IACS

International Association of Classification Societies

Annual Review 2023

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Class looks to the future

IACS Members continue their unique contribution to safety in the face of a deep transformation of the industry

By Roberto P. Cazzulo, IACS Council Chair

After more than 40 years with a classification society, I am proud to be elected Chair of the IACS Council for 2024-2025. It is a great challenge, and I will put all my experience at the disposal of the IACS Member classification societies. Since June 2023, I have had the opportunity of participating at Council and Chair office meetings and have appreciated the impressive job carried out by Nick Brown and his team for the previous two and half years. They adopted significant changes to the internal governance, passed through the remote working of the Covid period, and have improved the relationships with stakeholders having a great deal of trust in and expectations of class, including the IMO, Flag and Port States and the industry.

Class is a unique concept, covering the whole lifecycle of a ship from design, surveillance during construction, periodic surveys of ships-in-service, and carrying out a verification of compliance with class rules and statutory regulations. Through this experience, classification societies can promote the continuous improvement of rules and regulations to meet the objective of protecting life at sea, the environment, and ships and cargo. IACS can be of great help in keeping the three pillars of people, planet and property together to ensure a sustainable future.

We cannot forget the amount of work carried out by IACS Working Groups for the maintenance and continuous upgrade of class rules, as well as for the consistent implementation of statutory requirements. This is one of the cornerstones of IACS, requiring a close collaboration between Members, who make unique contributions to maritime safety through technical support, compliance verification, and research and development.

Looking forward, IACS is pursuing three main workstreams that will have a great impact on shipping in the next few years from the safety and environmental protection points of view. Those are safe decarbonisation, safe digital transformation and the human element.

A year ago, IACS launched a Safe Decarbonisation Panel focused on safety issues associated with each of the principal alternative fuel types, recognising that there will not be a sole viable solution to meet the 2030-2050 targets. IACS is agnostic about the choice of renewable energy or green fuel that might be used for shipping, but recognises that an early significant accident might jeopardise the implementation of a promising novel technology. IACS has already provided the IMO with its gap analyses, and it is developing class Unified Requirements (URs) and guidelines about the use of methanol, ammonia and hydrogen as marine fuels, as well as other means to reduce carbon emissions, such as electric batteries, fuel cells and carbon capture technologies. Those do not exclude the use of nuclear power, either onboard or as a means to produce synthetic fuels, which might be considered in the future too.

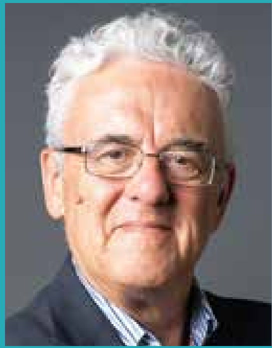
Focus on digital transformation

The second workstream is about the digital transformation of the shipping industry, which is already happening although not yet on a large scale, but rather as voluntary measures adopted by experienced operators. IACS has set up a Safe Digital Transformation Panel to embrace a wide range of issues not currently covered by class rules and statutory regulations. For instance, these include IACS URs on cyber resilience of ships and of onboard systems and equipment; the complex integration of hardware and software systems on board, requiring the application of systemic approaches; communication of data from ship ashore; and autonomous vessels. Examples of AI techniques that may be applied in these fields are machine learning, Internet of Things, predictive techniques, big data processing and digital twinning. This Panel will identify the top priorities to assist industry and the IMO, bearing in mind that these aspects will have a significant impact on the way ships will be designed, constructed, and operated in the future.

The third workstream that IACS is focused on is about the human element, specifically the implementation of innovative technologies on board and ashore. Ships today are increasingly home to a wide variety of novel technologies that are used by the crew to facilitate operations at sea. This should attract a new generation of skilled engineers to operate complex systems, dealing with a high level of integration and interaction. The qualification of officers and crew should follow such an evolution, and there are possible implications for the current STCW Convention.

Systems should be designed at the start following human-centred principles to prevent an accident that is later attributed to human factors. Rules and regulations should follow the same principles and should not be based solely on procedures and instructions that imply a lot of paperwork. At the earliest design stages, those who interface with the system directly or remotely must be kept in mind, including what might reasonably be expected from them, the skills and training required during normal operations, as well as planning for foreseeable abnormal or emergency scenarios.

Classification societies can play an important role in this respect. Model-based engineering, simulation and predictive techniques can support the verification and validation requirements at the design stage as well as throughout the whole lifecycle. This will have an impact on the scope of class too. For instance, an insight into actual and predicted ship conditions may offer an alternative to the traditional time-based survey and certification regimes required by class and statutory regulations, and the qualification of surveyors and technical staff to face technology innovations should change, too. These matters will be discussed in detail within IACS and with interested stakeholders in the coming year. ■



About the author

Roberto Cazzulo graduated in civil engineering from the University of Genoa (Italy) in 1979. He joined RINA in 1981 within the R&D department then became manager of international affairs and deputy director of the Marine Division. In 2019 he retired from RINA and was then appointed Secretary General of Registro Italiano Navale, the RINA main shareholder. Since the ’80s Roberto has represented IACS and the Italian Administration at the International Maritime Organization (IMO), chairing the joint MSC/MEPC working group on the Human Element and Formal Safety Assessment, and contributing to the development of the Goal Based Standards for new ship construction. He chaired the International Association of Classification Societies (IACS) in 2013-2014 when the Common Structural Rules for tankers and bulk carriers were adopted and submitted to the IMO for GBS verification. Roberto has been re-elected IACS Council Chair for 2024-2025.

Supporting digitalisation and decarbonisation

Developing familiar assurance processes for new and unfamiliar technologies

By Robert Ashdown, IACS Secretary General

As the structural changes dictated by the drivers of decarbonisation and digitalisation impact the maritime industry in ever more significant ways, ensuring the safety and reliability of ships remains paramount. The pace of change makes it essential that new fuels and technologies are introduced safely and with full consideration for the safety of the ship's crew and other shore-based personnel. Responding to these changes requires speed and agility in the development of common standards, whether they be in the form of IACS Resolutions or IMO or regional regulations. IACS has responded to that challenge by adapting its organisation to reflect changing demands and tailoring its extensive work programme to meet the most pressing needs of the industry and regulators we serve.

2023 saw IACS' nascent Safe Decarbonisation Panel hit its stride, making significant progress across four key workstreams related to decarbonisation, namely, ammonia, hydrogen, lithium battery technologies and carbon capture. IACS is developing its own Resolutions and Recommendations for these new technologies and fuels while continuing to support the IMO with its work in these fields. Key outputs arising from the work done in 2023 include a new Unified Requirement (UR) on the release of ammonia fuel to atmosphere from the onboard systems, together with the development of requirements for materials and testing of piping systems for hydrogen service as well as for ammonia treatment systems. Work is also well advanced on developing guidance for simulating dispersion of gas releases in ships using hydrogen and ammonia as fuel (see pages 32-35).

While new fuels are vital for the industry to meet the IMO's 2050 goal, shipping is not going to achieve this by building new ships alone; decarbonising the existing fleet is vital and this means the widespread deployment of new technologies and the commensurate ability to measure their success. The digitalisation of these engineering processes supports a 'coping strategy' in an increasingly complex world which makes the engineering of complexity more achievable and the prototyping, procurement, build, and assurance of complex assets more affordable than before. The ability to simulate prior to implementation can ensure safe arrangements more cost effectively in a shorter timescale.

This is why digitalisation is key to decarbonisation. In recognition of this, and of the accelerating pace of digitalisation within the industry, IACS established a Safe Digital Transformation Panel (SDTP) at the end of 2023. Recognising the inherent safety risks associated with the introduction of new digitised solutions, IACS is proactively developing measures to assist the industry in safely transitioning to the era of digitalisation. The establishment of SDTP aims to consolidate all IACS digitalisation activities within a single forum, enabling a holistic approach to addressing safety concerns and ensuring the integrity of maritime operations in the digital age.

Working with industry

A common theme between these two new essential panels – and IACS' increased awareness and focus on how a ship's crew can safely operate these increasingly sophisticated vessels (the human element) – is the need to work closely with our industry stakeholders and regulators. From leading panel discussions at CMA at the start of last year to providing thought leadership to Pudong Shipping Week in December, IACS facilitated discussions across numerous avenues in 2023 to ensure external input to the development and evolution of its outputs. This included, inter alia, the revision of 2022 URs E26 and E27 on cyber resilience where industry feedback helped to ensure the URs are clear in their applicability and in being consistently applied in ship surveys, thus ensuring that these important measures to enhance cyber resilience have the desired impact.

Industry consultation was also recognised as being crucial to the ongoing evolution of IACS' Common Structural Rules following the publication of new Standard Wave Data (Rec.34) at the end of 2022

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and the beginning of the assessment of its consequential impacts. IACS' work in this area has featured heavily in previous Annual Reviews and regular dialogue with industry took place throughout 2023 with IACS committing to lead the Rec.34 Consultation Group established at Tripartite 2023 (see pages 45-47).

On matters related to ship strength, and recognising the perpetual challenge posed by the harsh and corrosive environment in which ships operate, IACS released UR S35 Buckling Strength Assessment of Ship Structural Elements in 2023. Buckling has long been recognised as one of the main modes of failure of ship structural elements and while IACS has, for many years, had in place a number of Resolutions to address this, the adoption of a unified approach makes the rule application check of different ship types easier for Industry and also enhances the maintenance of future buckling rule improvements (a summary of other IACS technical outputs is in pages 14-17).

In addition to its active engagement with industry stakeholders and regulators on a global scale, IACS has long maintained a constructive dialogue with the European institutions. This has been particularly important in 2023 with IACS making numerous contributions towards the various EU legislative packages including the 'Fit for 55' Package and the Maritime Safety Package (see pages 36-37). These discussions serve as a platform for fostering collaboration, sharing insights and ensuring alignment with the evolving regulatory framework within the EU.

In 2023, and in line with IACS enhanced commitment to the Human Element, IACS also engaged with the International Labour

Organization (ILO). IACS Members, through their use of exclusive surveyors, are present at all stages of a ship's life making IACS uniquely placed, not only to provide expert technical input to the decision-making process at the ILO, but also to provide an impartial feedback mechanism regarding the practical implementation and effectiveness of the regulatory framework it has adopted. By drawing on the experience IACS' Members' role in performing Maritime Labour Convention (MLC) 2006 audits on behalf of ILO Member States, the continuous improvement of the MLC can be assured.

Promoting excellence

IACS continues to strengthen its commitment to quality by promoting excellence and compliance throughout the maritime sector. 2023 saw the various restrictions imposed by Covid-19 further reduced, thus enabling IACS to resume its full programme of Vertical Contract Audits (VCAs). These audits encompass surveys of ships in service, ships under construction and surveys of machinery and equipment. 2023 also saw the successful convening of the 15th IACS QSCS End User Workshop in Singapore for the first time since the pandemic.

Meanwhile, IACS continues to play a key role in driving forward quality standards across the classification sector through its support of the International Quality Assessment Review Body (IQARB) which brings together representatives from flag State Administrations, industry and regulatory bodies to further develop the oversight of classification societies' quality management systems (see pages 38-41).

In 2023, one classification society whose quality systems were assessed as having met the 'gold standard' of IACS' QSCS was Türk Loydu, who IACS welcomed into membership in November. This significant achievement followed the society's successful completion of the stringent membership application process and successful completion of multiple audits by an independent Accredited Certification Body which, in turn, were individually observed by the IACS Operation Centre to affirm full adherence to IACS standards.

The breadth of activities undertaken in 2023, and the increased pace of delivery, reflect the positive impact that the IACS' governance changes are having on the Association, supported by the continuity afforded by a longer tenure for the Chair. The turn of the year saw Nick Brown, CEO of Lloyd's Register, complete two and a half years in post and he handed over the reins to Roberto Cazzulo from RINA from1 January 2024 for an initial two-year term. By building on the achievements and initiatives detailed in this annual review, IACS will continue to demonstrate its unwavering commitment to advancing maritime standards and fostering a safer, more sustainable future for the industry. ■

About the author

Robert Ashdown has been Secretary General of the International Association of Classification Societies (IACS) since May 2015. He directs the Association's activities and initiatives, including relationships with the IMO, Flag Administrations, the EU, other industry associations, and media.
Before joining IACS, Robert was Secretary General of the Cruise Lines International Association (CLIA) in Brussels, representing the cruise industry at the institutions of the European Union on all policy/regulatory issues and with responsibility for transitioning the traditional passenger ship representation model into the European Chapter of the global CLIA organisation.
Robert has also worked for the UK Chamber of Shipping; as Head of its Technical Division he recalibrated the importance of environmental issues and developed the Chamber policy on GHG emissions. He also led the British Rig Owners Association (BROA), representing owners with North Sea marine offshore units.
Additionally, Robert is a Governor of the World Maritime University, sits on the Board of the Green Award Foundation, and is a Trustee of Stella Maris UK, a seafarers welfare charity.

IACS’ contribution to safer and cleaner shipping

Internationally applicable technical requirements for ships and other floating structures maintain standards

By Robert Ashdown, IACS Secretary General

The objective of ship classification is to verify the structural strength and integrity of essential parts of the ship’s hull and its appendages, and the reliability and function of the propulsion and steering systems, power generation and other features and auxiliary systems which have been built into the ship to maintain essential services on board for the purpose of safe operation of a ship.

Classification societies aim to achieve this objective through the development and application of their own Rules, and by verifying compliance with international and/or national statutory regulations on behalf of flag State Administrations. The vast majority of commercial ships are built to and surveyed for compliance with these Rules.

Classification and statutory certification are, except in rare cases, inextricably linked since classification by a society recognised by the Administration is usually a prerequisite both for registration of a ship with the flag State Administration and for certification of the ship’s compliance with the International Convention on Load Lines and the International Convention for the Safety of Life at Sea (SOLAS).

However, a classification certificate should not be construed as a warrant of safety, fitness for purpose or seaworthiness of the ship. It is an attestation only that the vessel is in compliance with the Rules that have been developed and published by the society issuing it.

Further, classification societies are not guarantors of safety of life or property at sea or the seaworthiness of a vessel because, although the classification of a vessel is based on the understanding that the vessel is loaded, operated and maintained in a proper manner by competent and qualified personnel, the society has no control over how a vessel is operated and maintained between the periodical surveys it conducts to check that a vessel is upheld in compliance with the relevant requirements.

Proper maintenance and operation by ship owners or operators and the seafarers on board between surveys are, therefore, equally key and form part of the overall safety net for protection of life and property at sea and the marine environment, which involves various stakeholders.

Should any defects that may affect class become apparent, or damages be sustained between the relevant surveys, the owner is required to inform the society concerned without delay.

Where the conditions for the maintenance of class are not complied with, class may be suspended, withdrawn or revised to a different notation, as deemed appropriate by the society when it becomes aware of the condition.

Rules and requirements

It is fundamental for classification societies to have a thorough understanding of internationally applicable technical requirements for ships and other floating structures. IACS has therefore established a robust process for contributing to and collecting such information, primarily through its role as a non-governmental organisation of the International Maritime Organization (IMO). Classification societies’ participation in IACS in its role as a technical advisor to the IMO gives them first-hand access to development of international regulatory instruments.

It provides IACS’ 12 Member societies with a means to share such information with the industry, and to secure consistent implementation of the international mandatory conventions and codes as part of statutory services the societies perform under authorisation from flag State Administrations.

Classification Rules have been developed over many years by each society through extensive research and development and service experience and are subject to constant refinement. In addition, Unified Requirements (URs) have been agreed

The class cycle

by IACS Members and transposed into the individual Member's Rules.

Classification societies involvement with ships through their lifecycle affords them the unique opportunity to utilise feedback obtained throughout the design approval process, new construction (including the certification of materials, equipment and components), and from surveys of ships in-service to drive research and development and the improvement of classification Rules. Utilising the opportunities afforded by this 'class cycle' (Figure 1), in support of the purposes and objectives of classification is a key element in IACS work.

In the context of the global shipping industry, 'statutory' requirements are developed at the IMO, and also at the ILO.

As necessary, and to assist in the global and consistent implementation of IMO statutory requirements, Unified Interpretations (UIs) are developed and adopted by IACS.

IMO agreed statutory requirements address the safety and security of ships and those on board and the protection of the environment.

On the basis of 'no more favourable treatment', they facilitate the efficiency of global trade in providing a regulatory 'level playing field' that allows a 'compliant' ship flying the flag of one country to trade anywhere in the world. IACS' UIs look to assist with the practical delivery of these requirements by identifying and resolving vague expressions and the likelihood of differences of interpretation.

Aid and assist

IACS establishes, reviews, promotes and develops minimum technical requirements in relation to the design, construction, maintenance and survey of ships. These requirements are considered minimum prerequisites. Any Member remains free to set and publicise requirements that result in an equivalent or higher safety level compared with the IACS requirements.

IACS also assists international regulatory bodies and standard organisations to develop, implement and interpret statutory regulations and industry standards in ship design, construction and maintenance, with a view to improving safety at sea and the prevention of marine pollution. ■

The support that IACS can offer to regulators such as the IMO and ILO and the industry relates to the following values:

1. Leadership: ability to be ahead and 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 minimum requirements that reflect current practice and changing demands of society, supporting innovation and new technologies.
3. Quality performance: commitment of its Members to define and adhere to the highest global quality standards.
4. Transparency: ability to provide advice on the implementation of regulations, interpretations or enhancements thereof, if 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 also engages bilaterally with individual flag State Administrations and regulatory bodies as required. Regionally, IACS is also active in Brussels promoting the aims of IACS to European institutions and, where appropriate, making technical contributions to EU regulatory developments related to shipping.

Scan this QR code to watch a video introduction to IACS
www.iacs.org.uk/about-us/introduction-to-iacs

More productive and stronger technical leadership

IACS' strategy fosters increased technical output

By Zhiyuan Li, Chair, General Policy Group

IACS' technical work mainly falls into two categories: firstly, to establish, review, promote and develop minimum technical requirements in relation to the design, construction, maintenance and survey of ships and other marine-related facilities; and secondly, to assist international regulatory bodies and standard organisations to develop, implement and interpret statutory regulations and industry standards in ship design, construction and maintenance with a view to improving safety at sea and prevention of marine pollution.

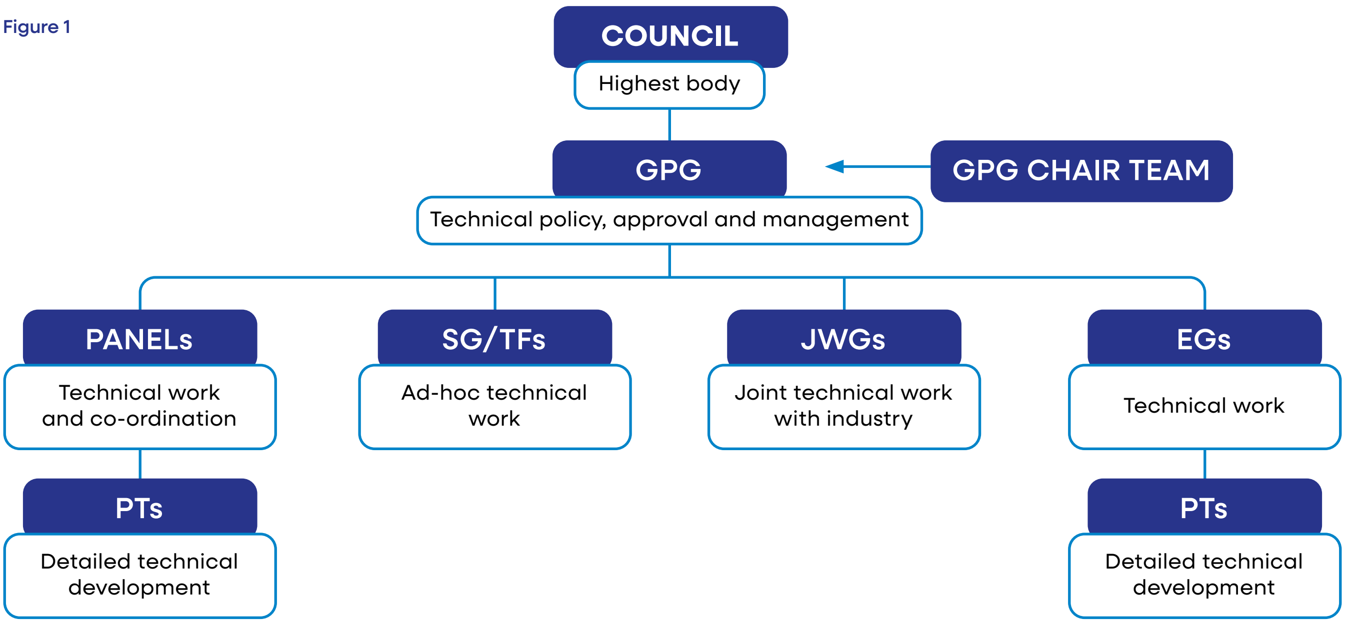
To accomplish this, IACS has established and evolved a unique and well-functioning technical work structure (Figure 1). This drives the implementation of IACS' strategy.

As part of the organisational change implemented in 2021, the GPG Chair and team are now based in London, which has facilitated deeper, wider and more consistent co-operation with the IMO and other industry associations on the key issues facing the maritime industry.

On decarbonisation, following the establishment of the Safe Decarbonisation Panel in 2022, 2023 saw good progress on, among other things, the development of Unified Requirements (UR) in support of battery power, hydrogen and carbon capture while a UR on ammonia as a fuel was being finalised at the end of 2023 for approval and publication at the beginning of 2024.

With the scale and pace of digitalisation within shipping and shipbuilding accelerating, IACS recognises and emphasises the

Figure 1



Note: At the 88th IACS Council Meeting in Dec. 2023, it was decided to establish the new Safe Digitalisation Transformation Panel (SDTP). SG – Small Group, TF – Task Force, EG – Expert Group, PT – Project Team. All the above groups are supported by the Permanent Secretariat. For details, please refer to the IACS Organisation section of this Review.

associated new safety risks to the ship and personnel when implementing the many and varied benefits of digital solutions. To support industry in managing these risks – and in recognition of the multi-decadal nature of the challenge – IACS decided to establish a new Safe Digital Transformation Panel (SDTP) at the end of 2023 which replaces the Cyber System Panel, EG/MASS, EG/DATA and SG/Complex Systems and aims to handle all IACS' digitalisation activities within a single forum in a holistic manner.

As with the Safe Decarbonisation Panel, IACS' new SDTP will focus its attention on the safety implications that accompany increasingly digitised ships, working closely with stakeholders to ensure that its work programme is carefully tailored to meet the needs and priorities of the global maritime communities.

Technical outcomes

Reflecting the tremendous efforts of colleagues within and beyond IACS and the organisational changes mentioned above, a greater number of technical outcomes were achieved in 2023.

For technical requirements development, GPG approved a total of 100 new or revised Resolutions and Recommendations in 2023 for implementation and application by IACS Member Societies. This total is comprised of one CSR RCN, 52 Unified Requirements, 24 Unified Interpretations, 6 Procedural Requirements and 17 Recommendations. They include RCN 2023 to CSR, UR H1 on Control of Ammonia releases in Ammonia fuelled vessels, UR S35 on Buckling Strength Assessment of Ship Structural Elements, UR M82 on Type Testing Procedure of Explosion Relief Devices for Combustion Air Inlet and Exhaust Gas Manifolds of I.C. Engines Using Gas as Fuel, UI SC300 on Containment of fire: details of fire insulation of duct penetrations, UI GC39 on Interpretation of 2014 IGC Code with respect to additional bunkering manifold equipment on LNG bunkering ships, REC 175 on SEEMP/CII Implementation Guidelines, REC 176 on Measurement of Underwater Radiated Noise, and REC 177 on Shipbuilding Quality Standard for Machinery and Piping Systems, etc. For more details, please see Section 10 of this Annual Review and IACS website

To support IMO in its development, implementation and interpretation of statutory regulations, IACS also put a considerable amount of resources into planning, discussing, drafting and submitting 50 independent or joint submissions to IMO meetings in 2023, and sent 148 experts to attend IMO meetings as well as its Working Groups, Drafting Groups and Correspondence Groups. In this regard, it is noted that IMO MSC 107 approved the IACS-initiated Proposal for a new output to facilitate a regulatory framework to support the safe delivery of IMO's strategy on reduction of GHG emissions from ships and made it a continuous one, which showed IACS has positively caused an overarching agenda to be set at the IMO Committee level, and indicated the importance Member States have attached to this work for the years to come.

IACS Position Papers revised/developed in 2023

Position Papers	New/Revision
MASS	Revision
Safety Aspects of New Technologies and Fuels	Revision
Developing and implementing technical measures to reduce GHG emissions from ships	Revision
Container Ship Safety	New

Note: Position Papers can be found on the IACS website at https://iacs.org.uk/about/iacs-position-papers.

On top of the two main work areas, IACS also issues and regularly reviews its Position Papers on key topics for the industry which provide background to the subject matters, IACS' position on the subject and a summary of actions that IACS has taken. Last year, four IACS position papers were newly developed or revised, covering hot issues such as Maritime Autonomous Surface Ships, developing and implementing technical measures to reduce GHG emissions from ships, safety aspects of alternative fuels, and container ship safety.

In addition, IACS has close ties with other intergovernmental bodies, including ILO, EU, Paris MoU, Tokyo MoU, and IOMoU; international industry associations such as ICS, BIMCO, INTERTANKO, INTERCARGO, OCIMF, ASEF, and IUMI; and international standard bodies such as ISO; and co-operates and collaborates on various issues through meetings, joint working groups, liaisons and visits. For example, IACS has a yearly policy level meeting with the ILO Director of the International Labour Standards Department and participates in the Special Tripartite Committee. At EU level, IACS is actively engaging in and contributing to Expert Groups, including the European Sustainable Shipping Forum, the Passenger Ship Safety Expert Group, the Marine Equipment Directive Expert Group and the Stakeholders Advisory Group on Maritime Security.

A selection of IACS papers submitted to IMO in 2023 and their outcomes	
IACS Paper	**Outcome at IMO**
NCSR 10/21/1* *Clarification of SOLAS IV and COMSAR/Circ.32/Rev.1*	Agreed
MSC 107/17/6* *Proposal to revise MSC.1/Circ.1353/Rev.2 to permit lashing software as a supplement to container stowage and securing plan. A new output*	Approved for post-biennial (2026/27)
MSC 107/17/21* *Proposal for a new output to facilitate a regulatory framework to support the safe delivery of IMO's strategy on reduction of GHG emissions from ships*	Approved - biennial (2024/25)
MSC 107/17/24 *Timeline and format of the road map for the safe decarbonisation regulatory assessment to deliver the regulatory framework. Continuous output*	Approved - biennial (2024/25)
CCC 9/3/14 *Comments on document CCC 9/3 pertaining to the use of ammonia as fuel*	Paper referred to the CG on IGF/IGC

*Joint submission

Number of IACS papers submitted to IMO/IACS representatives for its meetings held in 2023				
IMO Event	**Number of IACS Papers**	**Number of co-sponsored papers**	**Total number of IACS Papers**	**Number of IACS representatives**
SDC 9	5	2	7	20
SSE 9	7	1	8	19
PPR 10	1	1	2	14
NSCR 10	1	1	2	10
MSC 107	7	6	13	22
MEPC 80	6	2	8	31
III 9	0	0	0	12
CCC 9	9	1	10	20
Total	**36**	**14**	**50**	**148**

Within the industry, IACS is leading several Joint Industry Working Groups (JIWGs) such as the JIWG on Future Proofing the Maritime Safety Regime which addresses the opportunities and risks associated with the deployment of complex novel technology on board ships in the context of the existing SOLAS survey and certification regime, the JIWG on Technology Readiness Levels to discuss and develop a common understanding for the technology readiness level of low GHG emission technologies, and the JIWG on Safe Decarbonisation to discuss and develop a common understanding for the safety aspects of decarbonising technologies and fuels.

A large team

To achieve all this, IACS calls on the large amount of work undertaken and time expended by its seven dedicated Panels, nine Expert Groups, and 38 Project Teams, which form the foundation of IACS' technical achievements. Only the work of the Panel chairs, secretaries, and Project Teams managers and members fall within IACS' technical budget; the work of all Panel members, Expert Group chairs and members, and other Small Groups, Task Forces and Joint Working Groups, as well as IACS representatives to external meetings and events, are not covered by IACS's technical budget. The following budgeted man-days – a small portion of the total technical labour involved – indicate the scale of IACS' technical work:

Budgeted Personnel	Working Days
Chairs and Secretaries of 7 Panels	2,779
Managers and Members of 38 Project Teams	2,941

To summarise, 2023, the Chinese zodiac year of the Rabbit, proved to be a year of prosperity for IACS. The hard work undertaken by IACS Members combined with its continual organisational evolvement have produced more productive technical developments and stronger technical leadership. With a great deal of substantial technical work underway and even more to come under IACS' six-year long-term strategy – which is particularly focused on safe decarbonisation and digitalisation, as well as the human element and the role of surveyors and technical staff dealing with novel technologies – more concrete achievements are expected in 2024, the Chinese zodiac year of Loong. ■

About the author

Zhiyuan Li graduated with a bachelor's degree in naval architecture from Shanghai Jiao Tong University and an EMBA degree from China Europe International Business School (CEIBS). After working as a surveyor/ ISM auditor in CCS and a technical officer in IMO, he has held various management positions in CCS within international affairs, rule development, and newbuildings. He chaired IACS General Policy Group (GPG) 2016-2017 and led Chinese Delegations to IMO's DE and SSE Sub-Committees. He was elected and has been serving IACS as the chair of GPG since July 2021.

Preventing the loss of seaborne containers

IACS Unified Requirements strive to improve box industry safety

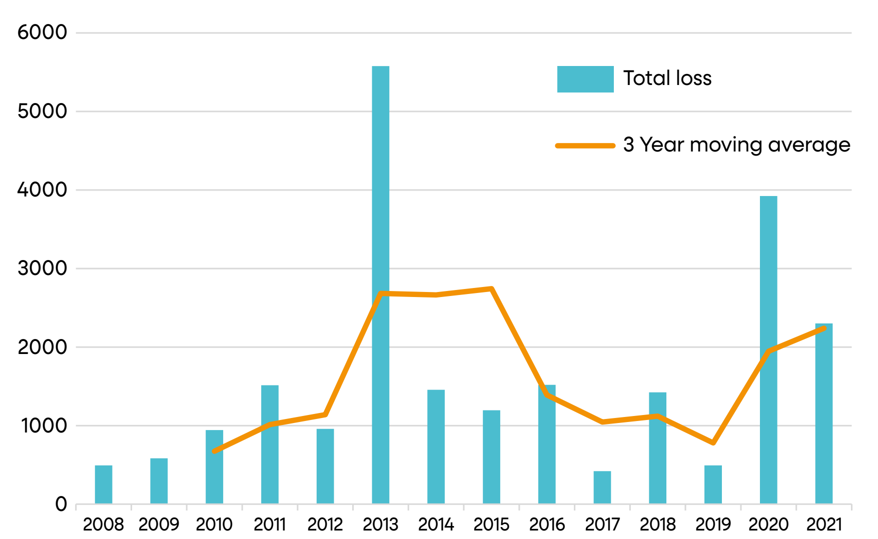
By Hyungmin Cho, IACS Hull Panel Chair

The maritime container sector is the backbone of world trade and covers the worldwide carriage of some 80% of all goods. The 102 million metric tons of containerised goods transported in 1980 had grown to about 1.83 billion metric tons by 2017[ii], demonstrating the importance of container trade to global commerce. Despite efforts and technological advances towards minimising container loss, a large increase in the number of transported containers has reaffirmed concerns regarding the loss of containers. Containers lost overboard imply economic issues, jeopardise safe vessel traffic, and even pose an environmental hazard, if they contain dangerous goods. As illustrated in Figure 1, it is noticeable that the approximate number of containers lost at sea has recently increased. This contradicts the zero-container-loss policy that the stakeholders of the maritime container segment are striving for.

Following the investigation report of the *MSC Zoe* incident prepared by the IMO Sub-Committee III-8 Correspondence Group (III8 CG), and interaction with the International Union of Marine Insurance (IUMI), IACS assessed the safety issues related to the loss of containers and initiated a task force project within the Association's Hull Panel. The project comprises experts from different member classification societies and approaches the problem of container loss at sea from three aspects: operation, design, and maintenance.

Lashing software is deemed to be the dominant solution in enhancing the safe seaborne transportation of containers. The Hull Panel is therefore developing Unified Requirement C6 (UR C6) to harmonise the performance standards and requirements for lashing software. Furthermore, the Hull Panel's submission to IMO's CCC8 to recognise lashing software as an additional means to supplement container stowage and securing plans, included in approved cargo securing manuals, received support in principle. However, the general view of the sub-committee was that harmonised performance standards and guidelines are required to permit the approval of lashing software to be carried out in a consistent manner. Consequently, a new output proposal was prepared by the Hull Panel and submitted to MSC 107 to introduce the supplementary use of lashing software together with the development of performance standards for lashing software to allow for uniform approval by flag State Administrations. Additionally, a follow-up proposal to revise the 'Revised Guidelines for the Preparation of the Cargo Securing Manual', (MSC.1/Circ.1353/

Figure 1: Approximated number of containers lost at sea[i]



i IMO CCC8/11 2022, Development of measures regarding the detection and mandatory reporting of containers lost at sea that may enhance the positioning, tracking and recovery of such containers. Estimate of containers lost at sea, submitted by the World Shipping Council (WSC).

ii iUNCTAD, 2017. Review of Maritime Transport 2017. United Nations Conference on Trade and Development.

Rev.2) will be prepared and submitted to CCC10, scheduled for September 2024.

From the design perspective, the Hull Panel is developing UR C7 to ensure that container securing systems are approved and certified, enhancing the safe transportation of containerised cargoes. Working towards this UR development, special consideration has been afforded to detecting gaps between the rules of the member classification societies regarding the approval and certification of container securing systems.

The maintenance of container stowage and securing systems is another subject to which IACS is contributing via prescription of unified standards and requirements for

"The Hull Panel is developing UR C6 to harmonise the performance standards and requirements for lashing software"

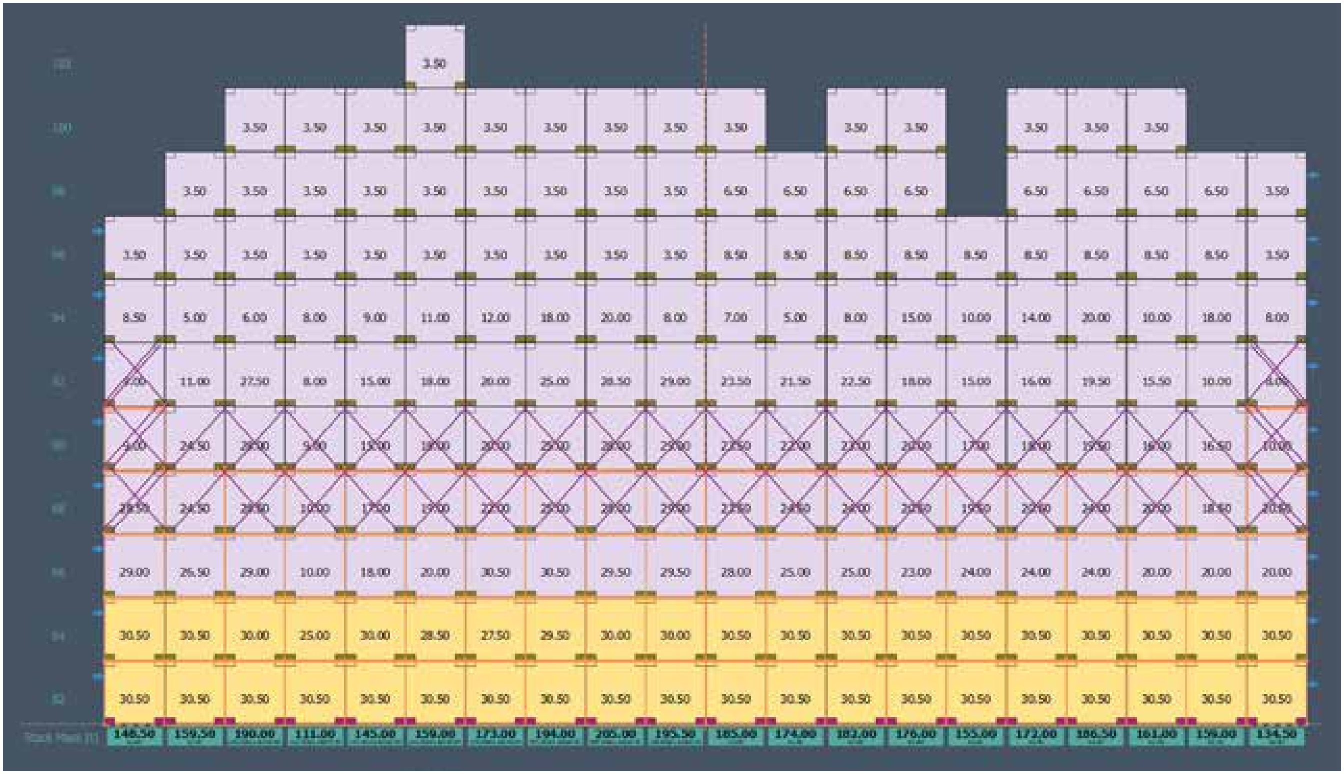


Figure 2: Lashing software plays a central role in improving the safe transportation of seaborne containers. IACS is developing unified requirements to harmonise the performance standards and compliance requirements for lashing software

Figure 3 – IACS is developing Unified Requirement C8 to enhance the wear, tear, and corrosion of container stowage and securing systems

allowable wear, tear, and corrosion of these systems. Such requirements are missing in the current rules of the majority of the Association's Members, emphasising the challenge of harmonising these requirements, which are under development in UR C8.

The Unified Requirement documents UR C6, UR C7, and UR C8 are planned for completion in 2024 with their implementation by Member classification societies due in 2025.

Further assessment of the causes of container loss reveals that harmonisation in the assessment of the container stack dynamics is another area where IACS can actively contribute.

Here, the Hull Panel will examine the feasibility of harmonising the design loads on container stacks and investigate the synergies and collaboration possibilities with other IACS projects, particularly within ship motion and acceleration contexts. Moreover, with regard to container stack dynamics, the feasibility of harmonisation of strength assessment methodology, including the possibility of unification of calculation methodology and acceptance criteria, will be studied. These feasibility studies are planned for 2024. ■

About the author

Hyungmin Cho is a seasoned naval architect, boasting both a Bachelor of Science and a Master of Science in Naval Architecture and Ocean Engineering. With a robust background, his proficiencies span across diverse domains, notably encompassing structural strength assessment utilising finite element analysis, spectral fatigue analysis, and the implementation of 3D model-based design approval systems. His significant contributions extend to the advancement of the IACS Common Structural Rules, evident through his active involvement in multiple IACS project teams dating back to 2008. Presently, Mr. Cho holds the esteemed position of Chair of the IACS Hull Panel, a role he will fulfill until the culmination of his three-year term in 2025.

Ensuring safe gas transportation passage

IACS supports the revision of the IMO IGC Code

By Kathrine Ilje Nerland, Safety Panel Chair

Since its entry into force in 1986, the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code) has set mandatory safety standards for new gas carriers. Since then, the Code has undergone several significant amendments to address emerging challenges and incorporate advancements in technology.

Given the complexity and continuous development of technologies involved in transporting gases, and the multiple hazardous properties of these gases – such as flammability, toxicity, corrosivity and reactivity – a regularly updated regulatory framework is essential to stay in line with technological development and for the safe design and construction of gas carriers.

Drawing on its experience during design approval and surveys, IACS has developed around 40 Unified Interpretations (UIs) to the IGC Code since its inception to foster uniform and correct application of its requirements. A similar number of papers have been submitted to the IMO to contribute to the Code's development.

IGC Code review

Based on an initiative by IACS and other stakeholders, the IMO is now conducting a focused review of the IGC Code following the large number of UIs developed since the latest major review of the Code entered into force in 2016. The primary objective of this review is to remove ambiguity and promote the consistent implementation of the IGC Code requirements.

Under this initiative, in 2023 IACS revisited its implemented UIs and suggested draft amendments to the IGC Code to incorporate guidance in the mandatory regulatory framework. The understanding of and approach to several technical topics in the IGC Code has also been discussed, leading to proposed new UIs.

Several amendments have been drafted by the Safety Panel, for example related to discharge tests of dry chemical powder fire-extinguishing systems, the consideration of weathertight ventilators in stability calculations and design temperatures for piping fittings and related components within the cargo area.

The IGC Code covers a wide range of safety aspects and multiple IACS Panels are therefore involved in its review. These include those related to the consideration of emergency shut down systems, design criteria for double wall piping and ducts for gas fuel systems, sampling arrangements, tank design, segregation of safe and gas hazardous areas, filling limits, new materials for cargo containment systems and survey requirements. Many of these were discussed and agreed by the 9th session of the IMO Sub-Committee on Carriage of Cargoes and Containers (CCC 9) in 2023.

Water spray systems

One of the major topics that IACS has suggested to incorporate into the IGC Code is the clarification of the requirements concerning water spray systems covering the boundaries of superstructures and manned deckhouses, lifeboats, life rafts and muster areas facing the cargo area. Having an adequate supply of water for firefighting is essential. On ships carrying flammable and/or toxic products, a water spray system for cooling, fire prevention and protection of the crew is also key.

The focus has been on redundancy and backup arrangements for the system, in particular interconnection between the water spray system and the fire main system. In this respect, it has been agreed that the water supply should have sufficient capacity to connect water from the fire main to the deck spray system, and that the emergency fire pump should have the size and capacity to supply the required amount of water if the main fire pumps are disabled.

Based on the principle of dealing with one single fire incident at a time, the emergency fire pumps could be sized to cover either the water spray system or the engine room fire extinguishing system, whichever is greater, in addition to two hydrants.

Safety of LNG bunkering ships

In September 2023, IACS issued a new Unified Interpretation (UI GC39) related to cargo transfer areas on LNG bunkering ships, which are specifically designed to transfer LNG from one vessel to another.

Some of these ships are permanently equipped with additional cargo transfer equipment – such as loading arms, bunkering booms and transfer hose reels – which are designed to handle the low temperatures and high pressures associated with LNG and can be installed in different locations around the ship.

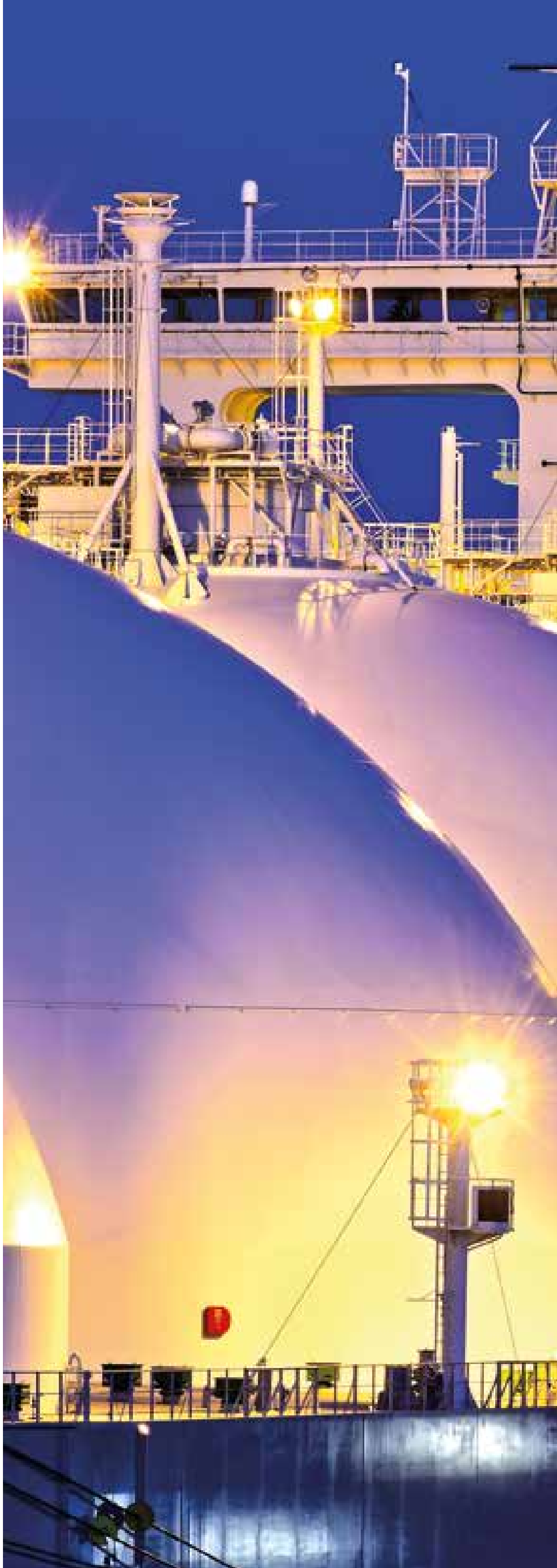
UI GC39 interprets the IGC Code such that, when in use, these additional cargo transfer arrangements on LNG bunkering ships are considered as 'cargo manifolds' for the purpose of several existing safety measures.

This brings these additional cargo transfer arrangements into the existing IGC Code, which requires protection of cargo manifolds by a water spray system covering discharge and loading connections, control valves and emergency shut down valves. This also extends to regulations which require areas where a possible cargo leakage may occur to be further protected by a dry chemical powder fire-extinguishing system. Additionally, the regulation requiring the emergency shut-down system – which is fitted to stop cargo flow in the event of an emergency – to be automatically activated upon detection of a fire on the weather deck of the cargo area, including the cargo manifolds, will also extend to the cargo transfer areas on LNG bunkering ships under UI GC39.

UI GC39 will be uniformly implemented by all IACS Members for vessels contracted for construction on or after 1 July 2024.

Going forward, the IACS Safety Panel will continue to be actively involved in the development of the future regulatory framework for transportation of gases by sea, including for alternatives to methane gas fuels, such as LPG and ammonia.

With the maritime industry shifting to alternative fuels, new technologies and novel designs, IACS is committed to continue sharing its knowledge and experience to ensure that operational safety is retained. ■



Credit: dcornelissen@chello.nl

About the author

Kathrine Ilje Nerland MSc is a senior principal engineer and safety regulation expert at DNV in Norway. She has a strong international background in technical safety for ships and offshore units, project management and statutory compliance, including nine years in the USA, Republic of Korea and the Netherlands. As IACS Safety Panel Chair, Kathrine leads IACS' work on initiating and shaping maritime safety standards in a transforming industry.

Measuring underwater noise pollution from ships

New IACS Recommendation on the measurement of underwater radiated noise

By Kathrine Ilje Nerland, Safety Panel Chair

Underwater Radiated Noise (URN) is the noise which a ship emits into the receiving waters due to regular operation. It has been recognised by the International Maritime Organization (IMO) that the impact of URN on the maritime environment is both significant and on the rise, and that measures can, and should, be taken to reduce its levels.

In 2023, the Marine Environment Protection Committee (MEPC) approved a revised edition of the 2014 Guidelines for the reduction of underwater noise from commercial shipping to address adverse impacts on marine life (MEPC.1/Circ.833).

Considering the growing concern around the detrimental impact of URN on many marine species, several IACS Members have published class notations to measure and characterise the underwater noise signature of ships and compare them with given limits.

In parallel, the International Organization for Standardization (ISO) has gathered a work-force to develop and publish standards on all the detailed technical aspects of URN.

IACS has been working over the last few years to develop common means for how URN should be measured, analysed and reported in the future. A project team has carefully considered the various class guidances and requirements, and examined terminologies used in different standards, with a view to providing clarity and enabling comparisons between the different class notations. The project team also considers standards related to the measurement of URN from ISO, as well as from other bodies such as the American National Standards Institute (ANSI) and the International Electrotechnical Commission (IEC).

The IACS team has also been tasked with a careful review of the technical requirements of the different class notations with the aim of developing harmonised measurements and post-processing procedures.

New IACS Recommendation

The result of this work is IACS Recommendation 176, published in September 2023. This covers the measurement of URN and the processing of collected data to give a single number for a ship's URN, which can then be used for comparison purposes.

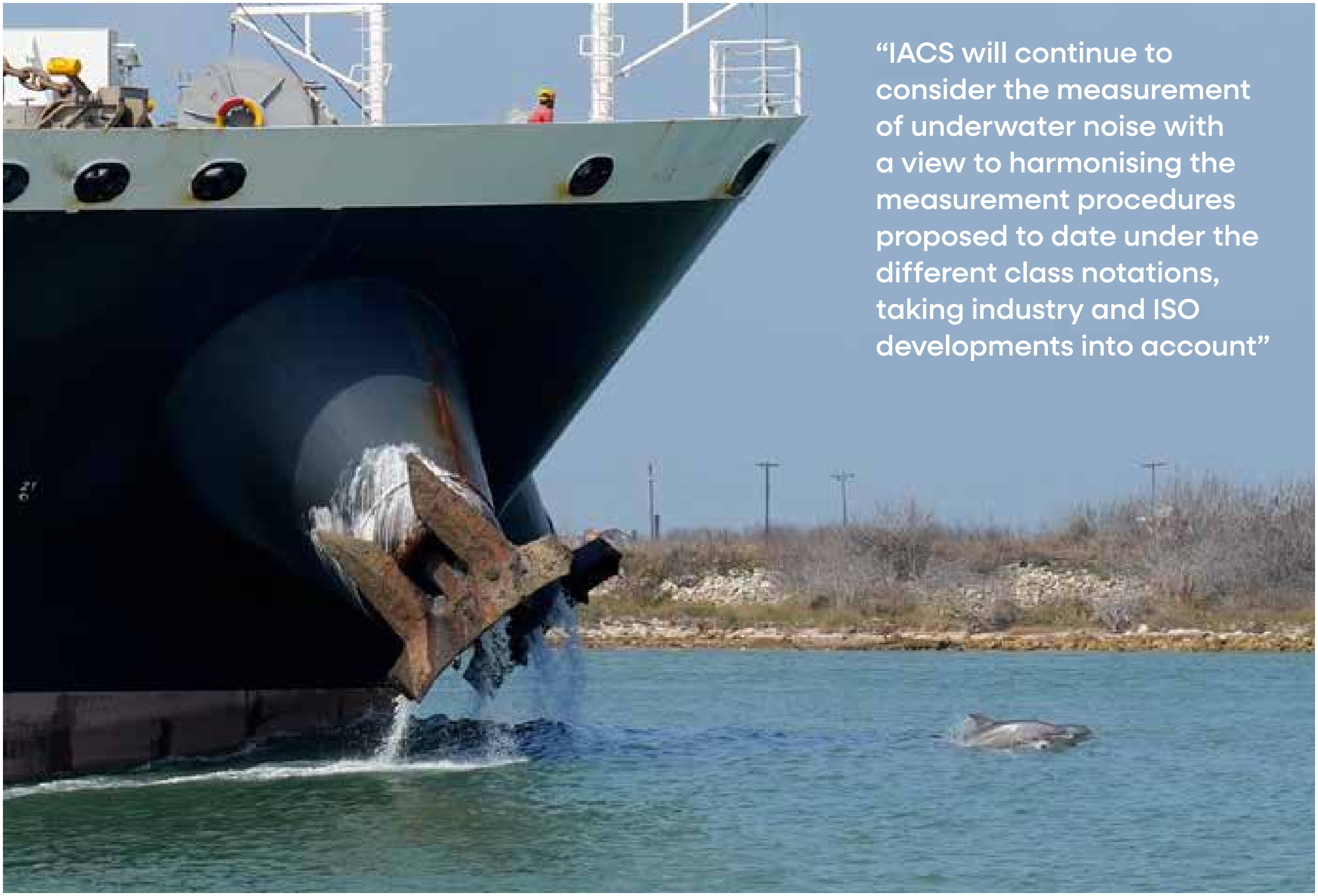
Use of this new Recommendation is expected to help create consistent measurement, to 'reference' value, and to enable simple comparisons to be made between ships.

The new Recommendation considers a range of factors to ensure that URN measurements are accurate and reliable.

When characterising noise, a baseline is needed to identify which noise is originating from the ship and which is normal 'background' noise from other sources. For example, if other waterborne vessels are in the vicinity of the noise measurement site, they will generate noise which needs to be accounted for. Similarly, water moving past the hydrophones, such as from currents or tide, will adversely affect the accuracy and quality of the data.

The new Recommendation also provides limits on the weather conditions, current rate and the state of the tide at the time of measurement. The local weather conditions will also have an impact as wind and rain can 'pollute' the noise generated by the ship being measured.

The depth of the water in which the measurements are taken also has a major impact on the noise propagation and consequently on the measurement. In deep waters the sound is likely to dissipate evenly in all directions. However, in shallow waters the sea surface and the seabed can significantly affect the propagation. At the seabed some of the sound will be absorbed and some will be reflected depending on the nature of the seabed surface (e.g. rock or sand). In shallow waters lower frequencies, in particular, do not get propagated but effectively get cut off by the reflections between the surface and the seabed.



The Recommendation also suggests measures to minimise the noise generated by the measuring equipment itself, such as internal noise from the electronics and connections as well as that from the securing cables.

Providing consistent analysis and reporting means

During test runs a lot of information needs to be recorded and the new Recommendation provides extensive advice for data collection and analysis. In addition to records of the calibrations and celerity profile, as a minimum the following need to be recorded for each test run:

- sound pressure measurements from hydrophones;
- distance between tested vessel and hydrophones; and
- tested vessel speed over ground.

Any limitations on the measured frequencies, such as the effects of shallow water, should be recorded.

IACS will continue to consider the measurement of underwater noise with a view to harmonising the measurement procedures proposed to date under the different class notations, taking industry and ISO developments into account. ■

IACS addresses ship data quality challenges

Managing data integrity in Industry 4.0

By R. Srinivas, Cyber Systems Panel Chair

The maritime industry is digitalising to increase operational efficiency and to meet decarbonisation and zero emissions challenges. Technological advancements in the Internet of Things, networking and high-speed data communication have helped to increase the adoption rate of digitalisation.

System integration and data sharing with multiple processes and stakeholders and use of advanced data analytics is the future. Ships are – albeit slowly – moving towards datacentric operations as more and more data-based control systems and applications are employed on board ships.

The importance of data quality is increasingly being recognised with the acceptance that low quality data can have a detrimental effect on decision making processes, due to inaccurate analytics. It is vital to ensure that data is fit to serve its intended purpose and that the desired quality of data is maintained throughout the data cycle.

Data quality is a critical attribute which provides a measure of the condition of data and refers to the degree to which data meets the specific needs of various business and/or operational scenarios. The level of data quality will affect the performance, dependability, and safety of onboard systems, and can have an impact on the accuracy of decisions taken based on data. Data quality problems can emerge anywhere in the data flow pipeline, from master data to data used by a software solution.

Addressing quality challenges

To address data quality challenges and to provide the maritime industry with a generic superior method and approach on how to determine the data quality requirements for a given application, IACS initiated development of a Recommendation on ship data quality.

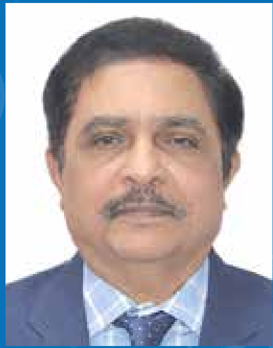
The Recommendation will cover data generated on board vessels, or received from other sources, and used for various functions.

This Recommendation, through a review of various ISO and industry standards on the principles of data quality management, will describe a process to determine the quality of data generated on board vessels, or received from other sources, and used for various functions such as performance optimisation, condition-based maintenance, system diagnostics, fault prediction, telemetry, or remote monitoring.

As well as qualifying the data quality, it is important that data collectors utilise appropriate dimensions, also known as characteristics. Noting that there are multiple dimensions to choose from and that they could be specific to an area of application, the Recommendation aims to provide guidance on this aspect through suggested dimensions based on a data lifecycle, while considering the key elements of a data quality lifecycle, such as data identification, data acquisition, data storage, data integration and data processing.

The Recommendation also aims to address data quality verification and validation, data value checks (e.g. range checks), data consistency checks (e.g. keeping information uniform as it moves across a network and between various applications), data semantics checks (e.g. verifying how closely data represent an event, concept or object in the real word), and more.

The Recommendation is in an advanced stage of development and is scheduled for release by Q2 2024. ■



About the author

Mr R.Srinivas is the Chairman IACS Cyber Systems Panel and also Chairman of IACS Joint Industry Working Group on Cyber systems .

He is working as Vice President & Senior Principal Surveyor at Indian Register of Shipping (IRS) and is heading the Electrical and control systems department in IRS plan approval division . Mr Srinivas specialises in control and automation systems, System integration, Maritime Cyber risk management, failure mode effect analysis and Digitalisation of ship systems.

Mr. Srinivas has more than 40 years of Maritime experience. He has 13 years of experience in shipbuilding and was in charge of installation, commissioning and testing of electrical, control, automation, navigational and communications systems on board. He has 12 years experience in ship designs and was involved in the preparation of class drawings, production drawings and also headed various consultancy projects for shipyards and ports in automation, networking & VTMS. He is with IRS for more than 14 years.

Paving the way to CII implementation

IACS Recommendation provides clarity on CII and SEEMP

By Eva Peno, Environmental Panel Chair

Last year saw the publication of a new IACS Recommendation, REC 175 – SEEMP/ CII Implementation Guidelines to help the shipping industry navigate the International Maritime Organization's (IMO) Carbon Intensity Indicator (CII) regulation. The guidelines serve to help shipowners ensure compliance and to be proactive in adopting more sustainable practices. Ahead of the first reporting year in 2024, Recommendation 175 will be invaluable for shipowners when calculating and verifying CII.

With environmental sustainability top of mind, the shipping industry is in the midst of a transition to more eco-conscious practices. The publication of IACS' comprehensive guidelines for SEEMP and CII implementation is an important milestone on this journey. The IACS Recommendation provides shipowners and charterers not only with a roadmap to ensure compliance with regulatory demands but also proactive steps to help shape a sustainable maritime future.

As the industry navigates evolving environmental regulations, the new IACS Recommendation is a precious tool to help the maritime industry move forward. It embodies IACS' mission to help reduce emission levels across the shipping industry and improve vessel efficiency and performance. By understanding the practical implications and making use of the opportunities CII implementation presents, maritime stakeholders can be drivers of sustainable change for the industry.

Understanding CII and SEEMP

The CII regulation aims to gradually reduce ships' carbon emissions to lessen the maritime industry's environmental footprint. CII values are a key performance indicator of ship energy performance and are part of IMO's short-term measures to reduce carbon intensity. They are calculated as a ratio of the total mass of CO_2 emitted by a ship against the total transport work it undertakes in a calendar year.

The Ship Energy Efficiency Management Plan (SEEMP) was developed by IMO to establish a cost-effective mechanism to improve ship energy efficiency. SEEMP is comprised of three parts:

Part I provides a standard approach to monitoring ship and fleet efficiency performance and includes measures to improve energy efficiency and reduce carbon intensity. It applies to any ship of 400 gross tonnes (gt) and above.

Part II describes methodologies for data collection on fuel oil consumption, distance travelled and hours underway. It applies to specific ship types of 5,000 gt and above.

Part III provides an implementation plan to maintain required annual operational CII values for the next three years. It also describes the data required to calculate CII and methodologies to attain relevant data. It applies to all ships of 5,000 gt and above.

Attained CII values must be recorded in Part III of a vessel's SEEMP. IACS' guidelines help clarify how CII will impact the update and revision of a vessel's SEEMP

IACS provisions

A key part of the IACS Recommendation's guidelines is the SEEMP Part III verification and documentation. It aims to ensure compliance with regulation 26.3.1 of the International Convention for the Prevention of Pollution from Ships (MARPOL) Annex VI. The guidelines set out a framework for documentary evidence for verification, starting with initial verification including the methodology of calculations and the effectiveness of measures to achieve the required CII.

They also outline documentation required for periodical and additional verification when the SEEMP needs to be revised to incorporate corrective action plans. Checks for additional verification include ensuring the corrective action plan is necessary for the vessel, validating timelines for implementation and verifying the company is able to perform all corrective actions.

IACS' guidelines offer specific guidance on the CII value verification and rating process. They also include details on audits – their purpose, different types and how often they should be performed. This includes specific direction on the verification process in the event of a change of company or administration.

Provisions are made for different ships, including guidance tailored to certain specific vessel types. For instance, in the case of LNG carriers, this involves nitrogen content correction. Similarly, for tankers, it includes specific corrections, such as those required for ship-to-ship voyages.

CII regulation also allows for voyage adjustments. Fuel consumption and distance travelled for defined periods of voyages may be exempt from consideration in CII calculations. This is subject to certain conditions, outlined in regulation 3.1 of MARPOL Annex VI, including when the safe navigation of a ship is threatened or when the vessel is sailing in ice. IACS sets out specific cases that vessels may encounter and the procedures to follow.

Conscious of the challenges of decarbonisation and the requirements to meet IMO targets for 2030 to 2050, the new Recommendation underscores IACS' continued support for the maritime industry. As the needs of maritime stakeholders evolve, these guidelines can be updated when new issues are brought to the attention of IACS. ■

About the author

Eva Peño is currently serving as the Chair of the IACS Environmental Panel. She initiated her career with Bureau Veritas in 2001, commencing her professional journey after earning her degree from the Escuela Technica Superior de Ingenieros Navales at the Politécnica in Madrid. Over the years, Eva has taken on various technical and project management responsibilities in both Madrid and Paris, diversifying her expertise and skills within the industry.

Committed to continual improvement of ship quality standards

Shipbuilding and remedial quality standard published for machinery piping systems

By Amir Lotfolazadeh, IACS Machinery Panel Chair

In January 2024, IACS published Recommendation 177 – Shipbuilding and Remedial Quality Standard for Machinery Piping Systems. This provides comprehensive guidelines for the construction, materials and workshop fabrication of piping systems that serve ship propulsion, electricity generation and navigation safety. By improving the quality of these piping systems, this IACS Recommendation presents several short- and long-term benefits for the shipping industry.

The Recommendation outlines requirements for quality management systems, procedure documents, and materials used in piping systems. This includes the selection of metallic materials and the application of materials in corrosive and different media. Moreover, it emphasises the importance of achieving compliance with design standards and receiving the certificates that are required by a classification society.

The IACS Recommendation describes preferred methods for carrying out the inspection and testing of piping systems, including visual inspection, non-destructive testing (NDT), and hydrostatic testing. In case of defects found in the piping systems, it also includes remedial information such as the treatment of surface imperfections and repairs of leaks and cracks.

In terms of manufacturing and installation, it highlights the importance of using materials that are suited to the marine environment, as well as noting the specified application on board the ship where it will be used. Further, it provides guidance on the selection of applicable metallic materials to be used for different pipes, valves, and fittings. It also sets out requirements for work procedures approved by classification societies for welding, bonding, NDT and installation.

Additionally, the document offers recommendations on two key areas: the use of independent quality control systems with different classified levels of inspection and their application for inspection, personnel qualification and the calibration of instruments.

Each case of possible applications for piping systems is based on service media which includes standards for material, workshop fabrication and installation on board.

Benefits of use

Implementing this IACS Recommendation can unlock a host of short- and long-term benefits for the shipping industry, including:

Improved safety: with guidance on quality standards for piping systems serving ship propulsion, electricity generation, and navigation safety, IACS helps shipping stakeholders to ensure that these systems are constructed and tested to a high standard. This is aimed at reducing the likelihood of machinery failures arising from errors during construction, which in turn can contribute to improving ship safety.

Increased reliability: manufacturers following the IACS Recommendation's guidelines for materials selection, fabrication procedures, and inspection and testing, can construct piping systems with a high level of reliability. This helps them to achieve the reduction of risks including downtime and maintenance issues. Overall, this can contribute to improving the efficiency and profitability of shipping operations.

Regulatory compliance: this IACS Recommendation emphasises the importance of complying with design standards and achieving the relevant certificates required by a classification society. Doing so can help shipping industries and companies to ensure that their vessels meet the relevant regulatory requirements and thus avoid any potential penalties or legal issues.

Improved reputation: maintaining a company's reputation is key to sustaining business operations and relationships. By implementing the guidelines in this document, shipping companies can demonstrate their commitment to quality and safety. They can thus improve their reputation among customers, regulators, and other stakeholders,

which may help them increase business opportunities and improve relationships with their suppliers and partners.

Cost savings: shipowners may encounter initial upfront investments when implementing these guidelines from training, equipment, and procedures. However, they can also benefit from long-term cost savings. These recommendations can help them to reduce risks of accidents, failures, and downtime. This therefore saves money on repairs and maintenance and avoids revenue loss.

Environmental benefits: improving the safety and reliability of their piping systems enables shipping companies to reduce the risk of environmental damage from accidents or failures. Furthermore, by following IACS' guidelines on the materials and procedures suitable for the marine environment, they can reduce the possibility of pollution and other ecological impacts from their piping systems. Implementing these recommendations can therefore help shipowners to operate their vessels more sustainably and contribute towards their overall environmental goals.

Piping systems on board ships act as the vessel's circulatory system, performing vital functions for its operation. With these guidelines, IACS hopes to assist shipping industries and shipowners in maintaining safe, profitable, and compliant vessels – now and into the future. ■

About the author

Amir Lotfolazadeh is a distinguished senior mechanical engineer with over 32 years of experience in the marine and offshore industry, where he currently serves as chair of the Machinery Panel at IACS in Paris, France. His expertise encompasses a wide range of areas, including machinery classification/certification, statutory certification compliance, and marine classification rule development. Amir's leadership and technical acumen have been instrumental in ensuring compliance with international regulations and developing classification rules, while also driving innovation in new technologies, and retrofit programs for alternative fuels. His commitment to excellence and extensive contributions to the industry make him a highly respected figure in the marine and offshore field.

Safe use of hydrogen and ammonia as fuel

Setting safety requirements for ships using new zero carbon fuels

By Carlo Aiachini, IACS Safe Decarbonisation Panel Chair

The International Maritime Organization (IMO) Marine Environment Protection Committee (MEPC) at its 80th meeting (held in July 2023) adopted a revised strategy on the reduction of greenhouse gas (GHG) emissions from ships, revoking the 2018 initial IMO GHG Strategy.

The revised strategy includes the following levels of ambition:

- carbon intensity of ships is to decline through further improvement of the energy efficiency of new ships;
- carbon intensity of international shipping to is decline, with a goal to reduce CO_2 emissions per transport work, as an average across international shipping, by at least 40% by 2030, compared with 2008;
- increase uptake of zero or near-zero GHG emission technologies, fuels and/or energy sources, with those to represent at least 5%, striving for 10%, of the energy used by international shipping by 2030; and
- that GHG emissions from international shipping peak as soon as possible and reach net-zero GHG emissions by or close to 2050.

The 2023 IMO GHG Strategy also introduces the following indicative checkpoints to reach net-zero GHG emissions from international shipping:

Reduce the total annual GHG emissions from international shipping by at least 20%, striving for 30%, by 2030, compared with 2008; and

Reduce the total annual GHG emissions from international shipping by at least 70%, striving for 80%, by 2040, compared to 2008.

With only seven years left before the first deadline for reducing carbon intensity by 40% compared with 2008, technological innovation and the introduction of zero carbon fuels and alternative energy sources for international shipping will be key factors in achieving the ambitious overall target.

Codes and guidelines

The IMO Maritime Safety Committee (MSC), via its Sub-Committee on Carriage of Cargoes and Containers (CCC), has already developed the International Code of Safety for Ships using Gases and other Low-flashpoint Fuels (IGF Code), the Interim Guidelines for the Safety of Ships using Methyl/Ethyl Alcohol as Fuel, the Interim Guidelines for the Safety of Ships using Fuel Cell Power Installations, and Interim Guidelines for use of LPG Cargo as Fuel.

It is now also developing Interim Guidelines for the Safety of Ships using Hydrogen as Fuel, Interim Guidelines for the Safety of Ships using Ammonia as Fuel, and Interim Guidelines for Ships using Low-Flashpoint Oil Fuels.

In this context, IACS developed two gap analyses of the IGF Code in respect of the hazards related to the use of hydrogen and ammonia as fuels and used them to provide input to the IMO CCC Correspondence Group convened to progress the development of the above new guidelines.

The results of the two gap analyses were submitted to the 9th session of the IMO CCC Sub-Committee (CCC 9), in the format of two commenting papers (CCC 9/3/14, CCC 9/3/15) to the Correspondence Group report.

CCC 9 met on September 20-29, 2023, and established a Working Group on Development of Technical Provisions for Safety of Ships using Alternative Fuels, where the Interim Guidelines for the Safety of Ships using Hydrogen as Fuel and Interim Guidelines for the Safety of Ships using Ammonia as Fuel were further developed with IACS' contribution.

Interim Guidelines for the Safety of Ships using Hydrogen as Fuel

During the discussion in the Working Group, it was highlighted that while the IGF Code is a good starting point and many of its requirements would also be applicable to hydrogen, the use of hydrogen presents additional peculiar hazards that are to be addressed specifically. In particular, the capability of hydrogen to leak through the container by permeation, its wide flammability range and low ignition energy bring new risks of accumulation of leaked hydrogen and explosion caused by ignition sources not normally considered for other gases, like electrostatic discharge.

Consequently, the following considerations, inter alia, were made:

Use of hydrogen as fuel should be subjected to a holistic risk assessment.

Hydrogen storage tanks should be protected from external damage caused by collision or grounding, according to the requirements for LNG tanks in Chapter 5 of the IGF Code.

All hydrogen storage tanks should, by default, be arranged on the open deck. Designs with tanks placed under deck would require special consideration by the Administration with focus on particular risks.

The Fuel Preparation Room (FPR) should be located in an open deck area providing natural ventilation and unobstructed relief of leakages. If such equipment is to be arranged in an enclosure or in a space below deck, then the arrangement should be subject to the special consideration and satisfaction of the Administration.

Hydrogen stored respectively in a liquefied or compressed state brings very different risks. Therefore, the relevant detailed requirements are to be adapted and separated. For example, in the case of liquefied hydrogen – which has a temperature of -253°C at atmospheric pressure – special attention should be paid to the condensation of oxygen from air on cold surfaces (including those of drip trays) which poses a risk of fire in case of contact with any combustible material, whereas for compressed hydrogen, special attention should be paid to its capability to permeate the container causing embrittlement of the container material and a continuous leak to the outside.

Only gas-safe machinery spaces in accordance with the IGF Code should be accepted, and the ESD-protected machinery space concept should only be accepted in the context of an alternative design according to SOLAS Regulation II-1/55.

Interim Guidelines for the Safety of Ships using Ammonia as Fuel

The Working Group also addressed the development of the Interim Guidelines for the Safety of Ships using Ammonia as Fuel. It was highlighted that the use of ammonia constitutes a different risk profile compared with LNG and requires careful consideration of safety provisions addressing the properties of ammonia, including toxicity and corrosivity.

A series of informal meetings held in the margins of the Working Group with many of the WG attendees were very useful in understanding the properties of ammonia, the industrial practice for handling ammonia and the Group's view on the risk of human exposure to toxic gas.

Due to time constraints, the Working Group was unable to consider the draft guidelines in their entirety, but discussed and agreed on some key principles to take into account, including:

Only refrigerated ammonia and semi-refrigerated ammonia should be considered in the guidelines as a first stage, while the use of pressurised ammonia would be made possible through the alternative design process.

The design should be such that during normal operations there is no presence of ammonia in areas and spaces to which people have access.

Ammonia release may occur for safety reasons, but release mitigation measures should be considered.

Arrangement of safe refuge spaces (and PPE) should be considered in the event of large ammonia releases.

Only the gas-safe machinery space concept in accordance with the IGF Code should be accepted, and the ESD-protected machinery space concept should only be accepted in the context of an alternative design according to SOLAS Regulation II-1/55.

The development of the draft Interim Guidelines will be continued by a new Correspondence Group, in which IACS participates, and then by an Intersessional Working Group to be held in September 2024.

New UR

IACS has recently published a new Unified Requirement (UR H1) on the control of ammonia releases in ammonia fuelled vessels, which – while respecting the IMO agreed principle of no release under normal conditions – sets thresholds for concentration of ammonia in manned spaces in the event that ammonia is released (e.g. for safety reasons) and establishes the actions to be taken when they are exceeded.

The IACS Project Team which carried out the gap analysis of the IGF Code in respect of the hazards related to hydrogen is now developing requirements for materials and testing of piping systems intended for hydrogen service, as well as hydrogen Type C tanks and swappable tanks, i.e. tanks intended to be disembarked, filled ashore and embarked when refilled.

The IACS Project Team which carried out the gap analysis of the IGF Code in respect of the hazards related to ammonia is now developing requirements for ammonia treatment systems, i.e. systems intended to reduce the quantity or concentration of the ammonia being released.

Finally, IACS has activated a new Project Team to develop guidance and recommended good practice on simulating dispersion of gas releases (under normal and emergency scenarios) using mathematical models (e.g. Computational Fluid Dynamics (CFD), DNV PHAST, etc.) for ships using hydrogen or ammonia as fuel, enabling evaluation of the extension of areas where hazardous concentrations of toxic or flammable gases are expected to occur in specific scenarios and which require special precautions.

IACS will continue to collaborate with IMO and in parallel will consider the opportunity of developing its own Resolutions and Recommendations to address the safety aspects of these and other new technologies and fuels. ■

About the author

Carlo Aiachini is a mechanical engineer, having graduated in Genova in 1990. In 1991, he joined RINA as a plan approval engineer in the Machinery department and by 2007 he had achieved the role of head of the Machinery and Automation Plan Approval Team. In 2010, he accepted the role of manager of the Machinery and Automation Group in the Technical Function Unit. Since 2020, he has been the manager of the Marine Environmental & Safety Innovation unit of the RINA Marine Excellence Center. Carlo has participated in IACS activities since 1998, as a member of the IACS Working Party on Engines, the Ad Hoc Group on Exhaust Emission Control, the Joint Working Group on Energy Efficiency Design Index (EEDI), various project teams, the Machinery Panel – which he chaired from 2017-2019, ESSF and CSSF. He is the current chair of the Safe Decarbonisation Panel.

Beating heart of shipping in Europe

IACS strives to keep maritime safety on the bloc's regulatory agenda

By Astrid Silvia Grunert, IACS Representative to the EU

IACS has maintained an office in Brussels for more than a decade, located in the Résidence Palace building in the heart of the European District. Its permanent Expert Group on EU Matters was founded in 2011, meets two to three times per year and is composed of representatives of IACS' Member classification societies. The group is currently chaired by Patrick Le Dily of Bureau Veritas (Vice President L-C&R external affairs of Bureau Veritas Marine and Offshore). Complementing this, IACS has had a Permanent Representative in Brussels since 2011, who co-ordinates the work of the Association at the EU level.

IACS' interaction with EU institutions is manifold. As an example, over the past decade, IACS has obtained a seat in all relevant European Commission Expert Groups, including the European Sustainable Shipping Forum (ESSF), the Passenger Ship Safety Expert Group, the Marine Equipment Directive Expert Group and the Stakeholders Advisory Group on Maritime Security, to which our experts actively contribute on a routine basis.

As a member of these groups, IACS has contributed to important legislative packages, including the 'Fit for 55' Package, with a special focus on the role of the independent verifier under the EU Emissions Trading System (EU ETS) and the FuelEU Regulation, both of which are expected to accelerate and streamline the EU's pathway towards decarbonisation of the shipping sector. The sub-groups of the ESSF provide an excellent platform for shaping important environmental legislation and deriving secondary legislation in an inclusive and constructive manner at the EU level as well as working towards alignment with the IMO.

With regards to new fuels and propulsion technologies, in 2022 IACS created a dedicated panel on Safe Decarbonisation. The work of this panel regularly feeds into considerations of respective EU groups, aiming to ensure that the safety angle of the decarbonisation endeavour is fully reflected in upcoming measures targeting the sector.

Safety considerations

The release of the Maritime Safety Package in June 2023 is another key milestone in EU legislation on shipping. IACS has contributed to shaping this package from the start to ensure that safety of maritime transport is constantly being kept at the highest possible level, while adjusting to new technological developments. IACS' expertise – ranging from electronic certification and remote inspections to cyber safety of increasingly automated vessels – is offered to ensure that legislations are practicable and, overall, yield the desired results in terms of safety.

IACS is also pleased to maintain a regular and fruitful dialogue with the European institutions, including the European Commission and its co-legislators, the European Parliament and the Council.

Co-operation with industry partners in Brussels is also considered vital and efficient, as last shown during the European Shipping Summit in September 2023. In addition, industry alliances such as the RLCF Alliance (Renewable and Low-Carbon Fuels Value Chain Industrial Alliance) are actively supported.

In all the above-mentioned endeavours, IACS with its permanent representation in Brussels seeks to ensure the Association's input to the EU is aimed at aligning its regulatory deliberations with those of the IMO (either immediately or with a view to future convergence) to try to ensure a consistent and technically sound global regulatory regime wherever possible, for the benefit of the sector and those who oversee it.

The role of classification has a long history and is well understood by the IMO, as a specialised UN agency for the sea. In the EU, many aspects of the work of classification societies are dealt with by 'non-maritime' directorates. The co-decision procedure means that MEPs are crucial to the decision making and regulatory process. IACS' European engagement also seeks to explain

Scan this QR code to watch a video introduction to IACS

www.iacs.org.uk/about-us/introduction-to-iacs

About the author

Astrid Silvia Grunert has represented IACS at the EU since 2011. Prior to that, she held various positions in Brussels, including at CEOC (now the TIC Council), and the German Embassy. Astrid holds Masters degrees in International Relations and Romance Studies.
Prior to moving to Brussels and specialising in EU affairs, Astrid worked and studied in France, Austria and Germany.

how classification rules cover items such as the quality of ships' structures, machinery and electrical and control systems while, in parallel, they act as Recognized Organizations on behalf of flag State Administrations, including EU Member States, to verify that ships comply with international, regional and national requirements.

Ensuring that all parts of the EU's regulatory machine recognise that, together, classification rules and statutory regulations ensure safe shipping, and that classification societies play an essential role in ensuring those rules and regulations are enforced, forms an important part of IACS outreach to the EU.

Looking ahead, IACS wishes to reiterate its message to keep safety as an indispensable motivation and goal in all the legislative and political deliberations of the EU in reference to the shipping sector. IACS is pleased to continue to lend its support to our much appreciated counterparts, as well as to the new Commissioners and MEPs that will take office during 2024. ■

"IACS with its permanent representation in Brussels seeks to ensure the Association's input to the EU is aimed at aligning its regulatory deliberations with those of the IMO to try to ensure a consistent and technically sound global regulatory regime wherever possible"

Quality requirements stronger than ever

Procedures and processes recovered from pandemic disruptions

By Jonathan Spremulli, Quality Secretary

In IACS' 2022 Annual Review, I stated that as the pandemic subsided, we were returning to a 'new normal' and that there had been a number of significant changes and developments related to the IACS Quality System Certification Scheme (QSCS). I am pleased to report that in 2023, as I complete my first year as the IACS Quality Secretary, responsible for the effective implementation of QSCS, that the effects of the pandemic have now reduced to the point where we can consider that the QSCS is being fully complied with in accordance with the QSCS procedures. This includes most significantly the conducting of Vertical Contract Audits (VCAs), which can only be carried out on board ships or on site.

The Accredited Certification Bodies (ACBs) recognised by IACS to audit its member classification societies in accordance with QSCS and the incorporated Quality Management System Requirements (QMSR) have, during 2023, been able to conduct the full number of required audits. This includes the VCAs relating to surveys of ships in service, ships under construction and surveys of machinery and equipment. This is the first time since 2019 that this has been achieved.

I can also report that the onsite audits undertaken by the ACBs have taken place globally, including in China. The in-person observation of these audits by IACS Operation Centre (OC) staff has also taken place which means that the robustness of the audits has also been verified.

A significant development in 2023 is that IACS, as of November 1, 2023, welcomed new member TÜRK LOYDU (TL). This followed the completion of its successful membership application which required it, among other criteria, to have a Statement of Compliance issued by an IACS recognised ACB. Before the issuance of the Statement of Compliance, the IACS OC observed all QSCS audits conducted by the ACB and successfully benchmarked the robustness of the ACB's audits and audit plan.

Quality policy

IACS continues to strengthen its commitment to quality in line with its long-term strategic plan. In 2023, the Association established its new Sub-Committee on Quality Policy (SC QP) which met for the first time in May 2023 and subsequently in October. The Sub-Committee's membership is made up of Council level members from each of the member classification societies.

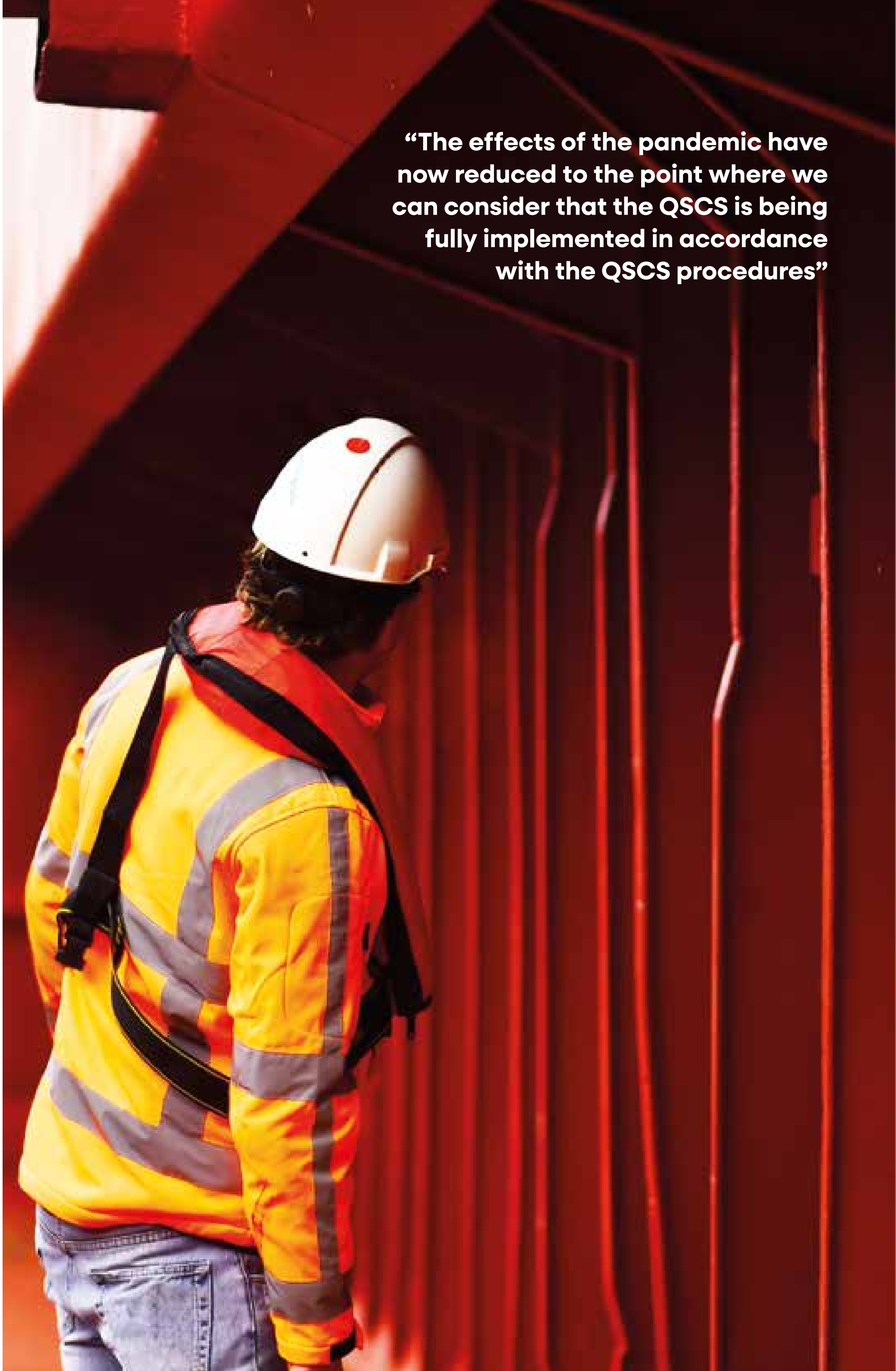
Each SC QP meeting includes additional days of high-level dedicated discussions on quality related matters only, with the resulting outputs forwarded to the subsequent IACS Council meetings for any necessary actions.

The creation of the SC QP has been welcomed by all and one of the benefits we have seen is the additional time it provides for the IACS Quality Advisory Committee's (AVC) Annual Report to be considered in full before being presented at the summer Council meeting and feedback being provided to the AVC.

Finally, I am pleased to report that the 15th IACS QSCS End User Workshop took place in Singapore as an in-person meeting at the beginning of November 2023. This was the first time since the global pandemic that this important workshop has been held in Asia and it brought together QSCS stakeholders including representatives of flag State Administrations, ACBs, classification societies and many others.

The Workshop facilitated excellent discussions relating to developments concerning QSCS, the International Quality Assessment Review Body (IQARB) and the Quality Assessment and Certification Entity (QACE). In addition, informative presentations were provided by the flag State Administrations of Singapore, Hong Kong, China, Liberia, and the Marshall Islands concerning their respective Recognized Organization (RO) oversight programmes and how each ROs performance is monitored and assessed by them.

The benefit of the in-person nature of the workshop was evident from the level of discussion both in session and in the margins, and from the positive feedback received. I look forward to the 2024 workshop. ■



"The effects of the pandemic have now reduced to the point where we can consider that the QSCS is being fully implemented in accordance with the QSCS procedures"

Credit: dcornelissen@chello.nl

About the author

Jonathan Spremulli is the current IACS Quality Secretary, having been appointed in April 2022. He is a Chartered Engineer and Member of the IMarEST and is qualified in marine engineering and naval architecture. Jonathan has over 42 years of experience in the marine industry. Prior to joining IACS he most recently held positions including marine director at the International Chamber of Shipping and general manager for the Liberian Registry's London office. Jonathan has worked for over 20 years in classification, including for Lloyd's Register and RINA SpA. Jonathan started his career as a sea-going engineer for Canadian Pacific.

Keeping quality front and centre

IACS sees an opportunity for even greater use of its Quality Standard

By Łukasz Korzeniewicz, IACS Quality Committee Chairman

To ensure a consistent quality level among classification societies, IACS took the decision in the early 1990s to develop the IACS Quality System Certification Scheme (QSCS). Since then, the IACS Quality Committee has kept QSCS under constant review to maintain its relevance to classification societies, Recognized Organizations (ROs) and the shipping industry in general.

An integral part of QSCS is Annex 2: the IACS Quality Management System Requirements (QMSR) which is the interpretation of the internationally recognised standard for quality management systems ISO 9001 and additional requirements supplementing the ISO 9001 standard, for example ISO/IEC 17020: 2012 Conformity assessment – Requirements for the operation of various types of bodies performing inspection, and the International Maritime Organization's Code for ROs (RO Code).

By design, the IACS QMSR is equally useable by IACS Members and non-IACS classification societies.

Since first publication, IACS Quality Committee has continuously developed, documented, maintained and revised the IACS QMSR based on the latest developments from the ISO and IMO and under the advice of IACS Quality Advisory Committee. That Committee presents the views of parties external to IACS. Its membership is interested in the quality management of classification and statutory services and the effectiveness of IACS QSCS.

While IACS QSCS has proved its applicability to classification societies and ROs, it has been subject to many changes over the years to ensure it remains current. One of the most essential changes was the IACS' decision to make QSCS generic to all classification societies and auditable by independent Accredited Certification Bodies (ACBs), which became fully effective from January 1, 2011. This change strengthened the objectivity, robustness and transparency of audits of classification societies carried out for compliance with the IACS QMSR and the Scheme itself.

High standards

To maintain and safeguard the robustness, consistency, effectiveness and integrity of the IACS QSCS and to promote and nurture a uniformly high-quality standard within IACS Members, audits carried out by ACBs are observed by the Quality Secretary and IACS QSCS Operations Centre.

ACBs conduct audits of IACS Members and applicants using recognised auditors that meet general quality management system auditing requirements and specific IACS QSCS knowledge and experience, relevant theoretical knowledge and practical experience in applying IACS QSCS, IACS Resolutions and the Rules and Regulations for classification and statutory service activities.

To demonstrably maintain the highest quality and performance, the ACBs are benchmarked and their auditors are assessed by the IACS Quality Secretary. Additionally, to continuously strengthen the auditors' competences, IACS organises an Auditors Seminar during which auditors, the IACS Quality Secretary and the IACS QSCS Operations Centre exchange experiences gained during the QSCS audit.

IACS also organises an annual End-User Workshop which serves as a meeting platform with the ACBs and maintains the continual improvement of IACS QSCS by:

- updating the ACBs regarding the forthcoming changes to the QSCS;
- providing feedback to the ACBs on common issues arising out of their audits;
- sharing experiences of ACBs in auditing as per the Scheme; and
- soliciting feedback from the ACBs regarding QSCS.

With transparency in mind, the End-User Workshop is open to participation from other stakeholders of IACS QSCS, such as the Quality Advisory Committee, flag State

Administrations, non-IACS classification societies, QACE, EMSA, the IMO and the International Quality Assessment Review Body (IQARB).

IQARB origins

IQARB came from a proposal to the IMO Maritime Safety Committee 100 in 2018 (MSC 100/19/8) noting that IQARB could assist Member States in fulfilling some of their obligations under the IMO Instruments Implementation Code (III Code) (resolution A.1070(28)) and the Code for Recognized Organizations (RO Code) (resolutions MEPC.237(65) and MSC.349(92)) with regard to the oversight programme exercised by flag State Administrations over the ROs authorised to carry out surveys and issue certificates on their behalf.

As a part of its vision to maintain classification as the primary mechanism for practical self-regulation of the maritime industry, IACS has been involved in the IQARB idea since the beginning, seeing the opportunity for even greater transparency and promotion of the IACS QSCS.

The IQARB at its second meeting at the IMO in February 2020 confirmed that the alignment of the IACS QMSR and the RO Code by the IACS Quality Committee has been efficient and effective.

A recent development in the IMO III Code Implementation Guidance, which is expected to be approved by MSC and MEPC in 2024, invites flag State Administrations to take into account the factual statements issued by IQARB with regards to the organisational elements of the RO Code. These are general in nature and related to effective implementation of a Quality Management System.

Aspiring to their key values of leadership, technical knowledge, quality performance and transparency, IACS and its Members believe that IQARB could be developed into a fully independent and international body that could play a key role in the near future in the further development of the IACS QMSR, as well as the quality assessment and certification of classification societies and ROs. ■

"Since first publication, IACS Quality Committee has continuously developed, documented, maintained and revised the IACS Quality Management System Requirements based on the latest developments from the ISO and IMO and under the advice of IACS Quality Advisory Committee"

About the author

Łukasz Korzeniewicz graduated from the Maritime University of Szczecin with a Masters degree in Mechanics and Mechanical Engineering in 2002, from the University of Gdańsk with a Master's degree in Law in 2011 and completed postgraduate studies in the field of occupational health and safety at the WSB University in Gdańsk in 2022. Before joining the Polish Register of Shipping (PRS), he worked in a shipyard in Szczecin and as a watch engineer officer on merchant ships. His career at PRS has covered most aspects of the classification society's activities, starting as a technical assistant, through to plan approval surveyor, field surveyor, auditor and external co-operation department specialist, to his current position as quality manager. Łukasz has been a member of several bodies of IACS during his 18-year career in classification, including the EU and Legal Expert Groups and the Quality Committee, of which he was elected Chairman in 2017. He has been involved in the development of QACE and IQARB since their beginnings. In 2021 he was elected President of QACE. Additionally, Łukasz is a lecturer for postgraduate studies at the Gdańsk University of Technology.

Accelerating technical advice to IMO

IACS deepens its technical co-operation with shipping's global regulator

By Konstantin Petrov, IACS Accredited Representative to IMO

In the IACS Annual Review, we have previously explored the enormity of work which IACS performs to assist IMO and its member flag State Administrations in clarifying the practical aspects of application of statutory regulations. That work has predominantly taken the form of submissions from IACS to IMO technical sub-committees, proposing Unified Interpretations (UIs). IMO has recognised the value of that input as a mechanism of fine-tuning its regulations, from the experience of their practical application, by agreeing a continuous agenda item on Unified Interpretations for all technical sub-committees. IACS continues to provide that service to the IMO and maritime industry.

At the same time, the value of IACS Members' technical expertise does not only reside in the field of analysing issues arising from the reality of practical implementation. That same source of technical expertise significantly contributes to the work of IMO at the development stage of regulations.

The advice at that stage of IMO's work is wide-ranging and requires a timely and creative approach from many experts from IACS. Not only is there the challenge of technical detail to be overcome, increasingly the work at IMO starts with conceptual exploration of ideas ('development'), where IACS Members' capabilities in research and development have direct application. Coupled with a steady stream of Unified Interpretations ('maintenance'), that 'development' injection, while solely aiming to assist with regulatory crafting, inadvertently and inevitably adds to the load on IMO's structure and working processes.

To illustrate the point, over the past two years, IACS has submitted 152 documents containing specific proposals, compared with 100 submissions in the 2017-2019 period. This visible year-on-year increase of workload both for IMO and IACS has led the Association to revisit its approach to both the consideration of UIs and contribution to the development phase of IMO regulations.

IACS' review of the statistics of the past three years' submissions under the standing agenda item on UIs of sub-committees and new output proposals at IMO's Maritime Safety Committee found the following:

IACS' proposals of UIs represented 80% of all submitted documents under the relevant agenda item; and

IACS' proposals for new outputs developed by IACS together with co-sponsors represented 18% of all proposals or one-fifth of the Committee's workload.

Importance of UIs

UIs aim to have a near immediate effect, whereas an output proposal to amend a regulation instead of interpreting takes up to five years to effect ships. That timeframe can be longer as outputs will not be automatically turned into agenda items of sub-committees. Also, the situation could be exacerbated in case of SOLAS and safety related codes (with a few exceptions) where a four-year amendment cycle is usually required. So, UIs undoubtedly serve their purpose.

> "For IACS, the journey on the path of improvements in ship safety and security and protection of the environment continues"

With the adoption of new instruments for the safety of decarbonisation and digitalisation, the need to have clarity on the regulations is likely to produce more UIs, depending on how prescriptive those instruments are.

The other aspect of IACS' relationship with the IMO concerns IACS' contribution to the 'development' phase of IMO's work. Having proposed new outputs, IACS helps IMO to start, progress and complete those items. That help represents a significant effort and resource commitment from experienced IACS Members. A major rewrite of two IMO instruments (SOLAS regulation II-2/9 and the Code of Alerts and Indicators) was accomplished in record time due to the dedication and focus of those technical experts, resulting in submissions

IACS continues to contribute to IMO debates, sessions and committees

to the 10th session of the Sub-Committee on Ship Systems and Equipment (SSE).

Among recently submitted IACS documents, there are a number of proposals which have assisted IMO in structuring its work on critical safety items. IACS' analysis of the need to launch a structured approach to the safety of decarbonisation was accepted as a new output at MSC 107; a correspondence group to start and progress the work was then immediately launched.

IACS Safe Decarbonisation Panel is actively engaged in that work, spanning themes from hydrogen and ammonia to carbon capture and storage and nuclear-powered ships. IACS technical review of the Formal Safety Assessment study of containership fires submitted to SSE 10 highlights areas requiring deeper technical discussion before a regulatory pen is put to paper.

World Maritime Day

In 2023, IMO celebrated World Maritime Day with the theme 'MARPOL at 50 – Our commitment goes on'. Over many years, IMO has addressed different forms of ship-source pollution of the sea as covered by MARPOL, including: pollution from oil; noxious liquid substances in bulk; harmful substances in packaged form; and sewage and garbage. Alongside these are measures to address air pollution emanating from ships and for improving the energy efficiency of shipping. It has been a long and successful journey, as evidenced by the statistics showing reduced environmental pollution. IACS is proud to be a co-contributor to that success as an advisor at the development stage of MARPOL Annexes, codes and guidance instruments, refining them with the experience of practical application.

In that respect, it is noteworthy to highlight a few significant contributions which IACS has made over the years, specifically in relation to MARPOL.

When MARPOL Annex VI and the NOx Technical Code (NTC) entered into force, IACS launched, without delay, a project to understand the practical aspects of its application. That programme produced more than 70 UIs which were later incorporated into NTC 2008. Since then, Annex VI of MARPOL has evolved to introduce ship efficiency measures both at design stage (EEDI) and in operation (CII) for new and existing ships (EEXI).

To understand the effects of the EEDI regulation with a view to its improvement, IMO asked IACS to collect and provide data on compliance with the regulation and the technology which had been used.

Over several years, IACS submitted accumulated data to the IMO Secretariat at no cost to IMO, which allowed the Secretariat to produce reports to IMO's Marine Environment Protection Committee informing the work of the Committee on the next phases of that regulation.

With attention expanding to the need to address efficiency of existing ships, resulting in EEXI regulation and operational efficiency of ships, and bringing about CII regulations, IACS set about understanding the practical nuances of implementing those regulations. Today, IACS has produced an elaborate set of recommendations allowing shipbuilding and the ship owning industry to determine a clear path to compliance.

These are just a few examples of IACS' immediate and recent support of the aims of IMO, as captured and delivered through the MARPOL Convention. At the same time, work continues on oil, chemical and sewage/garbage pollution prevention, where IACS has been, and continues to be, active in its contribution to achieving the objective of clear regulations applied universally and uniformly.

While acknowledging the achievement of positive results and recalling past efforts, one must not overlook the herculean efforts of IMO as it plays its role in preserving our planet for future generations. Over the years, MARPOL has extended its scope to address new challenges that have emerged from shipping and to respond to the changing expectations of global society – such as the reduction of GHG emissions. IACS congratulates IMO on the landmark achievement of MEPC 80 agreeing the revised strategy on the reduction of GHG emissions from shipping. It sets ambitious targets and a clear path which will guide the evolution of MARPOL to address those new challenges.

For IACS, the journey on the path of improvements in ship safety and security and protection of the environment continues. That journey becomes more exciting as IACS shifts gears to accelerate and deepen its technical work at IMO by bringing to the fore the best of its Members' highly skilled, knowledgeable and experienced engineers and experts to explore new technological worlds, to seek out new solutions and new safety concepts, and to collaboratively go where a single entity alone would not succeed. ■

About the author

Konstantin (Kosta) Petrov graduated from Saint Petersburg State Marine Technical University with a master's degree in Naval Architecture in 1996. Before joining IACS as its Accredited Representative to IMO in 2019, he worked for two classification societies. In both organisations he was responsible for international policy towards regulators and industry, later switching to leading business development with postings to Helsinki and Hamburg. Over a period of 27 years in classification, Kosta has chaired various international groups/committees in IACS, IMO, and industry, and promoted a classification and statutory regime as a way to deliver safe, secure and environmentally friendly shipping.

Ongoing dialogue with industry

IACS continues discussions to address existing and emerging technical challenges

By Robert Ashdown, IACS Secretary General

In its unwavering commitment to safer and cleaner shipping, IACS has continued to maintain and strengthen its relations across industries, sharing views and addressing key topics of the maritime industry both at the technical and policy levels. The ongoing dialogues between IACS and its industry partners has yielded significant progress across a number of work items, and in understanding the emerging technical and regulatory challenges.

During Tripartite 2022, and IACS/Industry Technical Meeting held in May 2023, it was highlighted that IACS should consider establishing a Joint Industry Working Group (JIWG) on Safe Decarbonisation work. IACS Safe Decarbonisation Panel has launched the initiative, extending invitations across the industry to actively participate in the JIWG. The main objective will be to discuss and develop a common understanding for safety aspects of decarbonising technologies and fuels, including the possible solutions to identified challenges and regulatory needs. Further to the risk assessment for carbon capture and storage conducted by a project team under IACS SDP panel, IACS actively took part in the IMO Correspondence Group on the development of Technical Provisions for Safety of Ships using Alternative Fuels, via the Managers of the Project Teams (PTs) for Hydrogen and Ammonia.

"The annual Tripartite meeting continued its traditional discussions on safety, decarbonisation and the environment."

Following the significant increase in the number of containers lost at sea during recent times, IACS together with France, Germany and ICS submitted a proposal to MSC 107 to amend MSC.1/Circ.1353/Rev.2 to include harmonised performance standards and guidelines for lashing software to permit lashing software as a supplement to container stowage and securing plans. The use of a lashing software would improve the accuracy of loading containers on board ships, and allows for more flexible loading patterns, reducing the risk of containers falling overboard. Additionally, the Joint Industry Working Group/Anchoring has recommenced its activities, with IACS also actively participating in this initiative. The primary objective is to investigate accidents involving ship anchoring systems, with a view to collect and analyse data, review regulations, and propose design and operational improvements to enhance safety and establish new standards.

In 2023, the ongoing technical collaboration between IACS and IUMI resulted in significant progress across a number of areas, including low-pressure fuel pipes and container vessel fires. A joint submission to IMO is being finalised to propose new measures aimed at amending SOLAS regulation II-2/4. This specifically addresses the arrangements for oil fuel, lubrication oil, and other flammable oils to reduce the possibility of engine room fires from leakages in low-pressure fuel pipes and lubrication oil pipes.

With regards to containership fires, IACS and IUMI have been having joint discussions concerning the considerations of Risk Control Options (RCOs) proposed in the CARGOSAFE Project and beyond. The outcome of these exchanges provided the basis for a joint submission to SSE 10 on 'Technical evaluation of the CARGOSAFE FSA study'. Meanwhile, the IACS Safety Panel is, with the support of a dedicated PT, working with and contributing to IMO discussion and development of SOLAS amendments regarding cargo fires on containerships and evaluating the need for additional IACS instruments.

With a view to enhancing the cyber resilience on ships, in 2022 IACS had published UR E26 'Cyber Resilience of Ships', and UR E27, 'Cyber Resilience of On-Board Systems and Equipment'. However, since the publication of these URs, the experience of cyber security oversight within the maritime industry has evolved, thereby the need for a standardised approach to survey requirements has been

The IACS team at the IMO

identified, coupled with insights gained from industry comment. Industry feedback identified a number of improvements which resulted in extensive changes and the URs have been revised and published to reflect new survey requirements and industry feedback with a view to accommodating smaller and non-conventional vessels.

The annual Tripartite meeting – comprised of shipbuilders, class and shipowners – was held in November 2023 and continued its traditional discussions on safety, decarbonisation and the environment. Several other issues which were raised include underwater noise, carbon capture, IACS plans for industry consultation on Rec.34 and its consequential impacts, calibration requirements for conventional steering gear on ships and data collection.

On this latter point, and in response to the evolving landscape of maritime operations, the need for onboard data collection systems for monitoring the energy efficiency of ships was identified. In light of the discussions at Tripartite, monitoring of data tied to operation efficiency data will play a crucial role in facilitating the green transition.

At Tripartite 2023, IACS further communicated its plan for industry consultation on Rec 34 and presented the ongoing works on CSR revisions. The basis for new wave loads and corrosion addition is more transparent, and it provides a more comprehensive and technically sound background compared to the previous CSR which was based on experience gained in service and benchmark data. In addition, IACS is also preparing/initiating a more proactive engagement with the industry to inform stakeholders in advance about potential CSR developments. IACS remains dedicated to its commitment to transparency and aims to foster an open and in-depth dialogue with the industry.

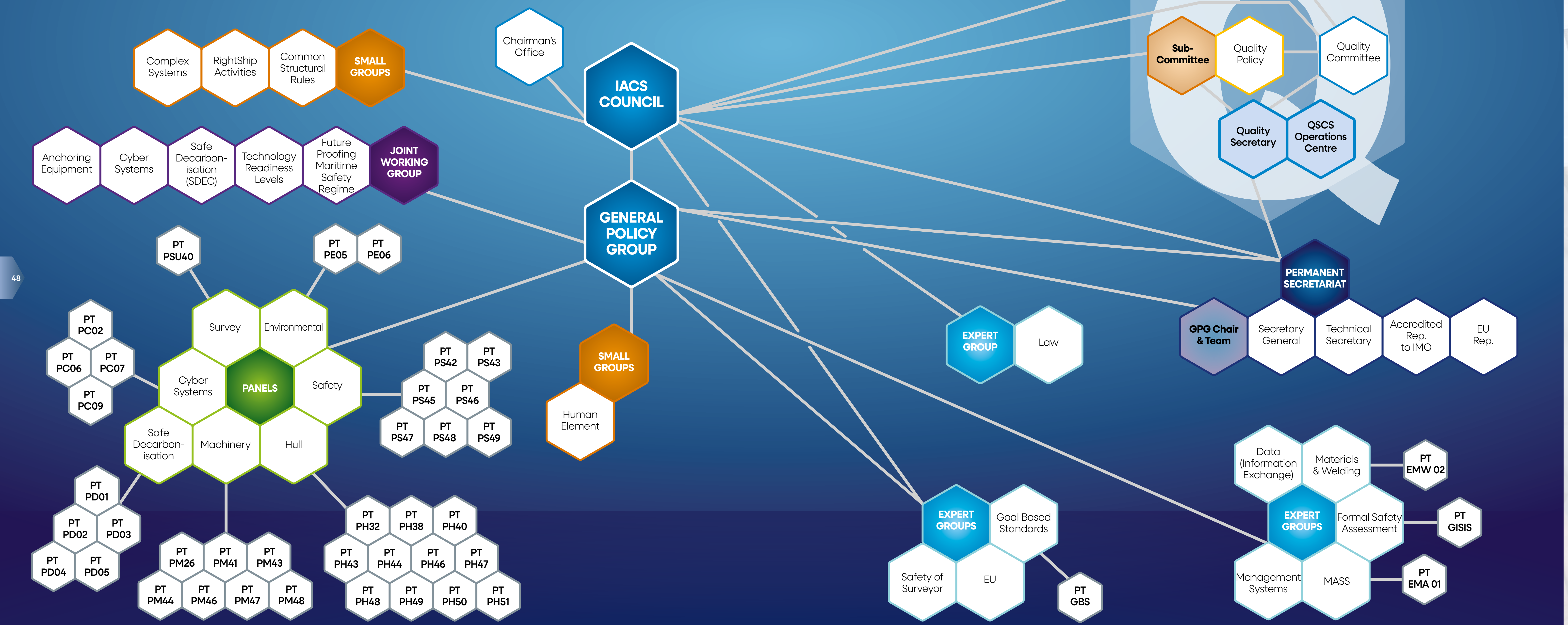
As part of IACS' 88th Council session, held in London at the end of the year, IACS also extended the invitation to the industry to participate in discussion on these changes. There were productive discussions on a wide range of topics, regarding the evolution of CSR, developments on IQARB, safe decarbonisation and the associated implications for seafarers and port operations.

By confronting challenges and nurturing cross-industry collaborations, IACS consistently contributes support and insights to regulatory challenges and the diverse work streams in which it is involved. ■

Credit: dcornelissen@chello.nl

Organisation 2023

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 Computer-based systems (UR E22)
PT PC06 Ship data quality
PT PC07 Compliance with UR E26 and E27
PT PC09 Cyber security controls

Environmental Panel – 2 Project teams
PT PE05 Implementation of IMO SEEMP/CII
PT PE06 Implementation of the BWM Conv.

Hull Panel - 11 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 New corrosion additions and CA
PT PH51 Securing of Containers at deck

Machinery Panel – 7 Project teams
PT PM26 IGF development
PT PM41 Shaft alignment investigations
PT PM43 Revision of UR M78
PT PM44 I.C. Engine approval and inspection
PT PM46 Machinery Piping Systems
PT PM47 Earthing guidelines for ships and MODU
PT PM48 Anchor windlass, bow anchor winch

Safe Decarbonisation Panel – 5 Project teams
PT PD01 Ammonia as fuel
PT PD02 Hydrogen as fuel
PT PD03 Carbon capture & storage technologies
PT PD04 Use of novel batteries
PT PD05 Gas dispersion analysis

Safety Panel - 7 Project teams
PT PS42 UR F44 to include chemical tankers
PT PS43 Underwater Noise
PT PS45 Develop text for SOLAS II-2/9
PT PS46 Amendments to the IGC Code
PT PS47 Doors in watertight bulkheads
PT PS48 2009 Code on Alerts and Indicators
PT PS49 Intact stability with WAPS (Wind Assisted Propulsion Systems)

Survey Panel – 1 Project team
PT PSU40 Model Course 3.04 on Survey of Electrical Installations

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

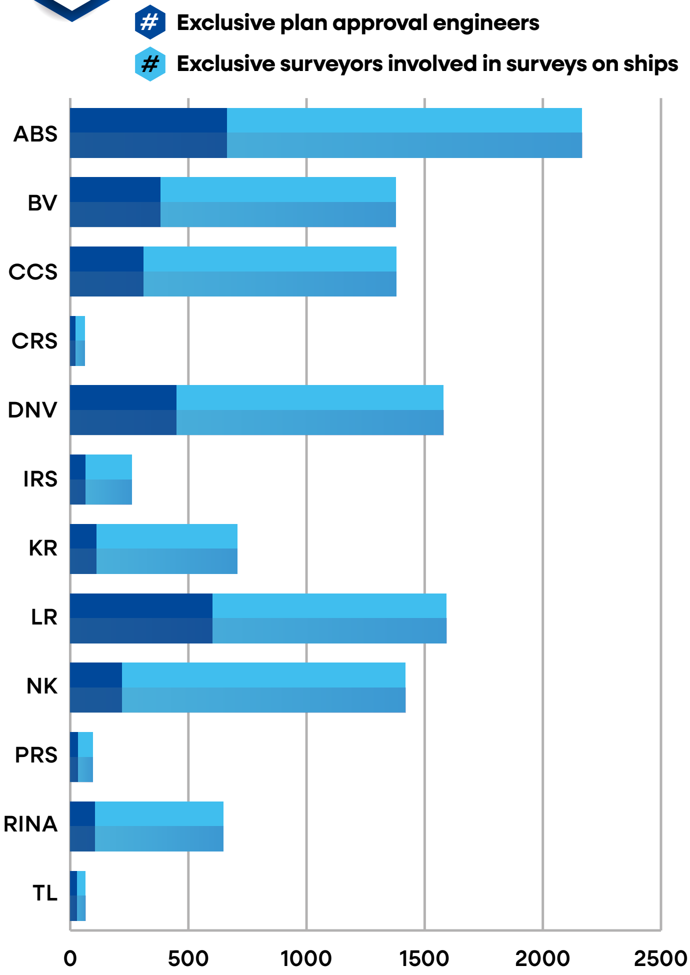
EG-M&W – 1 Project team
PT EMW02 Guidelines for Additive Manufacturing

EG-MASS – 1 Project team
PT EMA01 Autonomous systems

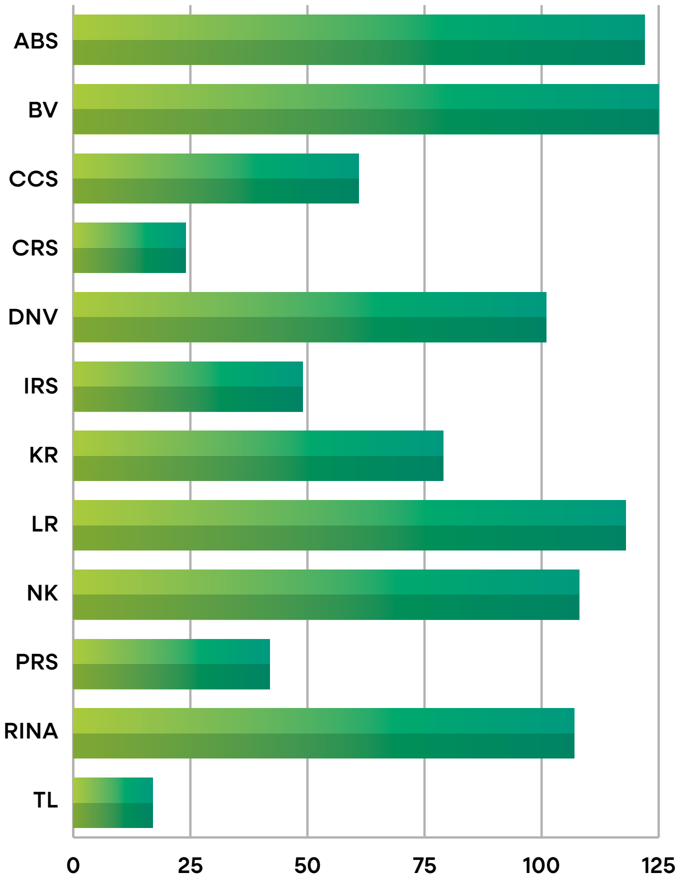
IACS Class Report Data 2023

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]



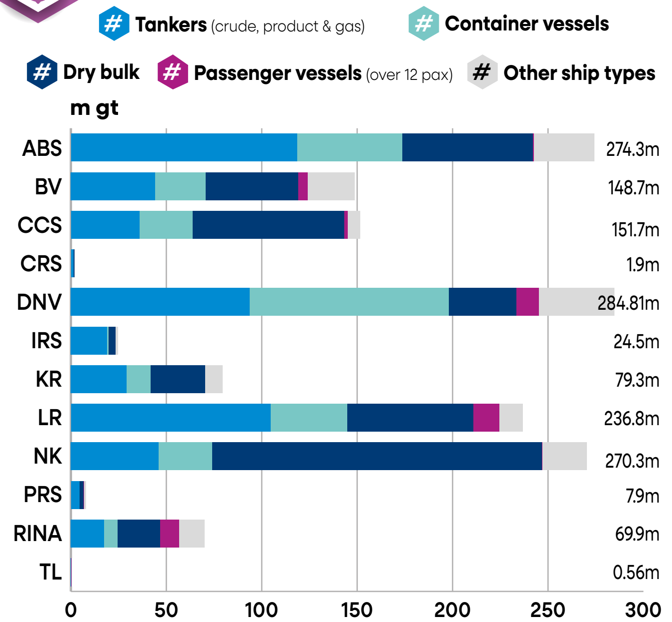
Notes

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).

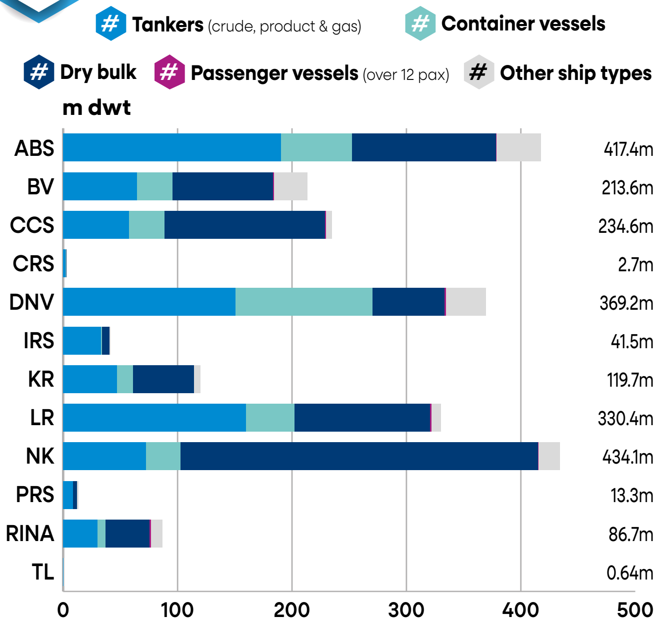
2 Number of recognising flag State authorities means number of RO agreements with flag States, with general or standing authorisation to act on their behalf for any statutory certificate.

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%.

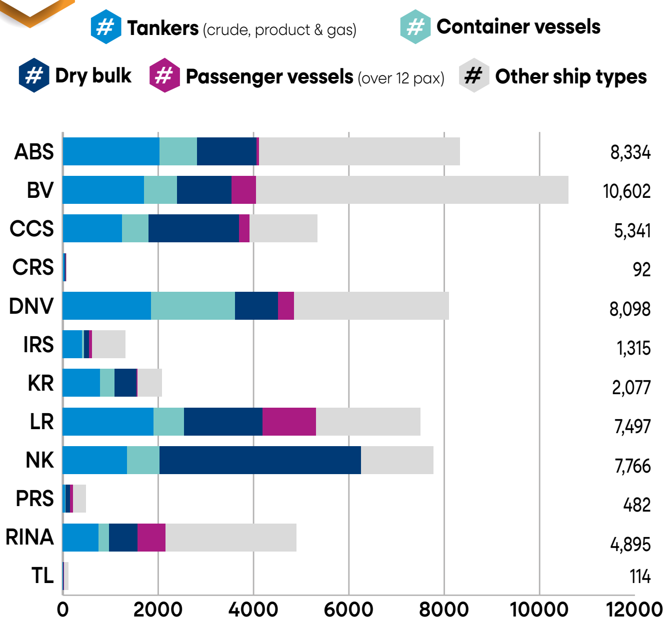
Total gross tonnage by type[3]



Total deadweight by type[3]

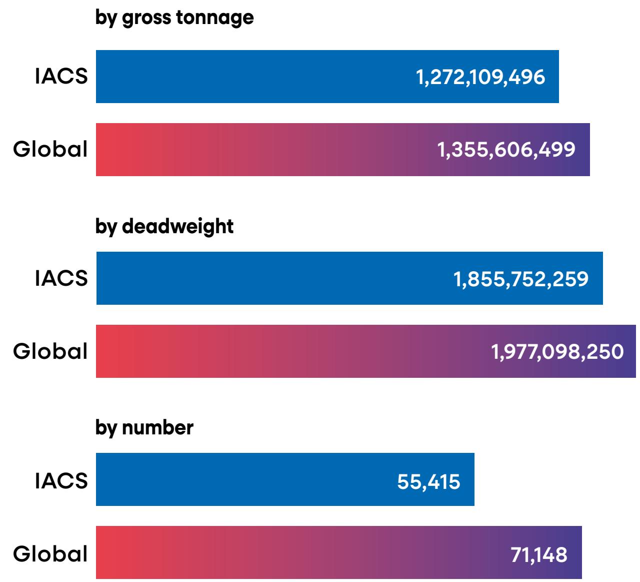


Total number of vessels by type[3]



IACS fleet compared to global fleet

*Source: Lloyd's List Intelligence



IACS empowers innovation through robust technical resolutions

IACS continues to provide a comprehensive scope of technical guidance

In the dynamic landscape of maritime innovation, IACS remains at the forefront by continually crafting and refining various IACS Resolutions and Recommendations. The ongoing evolution of both in response to emerging technical, regulatory, or operational challenges underscores IACS' profound technical leadership and adaptive responsiveness.

The following provides a glimpse into the multifaceted endeavours undertaken by IACS throughout 2023, showcasing the organisation's dynamic involvement in shaping the maritime sphere. A list of all IACS Resolutions amended or developed in 2023 can be found in the Appendix which starts on page 58.

Buckling strength assessment of ship structural elements

The maritime industry faces challenges with the structural integrity of ships due to the harsh and corrosive environments in which they operate, leading to potential deterioration and buckling of the hull over time. Buckling is a recognised mode of failure for ship structural elements, and IACS has historically addressed this through various resolutions, such as S11, S11A, S21, S21A, and the Common Structural Rules for Bulk Carriers and Oil Tankers (CSR for BC & OT). In 2018, recognising the variability in buckling rules across different IACS Unified Requirements (URs), IACS decided to develop a dedicated UR for buckling strength assessment. This initiative resulted in the publication of UR S35, 'Buckling Strength Assessment of Ship Structural Elements', set to come into force on July 1, 2024.

The new UR S35 (New Feb 2023) introduces a harmonised methodology for buckling strength assessment, utilising the net thickness approach. The methodology is developed by applying the toolbox in the CSR for BC & OT, known for their technical soundness and continuous improvement through industry expertise and experience. Significant improvements have been made in addressing global elastic buckling modes for stiffened panels under combined loads, torsional buckling modes for stiffeners, buckling strength of U-type stiffeners, plates with openings, and plate panels fitted with sniped stiffeners. The development process involved thorough verification and consequence assessments through extensive linear and nonlinear finite element analyses, ensuring increased accuracy and effectiveness.

UR S35 serves as a standalone buckling toolbox applicable to all ship types, consolidating general buckling requirements in one UR. Additionally, the development of UR S35 facilitates the merger of UR S21 and UR S21A, which currently address different ship types, into a single UR S21 Rev.6. Both UR S35 and UR S21 Rev.6 are scheduled to enter into force on July 1, 2024, aligning their implementation dates. This comprehensive approach aims to enhance the industry's ability to assess and address buckling strength in ship structural elements uniformly.

Measurement of underwater radiated noise

It is globally acknowledged that maritime activities are tightly linked to the sustainability of sensitive areas including natural habitats and endangered marine species. The underwater noise created by marine traffic and its impact on aquatic fauna has increased in proportion to an increase in traffic. The shipping industry is

"IACS believes that establishing a common means for assessing underwater noise induced by shipping is a key step forward."

Credit: dcornelissen@chello.nl

generally aware of this situation and many stakeholders have already taken actions.

IACS believes that establishing a common means for assessing underwater noise induced by shipping is a key step forward. A common quantification of ship underwater acoustics and understanding the various contributing factors can provide an effective means to drive industry efforts to reduce underwater radiated noise.

Aiming at harmonising the methods of measurement of underwater radiated noise (URN) from ships and providing a consistent analysis/post processing means and reporting standard, Rec.176 (New Sep 2023) has been developed to address safety concerns and experience of working in situ with large ships in open waters. It is intended to harmonise and present a single method for the measurement of URN and detail a consistent analysis/post processing means and reporting standard.

Shipbuilding quality of machinery piping systems

Acknowledging that the previous Rec.47 only covers hull structure and that the shipbuilding industry is in need of quality standards for machinery piping systems, IACS has introduced Rec.177 (New Dec 2023) to establish consistent quality standards for machinery piping systems during a ship's new construction phase. These systems, crucial for conveying fluids and operating control systems across the vessel, require stringent design to minimise the risk of failure.

Rec.177, meanwhile, focuses on improving quality standards in fabrication, installation, commissioning, and function tests, and includes remedial standards for instances where prescribed quality levels are not met. The Recommendation extends its applicability beyond new constructions to cover repairs, modifications, and retrofits of piping systems on ships in service, ensuring a comprehensive approach to maintaining and enhancing quality standards throughout the vessel's life.

Key aspects of Rec.177 include precise terminology related to machinery piping, general requirements encompassing qualification of welders and operators, Non-Destructive Testing (NDT) procedures, and Quality Management Systems requirements for shipyards. The Recommendation also outlines detailed quality standards for materials, workshop fabrication processes such as cutting, bending, and edge preparation, as well as NDT and acceptance criteria. Emphasising a through-life approach, Rec.177 addresses installation on board, covering pipe support, spacing, gap, and flushing.

Furthermore, Rec.177 is particularly focused on machinery piping systems critical for ship propulsion, electricity generation, and navigational safety, complementing IACS Rec.47, which provides guidance on quality standards for the hull structure. This comprehensive approach aims to establish and uphold high-quality standards, mitigating the potential risks associated with machinery piping system failures.

Cyber resilience

Recognising the need for a standardised approach in the relatively new field of cyber resilience in the maritime sector, UR E26 (Rev.1 Nov 2023) and UR E27 (Rev.1 Sep 2023) have undergone a meticulous revision to incorporate survey requirements, with industry feedback duly addressed.

To address challenges in implementing the new cyber requirements in smaller vessels within IACS' scope, the applicability of these URs was bifurcated, mandating compliance for one category and non-mandatory compliance for another, effective from July 1, 2024.

In a strategic decision, the original versions of UR E26 and UR E27 published in 2022, requiring mandatory application to all ships contracted for construction from January 1, 2024, were withdrawn. This strategic approach aims to eliminate confusion within the industry caused by having two versions of the same URs, with different implementation dates and scopes of applicability. ■

Outstanding Resolutions and Recommendations

Procedural Requirements

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

PR 37
Procedural requirement for confined space safe entry

PR 10
Procedure for the selection, training, qualification and authorisation of marine management systems auditors

Unified Requirements

UR S35
Buckling strength assessment of ship structural elements

UR M82
Type testing procedure of explosion relief devices for combustion air inlet and exhaust gas manifolds of I.C. engines using gas as fuel

UR M83
Testing of the control system of controllable pitch propellers intended for main propulsion

Unified Interpretations

UI SC299
Watertight testing after fire testing of penetrations in watertight divisions in passenger ships

UI SC300
Containment of fire: details of fire insulation of duct penetrations

UI GF19
Fuel supply to consumers – single common flanges

Recommendations

Rec 174
Recommended procedure for the finite element analysis to assess yielding, buckling and fatigue strength of IGC Code type C tanks

Rec 176
Measurement of Underwater Radiated Noise

Rec 177
Shipbuilding and remedial quality standard for machinery piping systems

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Summaries of IACS Resolutions published in 2023

Summary of New/Revisions to IACS Unified Requirements published in 2023

New | Revised | Corrigenda | Deleted/Withdrawn

Status	Index	Resolution no.	Revision	Adoption	Title	Implemention Date
Corrigenda	1	CSR	2023	-	Common Structural Rules - Consolidated 01 Jan 2023	1-Jul-23
Revised	2	UR M63	Rev.1	Jan 2023	Alarms and safeguards for emergency reciprocating I.C. engines	1-Jan-24
Deleted/Withdrawn	3	UR M31	Del	Jan 2023	Continuity of electrical power supply for vessels with periodically unattended machinery spaces	-
Revised	4	UR S21	Rev.6	Jan 2023	Requirements concerning strength of Ships	1-Jul-24
Deleted/Withdrawn	5	UR S21A	Del	Jan 2023	Requirements concerning strength of Ships	1-Jul-24
Revised	6	UR Z17	Rev.18	Feb 2023	Procedural Requirements for Service Suppliers	1-Jul-23
New	7	UR S35	New	Feb 2023	Buckling Strength Assessment of Ship Structural Elements	1-Jul-24
Revised	8	UR I3	Rev.2	Jan 2023	Machinery Requirements for Polar Class Ships	1-Jul-24
Revised	9	UR S10	Rev.7	Feb 2023	Rudders, Sole Pieces and Rudder Horns	1-Jul-24
Revised	10	UR M77	Rev.4	Feb 2023	Storage and use of SCR reductants	1-Jan-24
Revised	11	UR W31	Rev.3	Mar 2023	YP47 Steels and Brittle Crack Arrest Steels	1-Jul-24
New	12	UR M82	New	Mar 2023	Type Testing Procedure of Explosion Relief Devices for Combustion Air Inlet and Exhaust Gas Manifolds of I.C. Engines Using Gas as Fuel	1-Jul-24
Revised	13	UR Z10.1	Rev.25	Feb 2023	Hull Surveys of Oil Tankers	1-Jul-24
Revised	14	UR Z10.2	Rev.37	Feb 2023	Hull Surveys of Bulk Carriers	1-Jul-24
Revised	15	UR Z10.4	Rev.18	Feb 2023	Hull Surveys of Double Hull Oil Tankers	1-Jul-24
Revised	16	UR Z10.5	Rev.20	Feb 2023	Hull Surveys of Double Skin Bulk Carriers	1-Jul-24
Corrigenda	17	UR M56	Rev.4 Corr.2	Mar 2023	Marine gears – load capacity of involute parallel axis spur and helical gears	-

Index	Resolution no.	Revision	Adoption	Title	Implemention Date
18	UR M72	Rev.3	Apr 2023	Certification of Engine Components	1-Jul-24
19	UR G2	Rev.3	May 2023	Liquefied gas cargo tanks and process pressure vessels	1-Jul-24
20	UR S26	Rev.5	May 2023	Strength and Securing of Small Hatches on the Exposed Fore Deck	1-Jul-24
21	UR Z17	Rev.18 Corr.1	May 2023	Procedural Requirements for Service Suppliers	-
22	UR Z23	Rev.7 Corr.2	May 2023	Hull Survey for New Construction	-
23	UR Z11	Rev. 6	May 2023	Mandatory Ship Type and Enhanced Survey Programme (ESP) Notations	1-Jul-24
24	UR M53	Rev. 5	May 2023	Calculations for I.C. Engine Crankshafts	1-Jul-24
25	UR M73	Rev. 2	May 2023	Turbochargers	1-Jul-24
26	UR E22	Rev.3	Jun 2023	Computer-based systems	1-Jul-24
27	UR A1	Rev.8	Jun 2023	Anchoring Equipment	1-Jul-24
28	UR S10	Rev.7 Corr.1	Jun 2023	Rudders, Sole Pieces and Rudder Horns	-
29	UR S3	Rev.2	Jun 2023	Strength of End Bulkheads of Superstructures and Deckhouses	1-Jul-24
30	UR M81	Rev.1	Jul 2023	Safety measures against chemical treatment fluids used for exhaust gas cleaning systems and the residues which have hazardous properties	1-Jul-24
31	UR Z10.3	Rev.21	Aug 2023	Hull Surveys of Chemical Tankers	1-Jul-24
32	UR M61	Rev.2	Aug 2023	Starting Arrangements of Internal Combustion Engines	1-Jan-25
33	UR E10	Rev.9	Aug 2023	Test Specification for Type Approval	1-Jul-24
34	UR M24	Rev.2	Aug 2023	Requirements concerning use of crude oil or slops as fuel for tanker boilers	1-Jan-25
35	UR M46	Rev.3	Aug 2023	Ambient conditions – Inclinations and Ship Accelerations and Motions	1-Jan-25
36	UR E26	Withdrawal	Sep 2023	Cyber resilience of ships	-
37	UR E27	Rev.1	Sep 2023	Cyber resilience of onboard systems and equipment	1-Jul-24

Index	Resolution no.	Revision	Adoption	Title	Implemention Date
38	UR W27	Rev.3	Sep 2023	Cast Steel Propellers	1-Jan-25
39	UR F15	Rev.7	Sep 2023	Reinforced thickness of ballast and cargo oil piping	1-Jan-25
40	UR W24	Rev.5	Sep 2023	Cast Copper Alloy Propellers	1-Jan-25
41	UR G1	Rev.3 Corr.3	Sep 2023	Vessels with cargo containment system for liquefied gas	-
42	UR P2.1	Rev.3	Oct 2023	Rules for piping design, construction and testing - Application	1-Jan-25
43	UR P2.2	Rev.5	Oct 2023	Classes of pipes	1-Jan-25
44	UR P2.7.3	Rev.3	Oct 2023	Types of connections	1-Jan-25
45	UR P2.7.4	Rev.11	Oct 2023	Mechanical joints	1-Jan-25
46	UR P2.9	Rev.3	Oct 2023	Pressure tests of piping after assembly on board	1-Jan-25
47	UR P2.11	Rev.6	Oct 2023	Type approval of mechanical joints	1-Jan-25
48	UR G3	Rev.8	Oct 2023	Liquefied gas cargo and process piping	1-Jan-25
49	UR W35	Rev.1	Oct 2023	Requirements for NDT Service Suppliers	1-Jan-25
50	UR M83	New	Oct 2023	Testing of the Control System of Controllable Pitch Propellers intended for Main Propulsion	1-Jan-25
51	UR E26	Rev.1	Nov 2023	Cyber resilience of ships	1-Jul-24
52	UR L2	Rev.3	Nov 2023	Intact stability – matter of class	1-Jan-25
53	UR F42	Del	Nov 2023	Fire testing of flexible pipes	-
54	CSR	2023 RCN1	Dec 2023	IACS CSR for Bulk Carriers and Oil Tankers	1-Jul-24

1. CSR 2023

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 2023 was issued in March 2023 and came into force on 1 July 2023.

2. UR M63 (Rev.1 Jan 2023)

UR M63 provides test specification for alarms and safeguards for emergency internal combustion (I.C.) engines. In Rev.1 of this UR, the scope of required alarms and safeguards for fuel oil leakage in UR M63 has been clarified compared with UR M35 and M36.

3. UR M31 (Del Jan 2023)

UR M31 which contains no additional requirements to SOLAS except for the '45 seconds' requirement was deleted.

4. UR S21 (Rev.6 Jan 2023)

UR S21 provides test specification for evaluation of scantlings of hatch covers and hatch coamings and closing arrangements of cargo holds of ships. In Rev.6 of this UR, the buckling requirements are improved based on latest CSR buckling requirements. Then UR S21 and S21A are harmonised and combined as a single UR S21 Rev.6. and UR S21A is deleted since 1 July 2024.

5. UR S21A (Del Jan 2023)

The requirements in UR S21A are harmonised with S21, which are then included in UR S21 Rev.6. UR S21A is deleted on the implementation of UR S21 Rev.6.

6. UR Z17 (Rev.18 Feb 2023)

UR Z17 provides procedural requirements for approval and certification of service suppliers and is applicable to both initial and renewal audits. Rev.18 is revised to delete the requirement for an ISO/IEC accreditation for service suppliers for BWMS Commissioning Testing.

7. UR S35 (New Feb 2023)

UR S35 provides common buckling requirements, following the CSR buckling methodology, for all relevant IACS UR-S resolutions such as UR S21 (Rev.6, Jan 2023 Complete Revision). In UR S35-Buckling, it consists of five sections and one appendix, giving Application and Definitions, Slenderness Requirements, Buckling Requirements for Hull Girder Prescriptive Analysis, Buckling Requirements for Direct Strength Analysis of Hatch Covers, Buckling Capacity, and the Stress-based Reference Stress calculation method, respectively.

8. UR I3 (Rev.2 Jan 2023)

UR I3 is the machinery requirement for polar class ships regarding main propulsion, steering gear, emergency and auxiliary systems essential for the safety of the ship and the crew. In Rev.2 of this Resolution, comprehensive amendments, including introduction of requirements for icebreaker vessels, have been made.

9. UR S10 (Rev.7 Feb 2023)

UR S10 provides technical requirements on structure of the rudders, sole pieces and rudder horns. In Rev.7, the technical content of UR S10 has been improved and clarified based on feedback received from Industry and Members' practical experience. Additionally, this revision provides some clarifications through the introduction and/or modification of figures.

10. UR M77 (Rev.4 Feb 2023)

UR M77 provides technical requirements on the arrangements for the storage and use of SCR reductants. In Rev.4 of this Resolution, it clarified the application of UR M77 in a viewpoint of quantity and object.

11. UR W31 (Rev.3 Mar 2023)

UR W31 defines the requirements on YP47 steels and brittle crack arrest steels as required by UR S33. Rev.3 is dealing with the approval scheme of small-scale test methods for brittle crack arrest steels. Requirements for testing and approval procedures have been revised and developed.

12. UR M82 (New Mar 2023)

UR M82 provides test requirements for pressure relief systems on air inlet and exhaust gas manifolds of internal combustion engines using gas as fuel. The objective of this UR is to specify type testing procedure for explosion relief devices (ERDs) for combustion air inlet manifold and exhaust gas manifold of internal combustion engines using gas as fuel.

13-16. Revision to UR Z10.1, Z10.2, Z10.4 and Z10.5

UR Z10.1, Z10.2, Z10.4 and Z10.5 provide requirements for hull surveys of Oil Tankers, Bulk Carriers, Double Hull Oil Tankers and Double Skin Bulk Carriers. These revisions are to harmonise the revised requirements in line with the amendments made to ESP Code in Res.MSC.525(106).

17. UR M56 (Rev.4 Corr.2 Mar 2023)

UR M56 provides requirements for the capacity of involute parallel axis spur and helical gears. These requirements apply to enclosed gears, both intended for main propulsion and for essential auxiliary services. In Rev.4 Corr.2 of this Resolution, reference to an industry standard has been corrected.

18. UR M72 (Rev.3 Apr 2023)

UR M72 provides requirements for the certification of engine components. This revision of the UR provides clarifications regarding the NDE requirements of Engine Components. Non-destructive examination means e.g., ultrasonic testing, crack detection by MPI or DP. When certain NDE method on the finished component is impractical (for example UT for items 12/13), the NDE method can be performed at earlier appropriate stages in the production of the component, see M72.1.2.

19. UR G2 (Rev.3 May 2023)

UR G2 provides the general principles applied by Classification Societies for the approval and survey of liquefied gas cargo tanks and process pressure vessels, specifically independent cargo tanks type C (pressure cargo tanks) as defined in the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code). Rev.3 of UR G2 provides updates regarding the new IGC Code (MSC 370(93)) Corr.1 and Revised UR W1.

20. UR S26 (Rev.5 May 2023)

UR S26 is the requirement of the strength of, and securing devices for, small hatches fitted on the exposed fore deck. In Revision 5, a sentence has been incorporated to clarify that small hatches classified as non-weathertight, as per UI LL64, are exempt from the requirements of UR S26.

21. UR Z17 (Rev.18 Corr.1 May 2023)

UR Z17 provides procedural requirements for approval and certification of service suppliers and is applicable to both initial and renewal audits. In Corr.1 to Rev.18 of this UR, reference to Resolution MSC.388(94) which amended IMO Resolution A.761(18) in November 2014 was added in Section 5 of Annex 1 to this UR.

22. UR Z23 (Rev.7 Corr.2 May 2023)

UR Z23 gives the procedural requirements of hull survey for new construction. The scope of this UR includes examination of the ship covered by classification rules and by applicable statutory regulations for hull construction as well as appraisal of the manufacturing, construction, control and qualification procedures, including welding consumable, weld procedures, weld connections and assemblies. This revision is to update the reference in appendix 2 due to adoption of Resolution MSC.454(100) which revoked Resolution MSC.296(87).

23. UR Z11 (Rev.6 May 2023)

UR Z11 provides requirement for the Mandatory Ship Type and Enhanced Survey Programme (ESP) Notations for various ship types. In Rev.6 of this UR, an update was made to maintain the consistency with the outcome of previous work related to the definition of oil tankers which was reflected in UR Z10.1(Rev.25) and UR Z10.4(Rev.18).

24. UR M53 (Rev.5 May 2023)

UR M53 provides rules for the design of crankshafts are to be applied to I.C. engines for propulsion and auxiliary purposes, where the engines are capable of continuous operation at their rated power when running at rated speed. The Revision 5 of this UR provides amendments to the formula for the calculation of the acceptability factor (Q) for crankpin fillet & journal fillet in Appendix IV, paragraph 4.3.

25. UR M73 (Rev.2 May 2023)

UR M73 is applicable to turbochargers with regard to design approval, type testing and certification and matching to engines. In Rev.2 of this UR, clarifications have been provided as regards the expression ‘totally new design’, the type testing load cycles and the containment test.

26. UR E22 (Rev.3 June 2023)

UR E22 provides requirements for Computer-based Systems. This revision is intended to improve and clarify the requirements for computer-based system during design, construction, commissioning and maintenance, including better clarification of the system integrator. Objective of this revision is to ensure that UR E22 provides a minimum set of requirements to suppliers and system integrators of software-based automation that ensures that both individual systems and the total integrated functionality is of high quality and safe for use.

27. UR A1 (Rev.8 June 2023)

UR A1 provides requirements on anchoring equipment. In this revision, there are clarifications and updates to anchoring equipment requirements, including specifying the purpose of anchoring equipment, addressing the application of UR A1, introducing an alternative method for calculating anchoring equipment, outlining requirements specific to anchoring equipment for tugs, and allowing the use of wire rope as a substitute for chain cable.

28. UR S10 (Rev.7 Corr.1 June 2023)

UR S10 provides technical requirements on structure of the rudders, sole pieces and rudder horns. The Corrigendum for Revision 7 of UR S10 has been prepared to correct the editorial error with respect to the rudder stock diameter’s formula in S10.4.2.

29. UR S3 (Rev.2 June 2023)

UR S3 provides technical requirements on strength of end bulkheads of superstructures and deckhouses. The Revision 2 of UR S3 has been developed to consider the minimum thickness of plating for ships with L1<65m stipulated in S3.4.

30. UR M81 (Rev.1 July 2023)

UR M81 provides minimum technical requirements for exhaust gas cleaning systems using chemical treatment fluids and residues which have hazardous properties. In the revision, requirements for the EGCS discharge lines has been added.

31. UR Z10.3 (Rev.21 Aug 2023)

UR Z10.3 provides requirements for hull surveys of Chemical Tankers. In revision 21 of this UR, the reference of Owner's Inspection Report has been added in Section 6.3.1 (Supporting Documents) to update this UR and to improve the consistency with the other UR Z10s.

32. UR M61 (Rev.2 Aug 2023)

UR M61 provides starting arrangements of internal combustion engines. In Rev.2 of this Resolution, the acceptable percentage of air compressor capacity used for main engine starting has been clarified.

33. UR E10 (Rev.9 Aug 2023)

UR E10 provides technical requirements for test specification for Type Approval of electrical, electronic and programmable equipment intended for control, monitoring, alarm and protection systems for use in ships. In Rev.9 of this Resolution, the way to proceed in case the specified industry standard is not the last revision issued has been indicated.

34. UR M24 (Rev.2 Aug 2023)

UR M24 provides requirements for tankers where crude oil or slops are used as fuel for boilers. This revision clarifies that the UR will not be applicable when low flash point crude oil is used, and the design is subject to SOLAS regulation II-1/55.

35. UR M46 (Rev.3 Aug 2023)

UR M46 provides ambient conditions applied to the layout, selection and arrangement of shipboard machinery, equipment and appliances for inclinations and ship accelerations and motions to ensure proper operation. This revision address clarity issues based on in-service experience and external feedback and the means for demonstrating compliance by machinery manufacturers and shipbuilders.

36. UR E26 (Withdrawn Sep 2023)

Recognising the need for a standardised approach to survey requirements, a meticulous revision (Rev1) addressed industry feedback and will take effect on 01 July 2024. To address challenges in implementing cyber requirements in smaller vessels, the applicability was categorised into mandatory and non-mandatory compliance. To eliminate confusion, the original version of UR E26 was withdrawn, ensuring a unified approach and avoiding discrepancies in implementation dates and scope of applicability.

37. UR E27 (Rev.1 Sep 2023)

UR E27 aims to ensure system integrity is secured and hardened by third-party equipment suppliers. In this revision, UR E27 aims to ensure system integrity is secured and hardened by third-party equipment suppliers. This UR provides requirements for cyber resilience of onboard systems and equipment and provides additional requirements relating to the interface between users and computer-based systems on board, as well as product design and development requirements for new devices before their implementation onboard ships.

38. UR W27 (Rev.3 Sep 2023)

UR W27 provides requirements for the manufacture, inspection and repair procedures of cast steel propellers, blades and bosses. The revised version removes the permissibility of a modified Zone A for defect repair in Paragraph 11.5. Additionally, minor edits and clarifications were made, and definitions of linear and non-linear indications were updated to align with ISO 23277:2015.

39. UR F15 (Rev.7 Sep 2023)

UR F15 provides requirements for reinforced thickness of ballast and cargo oil piping, In Rev.7, the words 'not glands' are deleted and two definitions of 'expansion bends' and 'heavy flanges joints' are added so as to eliminate possible misunderstanding or confusion.

40. UR W24 (Rev.5 Sep 2023)

UR W24 provides requirements for the manufacture, inspection and repair procedures of cast copper alloy propellers, blades and bosses. The revision involves deleting the permissibility of a modified Zone A for defect repair in Paragraph 11.3. Minor edits and clarifications were made, and definitions of linear and non-linear indications were updated to align with ISO 23277:2015.

41. UR G1 (Rev.3 Corr.3 Sep 2023)

UR G1 provides requirements for approval and survey of the relevant items of vessels with cargo containment system for liquefied gas for classification purposes. Rev.3 Corr.3 of UR G1 is made in order to modify editorial errors on formulas in Table 1 and appendix 1.

42. UR P2.1 (Rev.3 Oct 2023)

UR P2.1 provides application of rules for piping design, construction and testing. In Rev.3 of this UR, the applicability of UR P2 has been clarified, in relation to IMO instruments such as IBC Code, IGC Code and IGF Code.

43. UR P2.2 (Rev.5 Oct 2023)

UR P2.2 provides details on classes of pipes of piping systems installed on board ships. In Rev.5 of this UR, Table 1 has been revised.

44. UR P2.7.3 (Rev.3 Oct 2023)

UR P2.7.3 provides requirements on slip-on threaded joints of piping systems installed on board ships. In Rev.3 of this UR, the use of threaded joints for small bore instrumentation equipment into piping systems conveying flammable media has been investigated and clarified.

45. UR P2.7.4 (Rev.11 Oct 2023)

UR P2.7.4 provides requirements on mechanical joints of piping systems installed on board ships. In Rev.11 of this UR, the requirements for mechanical joints were reviewed with respect to definition, applicability and size limitation.

46. UR P2.9 (Rev.3 Oct 2023)

UR P2.9 provides requirements for pressure tests of piping after assembly on board. This revision provides alternative pressure test as pneumatic leak testing for water sensitive system.

47. UR P2.11 (Rev.6 Oct 2023)

UR P2.11 provides requirements for Type Approval of Mechanical Joints on board. In Rev.6 of this UR, the requirements for mechanical joints were reviewed to align with revision work conducted for UR P2.7.4.

48. UR G3 (Rev.8 Oct 2023)

UR G3 provides requirements for approval and survey of the relevant items of liquefied gas tankers for classification purposes. Revision 8 provides revised requirements for cargo pumps and gas/reliquefication/refrigeration compressors as regards design assessment, material testing, prototype testing, unit production and installation testing.

49. UR W35 (Rev.1 Oct 2023)

UR W35 provides requirements for NDT service suppliers. This latest revision (revision 1) addresses issues raised by the NDT industry regarding implementation of this UR W35, particularly regarding level 3 supervisor.

50. UR M83 (New Oct 2023)

UR M83 provides requirements for the testing of the control system of controllable pitch propellers intended for main propulsion.

51. UR E26 (Rev.1 Nov 2023)

UR E26 aims to ensure the secure integration of both operational technology and information technology equipment into the vessel's network during the design, construction, commissioning, and operational life of the ship. This UR targets the ship as a collective entity for cyber resilience and covers five key aspects: equipment identification, protection, attack detection, response, and recovery. This revision includes requirements for the suppliers to demonstrate compliance with the requirements in this UR.

52. UR L2 (Rev.3 Nov 2023)

UR L2 requires that class will only be assigned to ships with a length of 24 m and above after demonstrating adequate intact stability. This revision considers the amendments to Resolution MSC.267(85), Intact Stability Code, since revision 2.

53. UR F42 (Del Nov 2023)

UR F42 has been deleted as all requirements are considered by UR P2 section 12 Flexible Hoses.

54. CSR 2023 RCN1 (Dec 2023)

Rule Change Notice 1 (RCN1) to CSR 2023 version was published as outcomes of regular CSR maintenance.

Summary of New/Revisions to IACS Procedural Requirements published in 2023

New | Revised | Corrigenda | Deleted/Withdrawn

Index	Resolution no.	Revision	Adoption	Title	Implemention Date
1	PR 38	Rev.4	Feb 2023	Procedure for calculation and verification of the Energy Efficiency Design Index (EEDI)	1-Apr-23
2	PR 1C Add	Withdrawn	Oct 2023	Procedure for Suspension and Reinstatement or Withdrawal of Class in Case of Surveys, Conditions of Class or Recommendations Going Overdue	1-Jul-23
3	PR 37	Rev.3	Aug 2023	Procedural Requirement for Confined Space Safe Entry	1-Jan-24
4	PR 1A	Rev.9	Aug 2023	Procedure for Transfer of Class	1-Jul-24
5	PR 10	Rev.5	Sep 2023	Procedure for the Selection, Training, Qualification and Authorisation of Marine Management Systems Auditors	1-Jan-24
6	PR 10B	Rev.1	Sep 2023	Procedure for the Selection, Training, Qualification and Authorisation of Maritime Labour Inspectors responsible for verifying compliance with the Maritime Labour Convention, 2006 (MLC, 2006).	1-Jan-24

1. PR 38 (Rev.4 Feb 2023)

PR 38 was introduced to provide uniform implementation of verification procedure of EEDI as defined in MARPOL by IACS members acting as verifiers. This revision is updated to reflect the amendment to MARPOL Annex VI (Resolutions MEPC 328(76)) and associated IMO guidelines, as well as the clarification on the determination of SFC and CF concerning paragraph 2.2.1 of MEPC.308(73).

2. Addendums to PR 1C

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. From 1 October 2023, Addendums to PR 1C was withdrawn.

3. PR 37 (Rev.3 Aug 2023)

PR37 contains the minimum requirements that Societies shall prescribe to help keep surveyors safe when conducting confined space entry. This Procedural Requirement has been updated for establishing a more uniform approach to technical safety matters related to confined space entry by considering the latest technological changes.

4. PR 1A (Rev.9 Aug 2023)

PR 1A contains procedures and requirements pertaining to transfer of class from one Society (i.e. losing Society) to another Society (i.e. gaining Society). This revision is to ensure that clause B2.1.1 iii) for chemical tankers can be applied also to oil/product carriers, which have the same structure as chemical carriers.

5. PR 10 (Rev.5 Sep 2023)

PR 10 describes the IACS requirements for the selection, training, qualification and authorisation of marine management systems auditors responsible for verifying compliance with the ISM and ISPS Codes. This revision has been developed in order to define Virtual Classroom Training performed in synchronous mode as equivalent to classroom based training required for training of ISM/ISPS Auditors as per Paragraph 4.2.

6. PR 10B (Rev.1 Sep 2023)

PR 10B describes the IACS requirements for the selection, training, qualification and authorisation of maritime labour inspectors responsible for verifying compliance with the Maritime Labour Convention, 2006 (MLC, 2006). This revision has been developed in order to define Virtual Classroom Training performed in synchronous mode as equivalent to classroom-based training required for training of MLC Inspectors as per Paragraph 4.3.

Summary of New/Revisions to IACS Unified Interpretations published in 2023

New | Revised | Corrigenda | Deleted/Withdrawn

Status	Index	Resolution no.	Revision	Adoption	Title	Implemention Date
Corrigenda	1	UI SC127	Rev.2 Corr.1	Jan 2023	Paints, varnishes and other finishes	-
Corrigenda	2	UI SC120	Rev.2 Corr.1	Jan 2023	Access to forecastle spaces on tankers	-
Revised	3	UI LL16	Rev.2	Jan 2023	Sheer	-
Revised	4	UI SC121	Rev.2	Jan 2023	Fire Pump Isolation Requirements	1-Jul-23
Revised	5	UI SC245	Rev.1	Jan 2023	Suction and discharge piping of emergency fire pumps, which are run through the machinery space	1-Jul-23
Corrigenda	6	UI SC138	New Corr.1	Feb 2023	Safe Access to Tanker Bows	-
Revised	7	UI SC30	Rev.3	Mar 2023	Fire-extinguishing arrangements in machinery spaces	-
Corrigenda	8	UI SC121	Rev.2 Corr.1	Apr 2023	Fire Pump Isolation Requirements	-
Corrigenda	9	UI SC70	Rev.4 Corr.1	Apr 2023	Cargo tank vent systems and selection of electrical equipment	-
Revised	10	UI MPC125	Rev.1	May 2023	Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines (NOx Technical Code 2008, Chapter 4, Paragraph 4.4.6.1)	1-Jan-24
Revised	11	UI GF13	Rev. 1	May 2023	Fire protection of spaces containing equipment for the fuel preparation	1-Jan-24
New	12	UI SC299	New	Jul 2023	Watertight testing after fire testing of penetrations in watertight divisions in passenger ships	1-Jul-24
Revised	13	UI SC123	Rev.5	Jul 2023	Machinery Installations - Service Tank Arrangements	1-Jul-24
Revised	14	UI GC13	Rev.3	Aug 2023	Verifications before and after the first loaded voyage	1-Jan-24
New	15	UI SC300	New	Aug 2023	Containment of fire: details of fire insulation of duct penetrations	1-Jul-24
New	16	UI GC39	New	Sep 2023	Interpretation of 2014 IGC Code (MSC.370(93), as amended) Paragraphs 11.3.1, 11.4.1, 11.4.3 and 18.10.3.2 w.r.t additional bunkering manifold equipment fitted on L.N.G. Bunkering Ships	1-Jul-24
Corrigenda	17	UI SC120	Rev.2 Corr.2	Oct 2023	Access to forecastle spaces on tankers	-

Index	Resolution no.	Revision	Adoption	Title	Implemention Date
18	UI SC265	Del	Nov 2023	Revised guidelines for cargo securing manual and code of safe practice for cargo stowage and securing - scope of application	-
19	UI SC212	Rev.1	Nov 2023	Shipboard fittings and supporting hull structures associated with towing and mooring on conventional vessels	1-Jan-24
20	UI SC298	Corr.1	Nov 2023	Interpretations of various Performance Standards related to GMDSS radio installations	-
21	UI MPC12	Corr.2	Dec 2023	Annex VI of MARPOL 73/78	-
22	UI MPC29	Rev.2	Dec 2023	Annex VI of MARPOL 73/78	1-Jul-24
23	UI SC264	Corr.1	Dec 2023	Non-combustible material as 'steel or equivalent' for ventilation ducts (SOLAS II-2/Reg. 9.7.1.1)	-
24	UI GF19	New	Dec 2023	Fuel Supply to Consumers – single common flanges	1-Jul-24

1. UI SC127 (Rev.2 Corr.1 Jan 2023)

UI SC127 regarding paints, varnishes and other finishes provides a unified interpretation of SOLAS Chapter II-2, Regulation 6.2.1. This revision is updated to include the text of SOLAS II-2/6.2 as amended by resolution MSC.57(67).

2. UI SC120 (Rev.2 Corr.1 Jan 2023)

UI SC120 provides acceptance criteria equivalent to those foreseen in SOLAS regulation II-2/4.5.2.2 and paragraph 3.2.3 of IBC Code on the basis of which the location of access door to forward spaces in position facing the cargo area may be accepted. In this corrigenda, reference to the IGC Code has been clarified to include the relevant resolution as the interpretation has already been included in the revised IGC Code i.e. 2016 IGC Code.

3. UI LL16 (Rev.2 Jan 2023)

UI LL16 provides interpretation of Regulation 38 of the International Convention on Load Lines, 1966 and of the 1988 Protocol as adopted by the International Conference on the Harmonized System of Survey and Certification. This revision is updated to indicate that UI is applicable only for ships built in accordance with 1966 ICLL or the original 1988 Protocol. It is not applicable to the 1988 Protocol as amended by resolution MSC.143(77).

4. UI SC121 (Rev.2 Jan 2023)

UI SC121 provides interpretation for fire pump isolation requirements when fire main is routed through a category A machinery space. This revision is updated to clarify the text and highlight conditions where small lengths of piping may be permitted without an isolation valve provided it meets the requirements of SOLAS II-2/10.2.1.4.1

5. UI SC245 (Rev.1 Jan 2023)

UI SC245 regarding suction and discharge piping of emergency fire pumps, which are run through the machinery space, provides a unified interpretation of SOLAS II-2 Regulation 10.2.1.4.1. Minor changes were made in Rev.1 to the text to improve the technical understanding of the text.

6. UI SC138 (New Corr.1 Feb 2023)

UI SC138 contains a unified interpretation of SOLAS Chapter II-1, Regulation 3-3.2. This revision is editorially amended to delete the outdated revision number for the referenced UI LL50.

7. UI SC30 (Rev.3 Mar 2023)

UI SC30 provides a unified interpretation of SOLAS Chapter II-2, Regulation 10.5.1 and 10.5.2. This revision is updated to include the text of SOLAS Regulation II-2/10.5.1.2.2 as adopted by MSC.409(97), which entered into force on 1 January 2020.

8. UI SC121 (Rev.2 Corr.1 Apr 2023)

UI SC121 provides interpretation for fire pump isolation requirements when fire main is routed through a category A machinery space. This corrigenda has replaced the wording ‘constructed’ with ‘contracted for construction’ in the application statement.

9. UI SC70 (Rev.4 Corr.1 Apr 2023)

UI SC70 regarding cargo tank vent systems and selection of electrical equipment provides interpretation of SOLAS II-2/11.6.2.2 and SOLAS II-2/4.5.4.3.1. In Corr.1 of this Resolution, editorial errors included when the clean version of Rev.4 of this UI was produced have been corrected.

10. UI MPC125 (Rev.1 May 2023)

UI MPC125 provides a unified interpretation on Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines (NOx Technical Code 2008, Chapter 4, Paragraph 4.4.6.1). Rev.1 clarifies the engine family concept issues (when number and arrangement of cylinders are different, but SCR parameters proven that NOx emission is either constant or lower than related parent engine).

11. UI GF13 (Rev.1 May 2023)

UI GF13 provides a unified interpretation on ships constructed on or after 1 January 2024 as defined in paragraph 2.2.42 of the IGF Code and Chapter 11.3.1. Rev.1 clarifies means of fire protection system based on Resolution MSC.475(102) for Fuel preparation rooms.

12. UI SC299 (New July 2023)

UI SC299 provides clarity on the provisions of SOLAS II-1 Regulation 13 when considering the requirements for testing of penetrations in watertight divisions after fire.

13. UI SC123 (Rev.5 July 2023)

UI SC123 provides interpretation of SOLAS Regulation II-1/26.11. In this revision, a footnote has been introduced to include examples of equivalent arrangements (1.2 & 2.2) for sake of clarity.

14. UI GC13 (Rev.3 Aug 2023)

UI GC13 provides interpretation of paragraphs 4.20.3.5, 4.20.3.6, 4.20.3.7, 5.13.2.5 and 13.3.5 of the International Code for the Construction and Equipment of Ships Carrying Liquid Gases in Bulk (IGC Code), as amended by Res. MSC.370(93), in relation to how to carry out the verifications and examinations required during the first full loading and discharging of the cargo. Rev.3 is to update this resolution in line with 2014 IGC Code (Resolution MSC 370(93)), include its applicability to all gas carriers (not only LNG Carriers), and clarify the scope of the verifications to be carried out by surveyors.

15. UI SC300 (New Aug 2023)

UI SC300 regarding the details of fire insulation of duct penetrations provides a unified interpretation of requirements in SOLAS regulations II-2/9.7.3.1.2 and II-2/9.7.3.2, with a view to facilitating their consistent and global implementation.

16. UI GC39 (New Sep 2023)

UI GC39 has been developed with a view to providing clarity on the provisions of 2014 IGC Code paragraphs 11.3.1, 11.4.1, 11.4.3 and 18.10.3.2, when considering LNG Bunkering ships fitted with cargo transfer equipment in addition to traditional cargo manifolds.

17. UI SC120 (Rev.2 Corr.2 Oct 2023)

UI SC120 provides acceptance criteria equivalent to those foreseen in SOLAS regulation II-2/4.5.2.2, paragraph 3.2.3 of the IBC Code, and paragraph 3.2.4 of the 1983 IGC Code, on the basis of which the location of access door to forward spaces in position facing the cargo area may be accepted. In this corrigendum, the note 2 was modified to correctly capture the understanding that IACS UI SC 120 (Rev.2) applies to oil tankers and chemical tankers, and to gas carriers constructed on or after 1 July 1986 but before 1 July 2016.

18. UI SC265 (Del Nov 2023)

UI SC265 is deleted as all recommendations are considered by MSC.1/Circ.1352/Rev.1.

19. UI SC212 (Rev.1 Nov 2023)

UI SC212 Rev.1 was developed in order to clarify new requirements of SOLAS regulation II-1/3-8, adopted by MSC Resolution MSC.474(102) and to also include modifications based on the outcome of review of MSC.1/Circ.1362/Rev.2.

20. UI SC298 (Corr.1 Nov 2023)

UI SC298 intends to clarify the phrase 'installed on or after 1 January 2024' used in various IMO performance standards, related to GMDSS radio installation, adopted at MSC 105 to supplement the amendments to SOLAS IV, as adopted by resolution MSC.469(105). This revision is to algin with the IMO's extension for the continued installation equipment compliant with the previous performance standards until 1 January 2028.

21. UI MPC12 (Corr.2 Dec 2023)

UI MPC12 provides a unified interpretation regarding the term 'all ships' in Annex VI of MARPOL 73/78. This revision is to update the UI to take account of IMO resolution MEPC.328(76).

22. UI MPC29 (Rev.2 Dec 2023)

UI MPC29 provides interpretation of the application of MARPOL Annex VI regulation 18(3). The revision was based on the periodical review of the UI taking account of IMO Circular MEPC.1/Circ.795/Rev.8.

23. UI SC264 (Corr.1 Dec 2023)

UI SC264 provides an interpretation of the term 'non-combustible material' for ventilation ducts (SOLAS II-2/Reg.9.7.1.1. This corrigenda considers the amendments to SOLAS text (MSC.365(93)) that entered into force 1 January 2016; the interpretation remains unchanged.

24. UI GF19 (New Dec 2023)

UI GF19 is based on IMO MSC.1/Circ.1670 with respect to Fuel Supply to consumers – single common flanges, IGF Code Part A-1 Section 9.2.2 with clearly indicating application date in force.

Summary of New/Revisions to IACS Recommendations published in 2023

New | Revised | Corrigenda | Deleted/Withdrawn

Index	Resolution no.	Revision	Adoption	Title	Implemention Date
1	Rec 73	Rev.2	Jan 2023	Type approval procedure for cable trays/protective casings made of plastics materials	-
2	Rec 31	Rev.3	Apr 2023	Recommended procedure for inclining test	-
3	Rec 175	New	Apr 2023	SEEMP/CII Implementation Guidelines	-
4	Rec 96	Rev.2	May 2023	Double Hull Oil Tankers - Guidelines for Surveys, Assessment and Repair of Hull Structures	-
5	Rec 10	Rev.5	Jun 2023	Chain Anchoring, Mooring and Towing Equipment	-
6	Rec 174	New	Jul 2023	Recommended procedure for the finite element analysis to assess yielding, buckling and fatigue strength of IGC Code type C tanks	-
7	Rec 176	New	Sep 2023	Measurement of Underwater Radiated Noise	-
8	Rec 116	Del	Sep 2023	Performance Standard for Protective Coatings for Cargo Oil Tanks of Crude Oil Tankers – 5 years field exposure test in accordance with MSC.288(87)	-
9	Rec 53	Rev.1	Oct 2023	Periodic Survey and Testing of Foam Concentrates, CO2 and Halon Containers	-
10	Rec 131	Rev.1	Nov 2023	Guidelines for application of SOLAS Ch.II-2 Reg. 4.5.7.3.2 for accepting constant operative inerting systems (COIS) as an alternative to fixed hydrocarbon gas detection equipment in double hull and double bottom spaces on oil tankers	-
11	Rec 26	Rev.2	Nov 2023	Spare Parts for Main Internal Combustion Engines of Ships for Unrestricted Service	-
12	Rec 151	Rev.2	Nov 2023	Recommendation for fuel oil treatment systems	-
13	Rec 24	Rev.7	Nov 2023	Intact stability	-
14	Rec 178	New	Dec 2023	Earthing Guidelines for Maritime Industry	-
15	Rec 73	Rev.3	Dec 2023	Type approval procedure for cable trays/protective casings made of plastics materials	-

Index	Resolution no.	Revision	Adoption	Title	Implemention Date
16	Rec 177	New	Dec 2023	Shipbuilding and Remedial Quality Standard for Machinery Piping Systems	-
17	Rec 179	New	Dec 2023	Recommendation for Valve Regulated Lead Acid (VRLA) Starting Batteries of Emergency Generators	-

1. Rec 73 (Rev.2 Jan 2023)

Rec 73 provides guidance for the type approval procedure for cable trays/protective casings made of plastics materials. In Rev.2 of this Recommendation, the surface sensitivity in section 4.1 has been revised from 106 to 108 Ohm [Ω].

2. Rec 31 (Rev.3 Apr 2023)

Rec 31 gives recommendations for achieving a satisfactory accuracy in the determination of the lightship weight and of the coordinates of its centre of gravity. This revision has updated to ensure consistency with Annex 1 of the 2008 IS Code.

3. Rec 175 (New Apr 2023)

Rec 175 aims to address issues in relation to SEEMP/CII verification and provide guidance for supporting the implementation of IMO SEEMP/CII as per reg. 26 and 28 of MARPOL Annex VI. In the context of SEEMP, the emphasis is on implementation of SEEMP Part III, specifically, as per reg. 26.3.

4. Rec 96 (Rev.2 May 2023)

Rec 96 gives guidelines for a double hull oil tanker which is constructed primarily for the carriage of oil in bulk and has the cargo tanks forming an integral part of the ship's hull protected by a double hull which extends for the entire length of the cargo area, consisting of double sides and double bottom spaces for the carriage of water ballast or void spaces. This revision has been updated to maintain the consistency with the outcome of previous work related to the definition of oil tankers which was reflected in UR Z10.4(Rev.18).

5. Rec 10 (Rev.5 June 2023)

Rec. 10 provides recommendations for anchoring, mooring and towing equipment. In this revision, a new appendix for alternative direct calculation of anchoring equipment is introduced to allow this new methodology of determination of anchoring equipment.

6. Rec 174 (New July 2023)

Rec 174 aims to provide general information and details for the finite element analysis of single-cylinder and multi-lobe shape IGC Code type C tanks. Additionally well-established international codes for design by analysis may be referenced as required. e.g., ASME Sec VIII Div. 2.

7. Rec 176 (New Sep 2023)

Rec 176 has been developed to address safety concerns and experience of working in situ with large ships in open waters, and intended to harmonise and present a single method for the measurement of underwater radiated noise and detail a consistent analysis/post processing means and reporting standard.

8. Rec 116 (Del Sept 2023)

Rec 116 was deleted in September 2023 as all recommendations are considered by UI SC259 (Corr.1 Oct. 2014)

9. Rec 53 (Rev.1 Oct 2023)

Rec 53 provides recommendations for periodic survey and testing of foam concentrates, CO2 and halon containers. Changes made in this revision aligns the provisions with those in MSC.1/Circ.1318/Rev.1 on 'Revised guidelines for the maintenance and inspections of fixed carbon dioxide fire-extinguishing systems'. Further, editorial changes were made keeping in view the recommendatory nature of the document and to update the references made from the document.

10. Rec 131 (Rev.1 Nov 2023)

Rec 131 contains guidelines for application of SOLAS Ch.II-2 Reg. 4.5.7.3.2 for accepting a constant operative inerting systems (COIS) as an alternative to fixed hydrocarbon gas detection equipment in double hull and double bottom spaces on oil tankers. This revision has been developed to consider relevant amendments to IMO instruments within the last decade.

11. Rec 26 (Rev.2 Nov 2023)

Rec 26 provides guidelines on spare parts for main internal combustion engines of ships for unrestricted service. The Recommendation has been revised to recommend a risk-based approach to determination of the minimum spare parts to be carried on board.

12. Rec 151 (Rev.2 Nov 2023)

Rec 151 provides recommendation for the treatment of fuel oil on board ships and procedures for tests to confirm the ability of RMF fuel oil pumps operation with marine fuels with low viscosity. This revision was made to reflect 'non-mandatory' nature of the document and improve technical consistency of recommendation.

13. Rec 24 (Rev.7 Nov 2023)

Rec 24 provides recommendations on values to be used in context of UR L2 intact stability assessment of ships with a length of 24 m and above. This revision considers changes with respect to the amendments to MSC.267(85) Intact Stability Code.

14. Rec 178 (New Dec 2023)

Rec 178 provides best practices for protective earthing for steel, aluminium, mobile or fixed offshore units and non-metallic vessels. The recommendations are designed to identify best practices for ship and offshore installations. The recommendations also will address specific earthing, where required for cyber systems.

15. Rec 73 (Rev.3 Dec 2023)

Rec 73 provides guidance for the type approval procedure for cable trays/protective casings made of plastics materials. In Rev.3 of this Recommendation, the resistivity test requirement in section 4.1 has been revisited, referring to the latest publication of IEC standard and contacting IEC TC in charge.

16. Rec 177 (New Dec 2023)

Rec 177 provides guidance to improve the quality standards in terms of fabrication, installation, commissioning and function tests of machinery piping systems onboard ship.

17. Rec 179 (New Dec 2023)

Rec 179 provides guidance to address the protection of VRLA batteries and their charging facilities in emergency generator installations, to prevent excessive gas evolution, which can lead to thermal runaway.

Appendix II Summaries of IACS Members' Class Report Data 2023

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	**8,334**	**417,416,397**	**274,310,978**	**2,166**	663	1503	**122**
Tankers (crude, product & gas)	2,020	190,369,445	118,466,942				
Container vessels	788	61,678,031	55,126,870				
Dry bulk	1,256	126,128,251	68,511,409				
Passenger vessels (over 12 pax)	46	308,869	383,000				
Other ship types	4,224	38,931,801	31,822,757				

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	**10,602**	**213,643,804**	**148,670,418**	**1,377**	382	995	**125**
Tankers (crude, product & gas)	1,700	64,550,285	44,191,629				
Container vessels	688	30,683,317	26,301,762				
Dry bulk	1152	88,065,558	48,582,712				
Passenger vessels (over 12 pax)	507	676,536	4,826,456				
Other ship types	6,555	29,668,108	24,767,859				

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	**5,341**	**234,556,745**	**151,665,823**	**1,380**	311	1069	**61**
Tankers (crude, product & gas)	1,236	57,257,381	35,819,786				
Container vessels	565	31,400,815	27,864,319				
Dry bulk	1,898	140,203,666	79,440,183				
Passenger vessels (over 12 pax)	214	444,842	1,889,622				
Other ship types	1,428	5,250,041	6,651,913				

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	**92**	**2,716,029**	**1,911,607**	**62**	23	39	**24**
Tankers (crude, product & gas)	29	2,069,276	1,256,601				
Container vessels	2	13,561	16,411				
Dry bulk	18	615,572	531,088				
Passenger vessels (over 12 pax)	12	4,548	36,879				
Other ship types	31	13,072	70,628				

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	**8,098**	**369,173,507**	**284,773,556**	**1,580**	449	1,131	**101**
Tankers (crude, product & gas)	1,850	150,428,848	93,755,949				
Container vessels	1,761	119,716,399	104,147,646				
Dry bulk	896	63,280,642	35,487,637				
Passenger vessels (over 12 pax)	340	1,119,449	11,858,139				
Other ship types	3,251	34,628,169	39,524,185				

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	**1,315**	**41,465,350**	**24,547,024**	**260**	65	195	**49**
Tankers (crude, product & gas)	402	32,779,889	18,929,901				
Container vessels	35	1,057,831	828,493				
Dry bulk	115	6,342,849	3,475,679				
Passenger vessels (over 12 pax)	62	27,902	106,624				
Other ship types	701	1,256,877	1,206,327				

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	**2,077**	**119,861,605**	**79,308,235**	**706**	111	595	**79**
Tankers (crude, product & gas)	778	46,886,662	29,123,512				
Container vessels	300	14,133,515	12,604,882				
Dry bulk	466	53,164,309	28,433,074				
Passenger vessels (over 12 pax)	13	56,656	173,384				
Other ship types	520	5,620,463	8,973,383				

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	**7,497**	**330,344,808**	**236,821,195**	**1,593**	603	990	**118**
Tankers (crude, product & gas)	1,899	159,863,877	104,590,961				
Container vessels	644	42,330,499	40,174,165				
Dry bulk	1640	117,995,825	66,138,356				
Passenger vessels (over 12 pax)	1127	1,467,213	13,580,619				
Other ship types	2187	8,687,394	12,337,094				

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	**7,766**	**434,081,744**	**270,254,628**	**1,419**	218	1,201	**108**
Tankers (crude, product & gas)	1,346	72,193,517	45,939,537				
Container vessels	674	30,547,966	27,878,641				
Dry bulk	4,227	312,346,430	172,990,030				
Passenger vessels (over 12 pax)	5	7,169	31,023				
Other ship types	1,514	18,986,663	23,415,397				

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	**482**	**13,271,108**	**7,894,734**	**96**	32	64	**42**
Tankers (crude, product & gas)	47	8,349,341	4,383,877				
Container vessels	8	110,036	85,631				
Dry bulk	90	3,444,111	2,075,697				
Passenger vessels (over 12 pax)	63	78,784	368,760				
Other ship types	274	1,288,836	980,769				

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	**4,895**	**86,709,470**	**69,943,548**	**648**	105	543	**107**
Tankers (crude, product & gas)	748	29,795,055	17,323,002				
Container vessels	211	7,053,915	7,001,632				
Dry bulk	603	38,481,204	22,404,795				
Passenger vessels (over 12 pax)	588	1,364,222	9,838,796				
Other ship types	2,745	10,015,074	13,375,323				

TL

	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	**114**	**642,443**	**557,345**	**65**	28	37	**17**
Tankers (crude, product & gas)	2	7,409	4,567				
Container vessels	0	0	0				
Dry bulk	3	149,528	84,775				
Passenger vessels (over 12 pax)	19	11,908	35,565				
Other ship types	90	473,599	432,438				

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.

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.

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