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“THE ROLE OF CLASSIFICATION SOCIETIES IN SHIPPING”

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ABSTRACT

In the paper entitled "The role of classification societies in shipping ,we would like to describe the contribution of classification societies in the maritime industry.

Our work is divided into five main chapters in which there are separated sections.

In these chapters we describe the contribution of the classification societies in maritime industry, how the classification surveys are conducted and what types of classifications exist.

In addition we present the story of International Association of Classification Societies and the scope of the IACS. Also in these chapters we mentioned the IACS members, their history, how they evolved over the years and their actions in today's maritime industry.

INTRODUCTION

The role of classification societies is major and versatile, one very crucial thing is that they assist in safeguarding safety. Also the implementation of IMO Conventions by Flag states is done by classification societies (which enjoy the status of a “Recognized Organizations” [NGO] IMO) and by a mandatory audit scheme (every 7 years)

In fact IACS is one of the non-governmental international organizations which has been granted consultative status with IMO.

In the following pages we will explain what is meant by “classification” and we present the main Classification Societies.

UNIT 1

General information about Classification Societies.

1.1 Definition of Classification Society.

“A classification society is a non-governmental organization that establishes and maintains technical standards for the construction and operation of ships and offshore structures. Classification societies certify that the construction of a vessel comply with relevant standards and carry out regular surveys in service to ensure continuing compliance with the standards.” (https://en.wikipedia.org/wiki/Classification_society)

A Classification Society is an organization which:

- i. Publishes its own classification Rules (including technical requirements) for ship design, construction and survey, and is capable of (a) applying, (b) maintaining and (c) updating those Rules and Regulations on a regular basis with its own resources.
- ii. Verifies compliance during construction and periodically during the service life of a classified ship with these Rules;
- iii. publishes a register of classed ships;
- iv. is not controlled by, and does not have interests in, ship-owners, shipbuilders or others engaged commercially in the manufacture, equipping, repair or operation of ships; and
- v. is authorised by the Flag Administration as defined in SOLAS Chapter XI-1, Regulation 1 and listed in the Global Integrated Shipping Information System IMO database accordingly. (GISIS).

1.2 The story of the Classification Societies.

From the ancient times, the need to create these organizations began. Similar organisations, which continued their action until the 17th century, took place in ancient Greece. The first international classification society, called Lloyd Register of Shipping, was established in the United Kingdom at this time.

1.3 Why 'Classification'?

Marine insurers based at Lloyd's coffee house in London developed a system for independent technical assessment of the ships presented to them for insurance cover in the second half of the 18th century. For this purpose, a committee was formed in 1760, the earliest existing outcome of their initiative being Lloyd's Register Book for the years 1764-65-66.

At that time, there was an attempt to 'classify' each ship's condition on an annual basis. The hull's condition was classified as A, E, I, O or U, depending on the excellence of its construction and its (or otherwise) continuing soundness. Equipment was simply G, M, or B: good, middle or bad. In time, G, M and B have been replaced by 1, 2 or 3, the origin of the well-known expression 'A1' which means 'first or highest class.' 'Lloyd's Register of British and Foreign Shipping' was reconstituted in 1834 as an autonomous 'Classification Society' with the concept of classification slowly spreading to other countries and insurance markets with the creation of several other major classification societies.

As the classification profession evolved, with some exceptions, the practice of assigning various classifications was replaced. Today a ship either meets or does not

meet the rules of the relevant class society. As a result, the ' class ' is either ' in ' or ' out. '

Classification Societies are often simply referred to as 'Class Societies' or just 'Class.

1.4 Classification Societies today.

The purpose of a Classification Society is to provide, based on the accumulation of maritime knowledge and technology, classification and statutory services and assistance to the maritime industry and regulatory bodies with regard to maritime safety and pollution prevention.

The ship classification objective is to verify the structural strength and integrity of essential parts of the ship's hull and its annexes, as well as the reliability and function of the propulsion and steering systems, power generation and other features and auxiliary systems built into the ship in order to maintain essential services on board.

Classification societies aim to achieve this goal by developing and applying their own rules and verifying compliance on behalf of flag administrations with international and/or national statutory regulations.

The vast majority of commercial ships are built and surveyed to meet Classification Societies ' standards. The Society issues these standards as published rules. A vessel designed and built in accordance with a society's appropriate rules may apply for a classification certificate from that Society.

Such a certificate, however, does not imply, and should not be construed as, a ship's safety guarantee, fitness for purpose or seaworthiness. It is only a certificate that the vessel conforms to the rules developed and published by the Society issuing the

certificate of classification. In addition, Classification Societies are not guarantors of the safety of life or property at sea or of a vessel's seaworthiness because the Classification Society has no control over how a vessel is manned, operated and maintained between the periodic surveys it conducts.

In the International Convention for the Safety of Life at Sea (SOLAS) and in the 1988 Protocol to the International Convention on Load Lines, the role of classification and classification societies was recognized.

Upon satisfactory completion of the relevant surveys, a vessel built in accordance with the applicable rules of an IACS member society may be assigned a class designation by the society. The society conducts surveys for ships in service to verify that the ship remains in accordance with those Rules. If any defects that may affect the class become apparent or damage between the relevant surveys is sustained, the owner shall promptly inform the society concerned..

A vessel's classification is based on the understanding that competent and qualified crew or operating personnel load, operate and maintain the vessel properly.

A vessel may be kept in class provided that it remains in compliance with the relevant rules in the opinion of the society concerned, as determined by periodic or non-periodic surveys.

Classification rules have been developed by each society over many years through extensive research and development and service experience and are subject to constant refinement. Furthermore, IACS Members have agreed on Unified Requirements and have been transposed into the Rules of the individual Members.

1.5 Scope of classification.

Implementing the published Rules, the classification process consists of:

- A technical review of the design plans and related documents for a new vessel to verify compliance with the applicable Rules;
- Attendance at the construction of the vessel in the shipyard by a Classification Society surveyor(s) to verify that the vessel is constructed in accordance with the approved design plans and classification Rules;
- Attendance by a Classification Society surveyor(s) at the relevant production facilities that provide key components such as the steel, engine, generators and castings to verify that the component conforms to the applicable Rule requirements;
- Attendance by a Classification Society surveyor(s) at the sea trials and other trials relating to the vessel and its equipment prior to delivery to verify conformance with the applicable Rule requirements;
- Upon satisfactory completion of the above, the builder's/shipowner's request for the issuance of a class certificate will be considered by the relevant Classification Society and, if deemed satisfactory, the assignment of class may be approved and a certificate of classification issued;
- Once in service, the owner must submit the vessel to a clearly specified programme of periodical class surveys, carried out onboard the vessel, to verify that the ship continues to meet the relevant Rule requirements for continuation of class.

Class Rules do not cover every other part of a vessel's structure or equipment, nor do they cover operational elements. Activities generally outside the scope of classification include items such as: process design and manufacturing; choice of type

and power of machinery and certain equipment (e.g. winches); number and qualification of crew or operating personnel; The ship's shape and cargo carrying capacity and maneuvering performance ; hull vibrations ; spare parts ; life-saving equipment and maintenance equipment. However, consideration may be given to these matters for classification by type of ship or class notation(s) assigned.

It should be emphasised that it is the shipowner who has overall responsibility for a vessel's safety and integrity, including how it is operated and maintained.

Classification effectiveness depends on the shipbuilder during construction, and once the vessel enters service, the shipowner cooperates openly and transparently with the Class Society on all issues that may affect its class status. This especially requires the shipowner to act in good faith by disclosing any damage or deterioration that may affect the classification status of the vessel to the Class Society. If the least question is raised, the owner should notify the class and schedule a survey to determine whether the vessel meets the relevant class standard.

Only once in a twelve-month period can a class surveyor go on board a vessel. It is not possible or expected at that time that the surveyor will scrutinize the entire vessel's structure or machinery. The survey includes a sampling for which guidelines exist based on empirical experience and the vessel's age that may indicate those parts of the vessel or its machinery that may be subject to corrosion, or that may be exposed to the highest incidence of stress, or that may show signs of fatigue or damage.

It is the responsibility of the owner to maintain the ship properly during the survey period. It is the owner's or his representative's duty to inform the Society of any events or circumstances that may affect the ship's continued compliance with the rules of the Society.

Unit 2

Classification Procedures

2.1 Classification surveys

A classification survey is a visual examination that normally consists of:

- an overall examination of the items identified in the Rules for survey;
- detailed checks of selected parts, on a sampling basis;
- witnessing tests, measurements and trials where applicable.

When a surveyor identifies corrosion, structural defects or damage to hull, machinery and/or equipment that, based on the rules of the Society and the surveyor's opinion, affects the class of the ship, remedial measures and/or appropriate class recommendations / conditions are specified to retain class.

2.1.1 Class renewal survey / special survey

Class renewal surveys / special surveys are conducted at intervals of five years.

However, the Society may consider granting an extension for a maximum period of three months after the due date in exceptional circumstances. In such cases, the next class period will start from the due date before the extension was granted for the previous class renewal survey.

The special survey may be commenced at the 4th annual survey and be progressed with a view to completion by the 5th anniversary date.

The renewal class surveys / special surveys include extensive reviews to verify that the ship's structure, main and essential auxiliary machinery, systems, and equipment

are in a condition that meets the relevant rules. Hull examinations are generally complemented by thickness measurements and test witnessing as specified in the Rules, and as the attending surveyor deems it necessary to assess that the structural condition remains effective and to help identify substantial corrosion, significant deformation, fractures, damage or other structural deterioration.

2.1.2 Annual survey

Annual surveys are to be conducted from three months to three months after each anniversary date within a window.

The ship is generally examined at the time of annual surveys. The survey includes an inspection of the ship's hull, equipment and machinery and some witnessing of tests to the extent necessary and practical to verify that the ship is in a general condition that meets the Rule requirements in the opinion of the attending surveyor(s).

2.1.3 Intermediate survey

An intermediate survey shall be conducted three months before the second to three months after the third anniversary date within the window.

The intermediate survey includes structure examinations and checks as specified in the Rules to verify that the vessel meets the applicable requirements of the rules. With age, the rule criteria are becoming more stringent.

Depending on the ship's type and age, the hull examinations may be supplemented by thickness measurements as specified in the Rules and if the attending surveyor deems it necessary.

2.1.4 Bottom / Docking survey

A bottom / dock survey is examining the hull and related items outside the ship.

This examination can be performed with the ship either on a dry dock (or on a slipway) or afloat: the survey will be referred to as a dry-dock survey in the former case, while the latter will be referred to as an in-water survey. The conditions for accepting an in-water survey instead of a drydock survey will depend on the ship's type and age and past history.

The outside of the ship's hull and related items are to be examined on two occasions with a maximum of 36 months between surveys over the five-year period of the class certificate.

One of the two bottom/docking surveys to be performed in the five-year period is to be concurrent with the class renewal/special survey.

For ships subject to the Enhanced Survey Programme (ESP) and 15 years of age and above, the intermediate bottom/docking survey is to be carried out in a dry-dock.

2.1.5 Tailshaft survey

A tailshaft survey is the survey of screwshafts and tube shafts (hereafter referred to as tailshafts) and the stern bearing.

The different types of surveys to which tailshafts may be subjected and the intervals are:

- complete survey;
- modified survey;
- partial survey

2.1.6 Tailshaft complete survey

Tailshafts are to be submitted to complete examination at a periodicity based on the type of shaft and its design. “Complete” means that the shaft is drawn up for examination or that other equivalent means of examination are provided.

2.1.7 Tailshaft modified survey

A modified survey of the tailshaft is an examination which may be accepted at alternate five-yearly surveys for tailshafts provided that the shaft arrangement is in accordance with specific requirements.

Tailshaft partial survey A partial survey allows a postponement of the complete survey, having a periodicity of 5 years, for 2.5 years.

2.1.8 Boiler surveys

In every five years, boilers and thermal oil heaters are to be surveyed twice. The boiler survey periodicity is usually 2.5 years. Internally and externally, steam boilers, super heaters and economizers are examined. To this end, boilers should be drained and appropriately prepared for the water-steam side and fire side examination.

2.1.9 Non-periodical surveys

Such surveys are carried out for example:

- to update classification documents (e.g. change of owner, name of the ship, change of flag);

2.2 Class certificate

2.2.1 Issue of the certificate of classification

A certificate of classification, bearing the class notations assigned to the ship and an expiry date, is issued to all classed ships. This certificate may also be provided with annexes supplying information sufficient for the management of the certificate, for determining the class surveys date and for immediate assessment of possible irregularities (overdue recommendations, etc.).

An interim/provisional certificate of classification may serve as a certificate of classification in certain situations when deemed necessary by the Society

2.2.2 Validity of the certificate of classification

A certificate of classification, properly endorsed, is valid until the expiry date unless advised otherwise by the Society or provided there are no grounds for suspension or withdrawal of class.

Endorsement of the certificate of classification

When annual and intermediate surveys are satisfactorily completed, the certificate of classification is:

- endorsed for the periodical surveys;
- according to the practice of some Societies, endorsed accordingly with the relevant entries in the appropriate annexes attached to the certificate concerning the outstanding recommendations/conditions of class, if any, and/or the surveys held.

2.3 Assignment, maintenance, suspension and withdrawal of class.

2.3.1 Assignment of class

Class is assigned to a vessel upon the completion of satisfactory review of the design and surveys during construction undertaken in order to verify compliance with the Rules of the Society. For existing vessels, specific procedures apply when they are being transferred from one Class Society to another. This assignment may be given in the following cases:

- on completion of the new building, after satisfactory surveys have been performed;
- on completion of a satisfactory survey of an existing ship carried out in accordance with the agreement developed by the IACS Member Societies for ships transferring class between Members; or
- on completion of a satisfactory specific class survey of an existing ship not classed with an IACS Society, or not classed at all.

2.3.2 Maintenance of class

Classed ships are subject to surveys for maintenance of class. These surveys include the class renewal (also called “special survey”), intermediate, annual, and bottom/docking surveys (either a survey in dry dock or an in-water survey) of the hull, tailshaft survey, boiler survey, machinery surveys and surveys for the maintenance of additional class notations, where applicable. Such surveys are carried out at the intervals and under the conditions given below.

The surveys are to be carried out in accordance with the relevant requirements in order to confirm that the condition of the hull, machinery, equipment and appliances

comply with the applicable Rules. It is the owner's duty to ensure that the ship's maintenance is kept at a satisfactory level in order to maintain the condition between surveys.

2.3.3 Suspension of class

The surveys are to be carried out in accordance with the relevant class requirements to confirm that the condition of the hull, machinery, equipment and appliances is in compliance with the applicable Rules. 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.

Class may be suspended following a decision made by the Society when one or more of the following occurs:

- when a ship is not operated in compliance with the Rule requirements;
- when a ship proceeds to sea with less freeboard than that assigned;
- when the owner fails to request a survey after having detected defects or damages affecting the class;
- when repairs, alterations or conversions affecting the class are carried out without requesting the attendance of a surveyor. In addition, class is automatically suspended:
- when the class renewal/special survey has not been completed by its due date or within the time granted in special circumstances for the completion of the survey, unless the ship is under attendance by the Society's surveyor(s) with a view to completion prior to resuming trading;

- when the annual or intermediate surveys have not been completed by the end of the corresponding survey time windows.

Suspension of class with respect to the above cases will remain in effect until such time as the due surveys and any other survey deemed appropriate by the Society have been completed.

In addition to the circumstances for which automatic suspension may apply, the class of a ship will be subject to suspension procedures following a decision of the Society

: • when a recommendation/condition of class is not dealt with within the time limit specified, unless it is postponed before the due date by agreement with the Society;

- when one or more other surveys are not held by their due dates - or the dates stipulated by the Society also taking into account any extensions granted;

- when, due to the nature of reported defects, the Society considers that a ship is not entitled to retain its class even on a temporary basis (pending necessary repairs or renewals, etc.);

- in other circumstances where the owner fails to submit the ship to a survey in accordance with a special requirement.

In all cases suspension will remain in effect until such time as matters are rectified and the class is reinstated or class is withdrawn.

2.3.4 Withdrawal of class

The Society will withdraw the class of a ship when:

- requested by the owner;
- the class has been suspended for more than six months;

- the ship is reported as a constructive total loss and the owner does not advise his intention to repair the ship for re-instatement of class;
- the ship is reported lost;
- the ship will not trade further as declared by its owner.

When class is suspended or withdrawn, the Society will at the same time:

- inform the owner, flag Administration and underwriters (the latter at their request);
- publish the information on its website and convey the information to appropriate databases

2.4 Statutory surveys

A number of the Conventions require an initial survey before a vessel is put in service for the first time and receives its first certificate, and a certificate renewal survey at one, two or five year intervals thereafter, depending on the certificate and type of ship. In addition, for those certificates valid for more than one year, surveys at annual intervals are required, one of which, at approximately half way and termed ‘intermediate’, may be of greater extent than an ordinary ‘annual’. The ‘Harmonised System of Survey and Certification’ (HSSC) implemented by many Administrations under IMO resolution A.997(25), as amended, brings all SOLAS (except for passenger ships), MARPOL and Load Line Convention surveys into a five-year cycle. With respect of safety equipment surveys, HSSC uses the term ‘periodical’ instead of ‘intermediate’, and for radio, ‘periodical’ instead of ‘annual’. These latter take the place of the renewal surveys held under the shorter certificate renewal cycles.

The scope of survey can generally be harmonized with the extents of the classification surveys detailed above and, as far as possible, are held concurrently with them.

The scope of each statutory survey or inspection is laid down by IMO resolutions and generally increases with age. It is to include sufficiently extensive examinations and checks to verify that the structure, machinery, systems and relevant equipment such as the life saving, fire fighting or pollution prevention equipment are in a satisfactory condition and in compliance with the applicable standards.

Between surveys, the Conventions require the flag Administration to make it compulsory for the owner to maintain the ship in conformance with the regulations so that the ship will remain fit to proceed to sea without danger to the ship or persons on board or unreasonable threat of harm to the marine environment. Initial statutory survey

An initial survey is an inspection of the design and construction of the relevant structure, machinery and equipment of the ship to verify that it complies with the requirements of the applicable regulations.

2.4.1 Renewal statutory survey

A renewal survey is an inspection of the structure, machinery and/or equipment, as applicable, to verify that their condition is in compliance with the requirements of the regulations. Modifications to the ship having a bearing on the conformity of the vessel to the requirements are to be declared by the owner and inspected.

2.4.2 Annual statutory survey

An annual survey, in principle, includes a general inspection of the relevant structure and equipment of the ship to confirm that it has been maintained in accordance with the regulations and is in satisfactory condition.

2.4.3 Intermediate statutory survey

An intermediate survey is an inspection of specified items relevant to the particular certificate to confirm that they are in satisfactory condition. Depending on the certificate concerned and the age of the ship, the scope may range from that of an annual to the equivalent of a renewal survey.

2.4.4 Periodical statutory survey

Periodical surveys generally take the place of renewal surveys for those certificates which previously were renewed after one or two years. However, in the case of a Load Line Certificate which is issued on behalf of, or by, flag Administrations that have not implemented the harmonised system of survey and certification, the fiveyear renewal survey may be referred to as the ‘periodical’ survey.

2.5 Statutory certificates

2.5.1 Recognised Organizations

SOLAS and the other International Conventions permit the flag Administration to delegate the inspection and survey of ships to a Recognised Organization (RO). This is in recognition of the fact that many flag Administrations do not have adequate technical experience, manpower or global coverage to undertake all the necessary statutory inspections and surveys using its own staff.

The RO is responsible and accountable to the flag Administration for the work that it carries out on its behalf. The principles of the inspection and survey work are to a very large extent the same as in respect of classification surveys, that is, the

verification by the RO that a ship is in compliance with applicable requirements at the time of the survey or inspection. The scopes of these inspections and surveys are laid down by the relevant national laws based on International Conventions to which the Government is a signatory, together with additional instructions that may be issued by the flag Administration.

2.5.2 Authorisation

Statutory certificates are issued by the RO in accordance with the terms of its recognition by the flag Administration. Variation of the delegation of statutory authority or certificates that can be issued by the RO exists between Administrations. The Administration should be contacted for specific details of the authorization.

2.6 Issue, endorsement and withdrawal

A certificate is issued or endorsed after the relevant surveys are passed. A certificate may be issued, valid for a short time period, listing corrective action to be rectified for minor deficiencies which do not prevent the issuance of a certificate to the ship.

For most Conventions, the Administration empowers the RO to withdraw or invalidate a certificate if the required corrective action is not taken.

2.7 Definitions related to classification surveys

2.7.1 Period of certificate of class

The period of the certificate of class starts either from the date of initial classification or from the credited date of the last class renewal/special survey, and expires at the due date assigned for the next class renewal/special survey.

The due date is the end of the time window for that survey.

2.7.2 Anniversary date

The anniversary date is the day and the month given in the certificate of class which corresponds to the expiry date of the certificate.

2.7.3 Survey time window

The survey time window is the fixed period during which the annual and intermediate surveys are to be carried out.

2.7.4 Overdue surveys

Each periodical survey is assigned a due date specified by the relevant Rules by which it is to be completed.

A survey becomes overdue when it has not been completed by its due date.

UNIT 3

CLASSIFICATION NOTATIONS

3.1 CLASSIFICATION NOTATIONS

Classification notations are indicative of the specific Rule requirements which have been met. Additional voluntary notations are offered by individual Societies and may be selected by an owner wishing to demonstrate that the vessel conforms to a particular standard that may be in excess of that required for classification. Depending on the Classification Society, the classification notations are assigned to the ship according to ship type, service, navigation and/or other criteria which have been provided by the owner and/or builder, when requesting classification.

Classification notations assigned to a ship are indicated on the certificate of classification as well as in the Register of Ships published by the Society. These notations can be generalized by the following types which may be used in combination:

- main class symbol;
- construction marks;
- service notations with additional service features, as applicable;
- navigation notations;
- geographic notations;
- additional class notations.

3.1.1 Class symbol

The main class symbol indicates the compliance of the ship with specific Rule requirements regarding its construction.



EQUIVALENT CLASSIFICATION SYMBOLS

The following are the symbols used by each IACS Member to denote a ship constructed under special survey in compliance with the society's rules, suitable for unrestricted sea-going service.

Enquiries regarding any other symbols or notations should be made direct to the society concerned.

Society	Symbol
ABS	⊠ A1
BV	I
CCS	★ CSA
CRS	★ 100A1
DNV GL	⊠ 1A
IRS	⚡ SUL
KR	⊠ KRS1
LR	⊠ 100A1
NK	NS *
PRS	* KM
RINA	100-A-1.1 or C
RS	KM⊠

3.1.2 Construction mark

The construction mark, when assigned, identifies the procedure under which the ship and its main equipment or arrangements have been surveyed for initial assignment of the class.

3.1.3 Service notations

The service notations, when assigned, define the type and/or service of the ship which has been considered for its classification. A ship may be assigned several different service notations. In such case, the specific Rule requirements applicable to each service notation will have been complied with.

3.1.4 Navigation and operating area notations

Navigation notations

Some Classification Societies define limiting areas for navigation (e.g. coastal waters, and sheltered waters), and/or limiting environmental conditions for certain types of ships and marine structures.

The assignment of restricted navigation notations may include the reduction of scantlings or specific arrangements.

The assignment of a navigation notation by Classification Societies does not absolve the owner from compliance with any applicable international and/or national regulations established by the Administrations for ships operating in national waters, or a specific area, or a navigation zone.

Operating or service area notations

The operating area notation specifies the service area where the ship (e.g. dredgers, crane pontoons, port tugs) can operate as regards its assigned class.

3.1.5 Additional class notations

Each of the Classification Societies has developed a series of notations that may be granted to a vessel to indicate that it is in compliance with some additional voluntary

criteria that may be either specific to that vessel type or that are in excess of the standard classification requirements.

Unit 4

IACS

4.1 International Association of Classification Societies -

IACS

IACS can trace its origins back to the International Load Line Convention of 1930 and its recommendations. The Convention recommended collaboration between Classification Societies to secure “as much uniformity as possible in the application of the standards of strength upon which freeboard is based...”.

Following the Convention, RINA hosted the first conference of major Societies in 1939 - also attended by ABS, BV, DNV, GL, LR and NK - which agreed on further cooperation between the Societies.

A second major Class Society conference, held in 1955, led to the creation of Working Parties on specific topics and, in 1968, to the formation of IACS by seven leading Societies. The value of their combined level of technical knowledge and experience was quickly recognised. In 1969, IACS was given consultative status with the International Maritime Organization (IMO). It remains the only non-governmental organization with Observer status which is able to develop and apply Rules

IACS is governed by a Council, with each Member represented by a senior management figure.

Under the Council is the General Policy Group (GPG), made up of a senior manager from each Member, which develops and implements actions giving effect to the policies, directions and long term plans of the Council.

The chair of GPG is taken by the Member holding the Council chair. IACS's technical work is undertaken generally through specialist Working Groups overseen by GPG.

The Association maintains a Secretariat in London and a QSCS Operations Centre in Southampton, UK.

Dedicated to safe ships and clean seas, IACS makes a unique contribution to maritime safety and regulation through technical support, compliance verification and research and development. More than 90% of the world's cargo carrying tonnage is covered by the classification design, construction and through-life compliance rules and standards set by the twelve Member Societies of IACS.

IACS is a not for profit membership organisation of classification societies that establish minimum technical standards and requirements that address maritime safety and environmental protection and ensures their consistent application. It carries out this responsibility through its panels, expert groups and project teams and provides a Quality System Certification Scheme (QSCS) that its Members comply with, as an assurance of professional integrity and maintenance of high professional standards. IACS is recognized as the principal technical advisor of IMO.

4.2 Common Structural Rules

On 14 December 2005 the Common Structural Rules for Double Hull Oil Tankers (CSR-OT) and Common Structural Rules for Bulk Carriers (CSR-BC) were unanimously adopted by the IACS Council for implementation on 1 April 2006. The

Council was satisfied that these Rules were based on sound technical grounds, and achieved the goals of more robust and safer ships.

These two sets of Rules were developed independently and in order to remove variations and achieve consistency, IACS decided to harmonise these Rules. There is now a single set of Rules "Common Structural Rules for Bulk Carriers and Oil Tankers" (CSR BC & OT) comprising of two parts; Part One gives requirements common to both Bulk Carriers and Double Hull Oil Tankers and Part Two provides additional specialised requirements specific to either Bulk Carriers or Double Hull Oil Tankers.

4.3 What does IACS do?

IACS is an association of Classification Societies which:

- a) establishes, reviews, promotes and develops minimum technical requirements¹ in relation to the design, construction, maintenance and survey of ships and other marine related facilities.
- b) 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.

IACS has a wide perspective on relevant matters through monitoring the developments in EU legislation related to shipping safety and environmental performance in addition to its technical advisory role to the IMO and its interaction

with the industry and flag states. IACS technical representatives can therefore bring crosscutting knowledge and experience from one forum to another.

IACS requirements are minimum requirements. Any member or group of members remains free to set and publicise requirements that result in an equivalent or higher safety level compared to the IACS requirements

4.4 What is IACS Quality System Certification Scheme (QSCS)?

IACS QSCS is the audit and certification scheme developed and adopted by IACS in 1991. It comprises a set of IACS requirements based on the latest versions of internationally recognized quality standards (i.e. ISO 9001 and ISO-IEC 17020), IMO Resolution MSC.349(92) and MEPC.237(65) (RO Code) and IACS Resolutions. The first IACS QSCS certificates were issued to IACS Member classification societies in 1993. The Scheme remains a cornerstone of IACS membership.

4.5 How does IACS maintain its lead in quality management for the industry?

The development, maintenance and continuous improvement of QSCS during the previous 26 years, represents a significant effort by IACS and its members. QSCS embraces the entire ‘class cycle’ of rule development, design approval, survey during construction, survey during service, research and development and feedback gained from experience in the practical implementation of rules and regulations as well as

industry feedback.

QSCS, the industry ‘Gold Standard’, remains a powerful and relevant tool – and IACS remains committed to ensuring that it meets the needs of its members and interested parties.

4.6 How is IACS Member compliance with IACS QSCS assured?

Each IACS Member is subject to annual audits against the requirements of ISO 9001 and IACS QSCS by an independent Accredited Certification Body (ACB)*. Provided the result of the audits are satisfactory, the ACB issues or endorses the Member’s ISO 9001 certificate. In addition, the ACB furnishes each IACS member annually with a Statement of Compliance, demonstrating the requirements of IACS QSCS (and consequently the IMO RO Code) have been satisfied.

*An ACB is an organization, wholly independent of IACS and IACS members, accredited to comply with ISO/IEC 17021 standard by an accreditation body who is signatory to the International Accreditation Forum (IAF) Multinational Recognition Agreement (MLA). Auditors used by ACBs for IACS member audits to IACS QSCS are competent in the work of classification societies and knowledgeable of the maritime sector in general.

4.7 How does the IMO oversee IACS QSCS and its implementation?

Since QSCS was established in the early 90's IMO has had an observer dedicated to the scheme to oversee and report annually on its evolution and development to the IMO Maritime Safety Committee. That arrangement continues to this day, whereby the observer selects several audits he will attend every year, in addition to holding regular meetings with IACS Quality Secretary and attendance at IACS Quality Committee and Advisory Committee meetings.

Unit 5

MEMBERS OF IACS

In this unit we will continue with a presentation of the Classification Societies which are members of the International Association of Classification Societies (IACS)



DNV GL (DET NORSCHE VERITAS GERMANISCHER LLOYD)

DNV GL is an international classification society headquartered in Norway. The company currently has about 14,500 employees and 350 offices operating in more than 100 countries, and provides services for several industries including maritime, renewable energy, oil & gas, electrification, food & beverage and healthcare. It was created in 2013 as a result of a merger between two leading organizations in the field - Det Norske Veritas (Norway) and Germanischer Lloyd (Germany). DNV GL is the world's largest classification society, providing services for 13,175 vessels and mobile offshore units (MOUs) amounting to 265.4 mill GT. It is also the largest technical

consultancy and supervisory to the global renewable energy (particularly wind, wave, tidal and solar) and oil & gas industry - 65% of the world's offshore pipelines are designed and installed to DNV GL's technical standards. Society's history dates back to 1864, when Det Norske Veritas was established in Norway to head technical inspection and evaluation of Norwegian merchant vessels. On the other hand, Germanischer Lloyd was founded in Hamburg around the same period in 1867 by a group of 600 ship owners, ship builders and insurers. Since 1864, has always maintained a department dedicated to research that enhances and develops services, rules and standards for various industries. Many of the innovations and findings by DNV have often been used as a basis for international standards

MAIN ACTIVITIES

DNV GL is organised into five business areas :

1. Maritime: Classification, verification, risk-management, training and technical advisory to the maritime industry on safety, enhanced performance, fuel efficiency. As a classification society, DNV GL sets standards for ships and offshore structures - known as Class Rules. They comprise safety, reliability and environmental requirements that vessels and other offshore mobile structures in international waters must comply with. DNV GL is authorized by 130 maritime administrations to perform certification or verification on their behalf.
2. Oil & Gas
3. Energy
4. Business Assurance
5. Digital Solutions



CLASS NKK

HISTORY:

The origins of Nippon Kaiji Kyokai date from the foundation in November 1899 of the Teikoku Kaiji Kyokai , in Tokyo, which was established in order to promote the regulation and development of the shipping and shipbuilding industries in Japan. The early years of the Society were spent promoting a wide range of shipping-related activities, very different from the focused technical role that ClassNK plays today. By 1915, the structure necessary for ship classification operations was ready.

In 1919, Teikoku Kaiji Kyokai gained international recognition by forming a group of four associated classification societies with the three major classification societies at the time “BC” which was combined with LR, ABS and RINA. The first ship to receive a class certificate from the then TKK was the Kwanan Maru in 1920. In 1926, the Society's class notation, NS*, was formally registered in the classification clause of the Institute of London Underwriters, amounting to recognition of TKK's existence as an internationally active classification society. In the inter-war years, TKK received support from, and co-operated with, the British Corporation Register of Shipping (later to merge with Lloyd's Register) and other societies. By 1929, the Society had reached 1 million gross tons of ships under class and by the Ship Safety Law published in 1934, it officially became Japan's Ship Classification Society, laying the foundations for the technical role it plays today.

The Society was relaunched under its current name, Nippon Kaiji Kyokai (the Japan Marine Association), in 1946 in the aftermath of World War Two.

In 1952, after the Treaty of San Francisco went into effect, all the ship classification operations were back to normal and the NS* class notation was once again recognized internationally. From a state of near complete destruction, the Japanese Shipping and Shipbuilding industries recovered gradually and then grew rapidly in strength, with the Society called upon to survey a large number and wide range of different vessel types over the years. The Society's Register of Ships had reached 1 million tons by 1963, exceeding 10 million gross tons by 1966, and 100 million gross tons by the end of 1997. As of the end of May 2012, Nippon Kaiji Kyokai has more than 7,800 vessels totalling over 200 million gross tons under class.

Reflecting the internationalization of both the shipping industry and the Society itself, a significant percentage of today's NK-classed ships are controlled by non-Japanese companies and shipowners, supported by a growing network of exclusive survey offices across the world and a system of national and technical committees. Following the establishment of offices in London and New York in 1962, the Society spread rapidly and now has exclusive survey offices in more than 70 locations, and representation in all major ports.

Nippon Kaiji Kyokai was a founding member of IACS, the International Association of Classification Societies, which was established in 1968 to represent the major national class societies and promote international initiatives and cooperation on ship safety. The Society has four times held the Chairmanship of IACS. Nippon Kaiji Kyokai celebrated its 110th anniversary on 15 November 2009. On 1 April 2011, the

Society underwent a change in its organization, becoming a general incorporated foundation under Japanese law. Finally, On 28 May 2012, ClassNK officially announced that its register had surged past the 200 million gross ton mark becoming the world's first class society in history to have more than 200 million gross tons on its register.

Just as in its earliest days, however, Nippon Kaiji Kyokai today remains an impartial third party, not-for-profit foundation, committed to promoting the safety of life and property at sea, and the prevention of marine pollution. The Head Office is located in Tokyo and in Chiba, Japan, and there are branch offices at the major Japanese and overseas cities throughout the world.

COMPANY'S MISSION:

ClassNK is dedicated to ensuring the safety of life and property at sea, and the prevention of pollution of the marine environment. To achieve this mission ClassNK will: Focus on delivering the highest quality classification services, by the highest quality personnel, while maintaining its totally independent third party, non-profit status. Focus on the development of relevant rules, procedures and guidance, and maintain and develop its commitment to scientific and technological research and development. Maintain and develop its global operations in line with the needs of clients using its services. The society has earned an outstanding reputation for its long-standing dedication to safeguarding life and property at sea and preventing marine pollution through the establishment of universally recognized standards for the design, construction and maintenance of ships and other marine structures. The principal work of the Society's expert technical staff is to undertake surveys to ensure that the rules which it has developed are applied to newbuildings and existing ships to

ensure their safety. The rules cover not only hull structures, but also propulsion systems, electrics, electronic systems, safety equipment, cargo handling gear, and various other areas. ClassNK's surveyors work in shipbuilding and repair yards and at ports across the world, wherever they may be called upon to examine the condition of a ship. As of the end of March 2019, the society had 9,085 ships totaling over 252 million g.t. under class. This figure represents approximately 20 percent of the world merchant fleet currently under class.

CLASS NKK's main services:

- **SERVICES RELATED TO SHIP CLASSIFICATION:** offers a broad range of services that encompass every aspect of ship classification from the approval of vessel and machinery plans to the survey and registration of the ship and ship installations, approval of materials, equipment and outfitting gear, as well as the assessment and registration of ship safety management systems and security systems.
- **CERTIFICATION OF MANAGEMENT SYSTEMS:** has long undertaken the audits at shipyards, manufacturers, ship management companies etc., (organizations) for the management systems established, implemented and maintained by them.
- **TECHNICAL SERVICES:** offers a variety of consulting and support services based on the technical expertise we have developed over more than a century of classification experience. In addition to shipping related services including technical consulting, appraisal and certification of ships and offshore structures, the Society is providing a broad range of services surpassing maritime industry related fields for items such as boilers, pressurized containers and others used in general industrial activities.

- **TRAINING:** makes its extensive experience, expertise, and technical knowledge available to the entire maritime community via a number of different educational and training programs. These include training programs carried out at the request of the Japanese government and other flag and port administrations, as well technical seminars and the ClassNK Academy Program of courses. ClassNK is constantly expanding its educational and training activities for a broad spectrum of people, from those new to the industry to specialized experts, as part of its efforts to further contribute to the growth and development of the maritime community.

- **INTERNATIONAL ACTIVITIES:** is actively taking part in the important maritime associations around the globe such as the IACS, and greatly contributes to the formulation of rules and regulations known as “Unified Requirements” (UR). ClassNK also dispatches a great number of experts to all the meetings of the International Maritime Organization (IMO), as representatives of the IACS or the Japanese government. Additionally, ClassNK has established committees all around the world, contributing to the development of local maritime activities.

- **RESEARCH & DEVELOPMENT:** In addition to survey related services, one of the core elements of ClassNK’s mission is contributing to the maritime community via practical research and development. This encompasses everything from fundamental research in areas directly related to ship classification such as vessel safety and protection of the marine environment, to collaborative projects designed to answer the needs of the maritime industry.



ABS (American Bureau of Shipping)

The American Bureau of Shipping is a maritime classification society established in 1862. Its stated mission to promote the security of life, property and the natural environment, primarily through the development and verification of standards for the design, construction and operational maintenance of marine and offshore assets.

ABS' core business is to provide global classification services to the marine, offshore and gas industries. As of 2015, ABS was the second largest class society with a classed fleet of over 12,000 commercial vessels and offshore facilities. ABS develops its standards and technical specifications, known collectively as the ABS Rules & Guides. These Rules form the basis for assessing the design and construction of new vessels and the integrity of existing vessels and marine structures. ABS was first chartered in the state of New York in 1862 as the American Shipmasters' Association (ASA) to certify qualified ship captains, or shipmasters, for safe ship operations during the Civil War. While ASA's certificates were not an official requirement for shipmasters, the certificate served as a recommendation for ship-owners. Vessels that sailed with a certified ASA shipmaster were more likely to find favorable insurance coverage. Has been organized as a not-for-profit since its founding in 1862. Has been commissioned by the U.S. government and the US Coast Guard to act in many maritime matters and has hired several former officers from the Coast Guard. ABS is required under US law to maintain its status as a not-for-profit organization in order to

maintain its role as the agent of the US government on matters of government vessel classification.

ABS Group ,is a wholly owned subsidiary of the ABS . It was established in 1971 and provides technical advisory services and risk management solutions to a broad range of industries including industrial manufacturing, oil and gas, chemical, alternative energy, offshore and the public sector[.

Some basic company's RULES& GUIDES about the classification are:

The Classification process consists of:

- a) The development of Rules, Guides, standards and other criteria for the design and construction of marine vessels and structures, for materials, equipment and machinery,
- b) The review of design and survey during and after construction to verify compliance with such Rules, Guides, standards or other criteria,
- c) The assignment and registration of class when such compliance has been verified
- d) The issuance of a renewable Classification certificate with annual endorsements valid for five years.

The Rules, Guides, and standards are, in general, developed by the International Association of Classification Societies and by ABS. Surveyors apply normally accepted examination and testing standards to those items specified for each survey by the Rules. Construction procedures, safety procedures and construction supervision remain the responsibility of the shipyard, ship repairer, manufacturer, Owner or other client. For classification, vessels are to comply with both the hull and the machinery requirements of the Rules and Guides



LLOYD'S REGISTER

HISTORY

It started with a cup of coffee. Classification was and continues to be all about quality. Put simply, it is an assessment against defined standards of the condition of a ship either under construction or already in existence. From 1768 the Society used a1 to indicate a ship of the highest class. From 1775 A1 was used and is now famous as a symbol of quality.

Safety has been at the heart of Lloyd's Register's work since 1760. In that year, 11 men met in Edward Lloyd's coffee house to talk about publishing a list of ships, a register to define their quality and safeguard life and property carried on them. In the years since then Lloyd's Register has applied its expertise across the energy and transportation sectors, helping to make the world a safer place. Lloyd's Register's constitution required it to enhance the safety of life and property at sea, on land and in the air. Further, it required the organisation to support public education within the transportation industries, engineering and technological disciplines. For many years, Lloyd's Register made funds available for this purpose. In 2004, to bring a sharper focus and greater professionalism to its charitable work it set up The Lloyd's Register Educational Trust (LRET) to fund advances in transportation, science, engineering and technology education, training, and research worldwide for the benefit of all. The LRET was wholly funded by Lloyd's Register

World's first classification society

The Society for the Registry of Shipping was set up in 1760 by customers of Edward Lloyd's Coffee House in Lombard Street, London. The aim was to give merchants and underwriters recorded information on the quality of their vessels. The Register Book listed vessels rated, or classed, after the condition of their hulls and equipment had been surveyed. The subscriptions generated by the Register Book paid for the surveyors to carry out the work. This was the true beginning of classification and the Society was the world's first classification society.

AND NOW THE FOUNDATION

Lloyd's Register recognised that its governance structure needed to evolve to optimise its commercial operations which, in turn, fuel the charitable output of Lloyd's Register. On 2 July 2012, the society converted its status from an industrial and provident society to a company limited by shares, called Lloyd's Register Group Limited. The shares in Lloyd's Register Group Limited are owned by the new parent, Lloyd's Register Foundation, a registered charity. Importantly, the objectives and mission of the Foundation remain the same as those of Lloyd's Register previously, to protect life and property and to advance transport and engineering education and research.

LLOYD'S MISSION

To secure for the benefit of the community high technical standards of design, manufacture, construction, maintenance, operation and performance for the purpose of enhancing the safety of life and property at sea and on land and in the air. The

advancement of public education including within the transportation industries and any other engineering and technological disciplines.

WORLDWIDE

The organisation rapidly earned widespread respect, giving evidence to government committees and receiving requests to appoint surveyors abroad. The first surveyor employed outside the UK appears to have been appointed in 1812 when the Shipowners' Register engaged a surveyor in Newfoundland. The same Register went on to employ surveyors in Le Havre (1826), Antwerp and Ostend (1829), and Port Louis in Mauritius (1832), of whom we know only the name of the latter, Alex Gordon. These were probably all non-exclusive arrangements.

When the reconstituted Lloyd's Register of British and Foreign Shipping came into being in 1834, the General Committee rejected persistent overseas requests for the appointment of surveyors abroad, preferring to wait until the Society's network of outposts in the UK had been properly established. The Quebec Board of Trade in particular made repeated requests for a surveyor due to the number of ships being built on behalf of British owners or for sale once they reached British ports. As a result, in 1852 the Society sent out Thomas Menzies as the resident exclusive surveyor for Quebec and the St Lawrence River. Menzies and his assistant, Charles Coker, did much to help local shipbuilders raise standards of construction. It was Menzies' idea in 1853 to use the Maltese Cross in the Register Book and on the classification certificates to denote a ship built under special survey.

Further appointments were made in continental Europe in the 1860s including at Antwerp (1866) and Rotterdam (1868). Louis Meyer, the Antwerp surveyor, seems to

have been the first person appointed with responsibility for an entire country when he was promoted to cover Belgium in 1869. Once a special sub-committee had been set up to consider establishing more overseas surveyors, there was a flurry of appointments. The first was the transfer of Joseph Tucker as exclusive surveyor to Shanghai in 1869. Other appointments included non-exclusive surveyors for Calcutta, Hong Kong, Melbourne Sydney and Hobart.

By the early 1880s almost half of the world's shipping was classed by Lloyd's Register. In 1914, with an increasingly international outlook, it was entirely appropriate that the organisation's name was changed simply to Lloyd's Register of Shipping. From 1916 the organisation started to establish many national and area committees to promote better understanding of local conditions.

DIVERSIFICATION

Inspection of materials and fabrication was an intrinsic part of the classification process and by the early 1800s surveyors were applying their skills onshore. For many years these land-based inspections were related to ships and the soundness and safety of their construction, from the testing of anchors and cables to the quality of iron and steel. As vessels became more sophisticated, so opportunities arose for the Society to extend its inspection role to other non-marine areas, beginning with refrigerated cold stores for the Port of London Authority in 1911.

With its base in one of the world's leading manufacturing nations, the expertise and reputation of Lloyd's Register became attractive to many organisations overseas eager to have assurance on the quality of goods being produced in and shipped from the UK. The Society's international network also led to invitations from foreign governments, businesses and organisations to carry out inspections. The First World

War brought further opportunities to demonstrate the effectiveness of inspection as means to provide an assurance of quality, from shell steel made for the French, to copper pipes and other products made for shipping in the USA. By 1934 surveyors were inspecting ten million cubic feet of cold storage, not just in the UK but in places such as Antwerp and Basle, Leopoldville and Matadi in the Congo, and Singapore.

Lloyd's Register retained its place as the leading classification society throughout the inter-war years, thanks in part to its significant overseas operations. It also sowed the seeds of an important future part of the organisation's work in the transportation and energy sectors. Long-standing clients with interests beyond shipping began to employ Lloyd's Register in new fields, most notably the oil industry. All this activity expanded considerably after 1945, eventually leading to the formation of a separate division for non-marine work, providing a new focus for yet more growth.

TECHNOLOGICAL INNOVATION

During the Second World War the demands of war accelerated the pace of change in shipping and industry and Lloyd's Register helped validate many of the innovations. Reconstruction work following the war allowed Lloyd's Register to gradually revive its activities overseas. The mid-1950s saw a long boom in shipping with many new challenges as shipping and shipbuilding influence shifted towards the east. Lloyd's Register saw remarkable growth of its non-marine operations. The organisation provided consultancy and inspection services to atomic energy plants including the UK's Calder Hall, which in 1956 became the world's first nuclear power station to generate electricity on an industrial scale.

In the decades following 1960, Lloyd's Register facilitated change as the shipping boom continued. Ships became ever larger and containerization changed the world by

revolutionizing the flow of goods. The oil crisis of the early 1970s led to a deep depression in shipping, but Lloyd's Register rode the storm through its involvement with the expanding energy industry and offshore business, led by the pioneering development for extraction of oil and gas under the North Sea.

There followed another difficult period as shipping scarcely grew in terms of tonnage until 1990. At the same time the offshore industry suffered from a collapse in oil prices. Nevertheless, Lloyd's Register strengthened its position in Asia, diversified its offshore operations around the world and consolidated its position as the leading classification society for passenger ships and liquefied natural gas (LNG) carriers. One of the most striking developments was the success of Lloyd's Register Quality Assurance (LRQA), a management systems business established in 1985.

A consultancy-based rail business was first considered in the early 1990s and Lloyd's Register Rail was formed in 1996. Real growth began only a decade later as governments around the world invested massive sums in major rail projects from the Netherlands to Dubai and Taiwan. In 2015, LR sold its rail business to Ricardo plc, recognising that it was better placed to provide the strategic focus on the rail sector needed to build a world class global rail business.



BUREAU VERITAS

Founded in 1828, Bureau Veritas was one of the first classification societies and a founding member of IACS. The worldwide BV network has more than 2,000 high qualified marine surveyors, specialized in the implementation of safety, security, and protection of environment rules and standards, operating in 180 survey stations in 90 countries. .Own VeriSTAR system is a powerful and sophisticated tool that facilitates the efficient management of safety and quality. It integrates all the elements of ship operation to provide timely and cost-effective solutions across a broad range of classification services

MAIN SERVICES:

Company's classification services support safe vessel construction and operations, and help ensure your ships and vessels meet regulatory requirements. The main services are:

- Ship classification : Classification services ensure your ships meet regulatory requirements. They assess all types of vessels: merchant, passenger and naval. They also are leaders in the classification of ships fueled by liquified natural gas (LNG), and also class innovative floating LNG structures used for bunkering and as terminals.

- Marine expert network: Their naval architects, and structural and materials specialists are available to assist marine companies in optimizing their vessel construction and operations.
- Advanced digital tools : Company's digital tools solve complex technical problems, optimize maintenance, and improve asset integrity.
- Value-added services : Their value-added services help marine companies to address a variety of shipping challenges, such as optimizing risk management, improving energy efficiency, supporting accident investigations and salvage, and helping insurers manage claims.

QUALITY PLAN

Quality is fully integrated into the Bureau Veritas strategy for development. In order to achieve this primary objective, launched a plan to raise the quality of its fleet. This plan is based on 5 basic actions:

- Focus on quality owners.
- Fleet monitoring.
- Systematization of vertical audits.
- Class-entry filtering.
- Training and certification of Bureau Veritas China Classification Society CCS



THE CHINA CLASSIFICATION SOCIETY

CCS was founded in 1956. The Headquarters are in Beijing and it is a full member of the International Association of Classification Societies (IACS).

CCS provides classification services to ships, offshore installations and related industrial products by furnishing world-leading technical rules and standards. Also provides statutory surveys, impartial and integral classification, verification, certification and accreditation and other services in accordance with international conventions, regulations and the related rules and regulations of the authorizing flag states or regions. As authorized by the administrations of the flag states or regions, carries out statutory survey and other services as authorized by the administrations. Up to now, CCS has been authorized by 46 major shipping nations or regions in the world including China to perform statutory surveys for the ships flying their flags.

By committing to the mission of “safety, environmental protection and creating value for clients and society” and based on the 114 offices established across the globe, CCS provides services for a range of industry and fields including shipping, shipbuilding, shipping finance and insurance, marine equipment, ocean resources exploitation, ocean scientific research, industrial supervision, system certification, government policy and rule development, energy saving and emission reduction, risk management and evaluation, and is constantly developing new business areas.

By sticking to the policy of building first-class international classification society with own characteristics and with technology as the foundation and credibility as the cornerstone, improves continuously its image and value through advanced technology and quality service and is widely and highly recognized by the international industry.

- Marine Inspection

Product inspection is the basic mode of marine product inspection. Namely, after CCS verification of the products complying with the requirements by reviewing the technical documents and the type test of necessary items, shall affix an inspection mark of CCS on the product and issue product certificate or equivalent document. Please find the Flow Chart of Product Inspection attached for information.

After individual/batch inspection by CCS, the classification products and statutory products shall be recorded and identified by the following:

- Marine Products Certificate
- Equivalent Certificate

For the products not covered in rules and statutory requirements, they shall, after individual/batch inspection, be recorded and identified by the following:

- Inspection Certificate
- Test Certificate

In the course of survey, to avoid unnecessary repeated test of the same product or in the case that the field inspection by the surveyor could be substituted to a certain extent based on the QA system of the manufacturer, provides various modes of approval according to the categories of marine products for the manufacturer to

choose when applying for the inspection of marine product. According to CCS' Rules and Regulations, there are following approval modes for CCS products certification.

1. Design approval: to verify that the products comply with the requirements of IMO convention, CCS rules or applicable criteria by way of reviewing the drawings and technical documents and related survey and experiment, such as windlasses, winches, steering gear. Certificate of design approval will be issued after CCS approval. Please find attached the flow chart of Design Approval for information.
2. Works approval refers to the approval of the manufacturer's conditions and capability for producing certain type of product, which is granted by the Society based on document review, approval test and field audit.
3. Type approval: type approval can be divided into Mode A and Mode B.
4. Approval of product test and inspection institutes refers to the approval of the product test and inspection institute's conditions and capability for marine and product-specific inspection and test projects which is granted by the Society based on document review, approval test and field audit. Certificate will be issued after CCS approval.

- **NEW-BUILDING SHIPS, SERVICES**

CCS provides newbuilding classification services which include the reviewing of design plans and surveys during construction. This is to verify the newbuilding project complies with 'CCS Rules for Classification' and other relevant standards.

With the high-speed development of shipping and shipbuilding industries, classed fleet is getting increasingly bigger with a good number of large, hi-tech and value-added ships (including LNG, VLCC, VLOC, 8,530TEU container ships, 180,000DWT bulk carrier, etc.) entering CCS fleet, which promotes the internationalization and modernization of CCS fleet.

- PLAN APPROVAL

Ship's plan approval is one of the major tasks to ensure that the ship design satisfies the requirements of the rules, conventions, regulations and the flag states. Plan approval is an important link in the ship survey chain, constituting the fountainhead of ship safety and the significant basis of field survey.

After dozens of years of plan approval work, CCS regional plan approval centers have accumulated abundant experience and trained a good number of experts in the fields of ship structure analysis, stability, machinery, shafting vibration, electric, etc., and continuously improved the technical means of plan approval. In recent years, carried out extensive study of key technology of plan approval and pre-contract service, having completed approval of HCSR ship type update of different types of ships. Plan approval centers have been maintaining a good cooperative relationship with shipping companies, shipyards and ship designers, and we will continue to serve our customers wholeheartedly in the future.

CCS provides excellent plan approval level and service, focuses on mutual coordination and close cooperation with field survey of newbuildings. Meanwhile, CCS promotes in an all round way electronic plan approval, to strengthen technical guidance and software maintenance and update, ensuring the accuracy and high quality of plan approval work.

ePAS makes plan approval convenient for customers due to fast plan uploading, downloading function, extensive search engine, independent and transparent client management function, detailed approval process that can be traced as well safe and effective security password function.



KOREAN REGISTRY OF SHIPPING

KR is a world-leading, technical advisor to the maritime industry, safeguarding life, property and the environment through the pursuit of excellence in its rules and standards. Founded in 1960 and becoming a member of International Association of Classification Societies (IACS) in 1988, KR ensures its customers receive immediate and high quality service through a comprehensive network of more than 60 offices with its headquarters in Busan.

CLASSIFICATION

-DURING CONSTRUCTION

The construction, materials, scantlings and workmanship of a ship's hull, equipment and

machinery are surveyed in detail in order to ascertain that they are in compliance with the requirements of KR Rules.

The responsibilities of the society concerns:

- The approval of the ship's plans
- The ships materials

- The machinery installation
- The cargo handling appliances
- Tests of the ship's machinery
- Stability experiments
- Trials of the ship



RINA

HISTORY: The classification society was established in Genoa, Italy in 1861. In the very first year of operations, 13 agencies classed 340 vessels. Five years after the establishment, 49 agencies classed 1,500 vessels. In 1865, an office in Shanghai was opened, a pioneering project that ushered in the international expansion policy .In 1910,the first international agreements were signed with the British Corporation Register, the American Bureau of Shipping and Teikoku Kaiji Kyokai, for mutual representation in the respective countries and harmonisation of the rules and regulations. During World War I (1915-1918) maritime and merchant traffic was at a standstill, RINA's operations were reduced throughout the war period. Registro Nazionale expanded its technical structure . Furthermore, during the World War II (1940-1945) sharp decline in maritime trade, accompanied by technical and logistical reorganisation to cope with the new post-war demand. In 1970,a special group was formed to acquire and deliver industrial services, to cope with the changed merchant marine needs corresponding to the rapid developments of associated industrial technology.

-SOCIETY'S MISSION & VISION

-Mission : RINA provides a wide range of high quality tailored solutions in the Energy, Marine, Certification, Transport & Infrastructure, Industry sectors. Multiple assets for a unique purpose: to build mutual trust with customers and to be recognized as the right choice in any step of a project lifecycle. Its activities contribute to developing the qualitative level of the market by adopting measures to protect health and safety. The main goal is to improve the well-being of society building value for future generations. In addition, the society believes in the value of visionary ideas and the importance of protecting life and environment. For this reason, innovation and sustainability run through our business and increase the reputation of both RINA and the customers who care for the planet, look ahead and want to lead the way in the market. RINA's commitment to excellence is full and fuelled by people's work and competences, so many, but all essential to bring the best solutions on the stage where the market leaders play.

-Vision: RINA wants to progress with the changing world, turning challenges into opportunities and visionary ideas into excellent solutions. Society's ambition is to be identified as the smartest partner to work with: extraordinary promptness, the value of teamwork, courage in making choices, "out-of-the-box" thinking and innovative mindset are the values we believe in. RINA wants to be where big things happen and among those who make them happen.

-SERVICES

RINA's the basic and the most important services in Marine area are:

- i. Classification and statutory services
- ii. Laboratory and testing
- iii. Technical advisory
- iv. Smart ships
- v. Training

The Classification and statutory services contains certificates and surveys according to the most important regulations and conventions. Except of the these, RINA performs surveys to new building ships but also in ships that are in service.

ISM CODE

-REQUIREMENTS:

The ISM Code requires owners and operators to set in place a Safety Management System (SMS) embracing its objectives and involving the totality of the Company's operations and managed ships.

The SMS allows a Company to measure its performance against a documented system, and it enables a Company to identify areas of improvement in safety practices and pollution prevention measures.

-RINA'S DELIVERABLES:

Issues two statutory certificates:

1. DOC (Document of Compliance), issued to the Company
2. SMC (Safety Management Certificate), issued to each ship.

The ISM certification procedure consists of the following steps.

For the Company: Document of Compliance (DOC):

- i. review of Safety Management System documentation
- ii. interim audit for issuance of interim DOC (valid one year)
- iii. initial audit and issuance of full term DOC (valid five years)
- iv. after the full term certificate issuance, 4 annual audits and DOC renewal audit after 5 years.

For the Ship: Safety Management Certificate (SMC):

- i. after DOC issuance to the company, Interim audit for issuance of interim SMC, valid six months
- ii. initial audit and issuance of full term SMC (valid five years)
- iii. intermediate audit follows 3rd year of the certification period
- iv. SMC renewal after 5 years.

ISPS CODE

The ISPS Code takes the approach that ensuring the security of ships and port facilities is a risk management activity. To determine which security measures are appropriate, an assessment of the risks must be made in each particular case.

-Deliverables

The ISPS certification procedure consists of the following steps:

- i. Ship Security Assessment (SSA) and Ship Security Plan (SSP) submitted to RINA for review and approval
- ii. interim verification on board and issue of an interim International Ship Security Certificate (ISSC) valid six months
- iii. initial verification on board, within interim expiring date, and issue of the full term ISSC – International Ship Security Certificate, valid for 5 years
- iv. intermediate verification during 3rd year of the certification period
- v. ISSC renewal required after 5 years.

MARPOL

MARPOL 73/78 has actually six technical Annexes, each addressing a potential source of pollution from ships:

- i. Oil pollution (crude oil, fuel oil)
- ii. Noxious liquid substances carried in bulk pollution
- iii. Harmful substances carried in packaged form pollution
- iv. Sewage pollution
- v. Garbage pollution
- vi. Air pollution

-Deliverables

The main certificates a vessel shall carry to show compliance with MARPOL

Annexes are:

- i. IOPP (International Oil Pollution Prevention Certificate)

- ii. ISPP(International Sewage Pollution Prevention Certificate)
- iii. IAPP(International Air Pollution Prevention Certificate)
- iv. NLS (International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances).

MLC

The Convention is split into three parts – Articles, Regulations and the Code (Part A and B). The Code details provisions of the Convention contain two parts – mandatory Part A and advisory Part B.

The provisions cover different aspects:

- i. Minimum requirements for seafarers to work on a ship
- ii. Conditions of Employment
- iii. Accommodation, recreational facilities, food and catering
- iv. Health protection, medical care, welfare and social security
- v. Compliance and enforcement.

-Deliverables

RINA, according to the delegations received by Administrations, performs verifications and issues certificates as foreseen by the Convention.

Ships to be inspected and certified are all commercially operating ships of 500 gross tonnages or more that fly under the flag of any of the Countries that have ratified the MLC 2006, if they operate on international voyages. They are required to carry,

among other things, two specific documents: the Maritime Labour Certificate (MLC) and the Declaration of Maritime Labour Compliance (DMLC).

Ships to be only inspected are all other ships that fly under the flag of any of the Countries that have ratified the MLC 2006, only against the requirements of the Convention.

In addition, ships flying under the flag of countries that have not ratified the MLC 2006 are also subject to inspection as regards working and living conditions of seafarers, when those ships enter in port of countries where the MLC 2006 is in force.

NEW BUILDING SHIPS

The main steps through which RINA performs the newbuilding classification process are:

- i. approval all drawings of the vessel submitted by the designer of the shipyard
- ii. supervision of the newbuilding construction at the shipyard, through inspection and patrolling activities during all the construction process of the ship, and attend sea trials before the ship enters into service
- iii. issuing of the ship's class certificate.

REMOTE SURVEY

RINA provides now a new digital service for crediting such inspections in remote ensuring an equivalent reliability without burden of time, money and resources. This new tool can support ship owners in managing critical situations, caused by logistical problems linked to the position/port where is the ship, saving money and time caused by the stop of the vessel.

-Deliverables

- i. Shipowners send to RINA the request of remote survey
- ii. RINA reviews the request and confirms if it is feasible, both in case of survey to be performed in port or in a ship in navigation
- iii. RINA surveyor connects via mobile device to the crew on board, for livestreaming attendance to the requested tests/checks
- iv. Upon good results of the remote survey confirms validity of class and/or of statutory certificates.

SHIPS IN SERVICE

A ship intended to sail in international trade must hold a valid class certificate, issued upon verification of its compliance with the rules of a Classification Society.

The first objective of RINA Rules for the classification of ships is ensuring that vessels are maintained and operated in such a way to minimize the risks to life, environment and property.

Class is assigned to a ship in service upon the completion of satisfactory document and drawings examination, and of surveys performed to verify that it is in compliance with the relevant Rules of the Society.

Class is maintained throughout the ship's life by means of periodical and occasional surveys.

-Deliverables

Classed ships are subject to periodical surveys (renewal, intermediate, annual, bottom, tail shaft, boiler) for maintenance of class. Occasional surveys are to be performed following incidents and other events.

A dedicated software, Leonardo Info, allows ship managers to view survey reports and monitor the survey status, as well as eventual outstanding recommendation and memoranda, and forthcoming applicable rule requirements. Furthermore, Leonardo Info gives access to the ship's reports, survey and certification history.

SOLAS

The current SOLAS Convention includes the following themes:

- i. General Provisions
- ii. Construction – Subdivision and stability, machinery and electrical installations
- iii. Fire protection, fire detection and fire extinction
- iv. Life Saving Appliances and arrangements
- v. Radio Communications
- vi. Safety of Navigation
- vii. Carriage of Cargoes
- viii. Carriage of Dangerous Goods
- ix. Nuclear Ships
- x. Management for the Safe Operation of Ships

- xi. Safety Measures for high-speed crafts
- xii. Special Measures for enhance maritime safety
- xiii. Special Measures for enhance maritime security
- xiv. Additional safety measures for bulk carriers.

Further IMO Codes provide guidelines in line with SOLAS requirements, such as:

- i. International Safety Management (ISM) Code
- ii. Life-Saving Appliances (LSA) Code
- iii. Fire Test Procedures (FTP) Code
- iv. Fire Safety Systems (FSS) Code.

-Deliverables

RINA performs verifications at the time of construction and throughout a vessel's service life, based on a satisfactory document review and periodical surveys, when delegated for these purposes by a Flag Administration.

We issue the following SOLAS certificates:

- i. International Bulk Chemical Certificate
- ii. International Certificate for Ships Carrying Liquefied Gases in Bulk
- iii. High Speed Craft Safety Certificate
- iv. Safety Construction Certificate
- v. Safety Equipment Certificate
- vi. Safety Radio Certificate
- vii. Passenger Ship Safety Certificate

viii. Document of Compliance for the Carriage of Dangerous Goods.

COMPANY'S ADDITIONAL BUSSINESS AREAS

Except of Maritime Area, RINA occupy with some other business areas:

1. ENERGY
2. TRANSPORT & INFRASTRUCTURE
3. CERTIFICATION
4. INDUSTRY



INDIAN REGISTER OF SHIPPING

Indian Register of Shipping (IRS) is an internationally recognized, independent ship classification society, founded in India in 1975. It is a Non-Profit organization and one of the 13 members of International Association of Classification Societies (IACS).

HISTORY

In 1977 IRS published its first rule book and after 2 years was authorized by the Indian government to assign load lines on Indian flag vessels. In 1991 became an associate of the IACS. In 1997 and was appointed by the Maritime Administration of the Indian government as the sole authority for final assignment of Load Line in Indian flag vessels and was the only recognized organization for conducting audits under the ISM code for all Indian Ships. In 2004 the ISPS came into effect and IRS was appointed to recognize security organization to determine compliance under the code for Indian flag ships and port facilities. Finally, in 2010 became a full member of IACS



RUSSIAN CLASSIFICATION

The Russian Classification Society was established in 1993. After that, in 1916 the first list of Russian Register Ships issued and 1923 the charter approved. In 1969 beomes a member of IACS. Nowadays RS is a leading world-known classification society closely associated with ice ships, high-tech icebreakers and ice-resistant equipment to develop offshore oil-and-gas fields.

The RS main objectives are:

- i. Improvement of standards of safety of life at sea\
- ii. Improvement of ship safe navigation standards
- iii. Improvement of standards of safe carriage of goods by sea and in inland waters
- iv. Development of measures and standards to prevent environmental pollution.

Highly qualified personnel and a wide network of offices in the Russian Federation and worldwide enable RS to provide prompt and reliable services elsewhere:

- i. Design technical appraisal, survey and issue of documents, certificates and reports to ships and offshore installations as well as to ship machinery,

equipment, arrangements, products, outfit and materials, refrigerating plants, cargo handling gear, containers

- ii. Tonnage measurement of ships and offshore installations
- iii. Survey for compliance with the requirements of international conventions and issue of relevant certificates and other documents on behalf of maritime administrations of the states - parties to the international conventions
- iv. Certification of industrial products and processes
- v. Certification of quality management, environmental management and health and safety management systems for compliance with the ISO International Standards Series 9001, 14001 and 45001.
- vi. Certification of safety management systems of shipping companies and ships for compliance with the International Management Code for the Safe Operation of Ships and for Pollution Prevention
- vii. Analysis of data and submission of information at the request of shipowners, maritime administrations, underwriters and port authorities in case of ship's class transfer
- viii. Cooperation with maritime administrations and port authorities during the inspections of ships in ports

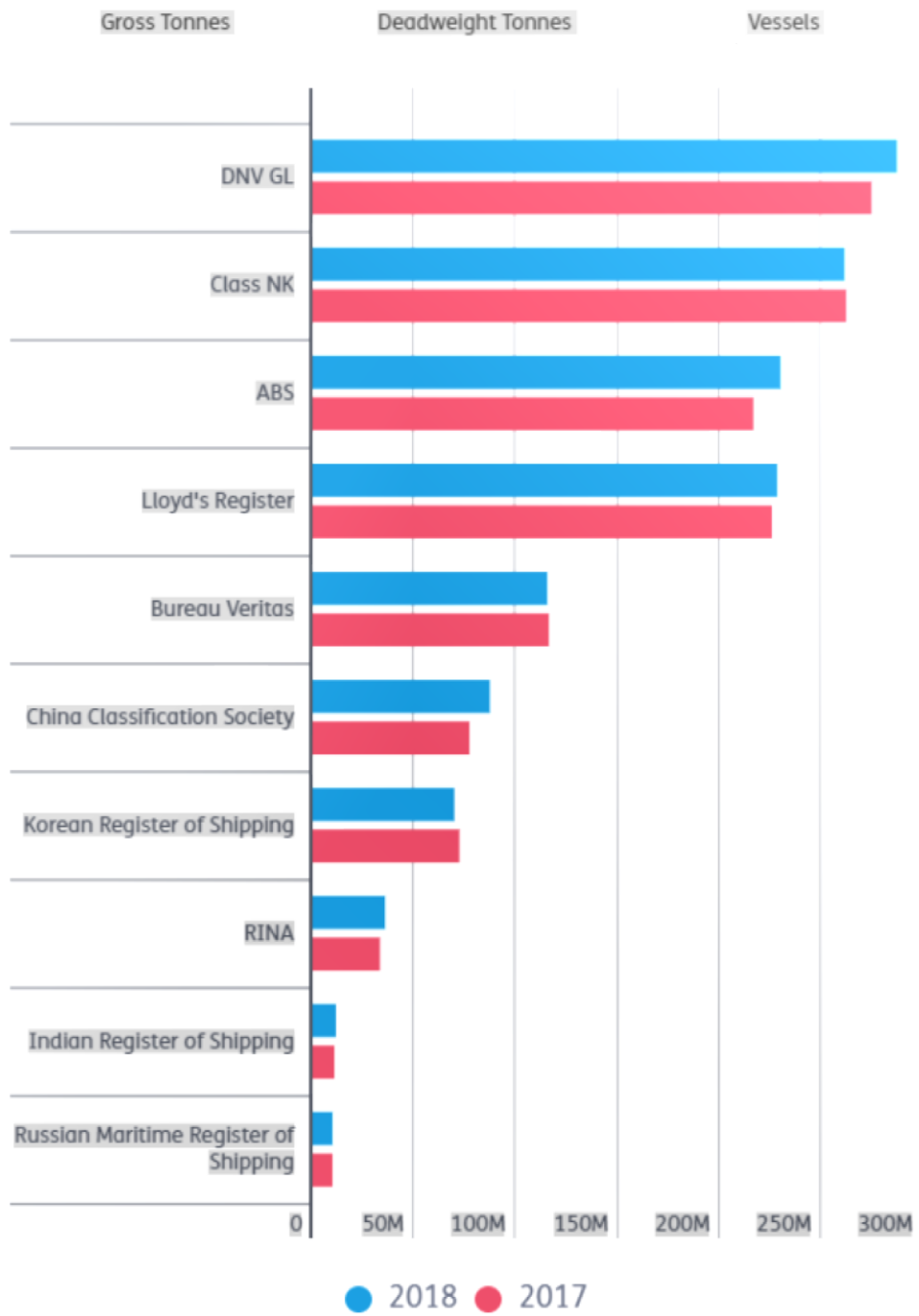
The classification activity of the Register is carried out in accordance with the General Provisions on classification and other activities. Classification surveys of ships and offshore installations in service are regulated by the Rules for the Classification Surveys of Ships in Service, the Guidelines for the Technical Supervision of Ships in Service, the Rules for the Surveys of Inland Navigation Ships in Service (for European Inland Waterways) and other RS Rules depending on the

type of ship and the offshore installation. Classification surveys of ships and offshore installations of various purposes are carried out to verify their compliance and the compliance of ship refrigeration units with the rules of the Russian Maritime Register of Shipping and with the normative and technical documents to determine the possibility of assignment, renewal, reassignment, retainment and confirmation of the Register class according to their purpose and to ensure the protection of human life at sea, the safe and reliable transport of passengers and cargo, and the prevention of pollution environment.

According the Lloyd's diagram list the top classification societies of 2018 by the tonnage are

1. DNV GL
2. CLASS NK
3. AMERICAN BUREAU OF SHIPPING
4. LLOYD'S REGISTER
5. BUREAU VERITAS
6. CHINA CLASSIFICATION SOCIETY
7. KOREAN REGISTER OF SHIPPING
8. RINA
9. INDIAN REGISTER OF SHIPPING
10. RUSSIAN MARITIME REGISTER OF SHIPPING

Top 10 Classification Societies



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