#### Methanol and Hydrogen as a fuel

Our leading technical knowledge in the safe transportation of gases and the use of various types of fuels means that we are uniquely positioned to develop the safety requirements to enable Methanol and hydrogen as a viable alternative energy source. We can work with you to identify and mitigate specific risks throughout the supply chain.

#### Bio-Fuel

Our Fuel Oil Bunkering Analysis Services provides confidence in marine fuels, their management and performance particularly now that more yachts are switching to HVO as fuel which comes with its challenges.

#### **New technologies**

#### Additive manufacturing

Additive manufacturing, also known as 3D printing, is set to revolutionise our approach to components. We have issued guidance on additive manufacturing and are working with clients to advance this technology and its applicability to the marine environment.

#### **Blockchain technologies**

Blockchain technologies can provide a secure, auditable record of activities across distributed networks. We are working with a range of partners to explore where such technologies could be used to address marine challenges.

#### **Service innovation**

#### Concept designs

We want to ensure that our clients are satisfied with the vessel that they build. We help you achieve your goals by working with you at the concept stage to develop innovative design solutions that work for you, your operations and your clients.

#### 3D plan approval

We are always trying to make our approval process as efficient as possible and offer you a responsive and competitive service during design. We are developing 3D plan approval capabilities that allow for faster approval, which is of particular advantage during early design iterations.

#### **Remote Surveys**

LR remote survey capabilities allow your yachts to be surveyed efficiently and securely, wherever you operate.

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SHARING EXPERTISE

## Where heritage meets the future

## LR Yacht Technical Advisory Committee (YTAC)

LR YTAC is composed of a group of global industry leaders and subject matter experts. Its general purpose is to promote a dialogue between LR and major players of the yachting industry, thus providing a forum to exchange views of, for instance, new technology, compliance with IMO and EU regulations, market conditions and other topical issues of concern – a dialogue to the benefit of both parties.

The focus of YTAC is to discuss and agree the development of LR's Rules and Regulations, ensuring that they are suited to the yacht industry and that the right balance is made between the demands of projected operational use and ship safety. The YTAC chairman may therefore advise LR on particular matters in relation to LR's work.

The function of YTAC is to consider and comment upon proposals to be submitted to the Technical Committee of LR for alterations to the Rules and for the framing of new Rules; and other technical matters.

#### LR yacht focus seminars

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Each year LR organises highly interactive and informative yacht focused seminars in Monaco, Viareggio, Bremen and Amsterdam, where we discuss not only technical matters such as common survey findings on yachts, cyber security and glass structures, but also the human element and management of change.

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I strongly believe that consultation with the industry on a globally recognised rule set through the LR YTAC brings about improvements to international standards which better supports industry in their decision making around how yachts should be designed, operated and maintained. This committee is the only global forum where technical leaders of the superyacht industry meet and discuss relevant and important issues.

#### Lorenzo Pollicardo

Technical and Environmental Director, Superyacht Builders Association



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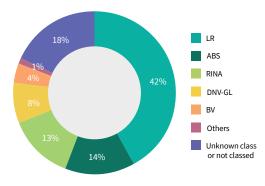
CLASSIFICATION

## A class apart

We have the leading market share of the yacht existing fleet and order book, delivering innovative designs with high standards of safety, quality, comfort and reliability.

Our extensive experience, gained during the design, construction and operation of luxury yachts around the world, gives us a lead when it comes to understanding your requirements.

#### Market share (GT 2.7M Total)





#### Case study

## Supporting safety assurance

in innovative yacht building

The yacht industry is synchronous with innovation, particularly when looking at the demands of the new yacht owners. Every detail has to be assessed and tested so that the framework behind the innovations is absolutely reliable. The most INNOVATIVE systems are possible because of thorough understanding of, and experience with, engineering principles and risk assessments.

"Some things, it seems, cannot be done, perhaps, because they've never been done before. Finding solutions requires an OPEN MIND, a focused mind. It is with this in mind that we work with Lloyd's Register since our inception in 1987 to build the owner's perfect yacht" Says Marcel Onkenhout, CEO of Oceanco.

Engel-Jan de Boer, LR Yacht segment manager: "We are delighted to be working with Oceanco and supporting them, bringing assurance for safety and quality to their exciting, innovative yachts which push the boundaries of the seemingly impossible."

MV Kaos, Oceano



#### Case study

## The watchkeeper before sailings

Showroom conditions can make any yacht shine and seem to promise the best of passages. The reality, though, is that peace of mind at sea hardly comes better than when composite construction is under the watch of the oldest name in sea safety – LR. For 45 years now, Contest Yachts, a Dutch family run yacht builder, has delivered projects with the surety of an LR Hull Construction Certificate (HCC).

Working toward a HCC, the contracting yard must open its doors wide to full and ongoing inspection and survey of calculations, drawings, plans, materials and methods, and actual manufacture of each individual yacht to be certified.

"It adds time and effort," says Contest CEO Arjen Conijn, "but it ensures very much higher standards in construction than the baseline statutory certification required of leisure yacht builders."

Ranko Petkovic, who has been Contest Yachts' lead technical specialist at LR for the past 15 years, works closely not only with the Contest engineers and stylists, but also the mathematicians in Judel/Vrolijk design studio and the artists of Wetzels Brown Partners. "Space and weight," comments Ranko, "are the typical spiral of naval architecture. We can find the balance between them by involving the entire design team."

LR's expertise in materials allows the use of destructive tests to run checks on component parts, particularly composites to ensure a match with requirements. It also enables us to work on the resin vacuum infusion process at Contest, which has been seen in other industries but never in yachting before.

#### LR classed deliveries

Most of the prestigious yacht projects are LR classed or were built under LR class. Notable yachts delivered to LR class in the last two years include:

Amels: 60m MY COME TOGETHER, 78m MY ENERGY

Feadship: 71m MY JUICE, 95m MY BLISS

Lürssen: 146mm MY OPERA, 158m MY BLUE

Oceanco: 127m SY KORU, 117m MY INFINITY

Golden Yachts: 88m MY PROJECT X

Royal Huisman: 81m SY SEA EAGLE II

Heesen Yachts: 60m MY LUSINE, 50m MY OCEAN Z

Tecnomar: 70m MY KENSHO

Benetti: 105m MY LUMINOSITY

San Lorenzo: 62m MY ALCHEMIST

Tankoa: 47m MY OLOKUN

Rossi Navi: 50m MY PIACERE

Baglietto: 38m MY PANAM

CRN RIVA: 50m MY FIFTY

Codecasa Yard: 42m MY BOJI

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As a leading class society we help clients worldwide to comply with international legislation. We have surveyors and consultants in ports and countries across the globe, so you've always got someone on hand who knows and understands your specific circumstances.

Risk management is our core business; we help you design and implement policies to safeguard your assets. We help you design, build, maintain and operate your yacht so they remain compliant.

#### **Regulatory advice**

We cut through the complexities of compliance to give you the clarity you need to make the right decisions, saving you time, resources and costs. Therefore helping you to create the best compliance strategy for your yacht, reducing the inherent commercial, technical and safety-related risks.

#### **Materials**

We understand that the correct selection and quality of materials, and correct manufacturing methods, are critical to your yacht. Our engineers apply their extensive expertise in materials, welding and non-destructive examination (NDE) to ensure that specified materials and fabrication practices are suitable for their intended application and will comply with the relevant regulations.

**OUR WIDER CAPABILITY** 



COMPLIANCE

#### **ADVISORY**

## Evidence-based advice you can trust

Through our business and technical advisory services we'll advise on the right technologies for your yacht, whether you're upgrading or modifying an existing yacht, or embarking on a new build project.

Our approach is based truly on understanding your requirements and applying the tailored support you need. From risk management and ship performance, to fuel testing and technical and failure investigation that makes us the right partner for you.

#### **Human element (HE)**

Consideration of the HE from design to operations is crucial for the yacht industry. We have a range of training on human centred design and ergonomics for the working environment, user interfaces, signage, information, checklists and operating procedures available. Our coordinated HE approach supports your competence management for crew and shore staff in ensuring safe, reliable and efficient operations. We also provide technical training on human factors in accident investigation.

#### Safety culture change management

Leading the way in safety performance goes beyond the integrity of assets, systems and procedures. Creating a robust safety (HSE) culture is central, but change within an organisation is complex. We'll help you get started with the right assessment tools, identifying what needs strengthening. We'll work with you to establish and support your improvement plans, so you can run your culture change programme with confidence.

#### Technical and failure investigation (TFI)

When failure strikes, it's good to know you're in safe hands. We provide world-class TFI services, our technical investigation department (TID) accurately assess failures and provides the correct solutions to get your yacht back in service quickly and prevent reoccurrence. Our TID's reputation is unrivalled in the marine industry, with over 60 years of accumulated knowledge of failures and experience in interpretation using established engineering principles.

#### **Environment and sustainability**

We stand alongside other world and industry leaders in enabling a transition to a cleaner, more sustainable world. Compliance with future and emerging regulations is one of the challenges the marine industry faces.

#### Computational fluid dynamics (CFD)

LR has built a highly respected reputation in CFD simulations and is now in a leading position in ship scale CFD, having successfully delivered the first workshop in ship scale computer simulations with the application to commercial cargo vessels. However, our capabilities are not limited only to merchant vessels, over the last decade, we have been involved in a number of projects aiming to improve design, performance and safety of passenger vessels, including mega yachts through the use of CFD. CFD can be used to assess and optimise a number of issues associated with yachts.

#### Air emissions

Compliance with exhaust emissions requirements can be achieved by a number of options: alternative fuels, emissions abatement technologies or in-engine controls. Each option comes with different technical, operational and commercial considerations and with a different technology maturity level.

#### **Training**

We help businesses and individuals across the globe continually improve with our scheduled and bespoke training courses. When you choose training with LR, you have direct access to the skills and knowledge of world-class specialists. We provide yacht specific training on classification and statutory requirements as well as risk management.

#### **Energy efficiency**

We have an extensive track record for not only assuring the safety of our clients' vessels, but also ensuring their new build designs are as energy efficient as possible. Our ship performance team can work with your design and construction teams to independently appraise the ship design in terms of the expected fuel consumption for the intended operating profile.

#### **Fuel testing**

Our new lube and fuel testing kits protect against subpar lubricants and fuels. Providing you with a peace of mind, we ensure the marine fuel and lubes you will be using are fit for purpose and in accordance with what you have purchased.

When it comes to experience, speed of service and competitive prices, we deliver outstanding quality.

We are unique in being the only long standing class society to provide fuel and lubes testing, and you benefit from our 30+ years of experience and technical skills to support you when and where you need.

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**OUR WIDER CAPABILITY** 

## One constant, wherever and whenever you need us

We are transforming to operate as a global functional orgainsation, putting your need for a reliable, predictable service first. We are committed to provide responsive, trusted local support to you through our dedicated regional yacht specialists and client hubs.

So, wherever you are, you can be confident that our entire team of specialists is never more than a phone call or email away.

#### Adding value to every stage



#### Design

### Embrace innovation and have confidence in your designs

Using technical expertise and data intelligence, we evaluate and approve your asset structures, materials, technologies, processes, and suppliers. We ensure your designs meet current and impending standards and requirements around long-term quality, safety and sustainability.



#### Construct

#### De-risk every stage of new construction

We support every stage of new construction and streamline processes to run on time and within budget. Leveraging our technical experience and data insight, we help you monitor supplier, component and process quality and mitigate risks of your newbuild projects.



#### Operate

#### Keep your vessel performing at its best

Through our enhanced survey schemes and expert advice on fuels and maintenance optimisation, we help you reduce risks and downtime of ship operations. Our holistic digital solutions platform is trusted to drive your asset performance and business growth.



#### Extend

#### Improve the value of your asset through conversion

We support you with all your retrofitting needs. Apart from assessment and approval of designs, processes, materials and suppliers, we help you adopt new technologies that are mostly viable to your operations, maximising the asset's lifetime value.



#### **Decomission**

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#### Recycle your vessel safely and sustainably

We provide confidence that your decommissioning process protects people, the planet, and your business reputation with expert support, including vetting recycling suppliers, evaluating safety hazards, assessing compliance, and helping reduce environmental impact.



Regional support for yacht projects







#### lr.org/yachts











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