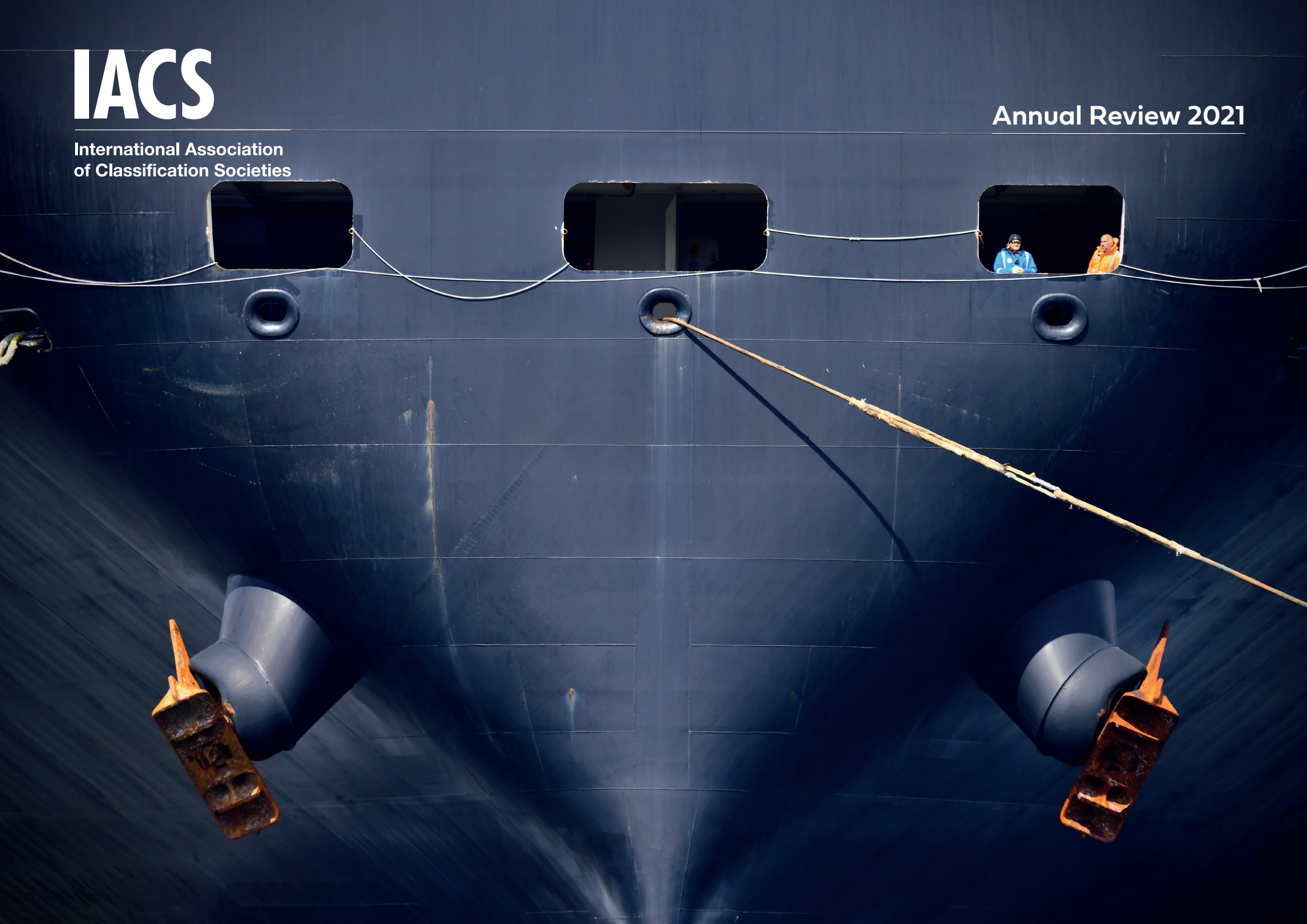
IACS

International Association
of Classification Societies

Annual Review 2021



Russian Maritime Register of Shipping's (RS) membership was withdrawn on 11 March 2022 and RS is no longer a Member of IACS. This Annual Review is an overview of IACS' activities in 2021 including RS' contribution during that year.

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Amplifying IACS' core safety commitment

Working with agility and speed to keep pace with changing technology and regulatory demands

By Nick Brown, IACS Council Chair.

The unpredictable nature of world events calls for agility and resilience. This applies to classification societies and those we serve in the maritime industry. Unsettling and uncertain times must amplify our core purpose – ensuring the safety of people, assets and the environment. Whatever the future holds, our safety focus must remain undiminished and unwavering, as it has been through recent challenges.

It is now two years since the start of the COVID-19 pandemic and our industry has worked tirelessly to keep supply chains open, efforts that have drawn heavily on the fortitude and forbearance of the world's seafarers. During these testing times, IACS and its Members have engaged with industry stakeholders to agree certificate extensions within a controlled governance framework, and supported the use and acceptance of remote surveys, collaborating with flag and Port State Control. Meanwhile, we kept on top of the updates needed to ensure IACS instruments were responsive to technical, industrial and regulatory drivers. We maintained our influence at IMO, attending remote meetings and promoting IACS' position. Since January 2021, IACS has released 140 publications, all with the ultimate goal of ensuring safety at sea. We have a lot to be proud of.

The maritime energy transition has also been garnering greater attention. In June of 2021, the IMO adopted amendments to MARPOL Annex VI, introducing an Energy Efficiency Existing Ship Index (EEXI) and an operational carbon intensity reduction (CII) requirement for all ships. We also saw a rise in regional activities. In April, the US committed to pursuing a zero-emission shipping industry by 2050, the European Union launched Fit for 55 and China announced its 2060 target for net zero. In November, the first 'action' COP saw the launch of the Clydebank Declaration, supporting the creation of green shipping corridors, the Getting to Zero Coalition's Call to Action and the Declaration on Zero Emission Shipping. It was a gathering where shipping had a more dominant voice than in the past, with many in our industry expressing their determination to accelerate the pace of decarbonisation within maritime. As the maritime energy transition progresses, IACS' focus remains firmly on safety standards. We must ensure that ships remain safe for their crew, their cargoes and the environment as we move towards new technologies and inherently more dangerous fuels, which are likely to be needed to reduce emissions.

We have also seen increasing appetite and acceptance of new technologies and digitalisation of processes as the pandemic forced us to rethink our routines. New ways of working were further embedded during 2021 as we learned to co-exist with COVID-19, and while these may have unlocked many efficiencies, we must be mindful of how these changes may impact the people in our industry.

Throughout this period of accelerated change, the trusted advisor role of class is more relevant than ever. Shipping has successfully relied on class for more than 260 years and class has a key role to play in the continued development, implementation and regulation of maritime technologies by bringing unified assurance processes to new and unfamiliar solutions.

Mindful of evolving industry demands, IACS adopted a new governance model in 2020 to enhance our ability to engage widely, consistently and at pace. Changes included an elected General Policy Group chair working from the London secretariat and a longer tenure for the chairman.

This means that, unlike my predecessors who only had a year, I have 30 months to deliver on the three goals I have for my chairmanship. The first of these is the creation of a long-term strategic roadmap to support the industry through the decade of transformation needed to stimulate an effective maritime energy transition. There is much talk about decarbonisation but very few people, if any, are talking about the impact of the transition on safety. This is fundamental to IACS' role as the primary technical advisor to IMO. We need to take a holistic, risk-based approach to assure the safety performance of the industry is maintained or improved.

My second goal is to develop and implement the relevant technical requirements to make sure IACS is providing the support the industry needs during digitalisation. Digitalisation is a key enabler of the transition, leading to efficiency gains but we must not disregard the human element impacts. The role of the human is being redefined as an essential component of technological solutions. IACS rules are based on a fit, healthy competent crew being on board. It is in our collective interests to prioritise and ensure seafarer wellbeing.

My final goal is to maximise collaboration across IACS. We must use the unparalleled strength and depth of our members' expertise to address the key challenges facing the industry and its regulators, across such diverse issues as remote surveys, complex systems and cyber-safety, and safety issues relating to alternative fuels and novel technologies. In this report, there are many examples of how our collective efforts are instrumental to the development of a safe and sustainable maritime industry.

I am confident that we will continue to build on these as we engage across multiple fronts simultaneously and do so with the agility and speed necessitated by the pace of change of technology and regulatory demands, as well as those challenges that we cannot foresee. ■

Continuity and flexibility in challenging times

IACS has adapted its structures and approach to provide services under a robust quality regime

By Robert Ashdown, IACS Secretary General.

2021 saw no respite from the impact of the COVID-19 pandemic and, for ship owners and operators, the crew-change crisis remained the predominant concern. IACS Members also continued to face significant challenges in ensuring that ships were able to safely remain in service and in compliance with Class Rules and the requirements of the international Conventions. IACS COVID-19 Task Force therefore continued to undertake vital work throughout the year *(see Page 8)*, taking swift and decisive action to ensure operational continuity as well as harnessing the experience gained to inform longer-term thinking about the future deployment of tools such as remote survey.

A parallel challenge of equal urgency but with longer term goals is decarbonisation. 2021 saw further advances in societal and regulatory decarbonisation ambitions as well as the further development of new technologies, alternative fuels and operational efficiency measures. Given the variety of technical solutions required to meet this challenge, many of which are unfamiliar in the marine sector, IACS' core objective of supporting safer shipping required it to highlight the need for regulations to keep pace with technological change. At events such as the IMO/Singapore Future of Shipping Conference in Spring 2021 and the IMO General Assembly, IACS spoke of how regulations could better utilise advances in digitalisation, of the need to futureproof SOLAS, of the need to strategically address the role of the seafarer, the inter-relationship between the increasingly complex and technically sophisticated ships, and the dependency on the human component in those systems for safe operations. Most importantly, however, IACS emphasised how safety regulation around candidate decarbonisation measures is often poorly defined and the challenges this poses both for industry, and for assurers, both of whom seek regulatory certainty through common technical requirements that satisfy the regulatory goals.

NEW APPROACH

Addressing such fundamental issues, be they the immediacy of COVID-19 or the multi-decade challenge of decarbonisation, has required many organisations to fundamentally reorganise their way of working. The implementation of IACS' new governance structures in mid-2021 – the culmination of a multi-year project that resulted in the most significant organisational changes in its history – has introduced greater continuity, flexibility and nimbleness into IACS' decision making at a vital time. A directly elected Chair in office for over two years, working with an enhanced technical team co-located with a permanent secretariat in London, and new voting procedures have had an immediate and positive impact on IACS' ability to address the unique, multi-disciplinary nature of the decarbonisation challenge as well as the wider challenges posed by digitalisation.

Successfully decarbonising the maritime industry will, of course, require collaboration across the industry and 2021 saw IACS maintain its structured series of meetings with industry stakeholders *(see Page 42)*. Uniquely, the traditional 'tripartite' meeting of owners, builders and class societies focused exclusively on decarbonisation reflecting its central importance across the maritime board. Notwithstanding this focus, there has also been wide collaboration with the industry on other key matters such as containership fires and container losses, cyber safety *(see Page 22)*, low-pressure fuel pipes, complex systems and anchoring equipment, to name but a few. Internally, IACS continues to work on other core projects such as fire protection, buckling strength, water level detection and the development of new materials to reduce the cost of ship construction *(see Pages 15, 20 & 30)*.

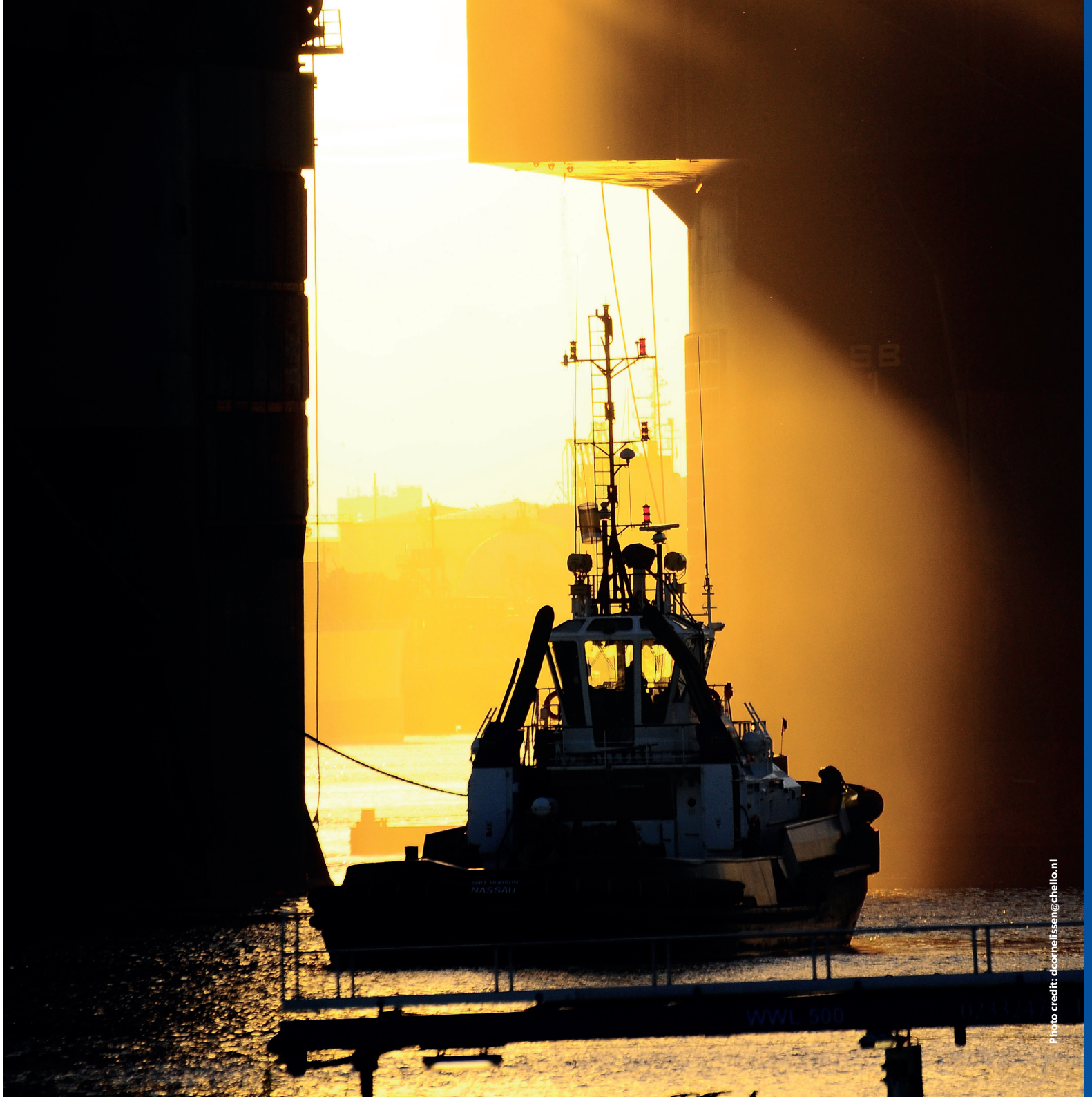
REMOTE OVERSIGHT

2021 saw a sharp increase in remote surveys as a direct result of the pandemic. IACS published

an *Information paper on Remote Surveys for interested stakeholders* in February 2021 which provided background information and practical case studies as well as covering the potential benefits of remote surveys, concerns, and issues raised by regulators. To ensure all IACS Members have uniform guidance and requirements, IACS initiated a Project Team to develop a Unified Requirement (UR) for Remote Classification Surveys for ships in service. This will be built around the key principle of equivalency between remote and traditional on-board surveys, and remote survey will only be appropriate provided quality is not compromised, with the survey carried out with the same assurance as that performed by an attending surveyor *(see Page 26)*.

As always, quality matters remain central to IACS Members and 2021 saw the association continue to support the development of the International Quality Assessment Review Body. Indeed, such has been the success of that initiative that IACS also established a high-level working group, to include representation from its external and independent Quality Advisory Committee, to conduct a holistic overview of IACS Quality provisions with the objective of rationalising and enhancing quality oversight as part of IACS' unceasing commitment to continuous improvement in this area.

In a world where often it seems that the only constant is change, IACS has adapted its structures and approach to ensure that it is well placed to meet new challenges while continuing to serve the ongoing needs of the industry, providing services under a robust quality regime. As the sole organisation representing the global classification industry, IACS' unique ability to contribute to, and harmonise, multiple diverse work streams and to give institutional effect to new ideas and practices, gives tangible effect to its long-standing commitment to cleaner, safer shipping. ■



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Maintaining safety – no matter the barriers

Challenge of COVID-19 disruption managed by IACS Members

By Robert Ashdown, Secretary General.

COVID-19 continued to exert pressure on the important work of IACS Members in 2021, but the core priority of maintaining safety – no matter the barriers - still stands strong. IACS Members continue to save lives and protect the environment through their technical support for safe operations of ships and other floating structures.

Their expertise and their technical understanding of marine structures and the stresses they are subjected to give IACS Members an unrivalled insight into standard-setting in the industry. Working in close partnership with industry and regulators, IACS Members work constantly to develop unified technical requirements and to produce other recommendations and guidance.

Rules developed independently by IACS classification societies are continuously refined and are supported by extensive research and development as well as service experience. Compliance with international and/or national statutory regulations on behalf of flag State Administrations further strengthens the safety envelope.

In this technological age, data is also paramount to defining and challenging safety norms. As classification societies are intrinsically involved in every step of a ship's life cycle, they can draw on a rich flow of first-hand data to promote research and development. The learning loop is closed when findings are fed back to IACS committees and working groups to enable continued improvement of classification Rules (see Figure 1).

Classification societies are also empowered to undertake certification by flag State Administrations, underlining the level-playing field necessary for high standards of safety to be maintained worldwide.

It is worth noting, however, that classification societies have no control over how a vessel is operated and maintained between the periodical surveys they conduct, and safety, therefore, relies on proper maintenance and operation by shipowners or operators, as well as on the competence of seafarers on board.

Shipowners and operators also have a responsibility to inform their classification society without delay of any defects found that may affect class, or if any damages are sustained. Once aware of those conditions, classification societies have the right to suspend, withdraw or revise class if the conditions for maintenance of class cannot be complied with.

STATUTORY STANDARDS

The International Maritime Organization (IMO) and the International Labour Organization set the statutory requirements for shipping, in consideration of safety and security of ships and those on board, as well as protection of the marine environment. IACS supports IMO through its role as the Organization's technical advisor, an interdependent relationship that gives IACS Members direct access to the development of international regulatory instruments and offers a unique channel to share technical information with the industry.

The development and adoption of Unified Interpretations (UIs) – adopted Resolutions on matters arising from implementing IMO agreed provisions – by IACS further supports global and consistent implementation of IMO regulations. IACS also establishes, reviews, promotes and develops Unified Requirements (URs) in relation to the design, construction, maintenance and survey of ships on matters directly connected to or covered by specific Rule requirements and practices of classification societies.

To further enhance safety, IACS offers technical expertise to assist international and regional regulatory bodies, standards organisations and flag State Administrations to develop, implement and interpret statutory regulations and industry standards in ship design, construction and maintenance.

IACS considers ship safety and the protection of the marine environment in the round and, even in the current challenging times, works tirelessly to ensure the continued safe operation of the global shipping industry. ■

Figure 1
The class cycle

"Working in close partnership with industry and regulators, IACS Members work constantly to develop unified technical requirements and to produce other recommendations and guidance."

IACS VALUES

IACS ascribes to the following values in its assistance to regulators, including the IMO and ILO, and industry:

1. **Leadership:** the ability to be ahead and to co-operate with regulators and industry on initiatives that can effectively promote maritime safety, protection of the environment and sustainability.

2. **Technical knowledge:** collective and individual knowledge and experience leading to the development, adoption and implementation of technical rules and requirements reflecting current practice and changing demands of society, supporting innovation and new technologies.

3. **Quality performance:** commitment of Members to define and adhere to the highest global quality standards.

4. **Transparency:** the ability to provide advice on the implementation of regulations, interpretations or enhancements thereof, if the need is identified, so that practical solutions can be effectively developed in co-operation and with the support of other stakeholders, increasing the trust on class.

IACS continues to support industry through the COVID-19 pandemic

COVID-19 Taskforce enables IACS to remain agile in its response to the ongoing pandemic

By Tim Kent, IACS COVID-19 Task Force Chair.

In our article for the 2020 Annual Review we expressed the hope that IACS would continue to adapt to the changing circumstances and continue to support safe and compliant shipping as the situation develops, and hopefully resolves, during 2021. This optimism for normality resuming has not been borne out as the COVID-19 pandemic continued to challenge and disrupt every aspect of normal life this year and looks set to have impacts on our industry well into 2022. IACS quickly changed business models and adopted new technologies to allow its Members to deliver their compliance assurance services to their clients.

Industry looked to IACS for leadership from the outset of the pandemic, and the organisation responded well by promptly establishing a Task Force to initially draft the text of a public statement providing guidance, then review potential impacts on IACS procedures. The Task Force met regularly throughout the year to ensure effective communication was maintained both within the organisation and with organisations in the wider maritime industry.

IACS worked closely with the IMO and flag administrations from the outset in providing guidance on safety of ships and crews and partnered effectively with industry associations including ICS and IUMI to avoid duplication of effort and muddled messaging. Regular updates were provided via the IACS website as well as through individual members' communication channels.

Our members adapted quickly to many governments' guidelines to work from home where possible. As was the case with most businesses, robust IT systems proved to be a key success factor in maintaining effective communication amongst our teams during the early periods of almost exclusively remote working. As hybrid working became the norm these systems also enabled solutions such as remote survey to be deployed when class surveyors could not attend onboard ships in need of urgent certifications.

The pandemic accelerated the industry's moves toward digitalisation, primarily evidenced by the sharp increase in remote surveys, and has transformed digitisation from 'nice to have' to 'must have' technology. IACS Members have been providing remote surveys since before the arrival of COVID-19 but have recently built on the strengths and overcome the challenges inherent in the technology to continue to provide accurate and quality survey services. Members also developed robust training regimes for surveyors to help them to understand the complex concepts associated with delivering remote surveys and adjust to new ways of working.

Where remote surveys were not possible or appropriate, members have enacted stringent procedures to ensure the health and safety of our staff and the staffs at ports and onboard vessels. In addition to strictly adhering to guidance provided by the WHO and IMO, individual members developed detailed health and safety checklists to be completed by members of staff and by clients before any in-person client work commenced.

IACS' learnings from our COVID-19 response may well have accelerated much needed changes in our organization structure and operating model. The COVID-19 Task Force for example was able to work quickly and agree actions to a timescale that would have been impossible in normal IACS correspondence channels. Collaboration has always been a strength for IACS but the challenges faced by our members and our clients have required us to work together more closely than ever before.

The COVID-19 Task Force has created a model for IACS to follow for the future, especially for the recommendation of urgent changes to published procedures for adoption by IACS Council. IACS will continue to reflect on the lessons learnt from this pandemic and apply them to ensure the continued safe operation of this vital industry. We will continue to explore new technologies and drive innovation in the industry and adapt our regulatory frameworks to more effectively respond to the accelerating pace of change. ■

"The pandemic accelerated the industry's moves toward digitalisation, primarily evidenced by the sharp increase in remote surveys, and has transformed digitisation from 'nice to have' to 'must have' technology."

Focusing on Safe Decarbonisation

IACS has a unique role to play in the maritime community's decarbonisation challenge

By Zhiyuan Li, General Policy Group Chair.

As one of the biggest and most universal challenges facing humankind in the coming decades, decarbonisation has been the main agenda item for many global regulators and industry stakeholders. 2021 witnessed major events and initiatives on decarbonisation at various levels, including the United Nations' COP26 conference and MEPC meetings at IMO.

With the global goal for decarbonisation becoming clearer and more ambitious, international regulations for world shipping are undergoing intense deliberation. Meanwhile, many shipping and shipbuilding first-movers are running pioneering projects to switch to net zero fuels and technologies in order to gain experience and get prepared earlier.

CHALLENGES OF SCALE

The challenges related to shipping's decarbonisation are not only related to technical, logistic, and/or economic difficulties. Shifting from a carbon-based fuel system that has been in place for hundreds of years is challenging enough, but it is even more challenging to do so at the ultra-large scale required to power every ship on the sea.

There are also markedly increased expectations for an ambitious and accelerated greenhouse gas reduction policy for shipping. IACS emphasises that the successful delivery of any agreed targets must recognise the need for a practical and achievable implementation plan. In parallel with the goal for decarbonisation of the global fleet and the regulatory framework being set at IMO – as well as the trials on alternative technologies and fuels taking place in the industry – IACS highlights the risks involved in this process and considers 'safe decarbonisation' to be of paramount importance. IACS is therefore taking a holistic approach to provide common and detailed safety requirements that support the design, fabrication and integration of equipment for systems and ships to address the risks associated with decarbonisation.

IACS APPROACH

Figure 2 illustrates IACS' understanding of the

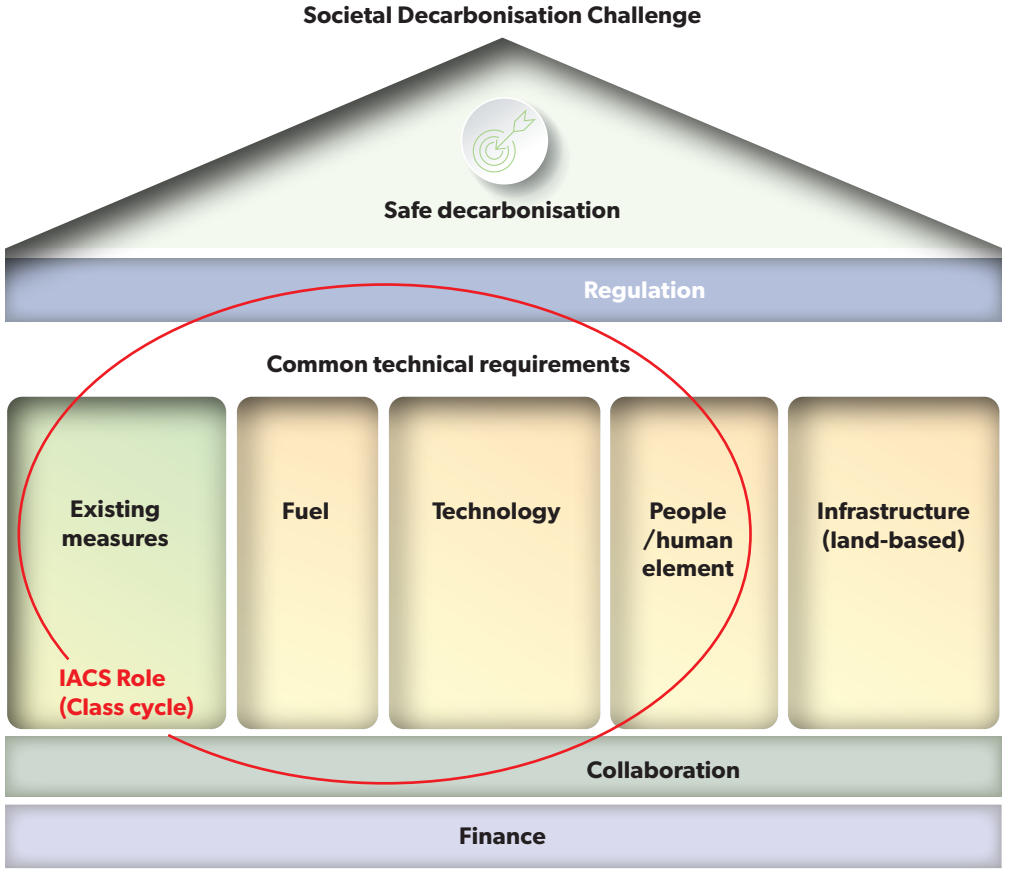


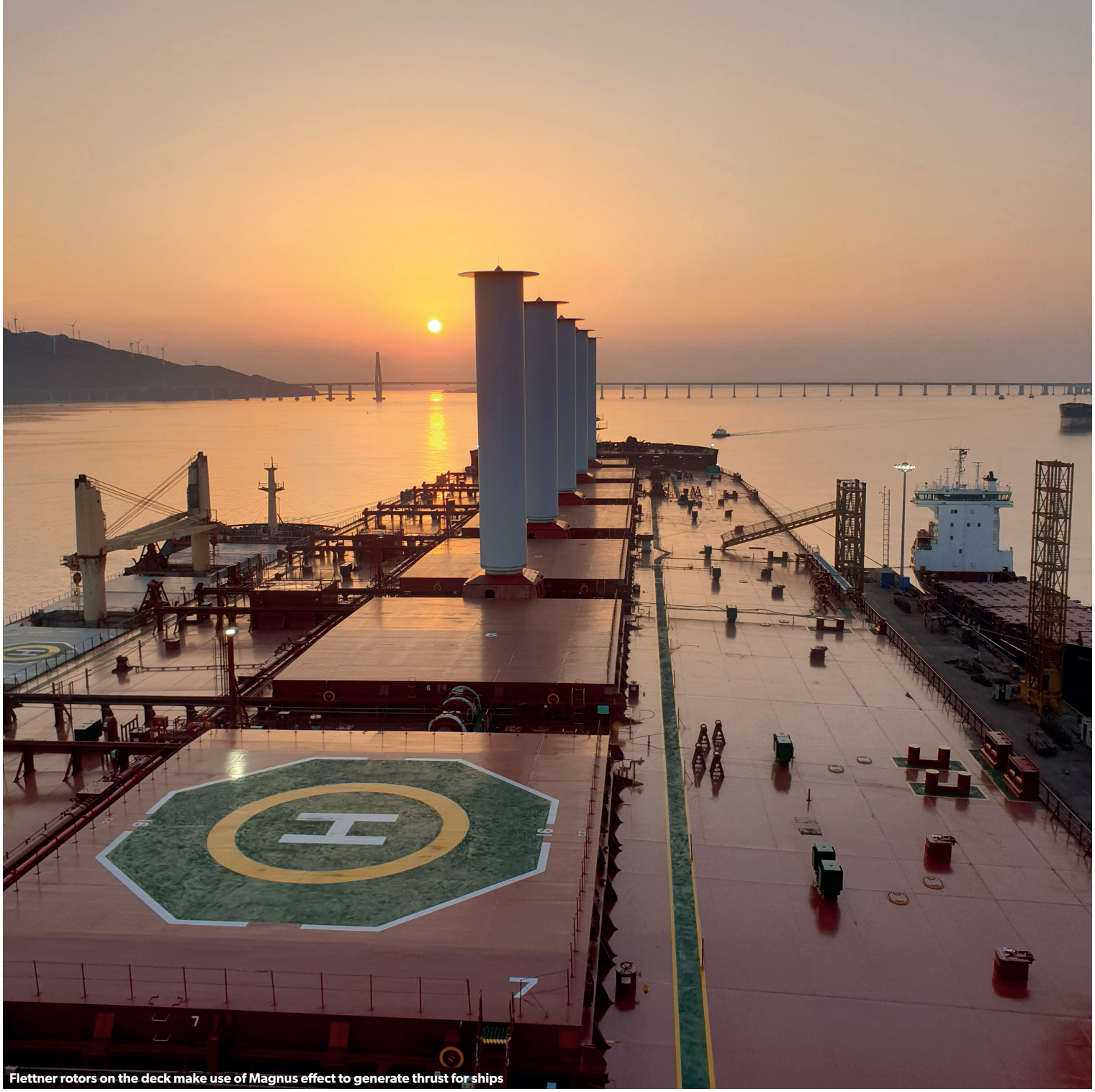
Figure 2

safety challenges involved in decarbonisation. It also illustrates how IACS supports regulators and industry to achieve the goal of safe decarbonisation.

The whole approach is driven by the societal decarbonisation challenge to which the marine industry, alongside other sectors, must respond. The IMO is setting ambitious and demanding targets, both in terms of impact and timescale, which the industry is coming to terms with. A variety of technical solutions will be explored and deployed by industry to meet this challenge. IACS' fundamental purpose of supporting safer shipping is immediately relevant. As many of the technical solutions are unfamiliar to the marine sector and there are demanding timescales that have been set by the IMO, the challenge for classification societies on safe decarbonisation is magnified beyond 'business as usual'.

Mandatory safety regulation around candidate decarbonisation measures is to be and is being developed in many areas, typically in goal-based form or an equivalent high level. To help an industry that urgently needs regulatory certainty and practical solutions, IACS is well positioned to develop detailed common technical requirements and assist in the global and consistent implementation of the regulations.

Such requirements are multi-faceted, covering existing measures on minimising carbon emissions, alternative fuels and other technologies aimed at zero emissions - all of which need to interface with the people engaged in developing, operating and maintaining the resulting, often complex, systems. Hence, the human element is relevant to decarbonisation and a ship's system needs to safely interface with the supporting land-based infrastructure for decarbonisation. While the ship-shore interface is outside IACS' scope, there are many safety issues to be considered there as well.



Flettner rotors on the deck make use of Magnus effect to generate thrust for ships

The other two important aspects – which support all the above elements – are collaboration with partners and stakeholders and finance arrangements.

The scope of the multidisciplinary and multi-interactive role of IACS in this landscape is shown in the class cycle circle in Figure 1.

ACTIONS TAKEN IN 2021

The following actions have been taken on existing measures:

Supporting IMO: In parallel with and in support of the development and implementation of IMO's regulations on minimising carbon emissions, in particular short-term measures including the Energy Efficiency Design Index (EEDI), the Energy Efficiency Existing Ship Index (EEXI), the Ship Energy Efficiency Management Plan (SEEMP) and the Carbon intensity Index (CII), IACS has been heavily involved in all layers of IMO meetings and working groups related to decarbonisation and has submitted and/or co-sponsored various papers, including but not limited to:

- The Correspondence Group on the development of technical guidelines on carbon intensity reduction related to the EEXI framework, CII framework, SEEMP and other relevant matters.

- Meeting of the Intersessional Working Group on Reduction of GHG Emissions from Ships (ISWG-GHG 8).

- MEPC 76

  MEPC 76/6/4 and INF.28 discussed amendments to the 2015 Industry Guidelines for Calculation and Verification of the EEDI, and the role of the verifier in conducting the verification of EEDI.

  MEPC 76/6/9 proposed amendments to the revised 2018 Guidelines on the method of calculation of the attained EEDI for new ships, to add a CF conversion factor between fuel consumption and CO2 emissions to be applied for ethane fuel.

  MEPC 76/7/37 commented on the report of the Correspondence Group on the Development of Technical Guidelines on Carbon Intensity Reduction (TOR 3 and TOR 4), with particular reference to SEEMP verification and plans for corrective actions.

  MEPC 76/7/47 proposed modifications to the draft guidelines on survey and certification of the attained EEXI.

- MEPC 77

  MEPC 77/7/7 proposed a draft unified interpretation of regulation 18.3 of MARPOL Annex VI, related to the use of biofuels.

  MEPC 77/7/26 commented on document MEPC 77/7/2 (Japan et al.) containing the draft amendments to the EEXI calculation guidelines and associated guidance to incorporate the in-service measurement method.

Development of IACS own instruments: In the second half of 2021, two project teams were tasked with developing firstly, an IACS Recommendation to provide guidance for performing and validating numerical calculations of the EEXI reference speed Vref; and secondly, another IACS Recommendation to provide guidance on the implementation of EEXI. Both project teams are expected to complete their work in 2022.

In planning for 2022, IACS devoted significantly increased resources to accommodate new work items on amendments to calculation and verification methods in the EEDI or EEXI framework, verification and audit of SEEMP and CII, and technical issues relating to other short-, mid- and long-term measures.

At a regional level, IACS has developed detailed clarifications regarding the role and status of the independent verifier in shipping-related legislation within the 'Fit For 55 Package', namely, the revised ETS directive and the new FuelEU maritime regulation.

The following actions have been taken on new alternative fuels/technologies:

EG/SAFTech: Recognising the considerable risks associated with alternative fuels and new technologies, an Expert Group on the safety of new technologies and zero or very low carbon fuels (EG/SAFTech) has been established to address tasks including identification of safety issues and concerns related to alternative fuels and new technologies, planning future IACS developments to address mitigation measures for identified risks, development of high-level positions on these issues and possible related submissions to the IMO and other regulators.

IMO Assembly: To assist the IMO in addressing the multidimensional challenge posed by the pace of development of technology, its decarbonisation ambitions and the necessary detailed requirements and regulations to deliver a safe zero-CO2-emitting ship, IACS submitted a high-level paper to IMO on 'The development of safety requirements at the needed pace and detail to support the achievement of a decarbonisation goal' (A32/12/2). This paper discussed various approaches that the IMO could adopt to assist in meeting these challenges and was unanimously welcomed by Member States who agreed to forward it to the Maritime Safety Committee for detailed consideration and action.

Rising to this challenge, IACS has continued its work and submitted a paper to MSC105 with further consideration of aspects of the above-mentioned approach and offered preliminary views on the risks associated with the options currently researched and trialled to deliver a safe zero-CO2-emitting ship. This will support the Committee in developing its approach and addressing the multiple dimensions of safe application of new fuels and new technologies.

NEXT STEPS

IACS fully recognises the unique, multi-disciplinary nature of the decarbonisation challenge, its scale and compressed timeframes for delivery, and the lack of extant technical solutions to achieve the desired outcomes - all of which warrant a dedicated and bespoke response. To further strengthen its work, IACS Council have agreed to an accelerated programme of activity to decide on structured and ambitious actions to address decarbonisation.

With its unique ability to develop and implement common technical requirements, IACS will work together with all relevant partners to promote the safety considerations that accompany the use of new technologies and fuels, and to establish an effective assurance arrangement for the safety of decarbonisation solutions. ■

"Safe decarbonisation is a key area where IACS can support the regulators and industry in achieving the goal of GHG reduction"

LNG as marine fuel is being increasingly used for regulatory compliance

Technical Work

Buckling strength updates

Specialist project leads to unified buckling capacity toolbox for future updates of URs

By Åge Bøe, IACS Hull Panel Chair.

Recognising that reliable methods for assessing buckling strength are vitally important when it comes ensuring that ship structures are safe, IACS Hull Panel is in the process of finalising a new IACS Unified Requirement (UR), UR S35 *Buckling*.

The new UR S35 will become the new common 'buckling toolbox' for many URs in the future and will be important for all non-Common Structural Rules (CSR) ships. The new 'buckling toolbox' has already been incorporated in CSR.

Since 1993, IACS has included buckling strength requirements in UR S11 *Longitudinal Strength Standard*. UR S11 has since been complemented by the introduction of other unified requirements covering buckling strength criteria, such as UR S11A *Longitudinal Strength Standard for Container Ships*, UR S21/S21A for scantlings of hatch covers and hatch coamings, and UR I2 *Structural Requirements for Polar Class Ships*.

< Oil tanker – Buckling is often the governing factor for the scantlings of upper decks in midship region

In 2006 IACS introduced Common Structural Rules (CSR) for Bulk Carriers and Oil Tankers. These rules include a far more comprehensive scope for buckling strength assessment than in previous URs. The CSR requires both prescriptive buckling checks related to longitudinal strength as well as full buckling assessment based on membrane stresses and lateral loads from cargo hold analyses made by the finite element method. The buckling checks cover all relevant structural elements in a bulk carrier or an oil tanker, including plane plates, stiffeners, curved plates, corrugated panels, pillars and cross-ties.

BUCKLING DEVELOPMENT

An IACS project on buckling initiated in 2018 has undertaken a comprehensive review of buckling methods in CSR, including the U-type stiffeners applied in hatch covers. The project was initiated based on comments and feedback both from the industry and from IACS Members. Two particular concerns were the lack of accuracy in stiffener buckling for slender panels subjected to transverse stresses and U-type stiffeners in general.

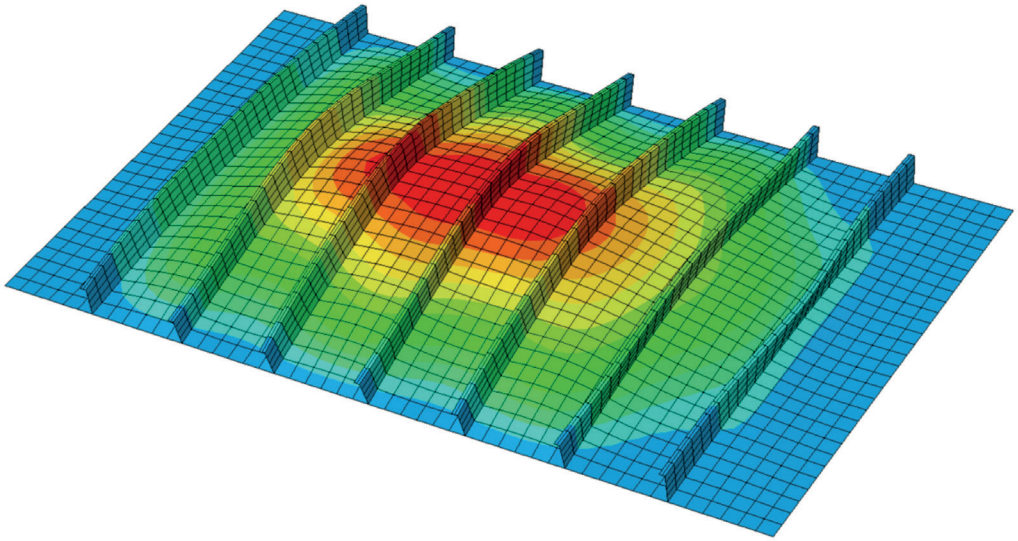


Figure 3
Global buckling mode (NLFEA) for a stiffened panel subjected to axial load

“The new UR S35 will become the new common ‘buckling toolbox’ for many URs in the future and will be important for all non-CSR ships.”

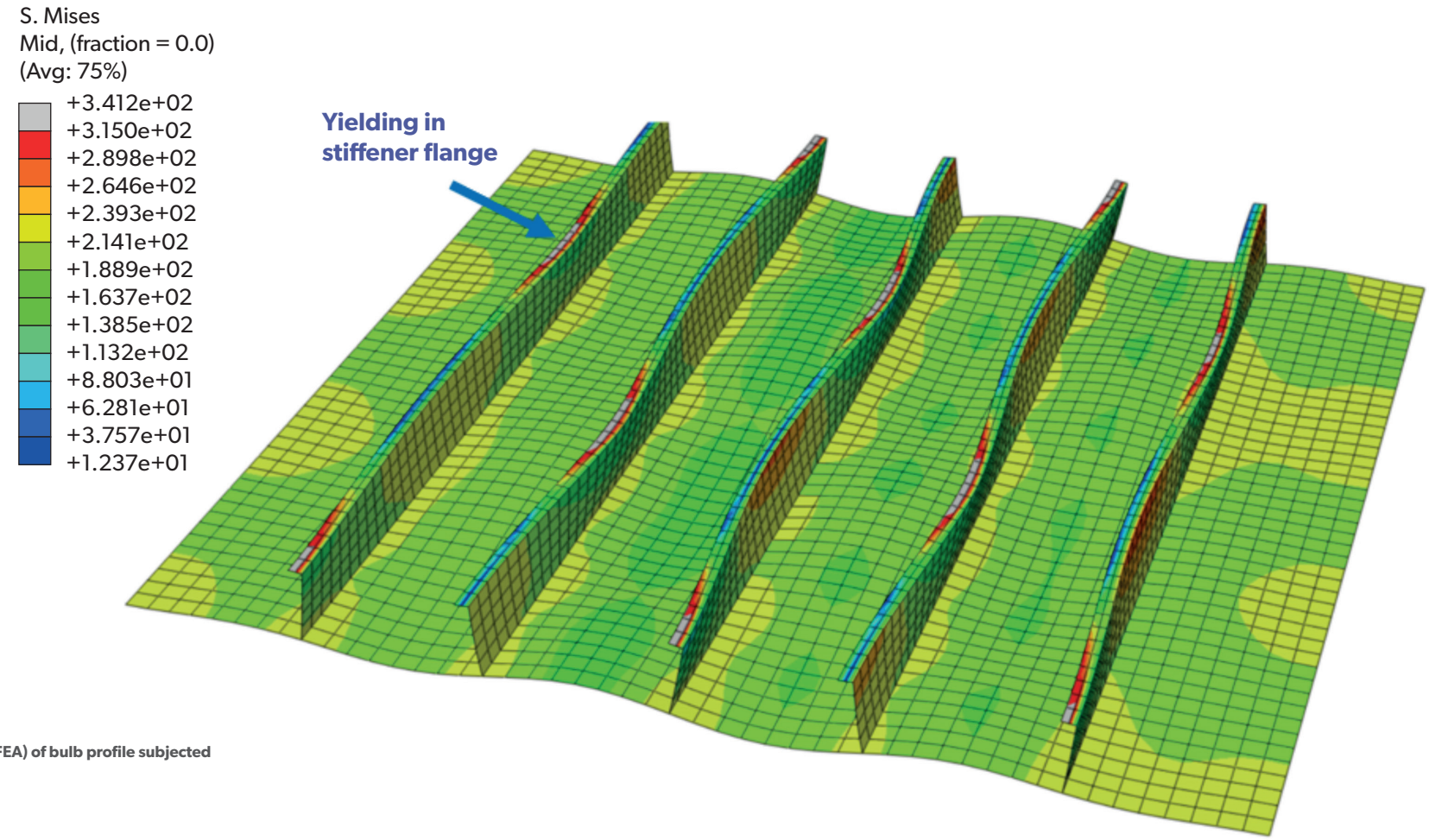
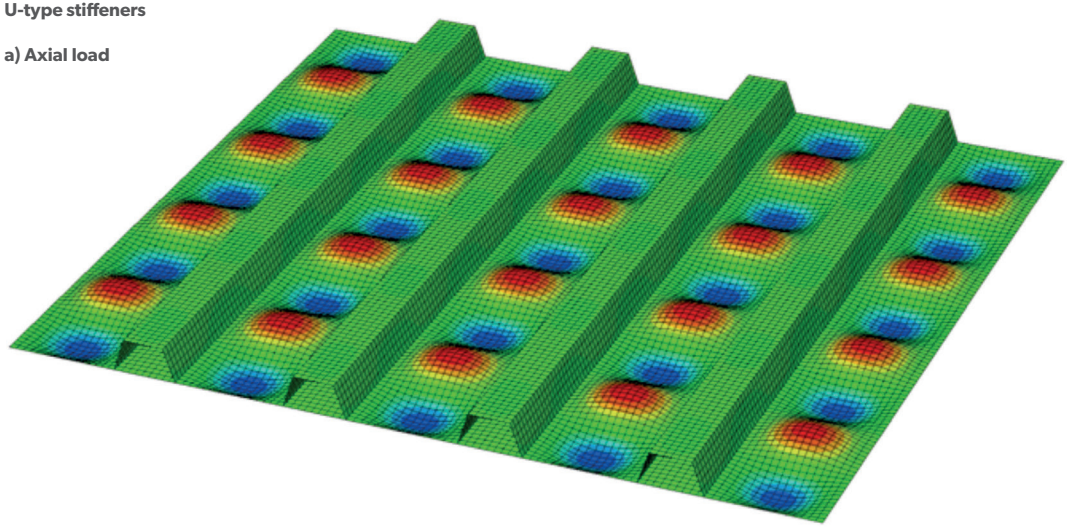


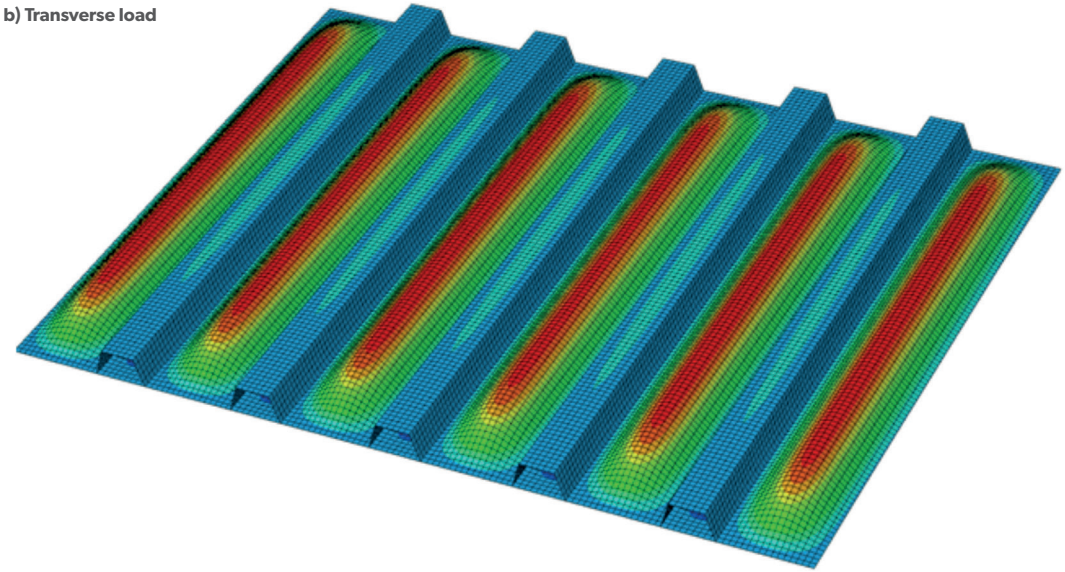
Figure 4
Torsional buckling (NLFEA) of bulb profile subjected to axial load

Figure 5
Buckling modes (NLFEA) for a panel with U-type stiffeners

a) Axial load



b) Transverse load



The project delivered improved stiffener buckling formulations for the January 2021 version of CSR, and has proposed new capacity formulations for panels with U-type stiffeners for the January 2022 version of CSR.

In addition to CSR, the project is in the process of finalising the new UR S35 *Buckling*, with publication planned for 2022. UR S35 *Buckling* will be based on the same methods as used in the current CSR and will form a unified buckling capacity toolbox for the design and approval of non-CSR ships. As a next step UR S35 will replace the buckling methods given in various unified requirements, including those given in UR S11 *Longitudinal Strength Standard*, UR S11A *Longitudinal Strength Standard for Container Ships* and UR S21/S21A for scantlings of hatch covers and hatch coamings.

The main improvements on the buckling capacity methods are:

- The method for analysing global elastic buckling of stiffened panels has been changed from beam theory to orthotropic plate theory. Figure 2 shows the global buckling mode in a non-linear finite element analysis (NLFEA).

- The stiffener torsional buckling method has been improved by changing the warping stress and the elastic torsional buckling capacity formulations. Figure 3 shows the stresses of high-web bulb profile stiffeners from a NLFEA.

- For panels with U-type stiffeners new capacity formulations have been developed. Figure 4 shows two calculated buckling modes resulting from different applied loads.

- Improved formulations are under development for buckling of plates with openings/plates with one free edge.

These changes have been made based on solid theoretical analysis and verified by extensive advanced numerical studies applying many fine mesh non-linear finite element models. In addition, a comprehensive consequence assessment has been carried out covering a broad range of in-service ship types. ■

Removing fire protection ambiguity

Safety Panel identifies necessary changes to SOLAS construction requirements

By Rhoda Willson, Safety Panel Chair.

SOLAS chapter II-2 contains the construction requirements for fire protection, fire detection and fire extinction. Regulation 9 of the chapter contains the requirements for containing a fire in the place of its origin. There have been many interpretations of regulation 9, some contained in IACS Unified Interpretations (UI), some in IMO circulars and some in both.

In 2021, IACS identified areas where a change to the regulation is needed and proposed to the IMO that a review of SOLAS II-2/9 is undertaken to address the issues identified and make any consequential amendments which may be required. The support of the United Kingdom delegation to the IMO with the proposal was greatly appreciated. Table 1 lists the regulation 9 paragraphs which have an existing interpretation, and where that interpretation can be found.

IACS has also identified other outstanding issues which require further consideration and a possible amendment to SOLAS. Regulation II-2/9.7.3.1.3 contains requirements for fire dampers in ducts passing through 'A' class divisions with a cross-sectional area exceeding 0.075 m2 and addresses the fire insulation of the sleeve of a duct that is located between the fire damper and the division that the duct is penetrating. It was agreed by the IMO's Sub-Committee on Ship Systems and Equipment (SSE) that 'A-60' class fire insulation of the sleeve of the duct is not required in all cases. However, to prevent the spread of fire, this section of the duct shall be provided with fire insulation that has "at least" the same fire integrity as the division that the duct is penetrating. This was a new requirement and could not be introduced by an interpretation.

Also, SOLAS II-2/9.7.2.4 contains incorrect references. The references to regulations II-2/9.7.2.4.2.1 and II-2/9.7.2.4.2.2 should be to regulations II-2/9.7.2.4.1.1 and II-2/9.7.2.4.1.2, respectively. This is an editorial issue and the IMO Secretariat have made the necessary arrangements for it to be changed.

INSULATION CLARIFICATION

Regulation II-2/9.2.3.3 is, meanwhile, unclear on the extent of application of requirements regarding insulation of 'A-0' class standard of bulkheads and decks separating adjacent spaces on an open ro-ro deck and an open deck. Paper SSE 7/16/4 set out the issue and proposed three possible understandings of the regulations. It was agreed by the Sub-Committee that "for open ro-ro and vehicle spaces, the requirement for 'A-0' rating should not apply to openings in the ends of the space or where permanent ventilation openings are fitted in the side plating or deckhead in accordance with the definitions in paragraphs 35 and 36 of SOLAS regulation II-2/3, as long as in case of fire in the cargo space such openings do not endanger the areas mentioned in SOLAS regulation II-2/20.3.1.5." It was agreed that new regulatory text was needed rather than an interpretation.

The 5th meeting of the SSE Sub-Committee considered a number of possible corrections to regulations II-2/9.7.2.4, II-2/9.7.3.1.3 and II-2/9.4.1.1.9, as contained in paper SSE 5/16/2. They require clarification where they have not been addressed in the final text of the amendments to SOLAS. The proposed changes which have not been addressed will need to be discussed and new text agreed.

Elsewhere, galley ducts require a fire extinguishing system, which in turn requires a means to activate them from a remote location. At one time this was to be close to the entrance to the galley and could be located inside the galley space, but a SOLAS amendment changed the requirement to be outside the galley. This is in contrast to the requirement for the deep fat fryer fire extinguishing system which can be activated from inside the galley. The requirements for both the galley duct and the deep fat fryer duct require a careful review to confirm the intention between the different requirements, identifying the fire scenarios and background.

DUCTING CONFUSION

The insulation requirements for vertical ducts which contain horizontal elements (SOLAS regulations II-2/9.7.2 and 9.7.4) are also unclear, in particular whether Table 9.1 or Table 9.2 should be used and if different

Table 1 Current interpretations to SOLAS II-2 regulation 9			
SOLAS II-2 regulation	IMO UI	IACS UI	Topic
	MSC.1/Circ.1615		Interim Guidelines for minimizing the incidence and consequences of fires in ro-ro spaces and special category spaces of new and existing ro-ro passenger ships.
9	MSC.1/Circ.1555		Bulkhead between the wheelhouse and toilet inside the wheelhouse
Multiple	MSC/Circ.1120 and MSC.1/Circ.1510		Various interpretations on SOLAS II-2/9
9, Tables 9.5 and 9.6	MSC.1/Circ.1511		Fire integrity of the boundaries of ro-ro/vehicle spaces
9.2	MSC.1/Circ.1581		Bulkhead between the wheelhouse and navigation locker
9.2.2.1		SC101	Main vertical zones
9.2.2.2.3		SC107	Continuous ceiling
9.2.2.3.2.2(9)	MSC.1/Circ.1634		Isolated pantries
9.2.2.3.2.2(7), 9.2.2.4.2.2(5), 9.2.3.3.2.2(5) and 9.3.4.2.2.2(5)		SC167	Electrical distribution boards
9.2.3 and 9.2.4		SC45	Fire integrity of bulkheads and deck
9.2.3.4.1		SC46	Protection of stairways and lift trunks in accommodation spaces, service spaces and control stations
9.2.4.2.5 and 9.3.1	MSC.1/Circ.1203	SC174 (only part of the Circular)	"A-60" insulation of portions facing cargo area of tankers Penetrations in fire-resistive divisions and prevention of heat transmission
9.4.1.1.2	MSC/Circ.1037	SC156	Fire testing of watertight doors
9.4.1.2 and 9.4.2		SC119	Balancing ducts
9.7.1.1	MSC.1/Circ.1480	SC99	Flexible bellows of combustible materials
9.7.1.1	MSC/Circ.1169	SC175	Combustible gaskets in ventilation duct connections
9.7.1.1	MSC.1/Circ.1527	SC264	Non-combustible material as "steel or equivalent" for ventilation ducts
9.7.2.1		SC192	Arrangement of galley ducts
9.7.2.1, 9.7.2.2 and 9.7.5.2.1	MSC.1/Circ.1276		Separation of galley exhausts ducts from spaces No IACS equivalent but see SC192
9.7.3.1		SC64	Fire dampers in ventilation ducts
9.7.3.1.2	MSC.1/Circ.1239 and Corr.1		Fire category of fan rooms serving engine-rooms
9.7.5 and 9.2.2.4.2.2	MSC.1/Circ.1616		Fire integrity of the division between engine rooms and spaces, in which urea or sodium hydroxide solution tanks are installed Galley exhaust duct fixed fire-extinguishing systems
9.7.5.1		SC108	Galley exhaust duct
9.7.5.1.1 and 9.7.5.2.1		SC118	Exhaust duct from galley ranges
9.7.5.2.1		SC106	Galley exhaust duct

tables can be used for the different elements (horizontal and vertical) along the length of duct in a single space.

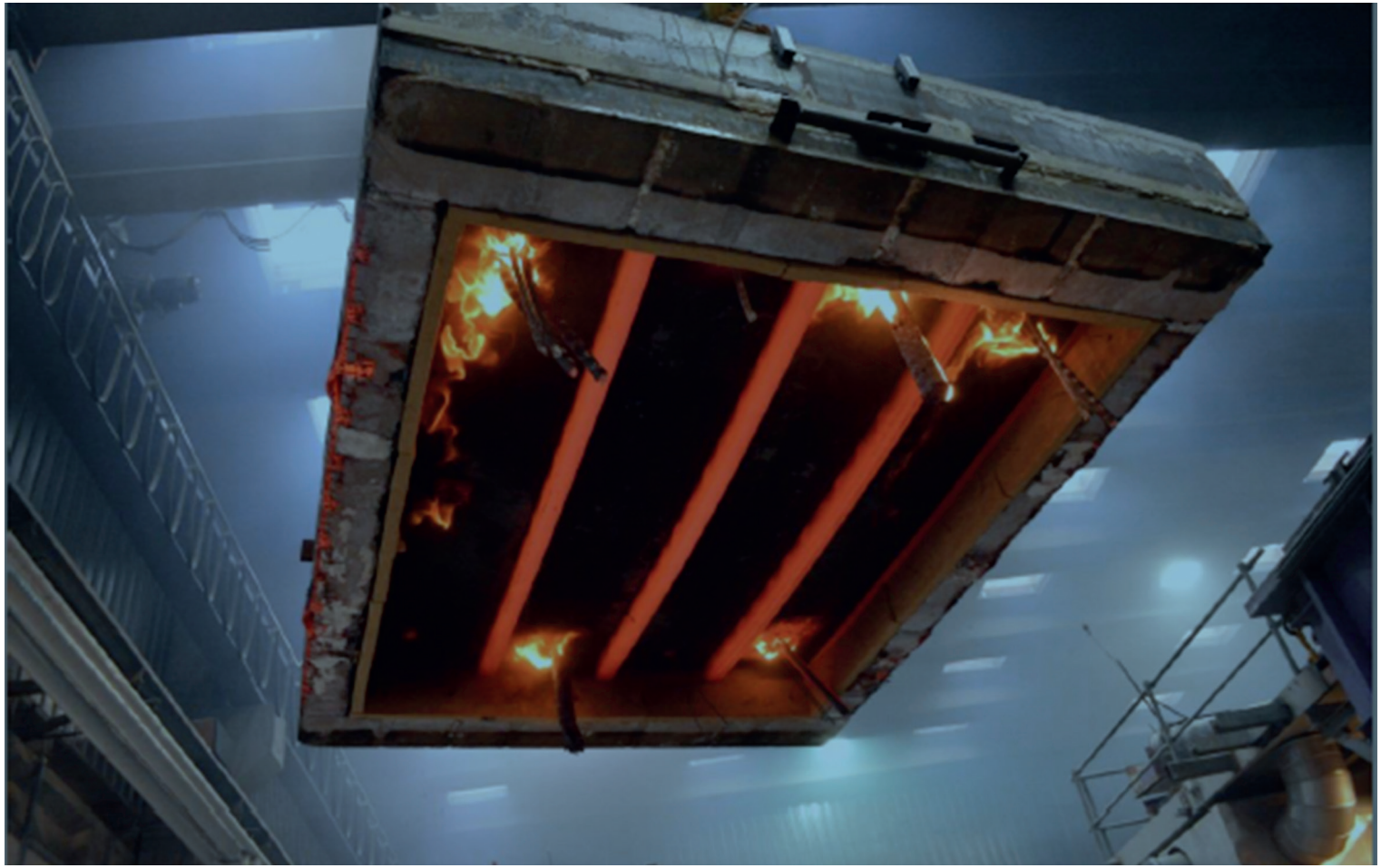
To address these issues IACS has established a separate project team to carefully review SOLAS II-2/9, incorporate the UIs, and ensure that the requirements are consistent and references are correct, before preparing a submission to the IMO with a new text.

The UR has been developed on the assumption that only one person is present in a ballast water treatment room while the ballast water treatment system is running. It recognises that when the system is being maintained and not running there may be additional people present. The new UR will be implemented by IACS members to new ships and to new installations of BWTS on existing ships from 1 July 2022. ■

CLARIFICATION PROVIDED ON REQUIREMENTS FOR BALLAST WATER MANAGEMENT SYSTEMS

In addition to the above work, IACS has released a Unified Requirement (UR) for the fire related issues pertaining to the installation of ballast water management systems (BWMS) on ships, UR F45. This new UR is the result of extensive discussion by IACS experts, who considered the various types of ballast water management systems and the different fire related risks. The UR gives the measures which should be taken to mitigate fire risks associated with the different types of system. The UR categorises eight different technologies which are used in BWMS and the mitigation measures are specific to each category. Systems which do not fall into one of the categories are to be specially considered.

The category of fire space used in SOLAS is determined by the different categories of technology and it imposes limits on the location of the ballast water treatment room. Requirements for fire prevention, detection and extinction are provided together with specific ventilation arrangements. The requirements are in addition to those required by SOLAS II-2.



Fire test on deck cable penetrations, courtesy of Roxtec

Improved detection of water levels

Clarification on requirements sought by Safety Panel

By Rhoda Willson, Safety Panel Chair.

SOLAS requires water level detectors to be provided to single hold general cargo ships, multiple hold general cargo ships and bulk carriers under chapter II-1 regulation 25, chapter II-1 regulation 25-1 and chapter XII regulation 12 respectively. The requirement for them to be fitted to multiple hold general cargo ships was introduced by resolution MSC.482(103), taking effect for ships constructed on or after 1 January 2024.

Water level detectors are to be fitted to give a warning:

- For single hold general cargo ships, when water ingress reaches a height of not less than 0.3 metres and when it reaches a height of not more than 15% of the mean depth of the hold.
- For multiple hold general cargo ships, when water ingress reaches a height of not less than 0.3 metres and when it reaches a height of not less than 15% of the depth of the cargo hold but not more than 2 metres.
- For bulk carriers, when water ingress reaches a height of 0.5 metres and when it reaches a height not less than 15% of the depth of the cargo hold but not more than 2 metres.

The new SOLAS II-1/25-1 recognises that ships have bilge level alarms fitted and permits them to be used in place of the lower water level alarm.

The introduction of the new requirement to multiple hold cargo ships provided an opportunity for IACS to raise some concerns with the requirements, specifically to seek clarification on the requirements relating to intrinsic safety, to cover operations in low temperatures and to ensure that there is no reduction in standards when a bilge level alarm is used as a water level detector. IACS also identified that the performance standards for water level detectors on bulk carriers and single hold cargo ships other than bulk carriers (resolution MSC.188(79)) need to be updated to cover multiple hold general cargo ships.

To address these points IACS carefully considered the performance needed from a water level alarm and worked closely with the US and Belgium administrations to prepare amendments to resolution MSC.188(79).

Other than general editorial changes - to include the new regulation and update old references - some more substantive changes have been proposed.

PROPOSED AMENDMENTS

IACS, supported by Belgium and the US, has proposed that the current general requirement that the part of the system which has circuitry in the cargo area should be intrinsically safe is clarified to require certified safe type equipment, with appropriate apparatus group and temperature class dependent on the cargo being carried. This recognises the fact that the performance standards are for general use and cannot reasonably list all possible cargoes, the appropriate apparatus group and temperature class.

New clauses have also been introduced to require type testing at the expected service temperatures and to require that the equipment meets the requirements of a suitable industry standard when it is to be used in refrigerated cargo spaces.

In addition, a new section has been written to cover bilge alarms which are to be used as water level detectors. This requires the bilge alarm to meet the same functional requirements and installation and testing requirements as ordinary water level detectors. Some cargoes require that the bilge pumping system is sealed to prevent the spread of contaminated or potentially dangerous fluids, so requirements to provide an alternative system which does not use the bilge alarm for those cargoes has been included.

Lastly, clarification has been provided on the surface from which the heights of the water level alarms should be measured, in particular when a lining is fitted to the cargo space. Generally it is proposed that the measurements are taken from the inner surface of the double bottom, but when a watertight lining is fitted the distance may be measured from the inner surface of the lining.

These proposals were considered by the 8th session of the IMO's Sub-Committee on Ship Design and Construction (SDC) in January 2022 with IACS present to assist with discussions. ■

New Unified Requirements address cyber resilience

IACS finalises new URs for cyber resilience of ships and onboard systems and equipment

By Vincent Lagny, IACS Cyber Systems Panel Chair.

During 2021, the IACS Cyber Systems Panel worked on three projects as identified and prioritised by its industry partners in its roadmap of development.

The first project was to translate the appropriate portions of consolidated Recommendation 166, published in May 2020, into a Unified Requirements (UR) for the cyber resilience of ships with the following objectives:

1. Building on the experience and knowledge acquired in the development of the consolidated recommendation, produce a new UR with minimum goal-based requirements for cyber resilience of new ships. The focus was set on Operational Technology systems and cyber incidents resulting from any type of offensive manoeuvre that targets such systems, excluding system failures. The scope of these requirements is limited to the most common and effective cyber security barriers that are feasible for smooth implementation on all new ships. Such requirements will be mandatory for Operational Technology systems that, if compromised, could immediately lead to dangerous situations for human safety, safety of the vessel and/or threat to the environment.

2. Organise the new UR to make it possible for classification societies and industry to implement the requirements it contains uniformly and smoothly and to make it applicable to all ship types in such a way that the requirements enable a minimum level of security and apply to all classed vessels/units regardless of operational risks and complexity of Operational Technology systems.

3. Organise the new UR to encourage its evolution and improvement to continuously provide answers to industry expectations on, for example, systems connectivity, digitalisation and smart shipping, anticipating the needs of Maritime Autonomous Surface Ships (MASS), and supporting the effort of national and international authorities on cyber risk management.

ONBOARD SYSTEMS

The second project aimed to establish a new UR cyber security document for onboard systems and equipment. The objective is to determine which requirements need to be met for cyber system equipment to be certified for cyber security, when used for essential and critical systems on board.

The publication of these two new URs for cyber resilience of new ships and cyber resilience of on-board systems and equipment, expected in early 2022, will mark a significant milestone in IACS' work to support the maritime industry.

Furthermore, as a consequence of IMO Resolution MSC.428(98) affirming that *"an approved safety management system should take into account cyber risk management in accordance with the objectives and functional requirements of the ISM Code"*, the objectives of the third project in progress are the following:

1. To develop an IACS Recommendation on incorporating cyber risk into ISM to help shipowners undertake risk assessments considering human factors in relation to cyber systems, determining what should be done to mitigate risks.

2. To provide a common framework to carry out risk assessments based on which risk mitigation measures are implemented.

Publication of this new IACS Recommendation is planned during the first half of 2022.

Significant cross-industry co-operation led to these three positive developments and the IACS Cyber Systems Panel looks forward to maintaining that dialogue going forward. ■

"The publication of these two new Unified Requirements for cyber resilience of new ships and cyber resilience of on-board systems and equipment, expected in early 2022, will mark a significant milestone in IACS' work to support the maritime industry."

Making technical sense of EEXI

Panel work supports uniform implementation of environmental goals

By Li Lu, IACS Environmental Panel Chair.

Since the adoption of the Initial IMO Strategy on reduction of greenhouse gas (GHG) emissions from ships in 2018, IMO has sped up the development of short-term measures to reduce GHG emissions. Following the finalisation of the enhanced Energy Efficiency Design Index (EEDI) Phase 3 requirement, a hybrid mechanism incorporating the Energy Efficiency Existing Ship Index (EEXI), operational Carbon Intensity Indicator (CII) and the associated rating system was proposed as a short-term measure for existing ships.

Since the start of 2020, informal and formal IMO meetings and Correspondence Groups have been taking place to discuss the development of the short-term measures and the EEXI framework, leading to the adoption of the associated supporting guidelines at MEPC 76 in the summer of 2021. The amendments to MARPOL Annex VI incorporating mandatory EEXI will become effective on 1 January 2023. IACS participated in the whole regulatory process and provided technical comments and proposals to IMO Correspondence Groups and intersessional working groups on GHG. IACS submitted nine papers relating to ship's energy efficiency and carbon intensity (EEDI/EEXI/CII), three of which focused on EEXI and were submitted to three consecutive MEPC sessions, from MEPC 75 to MEPC 77.

In the first submission paper, IACS submitted proposals on the structure and implementation elements of the proposed hybrid short-term measure. In the second submission paper, IACS proposed taking numerical calculations as a replacement for model tests in the draft EEXI guidelines, a proposal that was subsequently incorporated into the EEXI guidelines. In the latest submission paper to MEPC 77, IACS commented on the proposal of incorporating an alternative method based on the in-service ship performance measurements in the EEXI guidelines to determine Reference Speed (*Vref*).

METHODOLOGY DEVELOPMENT FOR NUMERICAL CALCULATION OF THE *VREF* FOR EEXI

Since IACS had proposed taking numerical calculations as a replacement for model tests in paper two, IACS decided to take the initiative in developing a commonly acceptable methodology for the numerical calculation of the reference speed *Vref* for EEXI. Relevant stakeholders will benefit from a common approach to the minimum requirements for numerical simulations to be accepted as an equivalent to or to complement model tests. This would lead to IACS Members using similar approaches to the approval of numerical calculations as well. IACS has therefore established a project to develop guidance for performing and validating numerical calculations of the EEXI reference speed *Vref*.

For this project, focused on developing guidance for performing and validating numerical calculations of the EEXI reference speed, IACS will:

- Determine the possible flowcharts to define *Vref* by means of numerical calculations.
- Consider the required level of detail of the numerical model (CFD model is used to complement model tests or as fully 'equivalent' to model tests).
- Discuss and agree on an acceptable numerical modelling methodology.
- Consider minimum requirements in terms of reporting and validating.
- Develop Recommendations on the use of numerical simulations to derive *Vref* for the purpose of the calculation of EEXI.

RECOMMENDATION ON IMPLEMENTATION

In addition, IACS received queries from industry after MEPC 76 regarding specific technical issues relating to the implementation of EEXI. Although the technical guidelines supporting the EEXI framework were adopted

at MEPC 76, there are still some ambiguities that need to be further considered. These include, inter alia, how to deal with the 'non-overridable power limitation' in the EEXI framework for existing ships, and how to consider the excessive natural Boil-off Gas used as fuel for LNG carriers in the EEXI calculation method.

To address this, IACS initiated another project, with a view to developing an IACS Recommendation to provide guidance for supporting the implementation of the IMO EEXI framework, particularly considering those ambiguous issues.

Regarding the second project to develop an IACS Recommendation to provide guidance for supporting the implementation of the IMO EEXI framework, IACS will:

- Collect information from the industry and identify technical implementation challenges associated with the EEXI framework, such as non-overridable power limitation, EEXI calculation methodology for LNG Carriers, and vessel type applicability.

- Develop an IACS Recommendation to provide guidance for supporting the implementation of the IMO EEXI framework, in co-operation with the industry.

- Develop submission papers to IMO if any issues are identified that need to be addressed in the IMO EEXI framework.

Finally, IACS will develop a submission paper to IMO to communicate the industry guidelines and understanding.

Target completion dates of the two projects are the middle of 2022.

OUTLOOK ON THE FUTURE DEVELOPMENT OF EEXI

The future work of EEXI may be advanced by two aspects. The first is the improvement of existing technical requirements, including, but not limited to: the proposal to incorporate an alternative method based on the in-service ship performance measurements in the EEXI guidelines to determine reference speed; and those issues IACS is now engaged in, with a view to offering recommendations, such as the common approach for replacing model tests with numerical simulation, calculation methods and verification methods for implementing non-overridable power limitation.

Second, the existing EEXI framework may face adjustment due to an expected higher GHG emission reduction ambition and the possible introduction of EEDI Phase 4.

According to the follow-up actions of the IMO GHG Initial Strategy, revision of the Initial Strategy is to be initiated at MEPC 77 and expected to be adopted at MEPC 80 in 2023.

There are many calls from industry and some countries for further and quicker action to address the decarbonisation of shipping to achieve a more ambitious goal. On the path to this goal, the utilisation of alternative fuels and technologies across the shipping industry is gradually scaling up.

IMO is currently considering the possible introduction of EEDI Phase 4, but for now, EEDI's new requirements are expected to be comprehensively considered in terms of the scope of implementation and reduction rate. For example, the target of the regulation may be extended to other greenhouse gases as well as CO_2, and further consideration will be given to relevant requirements for methane leakage, new fuel/power system application and verification.

NEXT STEPS

IACS will continue to participate in the work on the revision or upgrade of EEXI requirements and the development of an IMO Carbon Intensity Code in the future, and consider developing IACS proposals on amendments to calculation and verification methods in the EEXI framework or developing IACS Recommendations, taking into account the following:

- The introduction of alternative fuel and other new emission reduction technologies (e.g. wind assisted propulsion, CO_2 capturing system).

- The possibility of expanding the legal framework to cover ships using batteries (i.e. full electric or hybrid propulsion system of fuel and battery) or other propulsion systems not covered in the existing EEDI/EEXI framework;

- Technical issues arising from the possible expansion of the scope to cover other non-CO_2 GHG emissions (e.g. CH_4, N_2O).

- The review process and result thereof in respect of EEXI requirements before 2026. ■

Regulating the remote survey regime

Development of IACS Unified Requirements for remote classification surveys

By Sanjiv Mishra, IACS Remote Survey Project Manager.

Throughout the COVID-19 pandemic, the shipping industry has faced serious challenges in arranging surveys and inspections that involve physical attendance of surveyors on board ships. As a result of social distancing requirements and travel restrictions, remote surveys have been successfully deployed in appropriate cases under controlled conditions and have proven to be a helpful alternative to some traditional surveys.

A remote survey is a process of verifying that a ship and its equipment are in compliance with applicable statutory regulations and classification society rules where the verification is undertaken, or partially undertaken, without physical attendance on board by a surveyor.

For some years now, IACS Members have, to varying degrees, been active in the deployment of remote survey activities, typically where on board attendance adds no further insight than that obtained from a remote intervention. Remote surveys have become even more topical during the COVID-19 pandemic, with classification societies accelerating an increased use of technology in the survey process.

Remote surveys have provided flexibility for shipowners, with round-the-clock global coverage and improved efficiency through reduced travel times and increased availability. Remote surveys can, in many cases, be conducted with greater flexibility with respect to when and where a survey is conducted, including when the ship is on an open ocean crossing.

The benefits of remote surveys are acknowledged by many shipowners. In many situations, remote surveys have helped the shipping industry to continue to move cargo on ships with valid certificates during the pandemic, which has proved vital to ensure business continuity for global trade while maintaining high safety standards. Classification societies have reported a massive increase in the demand for remote surveys during the pandemic, especially due to travel restrictions.

CREW CONSIDERATIONS

A noteworthy concern has been expressed by the International Transport Workers' Federation (ITF) about the additional work imposed on the crew in taking photos and videos while conducting remote surveys – compared to traditional surveys – which may add to crew fatigue. IACS acknowledges the ITF's concerns and notes that a remote survey or audit intervention requires a mutual agreement between the Master and the classification society; and that IACS Members remain committed to not compromising on board safety during any survey whether held in a conventional manner or via a remote intervention. While IACS understands the challenges related to crew behaviour, it is worthwhile noting that remote surveys negate the need for a surveyor to physically attend the ship to carry out the same survey, which can disrupt the vessel's operational profile and crew preparedness.

Remote surveys are a joint exercise between the classification society and the shipowner with the active participation of the crew, hence it is expected that shipowners will take the necessary steps to ensure that the safety of the crew and rest hours are not compromised as a result of the remote survey.

Meanwhile, inadequate internet bandwidth on board has been the biggest challenge to the successful execution of remote surveys as data transfer is pivotal to the entire exercise. Therefore, ship operators interested in undertaking remote surveys should evaluate and, if necessary, improve the internet connectivity on board - especially in the engine room - enabling live streaming for effective remote verification.

INFORMATION PAPER

IACS published an *Information paper on the Remote Surveys for interested stakeholders* in February 2021. In the paper, IACS provided background information and practical case studies from classification societies on remote surveys. The article also covered the potential benefits of remote surveys, concerns, and issues raised by regulators,

industry associations, operators, and other stakeholders.

A sharp increase in remote surveys during 2020 as a direct result of the pandemic prompted classification societies to individually develop their own procedures without common requirements to carry out remote surveys. To ensure all IACS Members have uniform guidance and requirements, IACS initiated a Project Team (PT) reporting to the Survey Panel in the autumn of 2020. The main task of the PT was to develop a Unified Requirement (UR) for Remote Classification Surveys for ships in service.

The project work commenced in February 2021, when Members started a review of the remote survey process based on their own procedures, practical experience, existing flag State policies and their submissions to IMO. The project concluded with the development of a draft UR towards the end of 2021.

The project's main focus was to develop a UR, keeping the principle of equivalency between remote and traditional on board surveys. In terms of scope, a survey can range from a simple review of on board documents or logs to an extensive periodical survey including hull, equipment, machinery repairs and follow-up of all class and statutory items.

The IACS UR has been developed with an objective that remote survey will only be appropriate provided quality is not compromised, and the survey is carried out with the same assurance as that performed by an attending surveyor.

The draft UR is being reviewed by the IACS, taking input from all classification societies. Once the UR is adopted and published, it will

Live streaming from the ship

Office set-up for live streaming

"The IACS UR has been developed with an objective that remote survey will only be appropriate provided quality is not compromised, and the survey is carried out with the same assurance as that performed by an on board attending surveyor"

have to be transposed into individual IACS Members' Rules. The project's outcome will bring about a unified procedure for conducting remote surveys that will have much wider acceptance among flag State Administrations, shipowners, and other stakeholders. IACS has also held several rounds of discussions with other stakeholders, including IUMI and the EU's Directorate-General for Mobility and Transport (DG MOVE), keeping them abreast of development of the UR.

Some Governments (including the EU, the Republic of Korea and China) have taken an interest in remote surveys and have submitted papers to IMO to request that it initiates work on that subject with an objective to develop statutory guidelines. IACS has expressed its intention to support these proposals and will further collaborate with IMO to ensure a global and uniform implementation of such guidelines.

The IMO's Maritime Safety Committee has now agreed to look at the topic of remote surveys, ISM Code Audits and ISPS Code verifications under a new work programme of its Sub Committee on Implementation of IMO Instruments, starting in 2022. It is acknowledged that flag State Administrations have a predominant role in accepting alternative surveying methods and therefore the work being initiated by the IMO will be of utmost importance.

ENGAGEMENT CRUCIAL

After the adoption of the IACS Unified Requirement for Remote Classification Surveys, IACS will continue to be actively engaged with this challenging topic, aiming to support the adoption of new technology while strengthening maritime safety and contributing to the protection of the environment. Remote surveys are an alternative to the traditional on board survey and should not be perceived as something that is imposed on shipowners. The shipowner must therefore be given the clear option of selecting a survey method depending on the eligible scope and the vessel's necessary infrastructure available on board.

IACS recognises that remote surveys cannot fully replace on board surveys with the physical attendance of surveyors; the on board survey comes with many benefits for both

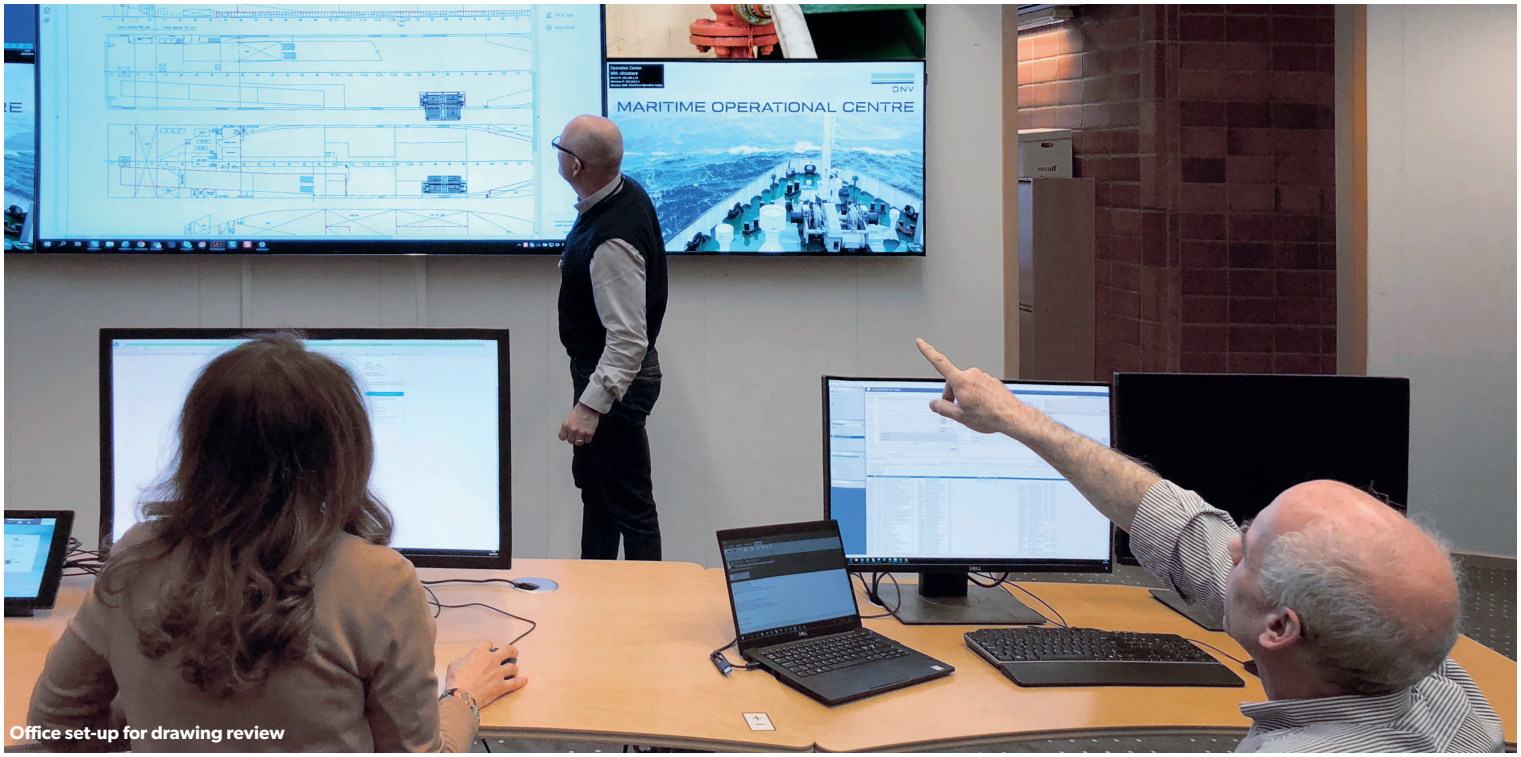
class societies and the shipowner. On board survey attendance builds experience for both surveyors and for the ships' crew with safety and compliance routinely assured and issues resolved through co-operation. However, a balance must be found between remote surveys and physical attendance to ensure the sustainability and robustness of the current classification and statutory systems.

IACS Members are moving towards a hybrid mechanism with a mix of physical and remote survey supported by progressive adoption of remote surveys in appropriate cases in step with the development of relevant IACS URs and the international regulatory framework, and the availability of appropriate technologies that enable effective remote survey intervention.

In summary, remote survey is a reality and it is a practice that will continue to mature as an industry benchmark in selected scenarios where physical attendance is deemed to add no more value than a remote survey and survey objectives continue to be met. Increasing demand from discerning owners to ensure compliant uninterrupted operations, the natural progression of classification societies to undertake alternative ways of verifying compliance, exponential evolution of remote digital communication options, and increasing decarbonisation focus will be key drivers of greater uptake of remote surveys.

IACS will take the lead, identifying the evolving needs and challenges, and will assist the industry in standardising the approach from classification societies. Looking ahead, IACS looks forward to working with flag State Administrations and other stakeholders to strengthen uniform guidance on the implementation of remote surveys. ■

A shipmaster attending a remote survey



Office set-up for drawing review

Material innovation heralds new LNG construction era

High manganese content steel to bring down the cost of ship construction

By Maxim Yurkov, IACS EG/M&W Chair.

Materials are an integral part of the shipbuilding industry - especially when it comes to building specialist ships, where there is a limited choice of both appropriate and safe materials for construction.

This is particularly true for the construction of gas carriers or ships storing and burning liquefied gas as fuel. These ships need to responsibly store and transport liquid gas at cryogenic temperatures. The environment and the safety of seafarers depend on the reliability of these components – a leak of extremely cooled liquid cargo or fuel would inevitably lead to tragic consequences.

Therefore, the selection of material for such systems and the requirements for these materials fall within the jurisdiction of the IMO and are governed by the well-known International Code of the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code) and the International Code of Safety for Ships Using Gases or Other Low-flashpoint Fuels (IGF Code), as well as many other resolutions covering this topic.

Until recently, steel grades rich with nickel, chromium and molybdenum were permitted as conventional materials but the cost of such steels is significant. For a liquefied natural gas (LNG) bunkering gas carrier the required amount of high nickel steel could be as much as several hundreds of tons. Therefore, the final price of a vessel significantly exceeds the cost of vessels of other types. Additionally, the need to use special welding consumables containing the alloy adds to the cost.

DEALING WITH EXTREMES

What makes these cold-resistant materials

special? First, the steel must cope with extreme, -165 degrees cooling. Second, the structure must be able to resist crack initiation and propagation. Third, the coefficient of thermal expansion must be very small in order to avoid critical deformations and, consequently, damage to the ship's construction.

On the one hand, we have the need for specific properties, and on the other, the high cost of the material's chemical composition, which delivers these properties. Until recently, these alloys were the only solution.

But in 2015 the Republic of Korea put forward a proposal to consider the possibility of using a steel alloy based on high manganese content for LNG ship construction. One of the benefits is that this material has an advantageous chemical composition, which will undoubtedly decrease the final price of a gas carrier.

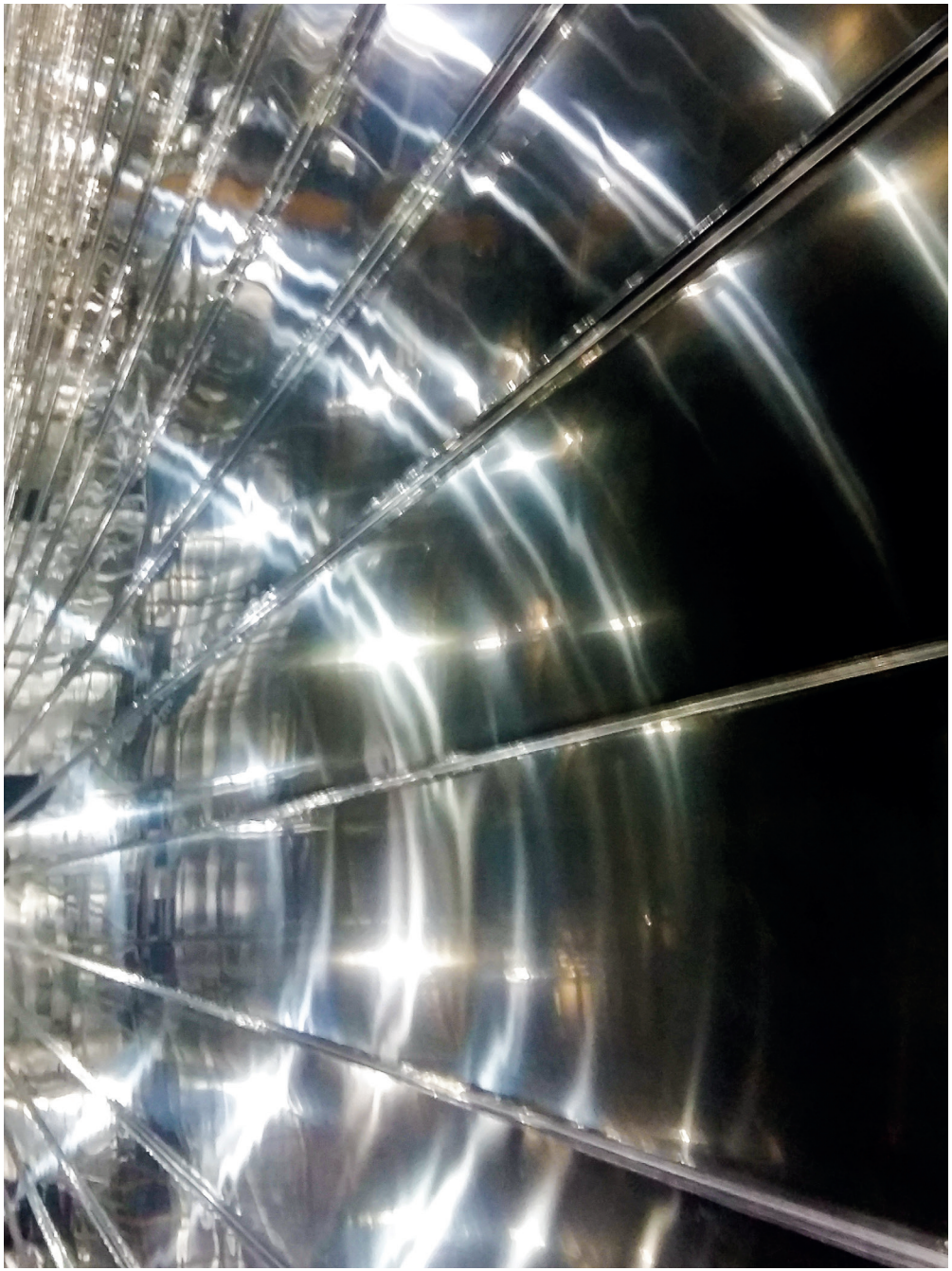
Of course, to be accepted as an alternative material the proposed steel alloy must not be inferior to conventional steel grades in terms of required safety level. As a result of discussions and experimental studies of the proposed alloy, IMO issued two documents in 2020 regarding the application and approval of the new alloy: MSC.1/Circ.1622 and MSC.1/Circ.1599-Rev.1. The latter – *'Interim Guidelines on the Application of High Manganese Austenitic Steel for Cryogenic Service'* – hints that the future implementation of the new steel alloy in the IGC and IGF Codes is highly likely.

In parallel and in addition to the above-mentioned IMO Circulars, IACS has developed its own Recommendation. Recommendation 169 is a non-mandatory document which was initiated in 2013 and successfully completed in 2021. This Recommendation provides the shipbuilding industry with 'Guidelines on Approval of High Manganese Austenitic Steel for Cryogenic Service'.

The IACS Expert Group on Material and Welding carried out extensive work for the development of the Recommendation, including provisions for mechanical properties, chemical composition, test procedures and scopes of surveys for both the base metal and the heat affected zone.

Consultation on the Recommendation is ongoing, and, once feedback has been received from the shipbuilding industry, it will most likely be translated into an IACS Resolution after high manganese steel is introduced into the relevant IMO instruments.

IACS remains happy to support and assist shipbuilders on their journey to improve maritime safety and drive innovation. ■



Surface of an LNG cargo tank made of austenitic steel

Keeping abreast of quality developments

Review will ensure QSCS remains fit for purpose

By Peter Williams, IACS Quality Secretary.

No ship is perfect. Even a newly delivered ship, safe and fully functioning will have minor issues to be resolved. It also takes time for the ship's crew to become familiar with the ship and its systems. But it's not long before the ship successfully lifts its first cargo and, with proper care and maintenance in line with class rules and statutory regulations, will trade for many years, transporting countless other cargoes of goods and commodities without polluting the environment and keeping all who sail in the ship safe.

Of course, the sea is a harsh, unforgiving environment and a well-maintained ship will be worked hard. Over time, maintenance inevitably becomes more extensive and intensive. Changing markets may also mean a major modification makes economic sense to ensure she continues to remain fit for purpose. At around 25-30 years of age even a well-maintained ship will have reached the point where recycling and replacing with another bright, shiny new one is the only viable option and so the cycle begins again.

IACS Quality System Certification Scheme (QSCS), the widely respected quality scheme that has served the 12 IACS classification societies so well for many years, is now around 30 years old. It was the wisdom of IACS Council in 1991 that made the insightful, long-term decision to invest and commit to developing a quality management system that would bind the 12 Members, long term, to an audit scheme and ensure consistent and full compliance with all IACS Resolutions for all members.

REMAINING RELEVANT

Just like a ship, QSCS has proved to be a trusted and well-maintained system that has served IACS Members well. But just as importantly, it has also served the wider shipping community by delivering what it says it does, which is to verify that every IACS Member has developed its own internal quality management system, satisfying the requirements set out in IACS Quality Management System Requirements (QMSR).

Obviously QSCS is not a ship and nor does it operate in a harsh corrosive environment. At its heart lies the QMSR – the standard that has become widely known and accepted as the Gold Standard quality management system for classification societies. Essentially QMSR sets out the requirements that the individual quality management system of every IACS Member must meet. QSCS is the framework that describes the audit and supporting ancillary processes and mechanisms by which the individual IACS Members are audited to ensure compliance with QMSR.

Similar to a ship, however, QSCS does require regular maintenance, something IACS Operations Centre and Quality Committee have been dedicated to since the scheme's inception. QSCS is now around 30 years old and it is worth reflecting how quality generally in the world of shipping has evolved and changed since QSCS was launched in the early 1990s.

In 1991 the European Commission's Council Directive 94/57/EC on common rules and standards for ship inspection and survey organisations and for the relevant activities of maritime administrations, did not exist. It came into force on 1 January 1995, two years after the first QSCS certificates had been issued. There was no International Safety Management Code regarding the management standards of shipping companies, no IMO Instruments Implementation Code for flag and port States. The quality assessment and certification entity required under Article 11 of Regulation (EC) No 391/2009, which has come to be known as QACE, was not even a twinkle in the eye of the European Commission. Furthermore, Regulation (EC) No 391/2009,

“Thirty years on and QSCS has proved itself of immense value.”

which superseded Directive 94/57/EC did not enter into force until April 2009. So the quality world that shipping operates in today is a very different place to that of 30 years ago. And in that time we have all come to understand and appreciate the importance and value of quality.

During the same period, ships have become increasingly complex and now with the latest developments regarding cyber security, digitalisation and decarbonisation, the rate of change seems exponential.

The internet did not become mainstream until the 1990s, but today everything is online, including class rules, international conventions, QSCS, and much more. Meanwhile, remote surveys and remote audits are becoming more common and will be here to stay, I am sure.

So at around 30 years of age, how is QSCS bearing up to all these changes? Maintenance is continuous and has always been ongoing since the start of the scheme. Around ten years ago QSCS underwent a major modification but cognisant of all the recent developments and a much greater focus on quality, has the time come for a more in-depth check of its health and fitness; does it stand up to scrutiny?

During the last ten years and since the major modification of the QSCS in 2010, QACE – a European regional initiative – has become established, and IQARB is gaining traction with the support of some major and respected flag States as well as the European Commission, IMO and a broad spectrum of the shipping industry. Additionally, ISO 9001:2008 has been superseded by ISO 9001:2015, which is an integral part of QMSR. This was a significant revision that now requires an organisation to determine external and internal issues that are relevant to its purpose and its strategic direction. Risk-based thinking is now also an important element requiring an organisation to ascertain risks and opportunities in the context of the organisation and the needs and expectations of its interested parties.

The IMO Member State Audit scheme is established and progressing well and places obligations on flag States regarding their oversight of the classification societies they authorise to act on their behalf for statutory surveys and inspections. In conjunction with the Recognized Organization Code, which is based on IACS QSCS, this clearly has consequences for classification societies.

Thirty years on and QSCS has proved itself of immense value. It underwent major modification around ten years ago but since then the world has inevitably moved on. Once again, IACS, one of the most respected and important bodies in shipping standards, with the assistance of its advisory committee, comprising credible and influential industry representatives, will conduct a thorough review of QSCS. This will ensure its continued credibility and that it complements and fits with the latest developments and initiatives, such as IQARB, that impact quality in our industry, now and for the foreseeable future. ■

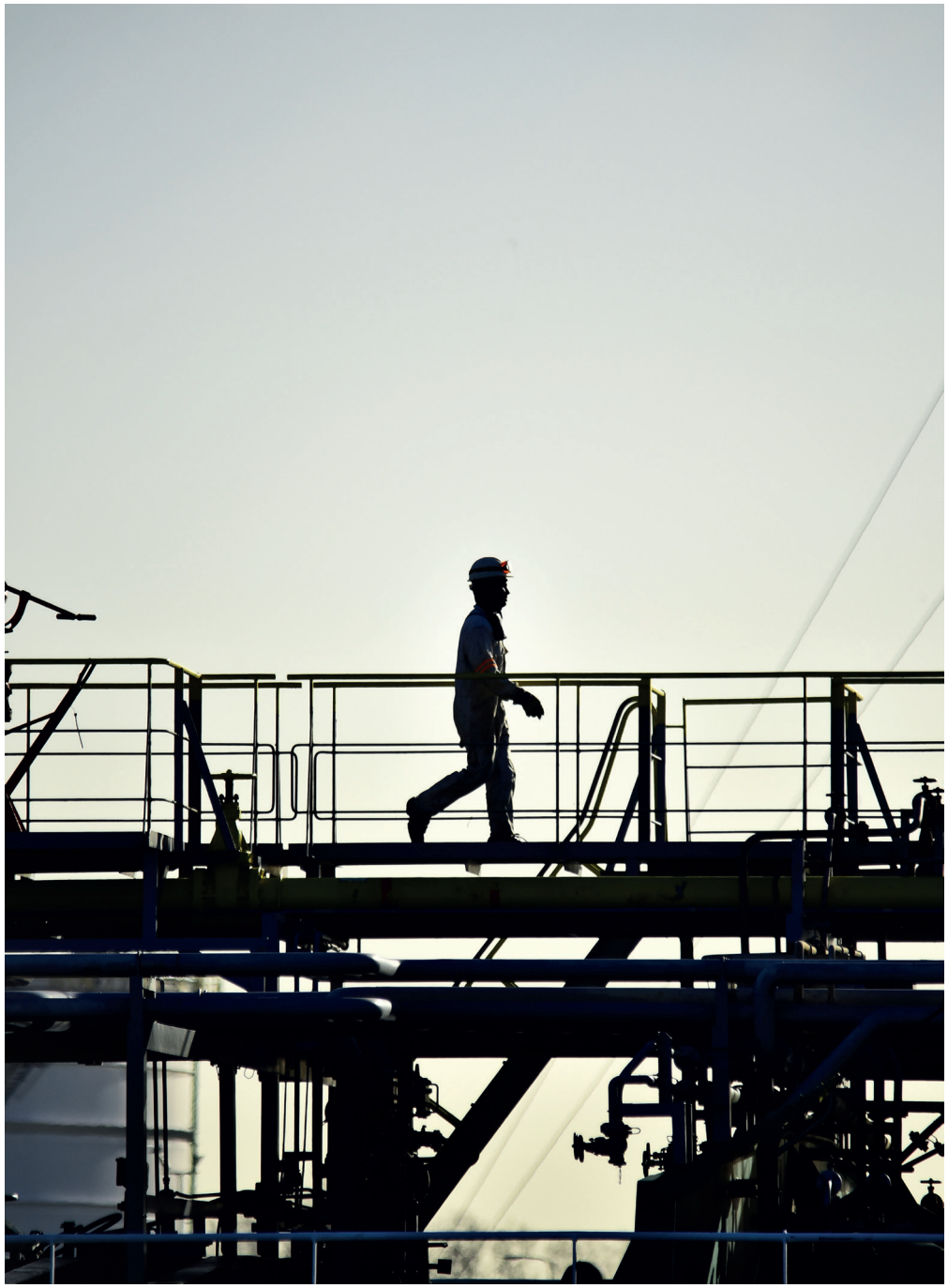


Photo credit: dcornelissen@chello.nl

Momentum maintained for quality review body

Positive movement for oversight of IACS classification society quality management systems

By Matthieu de Tugny, IACS SG-QP Chairman.

The International Quality Assessment Review Body (IQARB) was established in 2019 to review the certification process of the quality management systems of IACS classification societies. While still in its developmental phase, it was encouraging that IQARB's third meeting was able to meet in a hybrid format in October 2021 with the importance of the meeting being positively reflected by the physical participation of so many of its Members. The event was kindly facilitated by IMO at its central London premises.

IQARB 3 considered the work undertaken by the Steering Committee between IQARB 2 and 3 (SC1 and SC2) held remotely in November 2020 (SC1) and April 2021 (SC2).

IQARB analyst, Karl Lumbers, produced some excellent and detailed reviews for each of the 12 individual IACS Members. These were based on 2020 data since sufficient audits had been conducted in 2020 to make the review process meaningful.

However, due to the overriding need to undertake individual classification society reviews in person, with representatives of both the classification society and Accredited Certification Body (ACB) present, it was considered only fair and prudent for IQARB not to issue Factual Statements in 2021. This decision was taken due to the ongoing impact of the pandemic, which continues to prevent the physical attendance at meetings of a number of IQARB Members.

The report on Quality System Certification Scheme developments, delivered by IACS' Quality Committee Chairman, was well received by some major and respected flag States as well as the European Commission, IMO and a broad spectrum of the shipping industry, and included an update on the improved ACB performance benchmarking methodology criteria in relation to ACB performance.

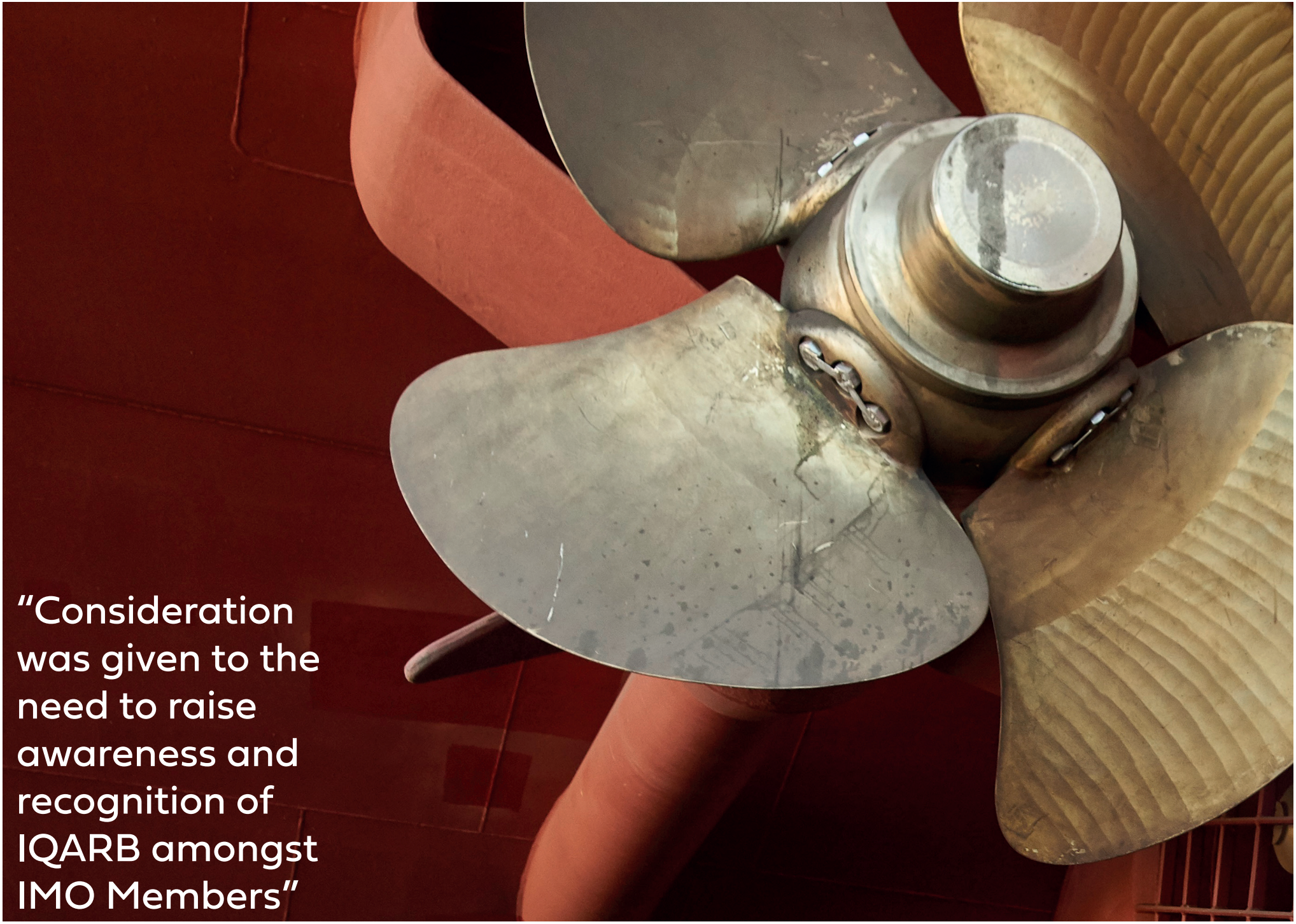
IACS' Secretary General introduced the draft Terms of Reference (ToRs) for the IQARB Technical Committee, noting that the proposal for this committee was an outcome of IQARB 2. It was encouraging that IQARB Members were generally receptive to the establishment of the Technical Committee, subject to a balanced composition of its membership being agreed.

At the time of writing this report, membership of the Technical Committee and the draft ToRs were still to be finalised.

Consideration was given to the need to raise awareness and recognition of IQARB amongst IMO Members. All who attended the meeting agreed on the importance of this.

Discussions on next steps for IQARB included the possibility of establishing IQARB as a legal entity, with its own secretariat and auditors, and the adoption of various measures which might improve the current IQARB system of oversight.

The success of this hybrid IQARB 3 meeting – one of the first to take place since the imposed restrictions of the pandemic – was evident. All participants look forward to maintaining the momentum generated at IQARB 3 and to making progress in the Steering and Technical Committees so that discussions at IQARB 4, currently scheduled to take place in April 2022, can be equally productive. ■



"Consideration was given to the need to raise awareness and recognition of IQARB amongst IMO Members"

Learning cycle enhances remote audit standards

Maintenance of IACS quality standards during the pandemic

By Sergey Bystrov, IACS Quality Committee Chair.

Despite the measures taken across the world to combat the pandemic, the further spread of COVID-19 in 2021 continued to have a significant impact on the maritime industry in general and on IACS Members' quality certification in particular.

In recognition of the importance of the continuous cycle of certification of IACS Members against the requirements of ISO 9001:2015 and IACS Quality System Certification Scheme (QSCS), audits of IACS Members by independent Accredited Certification Bodies (ACB) against the above standards continued in 2021, guided by the Policy Paper 'Covid-19 impact on IACS Members' quality certification' developed by IACS in 2020. Given the unprecedented travel restrictions throughout the world, IACS agreed that remote audits of offices were a possible substitute for on-site audits to maintain IACS Members' ISO 9001 and QSCS certification.

The developed Policy Paper was published on the IACS website for all stakeholders and provided for the possibility of applying remote auditing techniques for audits of IACS Members' offices, such as survey locations, plan approval centres, controlling offices and head offices.

With regards to vertical contract audits (VCA), the Policy Paper stipulates that IACS Members in co-operation with their ACBs should ensure that VCAs are conducted on-site throughout the year and cover the following:

- New construction
- Ships in service
- Significant equipment and/or material certification
- ISM Code, ISPS Code, or MLC Convention.

CHECKS AND BALANCES

While the effectiveness of remote audits differed at the beginning – especially in cases when ACB auditors and representatives of classification societies participated in audits using remote auditing techniques for the first time – with each subsequent remote audit both the ACB auditors and IACS Members gained more experience of using remote auditing techniques, learning lessons from this and sharing best practices. Thus, within a short period of time, a high standard for remote audits was achieved. The ever-increasing level of digitalisation of IACS Members and the management of documents and records in electronic format also contributed to improving the quality and effectiveness of remote audits.

The COVID-19 restrictions in place accelerated further the application of remote surveys undertaken by IACS Members. In this context, the 'Effectiveness of Remote Surveys including execution and documentation' was set as one of the focus areas for ACB audits of IACS Members in 2021.

While performing audits of IACS Members, auditors were tasked to note particularly that the industry requires assurance that safety standards are not compromised by the use of remote surveys, that is to say that the quality of remote surveys should be no less effective than if the survey had been conducted by the surveyor being physically present.

Throughout 2021, during both on-site and remote audits of head offices and survey locations of IACS Members, ACB auditors thoroughly checked the availability of instructions for planning and conducting remote surveys, training personnel in remote survey techniques, and video records and documents demonstrating the remote survey process and its results.

POSITIVE CONCLUSION

The audits conducted, auditors' comments and an appraisal from external observers drew the conclusion that in the age of the pandemic remote surveys, if conducted, were effective and that the IACS quality standards have been properly maintained during the COVID-19 pandemic.

“Effectiveness of remote surveys was set as one of the focus areas for ACB audits”

In May 2021, IACS revised the Policy Paper ‘Covid-19 impact on IACS Members’ quality certification’ and deemed it appropriate to allow remote VCAs for materials and/or equipment certification and for audits of shore-based divisions of shipping companies against the International Safety Management Code. It was a conscious decision, as the classification societies conducting surveys and/or audits remotely should be able to demonstrate online the entire process of such remote surveys and/or audits to ACB auditors.

By the end of 2021, all scheduled office audits were conducted either remotely or with the physical attendance of auditors. In 2021, IACS Members and their ACBs managed to increase the total number of VCAs as compared with 2020.

The external observers and IACS observers, having assessed the quality of remote ACB audits, came to the conclusion that in the cases when all records were available electronically and the quality of the internet connection was good, remote audits could be conducted at a very effective level.

Returning to normal life after the pandemic, ACBs and classification societies will be able to conduct a certain number of audits using remote auditing techniques, where applicable and justified, and this will not affect the robustness of the gold standard that the IACS QSCS represents. ■

Photo credit: d.cornelissen@chello.nl

New challenges enhance competence

Knowledge building boosted by remote techniques

By Sergey Bystrov, IACS Quality Committee Chair.

The key purpose of a classification society is to provide classification, statutory certification and services as a Recognized Organization acting on behalf of a flag State Administration, and assistance to the maritime industry and regulatory bodies on maritime safety and pollution prevention, drawing on an accumulation of maritime knowledge and technology.

One of IACS' key values is technical knowledge, defined as collective and individual knowledge and experience gained from the so-called 'class cycle'. This comprises the development of rules, approval of design and documentation, surveys during construction and in service, and the processing of feedback for further improvement of the rules.

It is the accumulation, maintenance and continuous development of competencies that enable classification societies to provide the quality services stakeholders expect from them.

The expansion of competencies takes place through the continuous interaction of societies and the exchange of experience and knowledge with representatives of the maritime industry, such as shipbuilding corporations, shipowners, equipment manufacturers, flag State Administrations and international regulators.

In addition, research conducted on orders and with the participation of classification societies is an important aspect and a significant input for the development of competence. Every year, IACS Members invest huge financial resources in research, the results of which are taken into account in the improvement of classification society rules and IACS Resolutions. And this process remains continuous, which allows for enhancement of the safety of navigation, taking into account modern trends, technologies and innovations.

The competence of classification societies is directly dependent on the competence of their employees; and the competence of IACS in turn depends to a large extent on the competence of specialists involved in the activities of the IACS Working Groups. At the time of writing, there were six panels and 32 project teams, nine expert groups and seven small groups, as well as three joint working groups successfully functioning in IACS.

The many participants of these groups are highly professional specialists, all striving to improve IACS' technical requirements and thereby enhance the safety of navigation and protection of the environment.

TOP PRIORITY

Knowledge and competence have always been and remain essential ingredients of the success and sustainable development of any organisation. This is why IACS and all classification societies give such high priority to personnel training and qualification. It should be noted, however, that this is not a question of the competence of individual specialists in some narrow areas, but of the competence of all specialists at all levels.

Special requirements for training surveyors and plan approval staff in classification societies, as well as for marine management systems auditors and maritime labour inspectors, are set out in IACS Procedural Requirements 6, 7, 10 and 10B. These

"It is the accumulation, maintenance and continuous development of competencies that enable classification societies to provide the quality services stakeholders expect from them."

Exchange of experience and knowledge is an essential ingredient of the success and sustainable development of IACS Members

Procedural Requirements also accommodate all personnel training and qualification maintenance requirements as stipulated in the IMO Code for Recognized Organizations (IMO RO Code).

Provision of a network of qualified and competent technical staff, including the related supervision and training system, is one of the fundamental processes of any classification society as defined in the IACS Quality Management System Requirements (IACS Procedures Volume 3), and the quality management system of the classification societies ensures the effective functioning of this process.

In the face of dynamically evolving digital and communication technologies, many principles and approaches to the maintenance and development of competence and qualification of surveyors have undergone significant change in recent times.

In addition to theoretical training in training centres and practical training on-site, it has long been the practice of classification societies to use various simulators, through which a surveyor can learn to conduct surveys on virtual ships.

Many classification societies invite manufacturers of complex equipment to their training courses for surveyors to explain the specifics of essential equipment and systems. Leading higher educational institutions also take part in the training of surveyors, and that brings a positive effect and enhances the competence of classification societies' specialists.

REMOTE APPLICATION

Personnel training has become even more topical during the pandemic, at a time when a surveyor's physical attendance at a place of survey has become impossible and the only possible way to verify compliance of a ship or equipment with applicable requirements is to conduct surveys using remote means. Under these conditions, individual members have developed their own approaches to ensure that remote survey, where applied, does not pose a risk to safety and is conducted to the satisfaction of the relevant flag State Administration. Classification societies have developed necessary requirements and instructions for planning and conducting remote surveys, as well as pertinent training programmes and plans for training personnel to conduct surveys using remote means. In addition to theoretical training, experienced surveyors who have conducted surveys on-site for many years are also being trained in remote survey techniques.

Recognising that the industry requires the assurance that safety standards are not compromised by the use of remote surveys, classification societies have taken great pains to ensure stakeholders trust their work and are confident in the quality of services rendered using remote means.

IACS Members have met this challenge having acquired new knowledge and experience in remote surveys, and this is being consolidated by a dedicated Project Team working under the Survey Panel, with a view to defining common IACS principles. ■

Adapting to the new normal

Safety still paramount regardless of changed meeting landscape

By Konstantin Petrov, IACS Accredited Representative to the IMO.

2021 could have easily been a groundhog day version of 2020. But armed with lessons learnt from the previous pandemic year, colour was added to the work of IACS at the IMO in 2021. The work at the IMO was organised to make good use of modern technology, which allowed for tangible progress during remote meetings.

The questions and challenges of application of regulations in engineering processes required clarity outside of those virtual meetings. To answer that call, papers were written and submitted. Some were considered, others deferred to either future sessions or to sub-committees and working groups to enable progress.

Because of severe limitations on the IMO's airtime, deferred papers snowballed, which made preparing for a meeting an act akin to an escape trick where one had to untie multiple knots and open multiple locks of process and papers just to know what to expect at the upcoming session, only to be shown that while planning is everything, rarely do plans come through in their entirety.

The diligent Houdini-like work of the IMO Secretariat, the smallest of the UN agencies and managing a mounting workload, allowed delegates to have some hope of achieving results.

It is against this changing environment that IACS continued with its agenda of developing requirements and interpretations, resulting in the preparation of numerous papers for submission to IMO. The need to provide for safe shipping and clarity of application of regulations waits for no-one.

Over 2020-2021, IACS submitted 99 papers to IMO committees and sub-committees and participated in all sessions related to technical aspects of ship building and ship operation. The scheduling in 2022 – after a break of two years – of the Ship Systems and Equipment Sub-Committee (SSE) and the sub-committee on Ship Design and Equipment (SDC) – both of which are rich on technical detail – gave IACS the unique opportunity to develop papers during those two years of abeyance. Issues in the papers are from a wide range of technical areas, including ship stability, carriage of industrial personnel, ship surveys, the Polar Code, reliability of essential propulsion components, fire protection, LSA, and lifting appliances, among others.

PRACTICAL APPLICATION

Last year saw the adoption by the IMO of short-term measures for greenhouse gas reduction: the Energy Efficiency Design Index for existing ships, the Carbon Intensity Index and the update of the Ship Energy Efficiency Management Plan. IACS has started work on understanding the practical application of those regulations in a uniform and consistent way to be able to assist the shipping industry in achieving compliance in a very short time. As issues arise and clarity is created, IACS will seek confirmation from the IMO to continue to help the industry in its preparation for compliance.

In this fast-changing world, where regulatory crafting at the IMO is complicated by disruption, IACS offers a unique mechanism of self-regulation to facilitate the creation of regulatory certainty within the IMO and elsewhere. This applies to drafting future regulation for zero-CO2-emitting ships, to fast-tracking regulations and to the future regulations necessary to ensure safe transition to the application of new technologies.

The outputs of that self-regulation, co-created by IACS in partnership with industry, need to be available to the IMO to support it in moving at a faster pace and upholding its role as the regulator of international shipping.

Further, the move to 'intelligent regulation', supplemented by artificial intelligence and learning, could create an environment of data streaming from ships with analysis in parallel, both of which hold the potential to aid improvements to regulations. This would allow the IMO to outpace the traditional process of drafting regulations and allow the UN agency to adjust to weather the storms of future disruption. ■

Left to right, Konstantin Petrov, IACS Rep to IMO; Kitack Lim, IMO Secretary General; Nick Brown, IACS Chair; Robert Ashdown, IACS Secretary General

"The need to provide for safe shipping and clarity of application of regulations waits for no-one."

Greater collaboration vital to progress

Decarbonisation given the collective attention and priority it deserves

By Robert Ashdown, IACS Secretary General.

The efforts made in recent years to establish a regular cycle of meetings with industry to enable a programme of action, with progress monitored and tailored to meet adjusted circumstances, came under significant strain in 2021. Inevitably, momentum from previous meetings dissipated while the wider, less formal, opportunities for discussion either at industry conferences or in the margins of IMO papers remained elusive. It is, therefore, a testament to all our industry colleagues that a full programme of meetings was completed with some of those meetings able to take place in a physical or hybrid format towards the end of the year.

A degree of flexibility was also required. In view of the all-encompassing nature of the decarbonisation debate coupled with the postponement of the 2020 Tripartite meeting, it was agreed that the regular IACS/Industry Technical meeting would cover non-CO_2 related matters in 2021. This allowed Tripartite 2021 – which was restricted to a virtual format – to adopt decarbonisation as its single agenda item, thus allowing greater focus and depth in the limited time allowed.

The IACS/Industry Technical meeting therefore covered a wide range of safety and environmental topics. These included COVID-19 data collection issues for the Ballast Water Management Experience Building Phase, various initiatives related to Underwater Noise which will need, in time, to be brought together at the IMO, and proposals for the Improvement of flag State Accident Reporting – with VDR enhancements and root cause analysis seen as potential tools to help in this regard. Fire risks due to leakage from low-pressure fuel pipes were also discussed, including the potential increase in risk through the use of alternative fuels which are toxic or have a low flash point. Following the IMO's decision to adopt a new output on the issue of fires on container vessels, all industry partners support a holistic approach to fire mitigation and prevention.

WORKING GROUP PROGRESS

Looking further into the future, IACS also briefed industry participants on its nascent efforts to modernise SOLAS by seeking to adapt the regulatory environment to the current and future pace of technology evolution. One of the key developments here was the establishment of a Joint Industry Working Group (JIWG) on modernisation of SOLAS to take forward work in this area.

Similarly forward focused – and also resulting in a new JIWG – were discussions regarding future IMO work on Maritime Autonomous Surface Ships and the need for industry to collaborate to develop joint positions and submissions to the IMO.

Meanwhile, IACS continues to engage with industry in the JIWG on Anchoring Equipment while the ever-active JIWG on Cyber Safety held its twenty-first meeting in 2021, discussing incorporating cyber risk into ISM and the development of Unified Requirements on cyber resilience of on-board systems and equipment and on cyber resilience of ships.

IACS was also pleased to enjoy a very well attended virtual meeting with the International Union of Marine Insurance (IUMI) which focused on subjects such as container losses at sea, remote surveys, and alternative fuels. As the technical collaboration between IACS and IUMI continues to grow, so do discussions around data analysis and data sharing. The success of these detailed meetings led to the creation of joint IACS/IUMI technical work streams that have delivered submissions to the IMO.

TRIPARTITE RETURN

Following an enforced break in 2020, the reconvening of Tripartite – the annual meeting of shipowners, shipbuilders and classification societies – in 2021 was welcomed across the board. Held in a virtual format, and constrained by time zones, it was agreed that with COP26 and MEPC77 happening in close proximity, Tripartite 2021 should focus exclusively on decarbonisation.

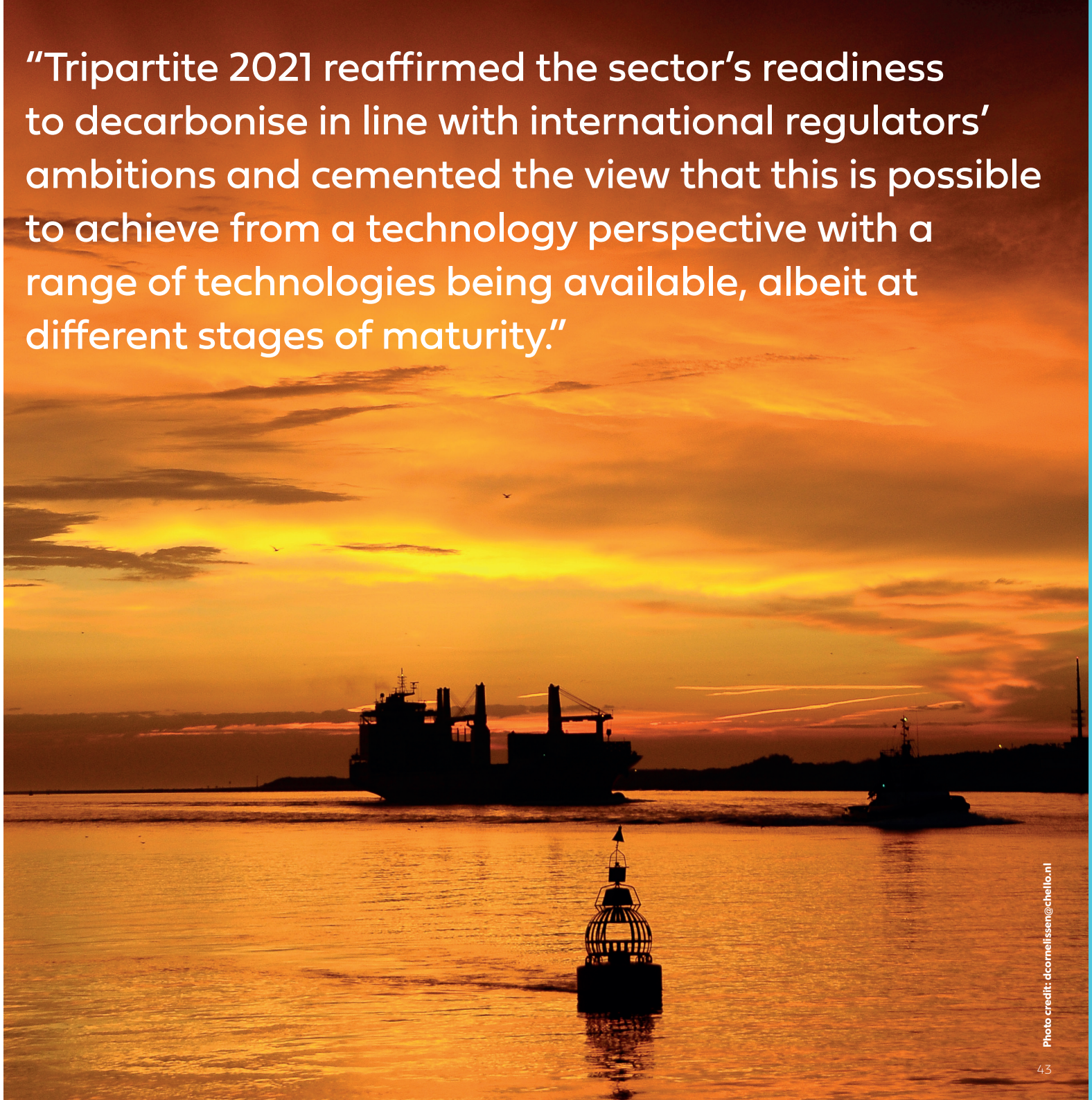
The wide-ranging discussions covered a variety of angles including the political/economic dimensions as well as the technical/scientific aspects. The highly positive and constructive discussions reaffirmed the sector's readiness to decarbonise in line with international regulators' ambitions and cemented the view that this is possible to achieve from a technology perspective with a range of technologies being

available, albeit at different stages of maturity. To achieve this, however, Tripartite recognised that the sector needs regulatory certainty to drive investment decisions and that it also needs funding. Both rely on global political will if they are to be effectively deployed.

From a technical perspective, Tripartite also reaffirmed that further standardisation is needed on technologies that are currently less developed and that the safety aspects related to alternative fuels should be kept at the forefront of regulators' thinking so that draft regulations are not only environmentally ambitious but also safe.

This emphasis on decarbonisation continued at the IACS Council meeting in December where the industry took stock of what had been achieved, both politically and technically, in 2021. The meeting also encouraged a wide-ranging discussion on how resources and efforts can best be prioritised to make the most effective impact in 2022.

As opportunities for dialogue and information sharing continue to be heavily restricted, IACS remains keen to ensure that its policy positions on key issues facing the industry are widely known and understood. Accordingly, IACS continues to update and issue new high-level position papers on matters of key concern to the industry. The latest versions are available at http://iacs.org.uk/about/iacs-position-papers/.



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Organisation 2021

IACS deals with multiple tasks to advance the goal of safer and cleaner shipping

Project teams in detail

Cyber System Panel – 4 Project teams

PT PC02	Evolution of UR E22
PT PC03	Requirements for cyber resilience
PT PC04	Translation of the Rec.166 into a UR
PT PC05	Incorporation of cyber risk into ISM

Environmental Panel – 2 Project teams

PT PE03	EEXI reference speed validation
PT PE04	Implementation of IMO EEXI framework

Hull Panel – 10 Project teams

PT PH32	CSR Maintenance Team
PT PH38	Whipping on containerships
PT PH40	Wave data investigations
PT PH43	Buckling requirements
PT PH44	Fatigue assessment
PT PH46	Tank testing for small ships
PT PH47	Stress criteria for Type C tanks
PT PH48	Anchoring for small vessels
PT PH49	Wave loads
PT PH50	Structural analysis and consequence assessment

Machinery Panel – 10 Project teams

PT PM26	IGF development
PT PM39	Polar code issues for icebreakers
PT PM40	Barred speed range investigations
PT PM41	Shaft alignment investigations
PT PM42	Retrofitting issues for BWM
PT PM43	Revision of UR M78
PT PM44	I.C Engine approval and inspection
PT PM45	Marine complex systems
PT PM46	Machinery Piping Systems
PT PM47	Earthing guidelines for ships and MODU

Safety Panel – 6 Project teams

PT PS40	Maintenance of IACS Rec.110
PT PS41	BTWS fire safety protection
PT PS42	UR F44 to include chemical tankers
PT PS43	Underwater Noise
PT PS44	Review UR N1
PT PS45	Develop text for SOLAS II-2/9

Survey Panel – 3 Project teams

PT PSU35	IGC Code Loading & Discharging
PT PSU36	Revision of UI GC 12
PT PSU38	Remote survey

EG-Formal Safety Assessment – 1 Project team

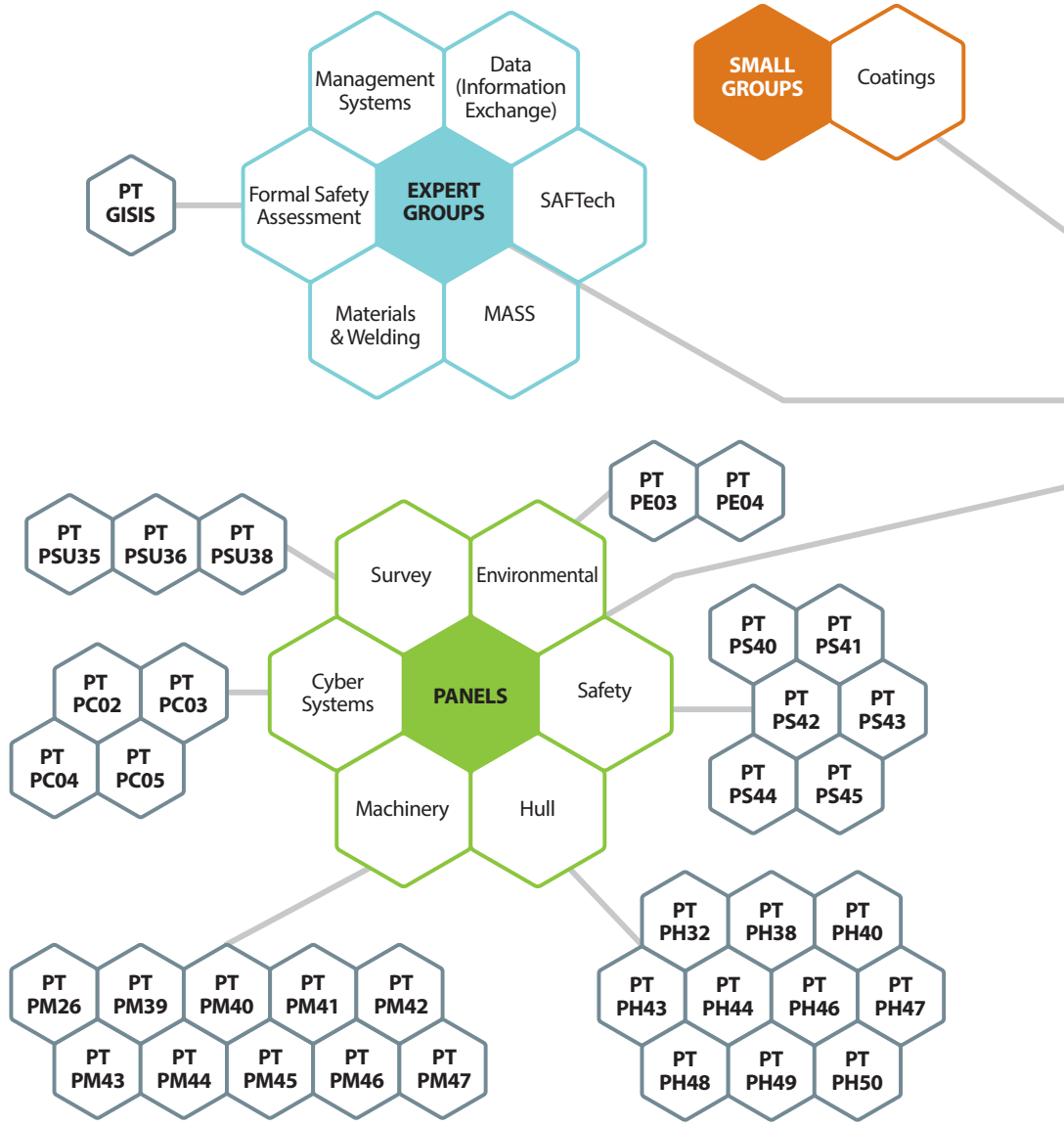
PT GISIS	Examination and Testing of new GISIS MCI module

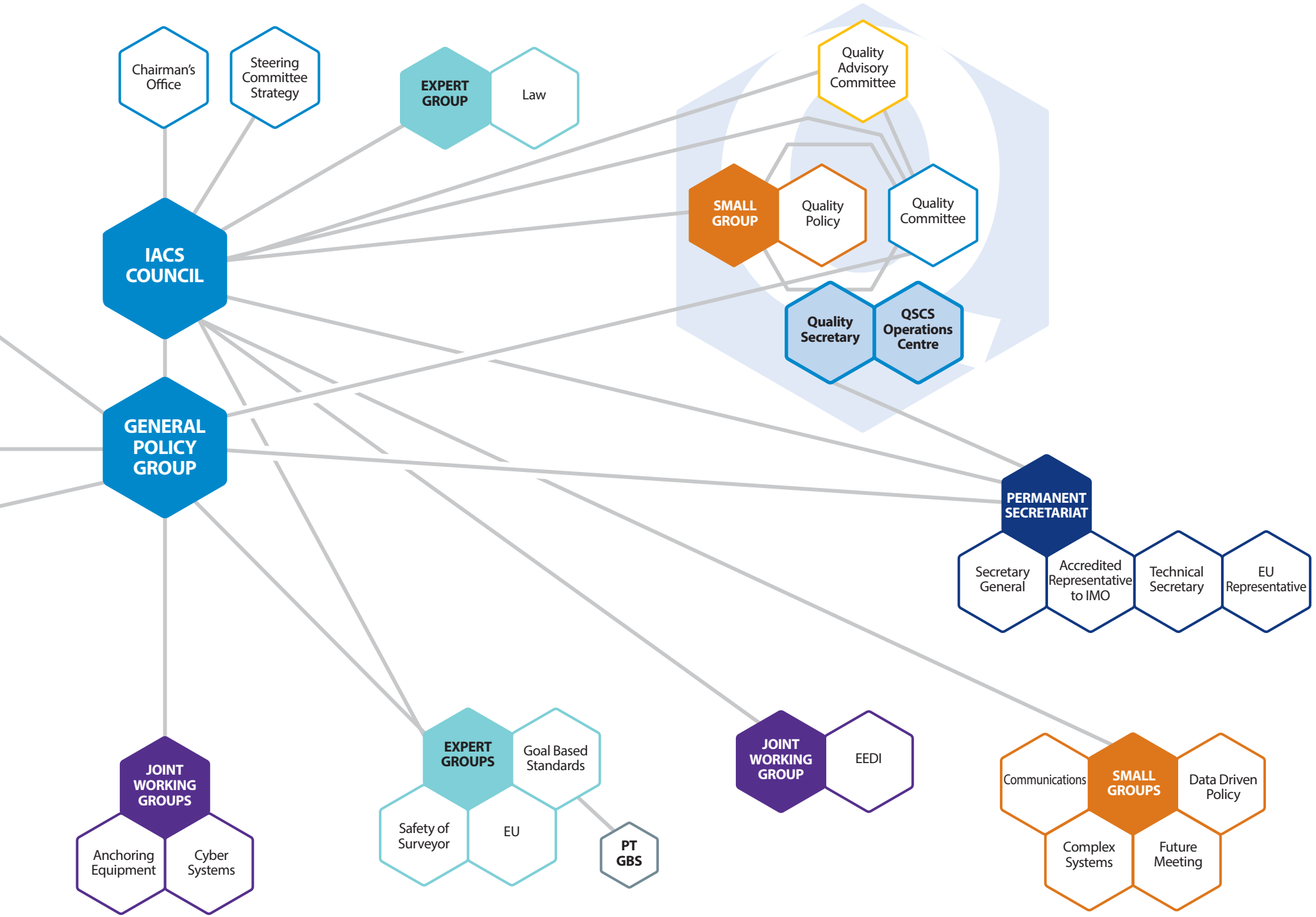
EG-Goal Based Standards – 1 Project team

PT GBS	GBS Maintenance

EG-M&W – 1 Project team

PT EMW01	Advanced NDT techniques

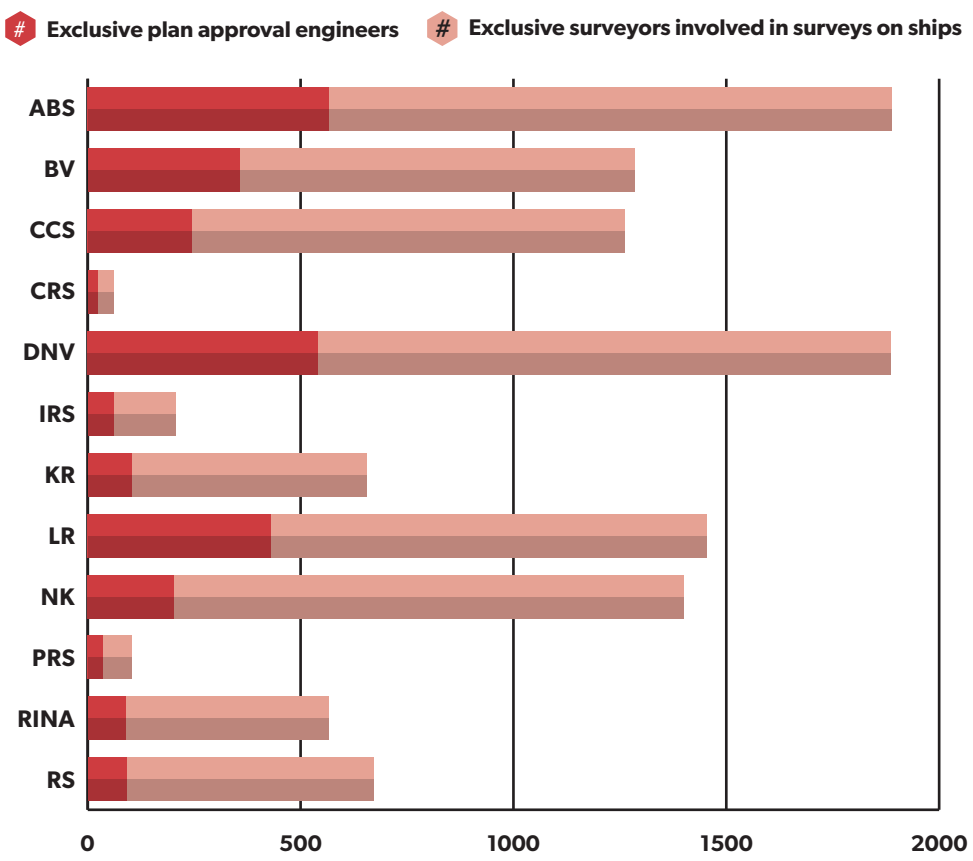



Chairman's Office
Steering Committee Strategy
EXPERT GROUP
Law
Quality Advisory Committee
SMALL GROUP
Quality Policy
Quality Committee
Quality Secretary
QSCS Operations Centre
IACS COUNCIL
GENERAL POLICY GROUP
PERMANENT SECRETARIAT
Secretary General
Accredited Representative to IMO
Technical Secretary
EU Representative
JOINT WORKING GROUPS
Anchoring Equipment
Cyber Systems
EXPERT GROUPS
Goal Based Standards
Safety of Surveyor
EU
PT GBS
JOINT WORKING GROUP
EEDI
Communications
SMALL GROUPS
Data Driven Policy
Complex Systems
Future Meeting

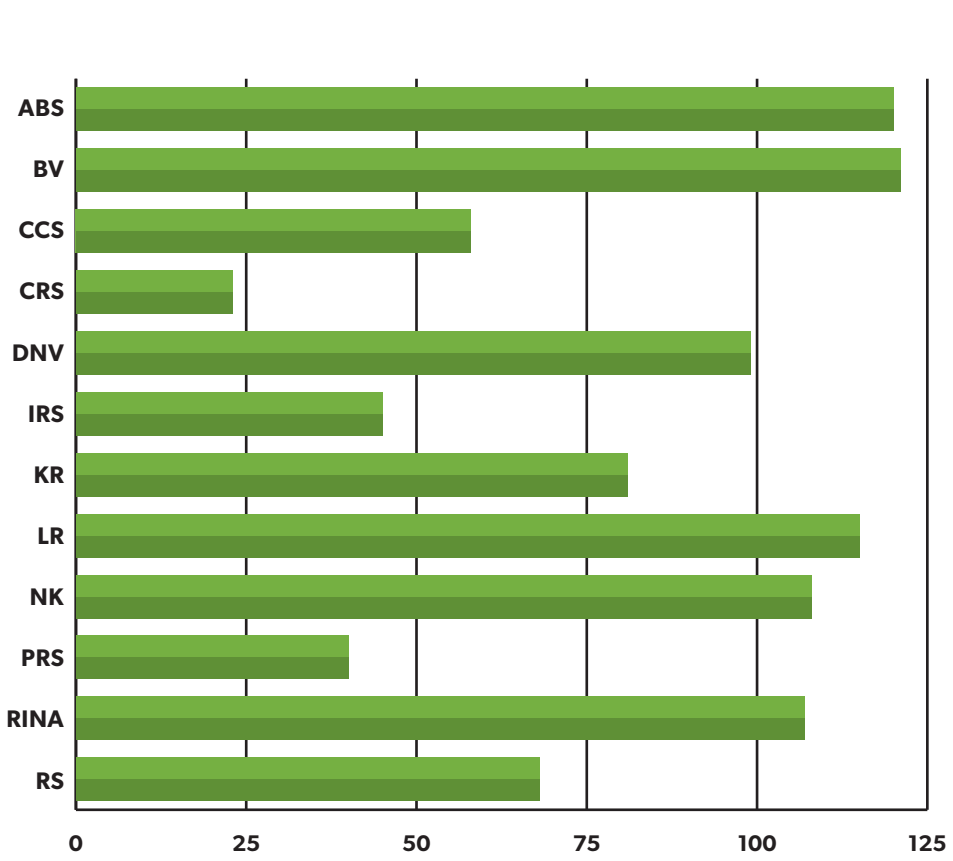
IACS Class Report Data 2021

Classed fleet figures include ocean-going self-propelled ships of 100 GT and over, excluding fishing vessels, military vessels and pleasure craft, with dual classed ships counted at 100%.

Number of surveyors[1]

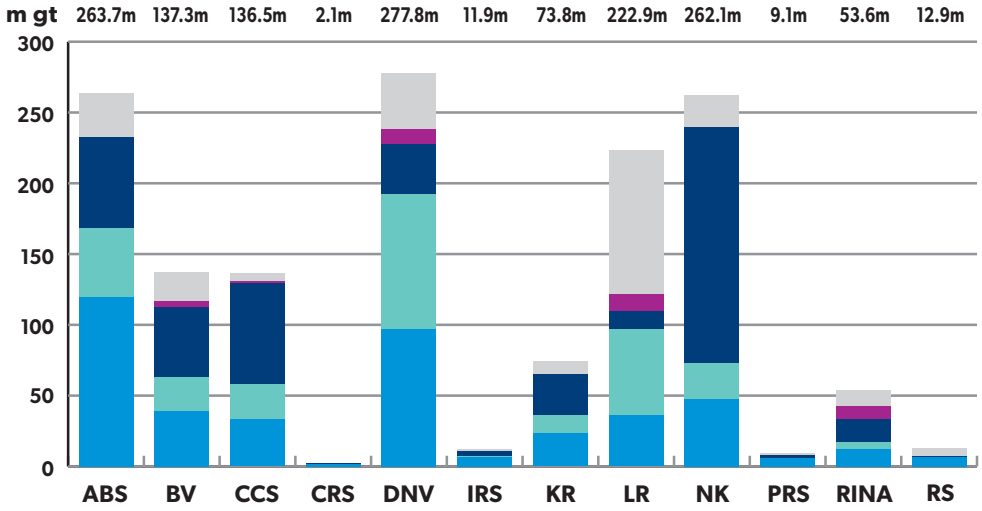


Number of recognising flag State authorities[2]



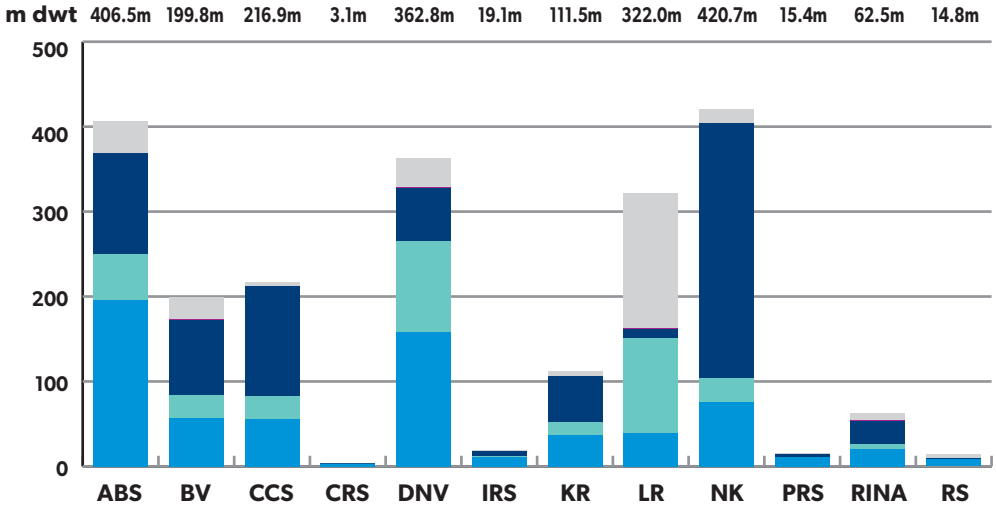
Total gross tonnage by type[3]

Tankers (crude, product & gas) **Container vessels** **Dry bulk**
Passenger vessels (over 12 pax) **Other ship types**



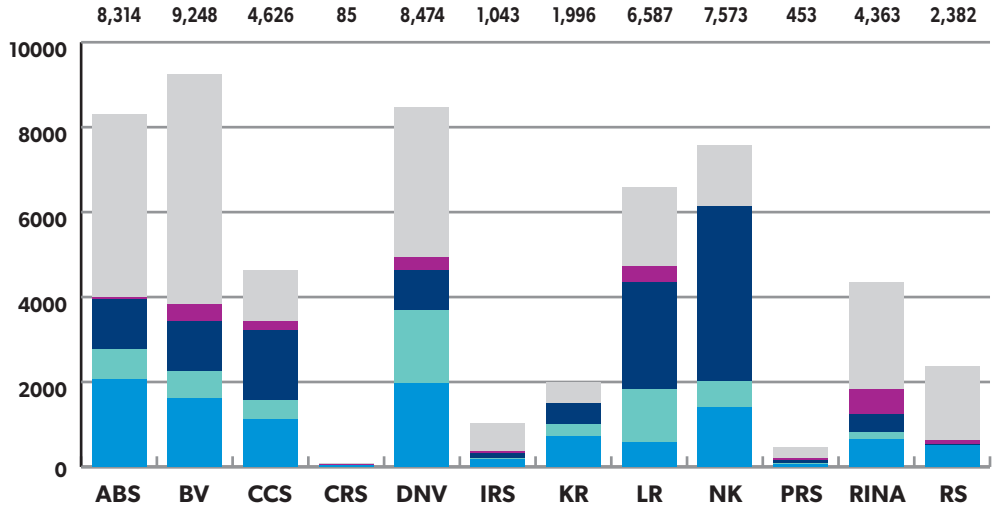
Total deadweight by type[3]

Tankers (crude, product & gas) **Container vessels** **Dry bulk**
Passenger vessels (over 12 pax) **Other ship types**

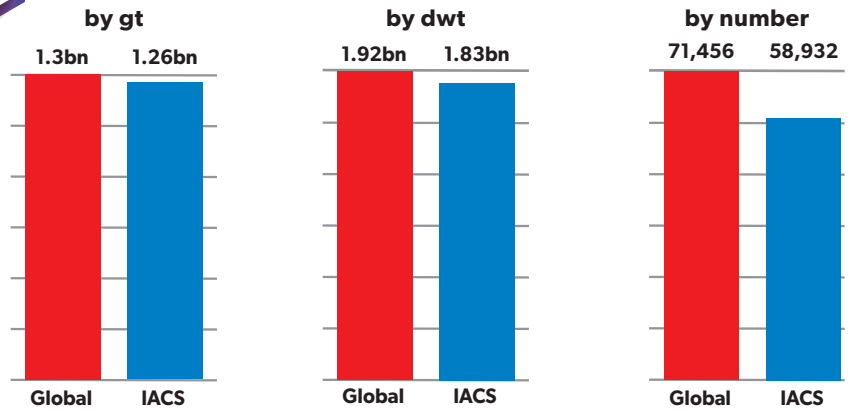


Total number of vessels by type[3]

Tankers (crude, product & gas) **Container vessels** **Dry bulk**
Passenger vessels (over 12 pax) **Other ship types**



IACS fleet compared to global fleet



*Source: Lloyd's List Intelligence

Notes

1 Combined total number of surveyors, consisting of **the number of exclusive plan approval engineers** (RO Code A1.1.2 Plan approval staff are the personnel authorised to carry out design assessment and to conclude whether compliance has been achieved), and **the number of exclusive surveyors involved in surveys on ships** (RO Code A1.1.1 Survey staff are the personnel authorised to carry out surveys (in operation and under construction), and to conclude whether or not compliance has been achieved.)

2 Number of recognising flag State authorities means number of RO agreements with flag States, with general or standing authorisation to act on their behalf for any statutory certificate.

3 The total of IACS Members' figures is in excess of the Lloyd's List Intelligence global figure as each IACS Member counts dual classed ships at 100%.

IACS' contribution to safer and cleaner shipping

IACS Resolutions cover a range of class, regulatory and operational matters of relevance across the maritime industry

The evolution and continuous review of IACS Resolutions and Recommendations is an essential part of the IACS' work. Keeping this large body of material up to date is vital to maintain its ongoing relevance, while the production of new Resolutions in response to technical, regulatory or operational advances demonstrates IACS' technical leadership and responsiveness.

The selection below represents only a small sample of the work undertaken in 2021 and highlights IACS' activity across the maritime sphere. A list of all IACS Resolutions amended or developed in 2021 can be found in the *Appendix* which starts on page 54.

NEW UNIFIED INTERPRETATIONS OF THE IMO IGC CODE

In 2021, IACS has provided six new Unified Interpretations (UIs) of the IMO International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code) to further assist in the uniform implementation of the Code.

UI GC32 (New Feb 2021)
UI GC32 provides a unified interpretation of the wording "design pressure of the outer pipe or duct" in paragraph 5.4.4 of the IGC Code and of the wording "maximum pressure at gas pipe rupture" in paragraph 5.13.2.4 of the IGC Code.

UI GC33 (New Feb 2021)
UI GC33 provides a unified interpretation on the scope of application of the requirements in paragraphs 5.6.5 and 18.9 of the IGC Code.

UI GC34 (New Feb 2021)
UI GC34 provides a unified interpretation of the requirement on cargo filters in paragraph 5.6.6 of the IGC Code.

UI GC35 (New Feb 2021)
UI GC35 provides a unified interpretation of Table 18.1, Note 4 and paragraph 13.3.7 of the IGC Code to prevent inadvertent operation of cargo pumps and inadvertent opening of manifold ESD valves.

UI GC36 (New Feb 2021)
UI GC36 provides a unified interpretation on the cases where oxygen deficiency monitoring is required in paragraph 13.6.4 of the IGC Code.

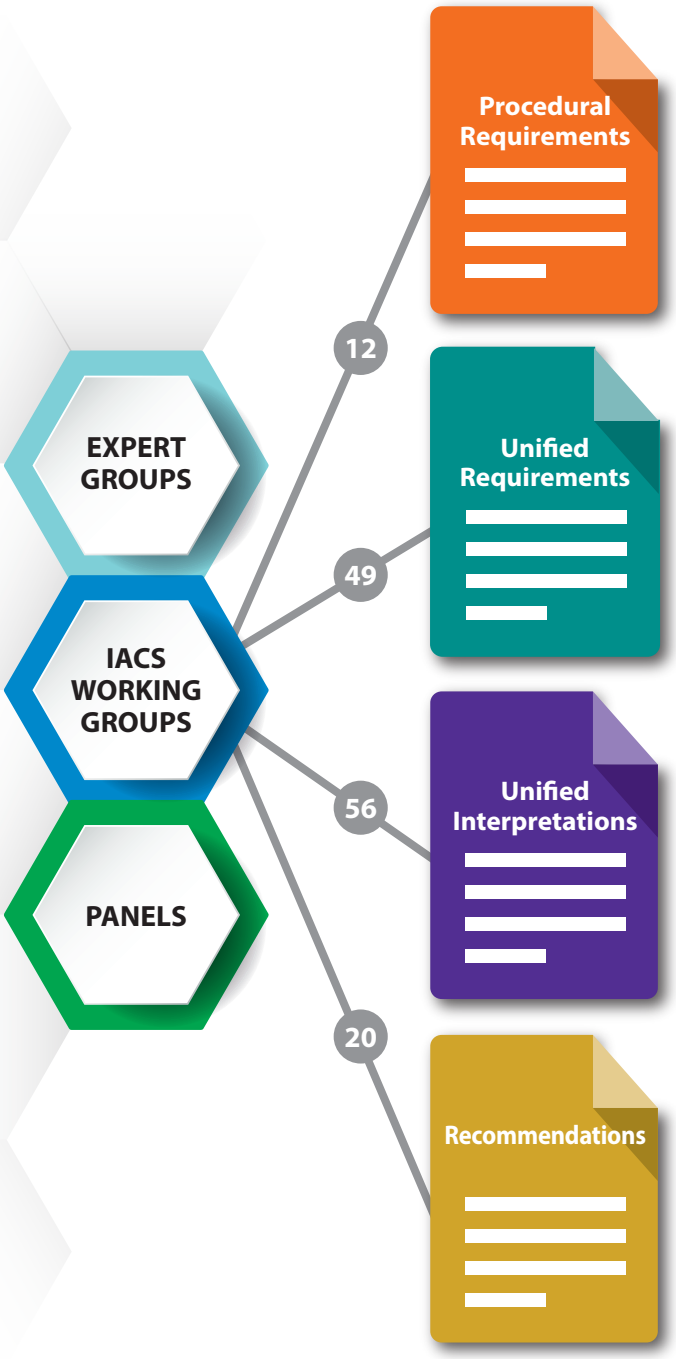
UI GC37 (New Feb 2021)
UI GC37 provides a unified interpretation of the Code requirements in paragraph 16.7.1.4 to clarify a criterion on the need to provide a suitable pressure relief system for air inlet, scavenge spaces, exhaust system, and crank case.

A CRITICAL REVIEW OF IACS PR 38 ON CALCULATION AND VERIFICATION OF EEDI

IACS established a project team to address industry concerns on the application of EPT (electric power table) which led to a variation of the computed value of the EEDI, followed with a revision of PR 38 and a paper to IMO MEPC 76 on proposed amendments to the 2018 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships.

PR 38 (Rev.3 Jan 2021)
PR 38 applies to all cases of class societies' involvement in conducting the survey and certification of EEDI in accordance with regulations 5, 6, 7, 8 and 9 of MARPOL Annex VI. In this revision, substantial items of the IMO Guidelines have been removed while references have been added as necessary.

Continues on page 50



PR 6
Procedure for Transfer of Class

PR 1A Annex
Annexes to PR 1A, PR 1B and PR 1C

PR 38
Procedure for calculation and verification of the Energy Efficiency Design Index (EEDI)

UR F45
Installation of BWMS on board ships

UR M60
Control and Safety of Gas Turbines for Marine Propulsion Use

UR W26
Requirements for Welding Consumables for Aluminium Alloys

UI GC36
Oxygen Deficiency Monitoring Equipment in a Nitrogen Generator Room Area

UI LL65
Ships with assigned or reassigned reduced freeboards and intended to carry deck cargo

UI SC213
Arrangements for remotely located survival craft

Rec 47
Shipbuilding and Repair Quality Standard

Rec 60
Intact stability of tankers during liquid transfer operations

Rec 169
Guidelines on Approval of High Manganese Austenitic Steel for Cryogenic Service

REVIEW OF IACS PUBLICATIONS OLDER THAN 10 YEARS

IACS has carried out a comprehensive review of publications that have not been updated in the last ten years. The project ensures that superseded references to IMO regulations and industrial standards such as ISO and IEC in related IACS Resolutions and Recommendations are identified and updated in a uniform way.

CONTINUED MEASURES AGAINST COVID-19 IMPACT

IACS issued addenda to IACS PRs in 2021 to address the impact of the Covid-19 situation in 2020. As the COVID-19 pandemic has continued to impact the shipping industry over the past year, IACS has conducted regular reviews of PRs as a measure to support the IMO's call to help ships safely remain in service.

Local measures restricting access to ships by surveyors and other shore-based personnel continue to challenge the scheduled survey activities of IACS members in 2021. To address this, IACS Council decided to extend the temporary changes to IACS Procedural Requirements through to 2022 which enables requests for survey postponements and certificate extensions to be safely and consistently addressed. For details, see addenda issued to PR 1C, PR 6, PR 10 and PR 10B. ■

Definitions

UR

Unified Requirements are adopted Resolutions on matters directly connected to or covered by specific Rule requirements and practices of classification societies, and the general philosophy on which the rules and practices of classification societies are established.

Subject to ratification by the governing body of each IACS Member, Unified Requirements should be seen as minimum requirements to be incorporated in the Rules and practices of Members within one year of approval by the IACS General Policy Group.

While each Member remains free to set more stringent requirements, the existence of a UR does not oblige a Member to issue respective Rules if it chooses not to have Rules for the type of ship or marine structure concerned.

CSR

The IACS Council adopted the **Common Structural Rules** for Double Hull Oil Tankers (CSR-OT) and Common Structural Rules for Bulk Carriers (CSR-BC) on December 14, 2005, for implementation on April 1, 2006, on the basis that these Rules were founded on sound technical grounds, and achieved the goal of more robust and safer ships.

These two sets of Rules were developed independently, and in order to remove variations and achieve consistency, IACS decided to harmonise these Rules to create a single set of Rules – '*Common Structural Rules for Bulk Carriers and Oil Tankers*' (CSR BC & OT). This comprised two parts: Part One gave requirements common to both bulk carriers and double hull oil tankers and Part Two provided additional specialised requirements specific to either bulk carriers or double hull oil tankers.

PR

Procedural Requirements are adopted Resolutions on matters of procedure to be incorporated in the practices and procedures of IACS Members within the periods agreed by the IACS General Policy Group.

UI

Unified Interpretations are adopted Resolutions on matters arising from implementing the requirements of IMO Conventions or Recommendations. The Resolutions can involve uniform interpretations of Convention Regulations or IMO Regulations on matters that are unclear.

Interpretations are circulated to the flag State Administrations concerned or sent to IMO for information. They are also designed to aid the development of regulations that are clear, unambiguous and can be easily applied by IACS Members to ships whose flag State Administrations have not issued definite instructions on the interpretation of the IMO regulations concerned, amid statutory certification on behalf of those flag Administrations.

Recommendations

IACS produces **Recommendations** and guidelines related to adopted Resolutions that not only deal with matters of class but also offer some advice to the marine industry.

Photo credit: dcornelissen@chello.nl

IACS Members

IACS consists of 12 member societies, details of which are listed below.

ABS
American Bureau of Shipping
www.eagle.org

BV
Bureau Veritas
www.veristar.com

CCS
China Classification Society
www.ccs.org.cn/ccswzen/

CRS
Croatian Register of Shipping
www.crs.hr

DNV
www.dnv.com

IRS
Indian Register of Shipping
www.irclass.org

KR
Korean Register
www.krs.co.kr

LR
Lloyd's Register
www.lr.org

NK
Nippon Kaiji Kyokai
www.classnk.or.jp

PRS
Polish Register of Shipping
www.prs.pl

RINA
RINA Services S.p.A.
www.rina.org

RS
Russian Maritime Register of Shipping
www.rs-class.org/en/

Russian Maritime Register of Shipping's (RS) membership was withdrawn on 11 March 2022 and RS is no longer a Member of IACS. This Annual Review is an overview of IACS' activities in 2021 including RS' contribution during that year.

Appendix I

Summaries of IACS Resolutions published in 2021

Summary of New/Revisions to IACS Unified Requirements published in 2021

New Revised Corrigenda Deleted/Withdrawn

Index	Resolution no.	Revision	Adoption	Title	Implemention Date
1	UR M75	Rev.1	Jan 2021	Ventilation of emergency generator rooms	01 Jan 22
2	UR M81	New	Jan 2021	Safety measures against chemical treatment fluids used for exhaust gas cleaning systems and residues which have hazardous properties	01 Jul 22
3	UR P2.13	Rev.1	Jan 2021	Installation	01 Jul 22
4	UR P2.7.4	Rev.10	Jan 2021	Mechanical joints	01 Jul 22
5	UR P2.11	Rev.5	Jan 2021	Type approval of mechanical joints	01 Jul 22
6	UR M44	Rev.10	Feb 2021	Documents for the approval of diesel engines	01 Jul 22
7	UR M56	Rev.4	Feb 2021	Marine gears – load capacity of involute parallel axis spur and helical gears	01 Jul 22
8	UR M66	Rev.4	Feb 2021	Type testing procedure for crankcase explosion relief valves	01 Jul 22
9	UR M68	Rev.3	Feb 2021	Dimensions of propulsion shafts and their permissible torsional vibration stresses	01 Jul 22
10	UR M69	Rev.1	Feb 2021	Qualitative failure analysis for propulsion and steering on passenger ships	01 Jul 22
11	UR M42	Rev.5	Feb 2021	Steering gear	01 Jul 22
12	UR E7	Rev.5	Feb 2021	Cables	01 Jul 22
13	UR E10	Rev.8	Feb 2021	Test specification for type approval	01 Jul 22
14	UR E11	Rev.4	Feb 2021	Unified requirements for systems with voltages above 1 kV up to 15 kV	01 Jul 22

Index	Resolution no.	Revision	Adoption	Title	Implemention Date
15	UR E17	Rev.1	Feb 2021	Generators and generator systems, having the ship's propulsion machinery as their prime mover, not forming part of the ship's main source of electrical power	01 Jul 22
16	UR E21	Rev.1	Feb 2021	Requirements for uninterruptible power system (UPS) units as alternative and/or transitional power	01 Jul 22
17	UR M78	Rev.1	Feb 2021	Safety of internal combustion engines supplied with low pressure gas	01 Jul 22
18	UR F15	Rev.6	Feb 2021	Reinforced thickness of ballast and cargo oil piping	01 Jul 22
19	UR P4	Rev.6	Feb 2021	Production and application of plastic piping systems on ships	01 Jul 22
20	UR P2.12	Rev.3	Feb 2021	Flexible hoses	01 Jul 22
21	UR D8	Rev.3	Feb 2021	Hazardous areas	01 Jul 22
22	UR D9	Rev.4	Feb 2021	Machinery	01 Jul 22
23	UR S6	Corr.1	Mar 2021	Use of steel grades for various hull members - ships of 90 m in length and above	-
24	UR N1	Deleted	Mar 2021	One man bridge operated (OMBO) ships	-
25	UR W1	Rev.4	Apr 2021	Material and welding for ships carrying liquefied gases in bulk and ships using gases or other low-flashpoint fuels	01 Jul 22
26	UR P3	Rev.5	Apr 2021	Air pipe closing devices	01 Jul 22
27	UR M74	Rev.2	Jun 2021	Ballast Water Management Systems (BWMS)	01 Jul 22
28	UR F45	New	Jun 2021	Installation of BWMS on board ships	01 Jul 22
29	UR Z28	Corr.1	Jun 2021	Surveys of watertight cable transits	-
30	UR F46	New	Aug 2021	Low pressure CO_2 piping system	01 Jul 22
31	UR W33	Corr.1	Aug 2021	Non-destructive testing of ship hull steel welds	-
32	UR Z17	Rev.16	Aug 2021	Procedural Requirements for Service Suppliers	01 Jan 22
33	UR A1	Corr.1	Sep 2021	Anchoring equipment	-
34	UR M77	Rev.3	Sep 2021	Storage and use of SCR reductants	01 Jul 22
35	UR W2	Rev.3	Sep 2021	Test specimens and mechanical testing procedures for materials	01 Jan 23

Appendix I Summaries of IACS Resolutions published in 2021

Summary of New/Revisions to IACS Unified Requirements published in 2021

Index	Resolution no.	Revision	Adoption	Title	Implemention Date
36	UR W13	Rev.7	Sep 2021	Thickness tolerances of steel plates and wide flats	01 Jan 23
37	UR W14	Rev.3	Sep 2021	Steel plates and wide flats with specified minimum through thickness properties ("Z" quality)	01 Jan 23
38	UR W17	Rev.6	Sep 2021	Approval of consumables for welding normal and higher strength hull structural steels	01 Jan 23
39	UR W18	Rev.6	Sep 2021	Anchor chain cables and accessories including chafing chain for emergency towing arrangements	01 Jan 23
40	UR W25	Rev.6	Sep 2021	Aluminium alloys for hull construction and marine structures	01 Jan 23
41	UR W26	Rev.2	Sep 2021	Requirements for welding consumables for aluminium alloys	01 Jan 23
42	UR G1	Rev.3 Corr.2	Oct 2021	Vessels with cargo containment system for liquefied gas	-
43	UR M42	Rev.5 Corr.1	Oct 2021	Steering gear	-
44	UR M56	Rev.4 Corr.1	Oct 2021	Marine gears – load capacity of involute parallel axis spur and helical gears	-
45	UR M66	Rev.4 Corr.1	Oct 2021	Type testing procedure for crankcase explosion relief valves	-
46	UR S6	Rev.9 Corr.2	Nov 2021	Use of steel grades for various hull members - ships of 90 m in length and above	-
47	UR M60	Rev.1	Nov 2021	Control and safety of gas turbines for marine propulsion use	01 Jan 23
48	UR D11	Rev.4	Dec 2021	Safety features	01 Jan 23
49	CSR 2021	URCN 1	Aug 2021	Urgent rule change notice 1 to CSR 01 Jan 2021 version	01 Jan 22
50	CSR 2021	RCN 1	Dec 2021	Rule change notice 1 to CSR 01 Jan 2021 version	01 Jul 22

1. UR M75 (Rev.1 Jan 2021)

UR M75 provides the requirements for closable ventilation louvers and ventilator closing appliances serving emergency generator rooms. In this revision, changes have been made to achieve consistency with requirements from SOLAS Convention and the International Load Line Convention so that possible challenges during PSC inspections can be avoided.

2. UR M81 (New Jan 2021)

UR M81 provides minimum technical requirements for exhaust gas cleaning systems using chemical treatment fluids and residues which have hazardous properties.

3. UR P2.13 (Rev.1 Jan 2021)

UR P2.13 relates to protection of seawater pipes from mechanical damage. The examples in the round brackets in paragraph P2.13.1.1 have been deleted in this revision as they are considered not appropriate/useful for the purpose of this requirement.

4. UR P2.7.4 (Rev.10 Jan 2021)

UR P2.7.4 is applicable to pipe unions, compression couplings, and slip-on joints. Requirements related to fire tests have been updated in this revision considering service condition for each piping system (dry, wet, dry/wet).

5 UR P2.11 (Rev.5 Jan 2021)

UR P2.11 describes the type testing condition for type approval of mechanical joints intended for use in marine piping systems. This revision introduced requirements for fire-resistant tests of mechanical joints.

6. UR M44 (Rev.10 Feb 2021)

UR M44 provides a list of documents necessary to approve a diesel engine design for conformance to the Rules and for use during manufacture and installation. This revision has been updated to unify the way to refer to external instruments.

7 (&44). UR M56 (Rev.4 Feb 2021) and (Corr.1 Oct 2021)

UR M56 was developed for the calculation of load capacity of spur and helical gears. Rev.4 of the UR has been updated to unify the way to refer to external instruments. Reference to an industry standard has been corrected in Corr.1 of Rev.4.

8 (&45). UR M66 (Rev.4 Feb 2021) and (Corr.1 Oct 2021)

UR M66 specifies type tests and identifies standard test conditions using methane gas and air mixture to demonstrate that classification society requirements are satisfied for crankcase explosion relief valves intended to be fitted to engines and gear cases. Rev.4 of the UR has been updated to unify the way to refer to external instruments. Reference to industry standards has been corrected in Corr.1 of Rev.4.

9. UR M68 (Rev.3 Feb 2021)

UR M68 applies to propulsion shafts such as intermediate and propeller shafts of traditional straight forged design and which are driven by rotating machines such as diesel engines, turbines or electric motors. This revision has been updated to unify the way to refer to external instruments.

10. UR M69 (Rev.1 Feb 2021)

UR M69 gives a qualitative failure analysis for propulsion and steering for new passenger ships including those having a length of 120 m or more or having three or more main vertical zones. This revision has been updated to unify the way to refer to external instruments.

11 (&43). UR M42 (Rev.5 Feb 2021) and (Corr.1 Oct 2021)

UR M42 gives class requirements for steering gear which apply to new ocean-going vessels of 500 gross tonnage and above. This revision has been updated to unify the way to refer to external instruments.

12. UR E7 (Rev.5 Feb 2021)

UR E7 gives type approval requirements for cables. This revision has been updated to unify the way to refer to external instruments.

13. UR E10 (Rev.8 Feb 2021)

UR E10 provides test specification for type approval which is applicable, but not confined, to electrical, electronic and programmable equipment intended for control, monitoring, alarm and protection systems for use in ships. This revision has been updated to unify the way to refer to external instruments.

14. UR E11 (Rev.4 Feb 2021)

UR E11 gives requirements for systems with voltages above 1kV up to 15kV. This revision has been updated to unify the way to refer to external instruments.

15. UR E17 (Rev.1 Feb 2021)

UR E17 provides requirements for generators and generator systems, having the ship's propulsion machinery as their prime mover but not forming part of the ship's main source of electrical power. This revision has been updated to unify the way to refer to external instruments.

16. UR E21 (Rev.1 Feb 2021)

UR E21 provides requirements for uninterruptible power system (UPS) units as alternative and/or transitional power. This revision has been updated to unify the way to refer to external instruments.

17. UR M78 (Rev.1 Feb 2021)

UR M78 addresses the requirements for trunk piston internal combustion engines supplied with low pressure natural gas as fuel. This revision has been updated to remove inconsistency between TA & FAT and Shipboard Trials, and to unify the way to refer to external instruments.

18. UR F15 (Rev.6 Feb 2021)

UR F15 gives requirements on reinforced thickness of ballast and cargo oil piping. This revision has been updated to correct references to MARPOL Annex I and its interpretation, and to unify the way to refer to external instruments.

19. UR P4 (Rev.6 Feb 2021)

UR P4 addresses the provisions of IMO Resolution A.753(18), as amended by IMO Resolutions MSC.313(88) and MSC.399(95). This revision has been updated to unify the way to refer to external instruments.

20. UR P2.12 (Rev.3 Feb 2021)

UR P2.12 gives requirements on flexible hoses. This revision has been updated to clarify the term “short length” for flexible hoses and the criteria for the selection of “different nominal diameters of hose type” for prototype tests, and to unify the way to refer to external instruments.

21. UR D8 (Rev.3 Feb 2021)

UR D8 provides requirements for hazardous areas. In this revision, an amendment was made to reflect the latest IMO Resolution.

22. UR D9 (Rev.4 Feb 2021)

UR D9 gives machinery requirements. This revision has been updated to reflect the latest IMO resolutions related to 2009 MODU Code.

23 (&46). UR S6 (Corr.1 Mar 2021) and (Corr.2 Nov 2021)

UR S6 stipulates requirements on the use of steel grades for various hull members for ships of 90 m in length and above. In Corr.1 to Rev.9 of the UR, reference in description of Table 5 to SOLAS XII/6.5.3 was updated to SLAS XII/6.4. In Corr.2 to Rev.9 of the UR, table 4 has been corrected. Figure 1 has also been improved.

24. UR N1 (Del Feb 2021)

UR N1 has been deleted as the majority of the requirements have been included in the other statutory instruments.

25. UR W1 (Rev.4 Apr 2021)

UR W1 gives additional requirements to the ones prescribed in the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code) or International Code of Safety for Ships using Gases or other low-flashpoint Fuels (IGF Code). This revision has been updated to remove some requirements that have been included in the IMO IGC code. The revision also extended the material thickness range above 40mm to a maximum of 50mm, and the tables contained within this UR (corresponding to the applicable tables contained in IGC and IGF instruments) reflect this extended material thickness range.

26. UR P3 (Rev.5 Apr 2021)

UR P3 gives requirements to air pipe closing devices. In this revision, changes have been made to address numerical analysis using CFD (computational fluid dynamics) as an alternative means to undertake reverse flow test.

27. UR M74 (Rev.2 Jun 2021)

UR M74 gives requirements for the installation of Ballast Water Management Systems in addition to the requirements contained in BWM Convention (2004). The outcome of a comprehensive review of the existing requirements has been reflected in this revision.

28. UR F45 (New Jun 2021)

UR F45 provides requirements to fire safety measures, in addition to that required by SOLAS II-2, related to the installation of Ballast Water Management Systems on board any ship.

29. UR Z28 (Corr.1 Jun 2021)

UR Z28 gives survey requirements of watertight cable transits. Corr.1 was issued to correct a reference in para 2.1.1.

30. UR F46 (New Aug 2021)

UR F46 provides requirements on CO_2 pressure at nozzles where a low-pressure CO_2 system is fitted.

31. UR W33 (Corr.1 Aug 2021)

UR W33 gives minimum requirements on the methods and quality levels that are to be adopted for non-destructive testing (NDT) of ship hull structure steel welds during new building. The UR was slightly corrected to align the definition of welding types with internationally used terminology.

32. UR Z17 (Rev.16 Aug 2021)

UR Z17 provides requirements on approval of firms providing services, such as measurements, tests or maintenance of safety systems and equipment. This revision adds a new section 18 to Annex 1, providing the requirements for approval of firms engaged in commissioning testing of Ballast Water Management Systems.

33. UR A1 (Corr.1 Sep 2021)

UR A1 gives requirements on anchoring equipment. Corr.1 to Rev.7 has corrected the definition of parameter “a” used in equipment number calculation. Figure 1 was also updated accordingly.

34. UR M77 (Rev.3 Sep 2021)

UR M77 applies to the arrangements for the storage and use of SCR reductants which are typically carried on board in bulk quantities. An exemption for FRP vessels, from the requirement for urea storage tanks to be of steel or other material with a melting point above 925 degrees C, was developed in this revision.

35. UR W2 (Rev.3 Sep 2021)

UR W2 gives requirements for test specimens when testing ferrous and non-ferrous metals. This revision has been updated to unify the way to refer to external instruments.

36. UR W13 (Rev.7 Sep 2021)

UR W13 applies to the tolerance on thickness of steel plates and wide flats with widths of 600 mm or greater with thicknesses of 5 mm and over. This revision has been updated to unify the way to refer to external instruments.

37. UR W14 (Rev.3 Sep 2021)

UR W14 supplements those given in W11 and W16 for material with a thickness greater than or equal to 15mm and intended to have a specified minimum ductility in the through thickness or “Z” direction. This revision has been updated to unify the way to refer to external instruments.

38. UR W17 (Rev.6 Sep 2021)

UR W17 gives the conditions of approval and inspection of welding consumables used for hull structural steel according to UR W11. This revision has been updated to unify the way to refer to external instruments.

39. UR W18 (Rev.6 Sep 2021)

UR W18 applies to the materials, design, manufacture and testing of stud link anchor chain cables and accessories used for ships. This revision has been updated to unify the way to refer to external instruments.

40. UR W25 (Rev.6 Sep 2021)

UR W25 applies to wrought aluminium alloys used in the construction of hulls, superstructures and other marine structures. This revision has been updated to unify the way to refer to external instruments.

41. UR W26 (Rev.2 Sep 2021)

UR W26 gives the conditions of approval and inspection of welding consumables to be used for hull construction and marine structure aluminium alloys according to UR W25. This revision has been updated to unify the way to refer to external instruments.

42. UR G1 (Corr.2 Oct 2021)

UR G1 gives general principles which are applied by classification societies for approval and survey of the relevant items of vessels with cargo containment system for liquefied gas for classification purposes. Corr.2 to Rev.3 was issued to update the references relating to UR W1.

43. UR M42 (Rev.5 Corr.1 Oct 2021)

UR 42 provides requirements for steering gear on ocean-going vessels of 500 GT and upwards. In this corrigendum, reference to SOLAS regulations and the application statement have been corrected.

44. UR M56 (Rev.4 Corr.1 Oct 2021)

UR M56 stipulates the load capacity of involute parallel axis spur and helical gears. References to ISO standards have been updated in this corrigendum.

45. UR M66 (Rev.4 Corr.1 Oct 2021)

UR M66 specifies type testing procedure for crankcase explosion relief valves intended to be fitted to engines and gear cases. References to ISO standards have been updated in this corrigendum.

46. UR S6 (Rev.9 Corr.1 Oct 2021)

UR S6 gives requirements for use of steel grades for hull structural members in ships of 90 m in length and above. In this corrigendum, table 4 has been corrected and figure 1 have been improved.

47. UR M60 (Rev.1 Nov 2021)

UR M60 provides requirements on control and safety of gas turbines for marine propulsion use. This revision has been updated to address industry requests.

48. UR D11 (Rev.4 Dec 2021)

UR D11 gives requirements on fire protection arrangements and fire extinguishing systems. This revision has been updated to provide clarity of "near other openings of accommodation spaces".

49 & 50. CSR 2021

Common Structural Rules (CSR) consist of two parts. Part One provides requirements common to both Double Hull Oil Tankers and Bulk Carriers and Part Two provides additional requirements applied to either Double Hull Oil Tankers or Bulk Carriers. The consolidated version of CSR 2021 was issued in March 2021 and came into force on 1 July 2021. Rule Change Notice 1 (RCN1), Urgent Rule Change Notice 1 (URCN) and Corrigenda 1 to CSR 2021 version were published as outcomes of regular CSR maintenance.

Summary of New/Revisions to IACS Procedural Requirements published in 2021

New Revised Corrigenda Deleted/Withdrawn

Index	Resolution no.	Revision	Adoption	Title	Implemention Date
1	PR 38	Rev.3	Jan 2021	Procedure for calculation and verification of the Energy Efficiency Design Index (EEDI)	01 Apr 21
2	PR 1A	Rev.8	Apr 2021	Procedure for Transfer of Class	01 Jan 22
3	PR 1 Annex	Rev.5	Apr 2021	Annexes to PR1A, PR1B and PR1C	01 Jan 22

1. PR 38 (Rev.3 Jan 2021)

PR 38 contains the procedure for conducting survey and certification of EEDI in accordance with 2014 Guidelines on Survey and Certification of the Energy Efficiency Design Index (EEDI), as amended. Rev.3 removed items covered by the IMO Guidelines and added reference(s) in PR 38 to the IMO Guidelines as necessary.

2. PR 1A (Rev.8 Apr 2021)

PR 1A contains procedures and requirements pertaining to transfer of class (TOC) from one society to another society. Rev.8 was adopted to make clear that even a certificate issued for a voyage in accordance with paragraph A.1.4.2 before the completion of TOC should be reported by the gaining society through Form G, Part B to the losing society.

3. PR 1 Annex (Rev.5 Apr 2021)

PR 1 Annex contains reporting forms, harmonisation of reporting, review of vessel's records and contact points for societies. This revision made clear that even a certificate issued for a voyage in accordance with paragraph A.1.4.2 before the completion of TOC should be reported by the gaining society through Form G, Part B to the losing society.

4 Addendums to PR 1C, PR 6, PR 10 & PR 10B

IACS has been regularly reviewing PRs as one of the measures supporting the IMO's call to help ships safely remain in service in the context of the COVID-19 pandemic. In the latest revisions, the addendum to PR 1C will remain in force until 31 March 2022 and addendums to PR 6, PR 10 & PR 10B will extend to 30 June 2022.

Summary of New/Revisions to IACS Unified Interpretations published in 2021

New Revised Corrigenda Deleted/Withdrawn

Index	Resolution no.	Revision	Adoption	Title	Implemention Date
1	UI SC63	Deleted	Jan 2021	Pre-discharge alarm of fixed gas fire extinguishing systems	-
2	UI SC156	Rev.2	Jan 2021	Doors in watertight bulkheads of cargo ships and passenger ships	01 Jul 21
3	UI SC11	Rev.1	Feb 2021	Precautions against shock, fire and other hazards of electrical origin	01 Jul 22
4	UI GC32	New	Feb 2021	Outer duct in gas fuel piping systems	01 Jul 21
5	UI GC33	New	Feb 2021	Cargo sampling	01 Jul 21
6	UI GC34	New	Feb 2021	Cargo filters	01 Jul 21
7	UI GC35	New	Feb 2021	Inhibition of cargo pump operation and opening of manifold ESD valves with level alarms overridden	01 Jul 21
8	UI GC36	New	Feb 2021	Oxygen deficiency monitoring equipment in a nitrogen generator room area	01 Jul 21
9	UI GC37	New	Feb 2021	Suitable pressure relief system for air inlet, scavenge spaces, exhaust system and crank case	01 Jul 21
10	UI SC57	Rev.2	Feb 2021	Venting, purging, gas freeing and ventilation	01 Jul 22
11	UI SC70	Rev.4	Feb 2021	Cargo tank vent systems and selection of electrical equipment	01 Jul 22
12	UI SC79	Rev.5	Feb 2021	Certified safe type electrical equipment for ships carrying dangerous goods	01 Jul 22
13	UI SC179	Rev.3	Feb 2021	Dewatering of forward spaces of bulk carriers	01 Jul 22
14	UI SC180	Rev.4	Feb 2021	Hold, ballast and dry space water level detectors and performance standards for water level detectors on bulk carriers and single hold cargo ships other than bulk carriers	01 Jul 22
15	UI SC194	Rev.1	Feb 2021	Installation of electrical and electronic appliances on the bridge and vicinity of the bridge	01 Jul 22
16	UI SC274	Rev.1	Feb 2021	Hazardous area classification in respect of selection of electrical equipment, cables and wiring and positioning of openings and air intakes	01 Jul 22
17	UI SC1	Rev.2	Feb 2021	Main source of electrical power	01 Jul 22
18	UI SC10	Rev.3	Feb 2021	Precautions against shock, fire and other hazards of electrical origin	01 Jul 22

Appendix I Summaries of IACS Resolutions published in 2021

Summary of New/Revisions to IACS Unified Interpretations published in 2021

Index	Resolution no.	Revision	Adoption	Title	Implemention Date
19	UI SC42	Rev.3	Feb 2021	Precaution against ignition of explosive petrol and air mixture in closed vehicle spaces, closed ro-ro spaces and special category spaces	01 Jul 22
20	UI SC43	Rev.3	Feb 2021	Precaution against ignition of explosive petrol and air mixture in closed vehicle spaces, closed ro-ro spaces and special category spaces	01 Jul 22
21	UI SC147	Rev.2	Feb 2021	Watertight door closure	-
22	UI SC93	Rev.2	Feb 2021	Enclosure of stern tubes on cargo ships	01 Jul 21
23	UI LL65	Rev.3	Feb 2021	Ships with assigned or reassigned reduced freeboards and intended to carry deck cargo	01 Jul 21
24	UI GC28	Corr.1	Feb 2021	Guidance for sizing pressure relief systems for interbarrier spaces	01 Jan 21
25	UI SC225	Corr.1	Mar 2021	The occupied volume by flooded water of a flooded space in the SOLAS Chapter II-1 (Requlation 2(14))	-
26	UI SC61	Deleted	Mar 2021	Fixed deck foam systems (FSS code, Ch. 14, 2.1.3)	-
27	UI HSC5	Deleted	Mar 2021	Aluminium lube oil sump or tank	-
28	UI SC87	Rev.2	Mar 2021	Certification of carriage of solid dangerous bulk cargoes	-
29	UI SC197	Rev.2	Mar 2021	Non-combustible cargoes (Reg.II-2/10.7.1.4)	-
30	UI SC128	Deleted	Apr 2021	CO_2 discharge time (FSS Code, Ch. 5, 2.2.1.2, 2.2.1.6, 2.2.1.7)	-
31	UI FTP3	Rev.3	Apr 2021	Fire door	01 Jan 22
32	UI LL8	Rev.2	Apr 2021	Miscellaneous openings in freeboard and superstructure decks (Regulation 18(2) & 18(3))	01 Jul 22
33	UI SC161	Rev.2	Apr 2021	Timber deck cargo in the context of damage stability requirements	01 Jul 22
34	UI SC49	Rev.3	May 2021	Fire protection arrangements in cargo spaces	01 Jul 22
35	UI SC85	Rev.2	May 2021	Ro-ro space	01 Jul 22
36	UI MPC11	Corr.1	Jun 2021	Interpretation to MARPOL I/27	-
37	UI LL50	Rev.6	Jun 2021	Protection of crew (1966 Load Line Convention Regulation 25(4), 26(2) and 27(7), 1988 Protocol Regulation 25(4), 26(2) and 27(8) and SOLAS II-1/3-3)	-

Index	Resolution no.	Revision	Adoption	Title	Implemention Date
38	UI LL35	Deleted	Jun 2021	Stowage of timber deck cargo on ships having timber freeboards assigned (Regulations 44 and 45)	-
39	UI SC64	Rev.2	Jun 2021	Fire dampers in ventilation ducts	01 Jul 22
40	UI SC146	Rev.2	Jun 2021	Fire hose couplings and nozzles	01 Jul 22
41	UI SC295	New	Jul 2021	Interpretation of performance standards for float-free emergency position-indicating radio beacons (EPIRBs) operating on 406 MHz (resolution MSC.471(101))	01 Jul 22
42	UI SC126	Corr.1	Aug 2021	Fire protection materials for cargo ships (SOLAS regulations II-2/4.4.4, 5.3, 6.2.1 and 6.3.1)	-
43	UI SC170	Deleted	Aug 2021	Low pressure CO_2 systems	01 Jul 22
44	UI SC213	Rev.5	Sep 2021	Arrangements for remotely located survival craft	01 Jan 23
45	UI SC154	Corr.1	Sep 2021	Provision of detailed information on specific cargo hold flooding scenarios (SOLAS XII/9.3)	-
46	UI SC159	Corr.1	Sep 2021	Equivalent protection SOLAS II-2/10.7.2	-
47	UI SC167	Rev.1 Corr.1	Nov 2021	Electrical distribution boards	-
48	UI SC169	Rev.1	Nov 2021	Foam systems positions of aft monitors	01 Jan 23
49	UI HSC1	Deleted	Nov 2021	Cupboards as part of the space	01 Jul 22
50	UI HSC2	Deleted	Nov 2021	Classification of stairways	01 Jul 22
51	UI HSC3	Deleted	Nov 2021	Public spaces extending over two decks	01 Jul 22
52	UI HSC4	Deleted	Nov 2021	Ventilation grille in toilet entrance door	01 Jul 22
53	UI HSC6	Rev.1	Nov 2021	Protection of propeller shafts	01 Jul 22
54	UI LL15	Rev.4	Nov 2021	Length of superstructure (Regulation 34(1) and 34(2))	01 Jan 22
55	UI LL55	Rev.1 Corr.1	Dec 2021	Least moulded depth for a ship with a rake of keel (Regulation 3(1))	-
56	UI LL77	New Corr.1	Dec 2021	Application of load line requirements to conversions of single-hull oil tankers to double-hull oil tankers or bulk carriers	-

Appendix I Summaries of IACS Resolutions published in 2021

Summary of New/Revisions to IACS Unified Interpretations published in 2021

1. UI SC63 (Del Jan 2021)

This UI was deleted as the content of this UI has been consolidated into FSS Code, Ch. 5.2.1.3.2, amended by Resolution MSC.206(81), adopted on 18 May 2006.

2. UI SC156 (Rev.2 Jan 2021)

UI SC156 pertains to doors located in the way of internal watertight subdivision boundaries and the external watertight boundaries necessary to ensure compliance with the relevant subdivision and damage stability regulations. This revision provides consequential modifications coming from the amendments to the IMO circular MSC.1/Circ.1572 which is the IMO version of the Unified Interpretation.

3. UI SC11 (Rev.1 Feb 2021)

UI SC11 provides interpretation for Regulation 45.5.3 of SOLAS Chapter II-1 as amended by IMO resolutions up to MSC.436(99) on precautions against shock, fire and other hazards of electrical origin. This revision has been updated to unify the way to refer to external instruments. The reference to regulations to SOLAS Chapter II-2 has also been corrected.

4. UI GC32 (New Feb 2021)

UI GC32 provides a Unified Interpretation of the wording “design pressure of the outer pipe or duct” in paragraphs 5.4.4 of the IGC Code and of the wording “maximum pressure at gas pipe rupture” in paragraph 5.13.2.4 of the IGC Code.

5. UI GC33 (New Feb 2021)

UI GC33 provides a Unified Interpretation on the scope of application of the requirements in paragraphs 5.6.5 and 18.9 of the IGC Code.

6. UI GC34 (New Feb 2021)

UI GC34 provides a Unified Interpretation of the requirement on cargo filters in paragraph 5.6.6 of the IGC Code.

7. UI GC35 (New Feb 2021)

UI GC35 provides a Unified Interpretation of Table 18.1, Note 4 and paragraph 13.3.7 of the IGC Code on the need of a hardware system such as an electric or mechanical interlocking device is to be provided to prevent inadvertent operation of cargo pumps and inadvertent opening of manifold ESD valves.

8. UI GC36 (New Feb 2021)

UI GC36 provides a Unified Interpretation on the cases where oxygen deficiency monitoring is required in paragraph 13.6.4 of the IGC Code.

9. UI GC37 (New Feb 2021)

UI GC37 provides a Unified Interpretation of the Code requirements in paragraph 16.7.1.4 to clarify a criterion on the need to provide a suitable pressure relief system for air inlet, scavenge spaces, exhaust system, and crank case.

10. UI SC57 (Rev.2 Feb 2021)

UI SC57 provides interpretation of Regulations 4.5.3.4.1.3 and 4.5.3.4.1.4 of SOLAS Chapter II-2 on enclosed spaces containing a source of ignition. This revision has been updated to unify the way to refer to external instruments.

11. UI SC70 (Rev.4 Feb 2021)

UI SC70 provides interpretation of Regulations 11.6.2.2 and 4.5.4.3.1 of SOLAS Chapter II-2 on openings for small flow by thermal variations. This revision has been updated to unify the way to refer to external instruments.

12. UI SC79 (Rev.5 Feb 2021)

UI SC79 provides interpretation for Regulation 19.3.2 of SOLAS Chapter II-2 on certified safe type electrical equipment for ships carrying dangerous goods. This revision has been updated to unify the way to refer to external instruments.

13. UI SC179 (Rev.3 Feb 2021)

UI SC179 provides interpretation for Regulation 13.1 of SOLAS Chapter XII on draining and pumping of forward spaces of bulk carriers. This revision has been updated to unify the way to refer to external instruments.

14. UI SC180 (Rev.4 Feb 2021)

UI SC180 provides interpretation for Regulation 25 of SOLAS Chapter II-1 on water level detectors and performance standards for water level detectors on bulk carriers and single hold cargo ships other than bulk carriers. This revision has been updated to unify the way to refer to external instruments.

15. UI SC194 (Rev.1 Feb 2021)

UI SC194 provides interpretation of Regulation 17 of SOLAS Chapter V on installation of electrical and electronic appliances on the bridge and vicinity of the bridge. This revision has been updated to unify the way to refer to external instruments.

16. UI SC274 (Rev.1 Feb 2021)

UI SC274 provides interpretation of SOLAS regulation II-1/45.11 to clarify that prescriptive requirements in SOLAS and related Codes take precedence and are to be applied if discrepancies are found with other requirements including those published by IEC. This revision has been updated to unify the way to refer to external instruments and clarify that the revision applies to new ships only.

17. UI SC1 (Rev.2 Feb 2021)

UI SC1 provides interpretation of SOLAS Regulation 41.1.3 on arrangements of a ship's main source of electrical power. This revision has been updated to unify the way to refer to external instruments.

18. UI SC10 (Rev.3 Feb 2021)

UI SC10 provides interpretation of Regulation 45.5.2 of SOLAS Chapter II-1 to clarify how the regulations may be achieved. This revision has been updated to unify the way to refer to external instruments.

19. UI SC42 (Rev.3 Feb 2021)

UI SC42 provides interpretation of Regulation 20.3.2.2 of SOLAS Chapter II-2 to clarify related IEC requirements that can be used to satisfy the SOLAS requirement to prevent the escape of sparks. This revision has been updated to unify the way to refer to external instruments.

20. UI SC43 (Rev.3 Feb 2021)

UI SC43 provides interpretation on definition of Regulations 20.3.2.1 and 20.3.3 of SOLAS Chapter II-2 to clarify that safe equipment to be certified shall meet the relevant IEC requirements. This revision has updated the references to SOLAS.

21. UI SC147 (Rev.2 Feb 2021)

UI SC147 provides clarity to the requirement of watertight door closure in case of fire detection for FSS Code Ch9. This revision aims at clarifying closing requirements for watertight doors also serving as fire doors.

22. UI SC93 (Rev.2 Feb 2021)

UI SC93 provides interpretation of SOLAS Chapter II-1 Regulation 12.11 on enclosure of stern tubes on cargo ships. This revision has updated the references reflecting that Chapter II-1 of SOLAS has been amended by MSC.421(98) and adopted on 15 June 2017.

23. UI LL65 (Rev.3 Feb 2021)

UI LL65 pertains to ships intended to carry deck cargo and assigned or reassigned reduced freeboards in accordance with Regulation 27 of the International Convention on Load Lines. Changes have been made in this revision as the text of SOLAS Chapter II-1 Regulation 4 has been amended by IMO Resolution MSC.421(98) and footnotes.6 and .7 in SOLAS II-1/4 have been included directly in the text of Regulation 4.

24. UI GC28 (Corr.1 Feb 2021)

UI GC28 provides interpretation of the second sentence of paragraph 8.1 of the IMO IGC Code to offer guidance for sizing pressure relief systems for interbarrier spaces. The Corr.1 to Rev.1 has changed the implementation date from 1 January 2020 to 1 January 2021.

25. UI SC225 (Corr.1 Mar 2021)

UI SC225 provides interpretation of the occupied volume by flooded water of a flooded space in Reg.2(14) of SOLAS Chapter II-1. This revision has been updated to refer to the associated IMO Circular.

26. UI SC61 (Del Mar 2021)

UI SC61 was deleted as most of the contents have been included in a mandatory IMO instrument (the FSS Code).

27. UI HSC5 (Del Mar 2021)

UI HSC5 was deleted as the content of this UI has already been incorporated in the amendments to the 2000 HSC Code.

28. UI SC87 (Rev.2 Mar 2021)

UI SC87 provides the interpretation of requirements to SOLAS Regs. II-2/19.3 and 19.4 relating to certification for carriage of solid dangerous bulk cargoes. It has been revised to refer to the IMSBC Code rather than the BC Code.

29. UI SC197 (Rev.2 Mar 2021)

UI SC197 provides clarity regarding the exemption from the requirements of Reg. II-2/10.7.1.3. and Reg. II-2/10.7.2., as provisioned by SOLAS regulation II-2/10.7.1.4. The UI highlights that the materials stated in Paragraph 1 (Non-combustible materials) of Annex 2 to the 2010 FTP Code need not be mentioned on the exemption certificates issued under this regulation. This revision updates the SOLAS text and the reference to the FTP Code.

30. UI SC128 (Del Apr 2021)

UI SC128 was deleted as respective requirements had been deleted from SOLAS Chapter II-2 and re-introduced in FSS Code Chapter 5. The FSS Code requirements have included a requirement to perform system flow calculations therefore the UI could be deleted.

31. UI FTP3 (Rev.3 Apr 2021)

UI FTP3 provides interpretation of FTP Code sub-section 5.3 and Annex 1, Part 3 on Test for “A”, “B”, and “F” class divisions. This revision has been updated to further harmonise with MSC.1/Circ.1319.

32. UI LL8 (Rev.2 Apr 2021)

UI LL8 provides interpretation of requirements of miscellaneous openings in freeboard and superstructure decks for Regulation 18(2) and 18(3) of the International Convention on Load Lines. This revision has updated the application statements to clarify the relevance to the amended 1988 Protocol.

33. UI SC161 (Rev.2 Apr 2021)

UI SC161 provides interpretation of SOLAS Regulation II-1/5-1 on stability requirements of timber deck cargo in the context of damage. This revision has been updated to consider the new TDC code (Resolution A.1048(27)) and SOLAS amendments (Resolution MSC.421(98)).

34. UI SC49 (Rev.3 May 2021)

UI SC49 provides a Unified Interpretation of the requirements of SOLAS Regulation II-2/10.7.2. This revision updates the SOLAS text being interpreted by the UI in line with the latest SOLAS amended texts.

35. UI SC85 (Rev.2 May 2021)

UI SC85 provides clarity to the definitions of ro-ro spaces in SOLAS regulation II-2/19.2.2.3. This revision has been updated to utilise the new format and corrects the SOLAS references.

36. UI MPC11 (Corr.1 Jun 2021)

UI MPC11 provides interpretation to MARPOL I/27. The Corr.1 to Rev.2 has been updated to align with MEPC.1/Circ.867.

37. UI LL50 (Rev.6 Jun 2021)

UI LL50 provides interpretation to Regulation 25(4), 26(2) and 27(7) of the ICLL 1966, Regulation 25(4), 26(2) and 27(8) of the Protocol 1988 as well as Regulation II-1/3-3 of SOLAS on protection measures of crew. This revision has been updated to clarify the application of the Resolution to each of the existing versions of the ICLL.

38. UI LL35 (Del Jun 2021)

UI LL35 was deleted and converted into Recommendation 168.

39. UI SC64 (Rev.2 Jun 2021)

UI SC64 provides clarification of SOLAS II-2/9.7.3.1. This revision has been updated to reflect amendments to SOLAS which were introduced by Resolution MSC.365(93).

40. UI SC146 (Rev.2 Jun 2021)

UI SC146 provides interpretation of SOLAS chapter II-2 regulation 10.2.3 on fire hose couplings and nozzles. This revision has been updated to delete irrelevant wording in SOLAS regulation II-2/10.2.3.

41. UI SC295 (New Jul 2021)

UI SC295 provides clarity to the phrase “installed on or after” in paragraph 2 of resolution MSC.471(101).

42. UI SC126 (Corr.1 Aug 2021)

UI SC126 provides a Unified Interpretation of the requirements of SOLAS Regulations II-2/4.4.4, 5.3, 6.2.1 and 6.3.1. Corr.1 to Rev.2 has been updated to correct a reference to SOLAS requirement.

43. UI SC170 (Del Aug 2021)

UI SC170 was deleted as the requirements have been included in the FSS Code and in IACS UR F46.

44. UI SC213 (Rev.5 Sep 2021)

UI SC213 provides interpretation of SOLAS Regulations III/31.1.4, III/7.2.1.4, III/11.4, III/11.7, III/13.1.3, III/16.7 and LSA Code paragraph 4.1.3.2 on arrangements for remotely located survival craft. This revision has been updated to align with MSC.1/Circ.1490/Rev.1.

45. UI SC154 (Corr.1 Sep 2021)

UI SC154 provides interpretation of Regulation 9.3 of SOLAS chapter XII on the provision of detailed information on specific cargo hold flooding scenarios. Corr.1 to New has updated the references to related SOLAS requirements.

46. UI SC159 (Corr.1 Sep 2021)

UI SC159 provides interpretation of Regulation 10.7.2 of SOLAS Chapter II-2 on equivalent protection for a ship engaged in the carriage of dangerous goods in any cargo spaces. The Corr.1 to Rev.1 has been updated to correct references to IMO documents. Other editorial amendments have been made to include the text of the SOLAS Regulation being interpreted.

47. UI SC167 (Corr.1 Nov 2021)

UI SC167 provides interpretation of SOLAS chapter II-2 Regulations 9.2.2.3.2.2(7), 9.2.2.4.2.2(5), 9.2.3.3.2.2(5) and 9.2.4.2.2.2(5)) on electrical distribution boards. The Corr.1 to Rev.1 has been updated to correct a reference to SOLAS.

48. UI SC169 (Rev.1 Nov 2021)

UI SC169 provides interpretation of SOLAS chapter II-2 Regulation 10.8 on fixed deck foam fire-extinguishing systems. The revision has been updated to align it with the latest amended IMO regulation.

49. UI HSC1 (Del Nov 2021)

UI HSC1 was deleted with implementation set for 1 July 2022 as it has been included in 2000 HSC Code.

50. UI HSC2 (Del Nov 2021)

UI HSC2 was deleted with implementation set for 1 July 2022 as it has been included in 2000 HSC Code.

51. UI HSC3 (Del Nov 2021)

UI HSC3 was deleted with implementation set for 1 July 2022 as it has been included in 2000 HSC Code.

52. UI HSC4 (Del Nov 2021)

UI HSC4 was deleted with implementation set for 1 July 2022 as it has been included in 2000 HSC Code.

53. UI HSC6 (Rev.1 Nov 2021)

UI HSC6 provides interpretation of paragraph 9.8 of the High Speed Craft Code 2000, Chapter 9, part B, Section 8, on the means for return to a port of refuge for category B craft. This revision has been updated to include a correct reference to the 2000 HSC Code.

54. UI LL15 (Rev.4 Nov 2021)

UI LL15 provides interpretation of the 1966 International Convention on Load Lines, Regulations 34(1) and 34(2) and the 1988 Protocol relating to the 1966 International Convention on Load Lines on length of superstructure. This revision has been revised to distinguish applicability of parts of the UI to different ICLL amendments.

55. UI LL55 (Corr.1 Dec 2021)

UI LL55 provides interpretation of paragraph 3(1) of the International Convention on Load Lines on moulded depth for a ship with a rake of keel. The Corr.1 to Rev.1 has been revised to reinstate a missed diagram.

56. UI LL77 (Corr.1 Dec 2021)

UI LL77 clarifies the application of load line regulations to conversions following discussions held in IACS and at IMO. The Corr.1 to New has been updated to correct the reference to circular 1247 from MSC-MEPC.1/Circ.1247 to MSC.1/Circ.1247.

Summary of New/Revisions to IACS Recommendations published in 2021

New Revised Corrigenda Deleted/Withdrawn

Index	Resolution no.	Revision	Adoption	Title	Implemention Date
1	Rec 97	Deleted	Jan 2021	Recommendation for UR S11.2.1.3, Rev. 5 (it will be published in the IACS Blue Book and website on 1 January 2022)	1 Jan 2022
2	Rec 18	Rev.2	Feb 2021	Fire prevention in machinery spaces of ships in service – guidance to owners	-
3	Rec 58	Rev.2	Feb 2021	Fire protection of machinery spaces	-
4	Rec 52	Rev.2	Feb 2021	Power supply to radio equipment required by SOLAS Chapter IV, and electrical/electronic navigation equipment required by SOLAS Regulation V/19	-
5	Rec 35	Rev.2	Feb 2021	Inspection and maintenance of electrical equipment installed in hazardous areas for ships other than tankers	-
6	Rec 110	Rev.2	Mar 2021	Guidelines for scope of damage stability verification on new oil tankers, chemical tankers and gas carriers	01 Jul 21
7	Rec 21	Deleted	Mar 2021	Guidelines on approval procedure for onboard loading computers	-
8	Rec 33	Deleted	Mar 2021	Guidelines for the construction of pressure vessel type tanks intended for the transportation of anhydrous ammonia at ambient temperatures	-
9	Rec 167	Corr.1	Mar 2021	Guidelines for the identification of vibration issues and recommended remedial measures on ships	-
10	Rec 60	Rev.1	Mar 2021	Intact stability of tankers during liquid transfer operations	-
11	Rec 68	Rev.1	Apr 2021	Guidelines for non-destructive testing of hull and machinery steel forgings	-
12	Rec 121	Corr.1	Jun 2021	Uniform application of MARPOL Annex I, revised Regulation 12	-
13	Rec 168	New	Jun 2021	Recommendation on transverse extent of timber deck cargoes	-
14	Rec 47	Rev.9	Jun 2021	Shipbuilding and repair quality standard	-
15	Rec 169	New	Sep 2021	Guidelines on approval of high manganese austenitic steel for cryogenic service	-
16	Rec 47	Rev.10	Sep 2021	Shipbuilding and repair quality standard	-
17	Rec 70	Rev.2	Sep 2021	Guidelines on welding procedure qualification tests of aluminium alloys for hull construction and marine structures	-
18	Rec 105	Rev.1	Sep 2021	Qualification scheme for welders of aluminium alloys	-
19	Rec 73	Rev.1 Corr.1	Oct 2021	Type approval procedure for cable trays/protective casings made of plastics materials	-
20	Rec 127	Rev.1	Nov 2021	A guide to risk assessment in ship operations	-

1. Rec 97 (Del Jan 2021)

Rec 97 was deleted on 1 January 2022 when UR S11 Rev.10 came into force.

2. Rec 18 (Rev.2 Feb 2021)

Rec 18 provides guidance to owners on fire prevention in machinery spaces of ships in service. This revision has been updated to make minor editorial amendments relating to references to IMO documents.

3. Rec 58 (Rev.2 Feb 2021)

Rec 58 provides guidance for fire protection of machinery spaces. This revision has added references to IMO MSC.1/Circ.1321.

4. Rec 52 (Rev.2 Feb 2021)

Rec 52 provides guidance for power supply to radio equipment required by SOLAS Chapter IV and electrical/electronic navigation equipment required by SOLAS Regulation V/19. This revision has updated references to related IMO instruments.

5. Rec 35 (Rev2. Feb 2021)

Rec 35 recommends that the integrity of features of electrical installations in hazardous areas is preserved and inspected. This revision has updated references to related industry standards.

6. Rec 110 (Rev.2 Mar 2021)

Rec 110 provides guidelines for scope of damage stability verification on new oil tankers, chemical tankers and gas carriers. This revision has been updated to clarify the vague expressions in IACS Rec.110 (2010 Rev.1) to comply with IMO guidelines MSC.1/Circ.1461 and MSC/Circ.406/Rev.1, and further improve it, taking into account IACS UR L5 Rev.3.

7. Rec 21 (Del Mar 2021)

Rec 21 was deleted in view of the presence of a relative IACS document (Recommendation No.48).

8. Rec 33 (Del Mar 2021)

Recommendation No.33 was deleted in view of the presence of a relative IMO instrument (the IGC Code).

9. Rec 167 (Corr.1 Mar 2021)

Rec 167 provides guidance on how to identify vibration problems in hull structures and describes remedial actions to make improvements to address such problems. Corr.1 has been updated to correct a typographical error.

10. Rec 60 (Rev.1 Mar 2021)

Rec 60 provides recommendations for tankers which are not subject to MARPOL Annex I Regulation 27 regarding intact stability during liquid transfer operation. This revision has been updated following the changes in Resolution A.748(18) and other related IMO regulations.

11. Rec 68 (Rev.1 Apr 2021)

Rec 68 provides guidelines for non-destructive testing examination of hull and machinery steel forgings. The purpose of this revision was to assess a few aspects including other international standards.

12. Rec 121 (Corr.1 June 2021)

Rec 121 enables uniform application of MARPOL Annex I, Revised Regulation 12. Corr.1 of Rec 121 was updated to include reference to IMO Resolution MEPC.311(73).

13. Rec 168 (New June 2021)

Rec 168 provides recommendations on transverse extent of timber deck cargoes for the purpose of applying Regulation 44 and 45 of the International Convention on Load Lines 1966.

14 (&16). Rec 47 (Rev.9 June 2021) and (Rev.10 Sept 2021)

Rec.47 gives recommendations for shipbuilding and repair quality standards. It is divided into two parts. Part A - Shipbuilding and Remedial Quality Standard for New Construction and Part B - Repair Quality Standard for Existing Ships. Rev.9 replaced the term “Recommendation 20” with “UR W33”, and the term “Recommendation 12” with “UR W11”, upon the deletions of Recommendations 12 and 20. Rev.10 updated references of industry standards in the Recommendation.

15. Rec 169 (New Sep 2021)

Rec 169 provides guidelines to apply high manganese austenitic steel for cryogenic service. High manganese austenitic steel is applicable to the construction of cargo and fuel tanks complying with the IGC and IGF Codes.

17. Rec 70 (Rev.2 Sep 2021)

Rec 70 gives general guidance for the qualification tests of welding procedures intended to be used for aluminium alloys for hull construction and marine structures specified in UR W25. This revision updated references of industry standards in the Recommendation.

18. Rec 105 (Rev.1 Sep 2021)

Rec 105 provides guidance for a qualification scheme for welders intended to be engaged in welding aluminium alloys specified in UR W25 for hull structures. This revision updated references of industry standards in the Recommendation.

19. Rec 73 (Corr.1 Oct 2021)

Rec 73 provides the type-approval procedure for cable trays/protective casings made of plastics materials. Editorial changes have been made in Corr.1 of the Recommendation.

20. Rec 127 (Rev.1 Nov 2021)

Rec 127 provides guidance to risk assessment in ship operations. This revision has been updated to remove reference to ISO standards and IMO Resolutions no longer in use, to update references to modified paragraphs of ISM Code, and to review and update the document as part of the regular IACS Recommendation 10th anniversary review process.

Appendix II

Summaries of IACS Member's Class Report Data 2021

ABS	No. of vessels	Deadweight	Gross Tonnes	Total no. of Surveyors	Plan approval engineers	Exclusive ship surveyors	No. of recognising flag authorities
Total Size of classed fleet	**8,314**	**406,483,440**	**263,648,751**	**1,888**	567	1321	**120**
Tankers (crude, product & gas)	2,072	195,815,282	119,649,611				
Container vessels	693	53,881,060	48,536,486				
Dry bulk	1,199	118,706,707	64,079,755				
Passenger vessels (over 12 pax)	42	298,076	359,337				
Other ship types	4,308	37,782,315	31,023,562				

BV	No. of vessels	Deadweight	Gross Tonnes	Total no. of Surveyors	Plan approval engineers	Exclusive ship surveyors	No. of recognising flag authorities
Total Size of classed fleet	**9,248**	**199,820,280**	**137,254,729**	**1,285**	356	929	**121**
Tankers (crude, product & gas)	1,607	57,200,939	39,375,852				
Container vessels	644	26,769,811	23,819,872				
Dry bulk	1,171	88,466,035	48,755,173				
Passenger vessels (over 12 pax)	422	572,143	4,305,410				
Other ship types	5,404	26,811,352	20,998,422				

CCS	No. of vessels	Deadweight	Gross Tonnes	Total no. of Surveyors	Plan approval engineers	Exclusive ship surveyors	No. of recognising flag authorities
Total Size of classed fleet	**4,626**	**216,917,117**	**136,494,257**	**1,261**	245	1016	**58**
Tankers (crude, product & gas)	1,128	55,610,791	33,094,330				
Container vessels	430	26,988,030	24,988,246				
Dry bulk	1,671	129,551,223	71,331,488				
Passenger vessels (over 12 pax)	205	424,708	1,608,170				
Other ship types	1,192	4,342,365	5,472,023				

CRS	No. of vessels	Deadweight	Gross Tonnes	Total no. of Surveyors	Plan approval engineers	Exclusive ship surveyors	No. of recognising flag authorities
Total Size of classed fleet	**85**	**3,054,381**	**2,142,010**	**61**	23	38	**23**
Tankers (crude, product & gas)	24	2,957,758	1,560,261				
Container vessels	0	0	0				
Dry bulk	20	847,494	495,742				
Passenger vessels (over 12 pax)	6	5,864	35,623				
Other ship types	35	5,965	7,031				

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DNV	No. of vessels	Deadweight	Gross Tonnes	Total no. of Surveyors	Plan approval engineers	Exclusive ship surveyors	No. of recognising flag authorities
Total Size of classed fleet	**8,474**	**362,794,792**	**277,834,912**	**1,887**	541	1346	**99**
Tankers (crude, product & gas)	1,965	157,909,630	97,267,273				
Container vessels	1,733	106,762,558	95,093,826				
Dry bulk	925	62,701,075	35,335,469				
Passenger vessels (over 12 pax)	323	926,837	10,229,678				
Other ship types	3,528	34,494,692	39,838,666				

IRS	No. of vessels	Deadweight	Gross Tonnes	Total no. of Surveyors	Plan approval engineers	Exclusive ship surveyors	No. of recognising flag authorities
Total Size of classed fleet	**1,043**	**19,065,410**	**11,898,876**	**206**	61	145	**45**
Tankers (crude, product & gas)	177	11,311,802	6,796,337				
Container vessels	30	875,331	680,167				
Dry bulk	106	5,514,335	3,036,139				
Passenger vessels (over 12 pax)	50	26,698	102,085				
Other ship types	680	1,337,244	1,284,148				

KR	No. of vessels	Deadweight	Gross Tonnes	Total no. of Surveyors	Plan approval engineers	Exclusive ship surveyors	No. of recognising flag authorities
Total Size of classed fleet	**1,996**	**111,506,579**	**73,813,767**	**656**	103	553	**81**
Tankers (crude, product & gas)	714	37,327,825	23,195,501				
Container vessels	294	14,273,621	12,754,169				
Dry bulk	477	54,452,188	29,082,151				
Passenger vessels (over 12 pax)	13	56,726	173,172				
Other ship types	498	5,396,219	8,608,774				

LR	No. of vessels	Deadweight	Gross Tonnes	Total no. of Surveyors	Plan approval engineers	Exclusive ship surveyors	No. of recognising flag authorities
Total Size of classed fleet	**6,587**	**322,031,613**	**222,959,120**	**1,454**	431	1023	**115**
Tankers (crude, product & gas)	582	39,534,225	35,930,268				
Container vessels	1,239	111,617,905	61,344,409				
Dry bulk	2,527	9,573,867	12,137,916				
Passenger vessels (over 12 pax)	373	1,444,213	12,275,917				
Other ship types	1,866	159,861,404	101,270,610				

NK	No. of vessels	Deadweight	Gross Tonnes	Total no. of Surveyors	Plan approval engineers	Exclusive ship surveyors	No. of recognising flag authorities
Total Size of classed fleet	**7,573**	**420,748,801**	**262,109,494**	**1,401**	203	1198	**108**
Tankers (crude, product & gas)	1,396	75,538,942	47,656,183				
Container vessels	633	27,720,833	25,343,062				
Dry bulk	4,105	300,861,674	166,313,917				
Passenger vessels (over 12 pax)	6	18,518	106,861				
Other ship types	1,433	16,608,834	22,689,471				

PRS	No. of vessels	Deadweight	Gross Tonnes	Total no. of Surveyors	Plan approval engineers	Exclusive ship surveyors	No. of recognising flag authorities
Total Size of classed fleet	**453**	**15,424,732**	**9,067,976**	**103**	36	67	**40**
Tankers (crude, product & gas)	66	10,771,604	5,681,255				
Container vessels	8	114,743	88,143				
Dry bulk	87	3,263,667	1,980,112				
Passenger vessels (over 12 pax)	45	78,299	366,390				
Other ship types	247	1,196,419	952,077				

RINA	No. of vessels	Deadweight	Gross Tonnes	Total no. of Surveyors	Plan approval engineers	Exclusive ship surveyors	No. of recognising flag authorities
Total Size of classed fleet	**4,363**	**62,474,425**	**53,629,655**	**566**	89	477	**107**
Tankers (crude, product & gas)	655	20,510,278	12,212,987				
Container vessels	152	4,961,084	5,016,444				
Dry bulk	446	27,770,209	16,241,974				
Passenger vessels (over 12 pax)	569	1,284,589	8,773,720				
Other ship types	2,541	7,948,265	11,384,530				

RS	No. of vessels	Deadweight	Gross Tonnes	Total no. of Surveyors	Plan approval engineers	Exclusive ship surveyors	No. of recognising flag authorities
Total Size of classed fleet	**2,382**	**14,782,055**	**12,915,353**	**672**	91	581	**68**
Tankers (crude, product & gas)	497	8,156,707	6,501,798				
Container vessels	16	205,892	168,783				
Dry bulk	25	948,904	567,356				
Passenger vessels (over 12 pax)	88	22,499	80,982				
Other ship types	1,756	5,448,053	5,596,434				

Classed fleet figures include ocean-going self-propelled ships of 100 GT and over, excluding fishing vessels, military vessels and pleasure craft, with dual classed ships counted at 100%.

Number of surveyors includes combined total number of surveyors, consisting of the number of exclusive plan approval engineers (RO Code A1.1.2 Plan approval staff are the personnel authorised to carry out design assessment and to conclude whether compliance has been achieved), and the number of exclusive surveyors involved in surveys of ships (RO Code A1.1.1 Survey staff are the personnel authorised to carry out surveys (in operation and under construction), and to conclude whether or not compliance has been achieved.)

Number of recognising flag authorities means number of RO agreements with Flags, with general or standing authorisation to act on their behalf for any statutory certificate.

Appendix III

IACS Membership Criteria

Criterion 1
Evidence that the organisation is a Classification Society as defined in Annex 4 to the IACS Charter and that it meets the requirements as detailed in the guidance for this criterion in section C I-4 of Volume 2 of the IACS Procedures.

Criterion 2
Compliance with QSCS.

Criterion 3
Demonstrated ability to develop, apply, maintain, regularly update and publish its own set of classification rules in the English language covering all aspects of the ship classification process (design appraisal, construction survey and ships-in-service periodical survey).

Criterion 4
4(a) Demonstrated ability to provide surveys of the ships under construction in accordance with the Applicant's rules and in accordance with IMO, ILO and flag State requirements.

4(b) Demonstrated ability to provide periodic surveys of ships-in-service, in accordance with the Applicant's rules and in accordance with IMO, ILO and flag State requirements.

Criterion 5
Sufficient international coverage by exclusive surveyors relative to the size of the Applicant's support of construction programmes and classed fleet in service.

Criterion 6
Documented experience that provides evidence of an Applicant's capability to assess designs for construction and/or major modification and/or ships-in-service of various types subject to any applicable IMO and ILO Convention.

Criterion 7
Significant in-house managerial, technical, support and research staff commensurate with the size of the Applicant's classed fleet and its involvement in the classification of ships under construction.

Criterion 8
Technical ability to contribute with its own staff to the work of IACS in developing minimum rules and requirements for the enhancement of maritime safety.

Criterion 9
Contribution to IACS work by the Applicant, on an ongoing basis with its own staff as described in Criterion 8 above.

Criterion 10
Compliance of classed ships with all IACS Resolutions as defined in Annex 4 to the IACS Charter.

Criterion 11
Evidence that the IMO's Maritime Safety Committee has advised in writing that the Applicant's Rules and Procedures conform to the functional requirements of the International Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers (SOLAS Reg.II-1/3-10, IMO Resolution MSC.287(87)).

Interpretative guidance in respect of the above criteria is contained in the document – IACS Procedures Volume 2 – Procedures Concerning Requirements for Membership of IACS, which is published and kept updated on the IACS website.

IACS

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