CIRCULAR

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Application outside CRS:

- MSTI
- Members of Mare Nostrum
- Shipyards: Uljanik, 3. MAJ, Kraljevica, Brodotrogir, Brodosplit

CONTENTS:

PURPOSE

The purpose of this circular is to describe the meaning of "goal based" regulation in general and to give explanation in more details of recently adopted (MSC 87) goal based ship construction standards for tankers and bulk carriers.

1. GBS IN GENERAL

1.1 Goal-based regulation – What does it mean?

In industry today there is an increasing tendency to adopt a goal-based approach to regulation in general and there are good technical and commercial reasons for believing this approach is preferable to more prescriptive regulation. "Goal-based regulation" does not specify the means of achieving compliance but sets goals that allow alternative ways of achieving compliance. For instance, "People shall be prevented from falling over the edge of a cliff" is goal-based. In prescriptive regulation the specific means of achieving compliance is mandated, e.g. "You shall install a 1 metre high rail at the edge of the cliff".

There are acknowledged shortcomings of prescriptive regulation. The parties applying such regulations are only required to carry out the mandated actions to discharge their legal responsibilities. If these actions then prove to be insufficient to prevent a subsequent accident, it is the regulations and those that set them that are seen to be deficient, not the parties applying them, whose responsibility, in law, it actually is. Prescriptive regulations tend to be a distillation of past experience and, as such, may become less and less relevant over time and at worst create unnecessary dangers in industries that are technically innovative. It is the innovator that is best placed to ensure the safety of their design, not the regulator. Clearly, prescriptive regulations are unable to cope with a diversity of design solutions. Also, prescriptive regulations encode the best engineering practice at the time they were written and rapidly become deficient where best practice is changing, e.g. with evolving technologies.

In fact, it is quite probable that prescriptive regulations eventually prevent industry from adopting current best practice. It follows that there are clear benefits in adopting a goal-based approach as it gives greater freedom in developing technical solutions and accommodating different standards.

1.2 GBS concept in IMO work in the past

Goal-based standards (GBS) are not a completely new concept in the work of IMO. Over the last few years, the Organization has started to introduce goal-based standards for certain special subjects, albeit not in a systematic manner. Examples are the revised SOLAS3 chapter II-2 on Construction - Fire protection, fire detection and fire extinction, which was completed in 2000, and the on-going work with regard to large passenger ship safety.

1.2.1 Revision of SOLAS Chapter II-2

SOLAS Chapter II-2 on Construction - Fire protection, fire detection and fire extinction was completely revised in 2000 and the revised chapter entered into force on 1 July 2002. In a radically new approach to the preparation of amendments to SOLAS, regulation 2 of the revised Chapter (Fire safety objectives and functional requirements) contains sections on fire safety objectives, functional requirements and achievement of the objectives. Although the chapter II-2 regulations still contain prescriptive requirements, each regulation now has a purpose statement and functional requirements to assist port and flag States in resolving matters which may not be fully addressed in the prescription requirements.

The revised Chapter II-2 also contains a regulation on Alternative design and arrangements (regulation 17) which allows deviation from the prescriptive requirements in the chapter by stipulating:

> "2.1 Fire safety design and arrangements may deviate from the prescriptive requirements set out in parts B, C, D, E or G, provided that the design and arrangements meet the fire safety objectives and the functional requirements.

2.2 When fire safety design or arrangements deviate from the prescriptive requirements of this chapter, engineering analysis, evaluation and approval of the alternative design and arrangements shall be carried out in accordance with this regulation."

This means that, for the first time, administrations are entitled to approve alternative designs and arrangements not complying with the prescriptive requirements contained in the chapter on condition that the designs and arrangements in question comply with the fire safety objectives and functional requirements contained in each regulation.

1.3 Generic guidelines for developing GBS

Note: This guidelines are based on IMO draft document MSC 87/5 and need further work before finalization. However, for the purpose of this circular document MSC 87/5 is considered as useful.

1.3.1 Purpose

These IMO Guidelines describe the process for the development, verification and implementation of goal-based standards (GBS) to support regulatory development within IMO.

The Guidelines are applicable to IMO, Administrations, classification societies recognized by an Administration and others who develop standards for ships. These Guidelines can be used to develop GBS for new areas of concern. The application of GBS will help ensure systematic and consistent development of new rules and regulations.

It should be noted that these Guidelines are generic and where they use phrases such as "required level of safety", this does not imply any preference for a specific technical approach.

1.3.2 Definitions

Goal-based standards (GBS) are high-level standards and procedures that are to be met through regulations, rules and standards for ships. GBS are comprised of at least one goal, functional requirement(s) associated with that goal, and verification of compliance that rules/regulations meet the functional requirements including goals. GBS establish "rules for rules".

A goal-based standards framework consists of goal-based standards and the associated detailed requirements of rules and regulations for ships (see Figure 1).

1.3.3 Basis principles

IMO goal-based standards are:

.1 broad, over-arching safety, environmental and/or security standards that ships are required to meet during their lifecycle;

.2 the required level to be achieved by the requirements applied by classification societies and other recognized organizations, Administrations and IMO;

.3 clear, demonstrable, verifiable, long-standing, implementable and achievable, irrespective of ship design and technology; and

.4 specific enough in order not to be open to differing interpretations.

1.3.4 Goals (Tier I)

Goals are high-level objectives to be met. A goal should address the issue(s) of concern and reflect the required level of safety.

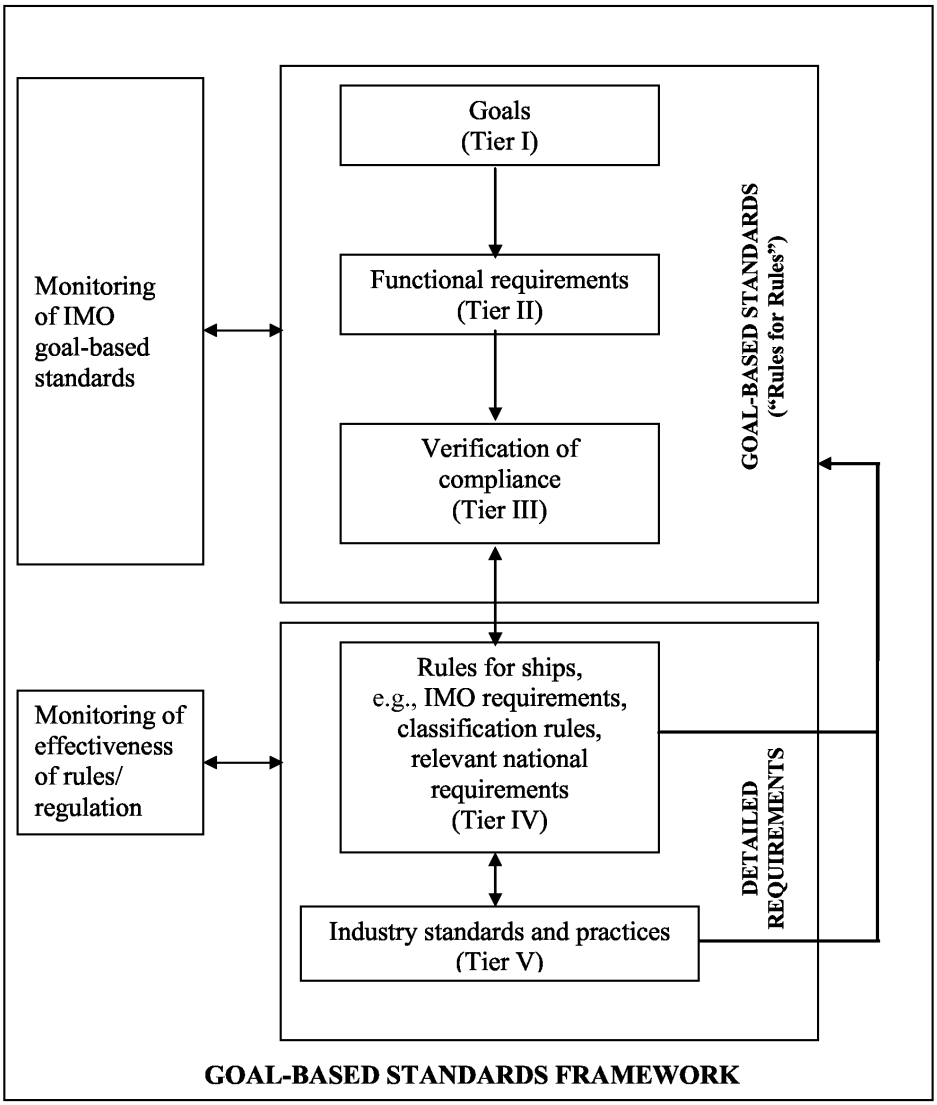

Figure 1
Goal-based standards framework

1.3.5 Functional requirements (Tier II)

Functional requirements provide the criteria to be satisfied in order to meet the goals. Once a goal has been set, functional requirements are defined. They should cover all functions/areas necessary to meet the goal, and be developed based on experience, an assessment of existing regulations, and/or systematic analysis of relevant hazards.

Figure 2 illustrates an example of how goal-based functional requirements for ship structure could be derived.

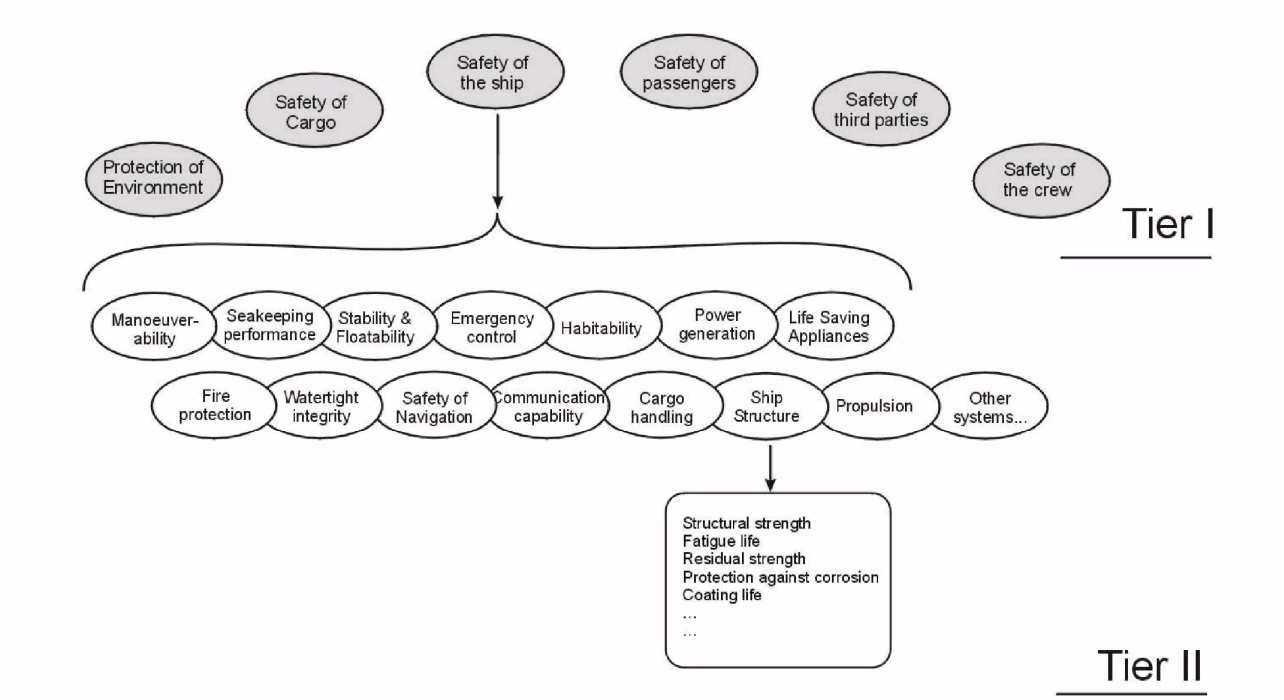

Figure 2
Example of how goal-based functional requirements for ship structure could be derived

1.3.6 Verification of compliance (Tier III)

.1 Verification of compliance provides the instruments necessary for demonstrating and verifying that the associated rules and regulations for ships comply with the goals and functional requirements. The verification process should be transparent and result in a consistent outcome irrespective of the evaluator.

.2 The verification process should be focused on the rule/regulations relevant to safety and environmental friendliness.

.3 Verification of compliance should establish the method and criteria to be applied during the verification process, and should consider the following elements:

.3.1 identification of the functional requirement(s) that are being addressed by the rules/regulations;

.3.2 extent to which the rules/regulations cover the functional requirements and contribute towards meeting the goal(s);

.3.3 rule commentary;

.3.4 technical documentation, which may include:

.3.4.1 mechanism of how the rules/regulations meet the functional requirements (operational, technical, design, etc.);

.3.4.2 explanation, including technical background information, of the way the rule/regulation was formulated/drafted; and

.3.4.3 methodology used to derive the rule/regulation along with supporting rationale/justification;

.3.5 quality assurance procedures applied throughout rule/regulation development process; and

.3.6 methods for obtaining feedback on the effectiveness of the rules/regulations and continuous improvement.

.4 Verification of compliance should:
- .1 be based on techniques varying from first principle models to historic data;
- .2 be based on analyses using proven, lately established technology;
- .3 be based on defined clear qualitative and quantitative criteria with a preference of quantitative values; and
- .4 check whether currently known modes and cases of failure are covered.
- .5 The developer of the rules/regulations under consideration is responsible for performing the analysis required to prove that the rules/regulations comply with the functional requirements the rules/regulations intend to cover.

1.3.7 Rules and regulations for ships (Tier IV)

Rules and regulations for ships are the detailed requirements developed by IMO, national Administrations and/or classification societies and applied by national Administrations and/or classification societies acting as recognized organizations to the design and construction of a ship in order to meet the goals and functional requirements. These detailed requirements become a part of a GBS framework when they have been verified as complying with the GBS.

1.3.8 Rules and regulations for ships (Tier V)

Industry standards, codes of practice and safety and quality systems for shipbuilding, ship operation, maintenance, training, manning, etc., may be incorporated into or referenced in the rules/regulations for the design and construction of a ship. The responsibility for justifying the suitability of such industry standards and practices, when referenced or incorporated in a rule set, rests with the rule/regulation submitter. This justification should be provided during the verification of compliance process.

1.3.9 Monitoring

Monitoring provides the information that is required in order to ensure the effectiveness of rules and regulations as well as the proactive identification of new risks. In order to verify that the risk of shipping is kept as low as reasonable practicable, safety should be continuously monitored and systematically analysed. The degree of detail for the data recording depends on the item to be monitored.

.1 As illustrated by Figure 1 of these Guidelines, two monitoring processes are distinguished:
- .1.1 the monitoring of the effectiveness of single rules/regulations; and
- .1.2 the monitoring of the effectiveness of the goals (Tier I) and the functional requirements (Tier II).

.2 The monitoring system to be established should address (list without any prioritization):
- .2.1 safety of passengers;
- .2.2 safety of third parties;
- .2.3 occupational safety and health of seafarers;
- .2.4 safety of ship;
- .2.5 protection of environment; and
- .2.6 safety of cargo.

.3 For both processes monitoring should consider, but not be limited to, historical data, such as casualty reports, in-service experience, accident investigation, incident reports, near miss reports, new scientific research results as published in the industry, as well as risk analysis.

2. GOAL-BASED STANDARDS FOR SHIP CONSTRUCTION

2.1 History

The notion of "goal-based ship construction standards" was introduced in IMO at the 89th session of the Council in November 2002 through a proposal by the Bahamas and Greece, suggesting that IMO should play a larger role in determining the standards to which new ships are built, traditionally the responsibility of classification societies and shipyards.

The paper argued that the Organization should develop initial ship construction standards that would permit innovation in design but at the same time ensure that ships are constructed in such a manner that, if properly maintained, they could remain safe for their economic life. The standards would also have to ensure that all parts of a ship could be easily accessed to permit proper inspection and ease of maintenance.

Over the next two years the matter was extensively discussed in the MSC, the Council and finally the IMO Assembly which, at its twenty-third session in 2003, included the item "Goal-based new ship construction standards" in the strategic plan and the long-term work plan of the Organization.

2.2 Methodology

From the outset there were different views in the MSC on how to approach the development of GBS for ship construction.

Some IMO Members advocated the application of a holistic approach which would define a procedure for the risk-based evaluation of the current safety level of existing mandatory regulations related to ship safety and consider ways forward to establish future risk acceptance criteria using FSA.

Other Members supported a more deterministic approach, based on the vast practical experience gained with oil tankers and bulk carriers over the years and stressed the need for clearly quantified functional requirements.

The MSC had extensive and wide ranging discussions on this issue, with active participation by many different Administrations, during which support for both methodologies was expressed. It was particularly noted that the GBS for new ship construction would not be limited to bulk carriers and tankers, but were meant to address, at a future date, all ship types and subsequently the current results would have to be expanded in order to make them applicable to all ship types.

It was therefore agreed that the use of the risk-based methodology should be further explored over the next few sessions of the MSC, while, at the same time, proceeding with the development of GBS using the deterministic approach. But this also means that, if it were decided to adopt the risk-based approach at some point in the future, a revisit of the goal-based standards developed under the deterministic methodology would be required to verify consistency and make changes where necessary.

The paper argued that the Organization should develop initial ship construction standards that would.

2.3 GBS package of measures adopted/approved on MSC 87 in respect to construction standards for bulk carriers and oil tankers

Note: All resolutions mentioned hereunder are contained in Annex to this circular

2.3.1 GBS and amendments to Ch. II-1, SOLAS 74 (new Reg. 3-10)

The MSC 87 adopted resolution MSC.290(87) which contains a new SOLAS regulation that requires new single side skin bulk carriers (excluding ore carriers and combination carriers) of 150m in length, and above, and oil tankers of 150m in length, and above to be designed and built to class society's rules that have been verified by the IMO to meet the new Goal Based Ship construction standards, GBS, which were also adopted MSC 87.

New oil tankers and bulk carriers are those ships:

- for which the building contract is placed on or after 1 July 2016;
- in the absence of a building contract, the keels of which are laid or which are at a similar stage of construction on or after 1 July 2017; or
- regardless of the contract or keel laying date, the delivery of which is on or after 1 July 2020.

The GBS standards, contained in resolution MSC.287(87), have been developed for a design life of not less than 25 years under specified operating and environmental conditions for unrestricted ocean service (i.e., North Atlantic environmental conditions). GBS provides for adequate strength, integrity and stability to minimize the risk of marine pollution due to the ship's structural failure resulting in flooding or loss of watertight integrity.

This means that, for the first time in its history, IMO will be setting standards for ship construction.

2.3.2 Verification of conformity with GBS

The MSC 87 also adopted guidelines (Res. MSC.296(87)) that, equally for first time, give the IMO a role in verifying compliance with SOLAS requirements. The guidelines establish the procedures to be followed in order to verify that the design and construction rules of an Administration or its recognized organization, for bulk carriers and/or oil tankers, conform to the adopted GBS. The verification process consists of two main elements: self assessment of the rules by the entity submitting them to IMO for verification; followed by an audit, to be carried out by experts appointed by the Organization, of the rules, the self-assessment and the supporting documentation.

2.3.3 Ship construction file (SCF)

MSC 87 also approved the MSC.1/C irc.1343 on Guidelines for the information to be included in SCF.

The purpose of these Guidelines is to provide additional guidance on the content of the (SCF) to be provided upon delivery of new bulk carriers and oil tankers in accordance with SOLAS regulation II-1/3-10.4, kept on board the ship and/or ashore and updated as appropriate throughout the ship's life in order to facilitate safe operation, maintenance, survey, repair and emergency measures.

2.3.4 Timetable and schedule of activities for the implementation of the GBS verification scheme

Timeline	Action
May 2010	MSC 87 adopts GBS SOLAS amendments
June 2010	• Secretariat issues circular letter calling for nominations of auditors, processes received nominations and regularly reports on progress to the Committee • Secretariat issues circular letter inviting advanced notification of intention to submit a verification request
1 July 2011	GBS SOLAS amendments deemed to be accepted
July 2011	• Secretariat staff is recruited and commences work on the establishment of the GBS verification scheme • Secretariat issues circular letter inviting requests for initial verification audits
1 January 2012	GBS SOLAS amendments enter into force and Standards take effect
January 2012 to December 2015	• Secretariat prepares, organizes and finalizes all audits requested • Secretariat processes any appeal requests • Secretariat regularly reports to the Committee on progress made
31 December 2013	Deadline for the receipt of initial verification requests at IMO
2014	MSC reviews progress made in GBS implementation
January 2016	Secretariat prepares documentation on all audits conducted for MSC 96 for final decision on conformity
May 2016	• MSC 96 takes final decisions on conformity with GBS for all rules submitted • Secretariat informs Administrations/ROs of MSC's decision • Secretariat circulates results of successful verifications • Secretariat maintains list of all rules verified to conform to Standards
1 July 2016	GBS SOLAS amendments (and Standards) become applicable
December 2016	MSC 97 reconsiders the verification process and related resources
January 2017	• Secretariat prepares for and organizes annual audits of rule changes, and *ad hoc* rule change audits as and when requested • Secretariat organizes initial verification audits as may be requested • Secretariat processes any appeal requests

2.4 IACS Harmonized Common Structural Rules (HSR)

In December 2005, the Common Structural Rules (CSR) for oil tankers and bulk carriers were adopted by IACS for implementation on 1 April 2006. The CSR are based on sound technical grounds, and achieve the goals of more robust and safer ships.

These CSR for oil tankers and bulk carriers were developed separately and were based on different technical approaches. During the review process of CSR prior to their adoption, industry stakeholders urged IACS to harmonize key technologies such as wave loads, fatigue, finite element analysis and buckling; and IACS committed to develop a harmonized version of these Rules.

IACS is therefore now undertaking a project to develop Harmonized Common Structural Rules (HSR) for oil tankers and bulk carriers. Through a harmonization process, the HSR will be developed into a consistent methodology, which will satisfy the commitments made to Industry.

The HSR will consist of three parts: a common part for "general hull requirements" that will contain requirements for both ship types, and separate parts for "ship type specific" requirements applicable to oil tankers and bulk carriers respectively. Noting that the CSR were developed and adopted prior to the substantive development of the GBS provisions in IMO, the development of HSR provides an opportunity for IACS to consider and take account of the discussions and decisions taken in the development of the GBS. The development of HSR is also taking account of the experience gained in the application of the separate CSRs, including feedback from industry partners. The goal of the HSR remains the same as the original CSR development, which is to establish unified rules and procedures for safe and robust ships, but now also includes the formal consideration of the IMO GBS. The new HSR will therefore be of great benefit to industry in providing a set of Rules based on a holistic and common set of principles for both ship types.

In particular, the benefit to IMO of the HSR is that it will need a significantly reduced effort to undertake the verification process to demonstrate that the Classification Society Rules deliver the goals and functional requirements specified in the GBS framework.

3. FUTURE WORK ON GOAL-BASED STANDARDS IN IMO

3.1 In considering how to proceed with further work on goal-based standards the MSC 87 agreed the following list of issues under long-term considerations:

- assessment of the experience gained from the application of GBS and incorporation of lessons learned into the Generic guidelines for developing goal-based standards (MSC 87/5);
- validation of the results of the safety level approach by comparing with the prescriptive approach;
- determination of the current safety level of the rules/regulations;
- application of GBS to other ship types on an incremental basis;
- expansion of GBS to cover every aspect of the design and construction of new ships;
- consideration of whether all new or revised IMO regulations, classification rules and other mandatory standards should be followed by a commentary in an agreed format, explicitly stating which functional requirements are addressed and providing the substantial basis for the regulation; and
- consideration of whether any changes to the IMO process for submitting proposals for new work programme items are needed after approval/adoption of the guidelines for developing goal-based standards.

3.2 MSC 87 also agreed to keep the item on "Goal-based new ship construction standards" on the Committee's agenda to:

- monitor the progress made with the implementation of the GBS SOLAS amendments and Standards, and in particular the verification scheme, taking into account the regular progress reports by the Secretariat as stipulated in the timetable and schedule of activities for the implementation of the GBS verification scheme and take action as may be necessary;
- further develop/finalize the Generic guidelines for developing goal-based standards; and
- further consider the issues under long-term considerations as specified in 3.1 above.

ANNEX 1

RESOLUTION MSC.287(87)
(adopted on 20 May 2010)

ADOPTION OF THE INTERNATIONAL GOAL-BASED SHIP CONSTRUCTION STANDARDS FOR BULK CARRIERS AND OIL TANKERS

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

BEING DESIROUS that the Organization should play a larger role in determining the structural standards to which new ships are built,

RECALLING ALSO that among the strategic directions of the Organization relating to developing and maintaining a comprehensive framework for safe, secure, efficient and environmentally sound shipping is the establishment of goal-based standards for the design and construction of ships,

CONSIDERING that ships should be designed and constructed for a specified design life to be safe and environmentally friendly, so that, if properly operated and maintained under specified operating and environmental conditions, they can remain safe throughout their service life,

NOTING regulations II-1/2.28 and II-1/3-10 of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended (hereinafter referred to as "the Convention"), adopted by resolution MSC.290(87), concerning goal-based ship construction standards for bulk carriers and oil tankers,

NOTING ALSO that the aforementioned regulation II-1/3-10 requires that bulk carriers and oil tankers as defined therein satisfy the applicable structural requirements of a recognized organization, or national standards of an Administration, conforming to the functional requirements of the goal-based ship construction standards for bulk carriers and oil tankers,

HAVING CONSIDERED, at its eighty-seventh session, the proposed International Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers,

1. ADOPTS the International Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers, the text of which is set out in the Annex to the present resolution;

2. INVITES Contracting Governments to the Convention to note that the International Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers will take effect on 1 January 2012 upon entry into force of regulation II-1/3-10 of the Convention;

3. REQUESTS the Secretary-General to transmit certified copies of this resolution and the text of the International Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers, contained in the Annex, to all Contracting Governments to the Convention;

4. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and the Annex to all Members of the Organization which are not Contracting Governments to the Convention.

ANNEX

INTERNATIONAL GOAL-BASED SHIP CONSTRUCTION STANDARDS FOR BULK CARRIERS AND OIL TANKERS

1 PREAMBLE

1.1 The notion of "goal-based ship construction standards" was introduced in the Organization at the eighty-ninth session of the Council in November 2002 through a proposal by the Bahamas and Greece*, suggesting that the Organization should develop ship construction standards that would permit innovation in design but ensure that ships are constructed in such a manner that, if properly maintained, they remain safe for their entire economic life. The standards would also have to ensure that all parts of a ship can be easily accessed to permit proper inspection and ease of maintenance. The Council referred the proposal to the seventy-seventh meeting of the Maritime Safety Committee (MSC) in May/June 2003 for consideration.

1.2 The MSC, at its seventy-seventh session, considered the matter as requested and recommended that the ninetieth session of the Council should consider it further in the context of the development of the Organization's Strategic Plan. The Committee also agreed to include a new item on "Goal-based new ship construction standards" in its work programme and agenda for its next meeting.

1.3 The ninetieth session of the Council, in considering the strategy and policy of the Organization for the 2006 to 2011 period, approved strategic directions regarding the development of goal-based standards for the design and construction of new ships. Subsequently, at its twenty-second extraordinary session, the Council included in the strategic directions of the Organization a provision that "IMO will establish goal-based standards for the design and construction of new ships".

1.4 The Assembly, at its twenty-third session in November/December 2003, when adopting resolution A.944(23) on the Organization's Strategic plan for the six-year period 2004 to 2010, resolved, *inter alia*, that "the IMO would establish goal-based standards for the design and construction of new ships". This decision was also reflected in resolution A.943(23) on the Long-term work plan of the Organization, up to 2010, where the subject "Goal-based new ship construction standards" was introduced in the list of general subjects.

1.5 The MSC commenced detailed technical work on the development of goal-based ship construction standards at its seventy-eighth session in May 2004, when a comprehensive general debate of the issues involved took place and the Committee agreed to utilize a five-tier system initially proposed by the Bahamas, Greece and IACS, consisting of the following:

.1 ***Tier I – Goals***
High-level objectives to be met.

.2 ***Tier II – Functional requirements***
Criteria to be satisfied in order to conform to the goals.

* Document C 89/12/1 (Bahamas, Greece) – IMO Strategic Plan.

.3 ***Tier III – Verification of conformity***
Procedures for verifying that the rules and regulations for ship design and construction conform to the goals and functional requirements.

.4 ***Tier IV – Rules and regulations for ship design and construction***
Detailed requirements developed by IMO, national Administrations and/or recognized organizations and applied by national Administrations and/or recognized organizations acting on their behalf to the design and construction of a ship in order to conform to the goals and functional requirements.

.5 ***Tier V – Industry practices and standards***
Industry standards, codes of practice and safety and quality systems for shipbuilding, ship operation, maintenance, training, manning, etc., which may be incorporated into, or referenced in, the rules and regulations for the design and construction of a ship.

1.6 Following deliberation on the subject at its eighty-first session, the Committee agreed to limit the scope of its consideration initially to bulk carriers and oil tankers and consider expansion to other ship types and areas of safety at a later time.

2 SCOPE

The International Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers (hereinafter referred to as "the Standards") describe the goals and establish the functional requirements that the rules for the design and construction of bulk carriers and oil tankers of an organization recognized by the Administration, or the national rules of an Administration, shall conform to, as defined in SOLAS regulations II-1/2.28 and II-1/3-10. Additionally, the Standards establish that the above mentioned rules shall be verified as conforming to the goals and functional requirements.

3 STRUCTURE

These Standards consist of the following three tiers:

Tier I – Goals
Tier II – Functional requirements
Tier III – Verification of conformity.

4 TIER I – GOALS

The Tier I goals are as defined in SOLAS regulation II-1/3-10 and are reproduced here for ease of reference, as follows:

Ships shall be designed and constructed for a specified design life to be safe and environmentally friendly, when properly operated and maintained under the specified operating and environmental conditions, in intact and specified damage conditions, throughout their life.

.1 *Safe and environmentally friendly* means the ship shall have adequate strength, integrity and stability to minimize the risk of loss of the ship or pollution to the marine environment due to structural failure, including collapse, resulting in flooding or loss of watertight integrity.

.2 *Environmentally friendly* also includes the ship being constructed of materials for environmentally acceptable recycling.

.3 *Safety* also includes the ship's structure, fittings and arrangements providing for safe access, escape, inspection and proper maintenance and facilitating safe operation.

.4 *Specified operating and environmental conditions* are defined by the intended operating area for the ship throughout its life and cover the conditions, including intermediate conditions, arising from cargo and ballast operations in port, waterways and at sea.

.5 *Specified design life* is the nominal period that the ship is assumed to be exposed to operating and/or environmental conditions and/or the corrosive environment and is used for selecting appropriate ship design parameters. However, the ship's actual service life may be longer or shorter depending on the actual operating conditions and maintenance of the ship throughout its life cycle.

5 TIER II – FUNCTIONAL REQUIREMENTS

(Applicable to bulk carriers and oil tankers in unrestricted navigation*)

DESIGN

II.1 Design life

The specified design life shall not be less than 25 years.

II.2 Environmental conditions

Ships shall be designed in accordance with North Atlantic environmental conditions and relevant long-term sea state scatter diagrams.

II.3 Structural strength

II.3.1 General design

The ship's structural members shall be of a design that is compatible with the purpose of the space and ensures a degree of structural continuity. The structural members of ships shall be designed to facilitate load/discharge for all contemplated cargoes to avoid damage by loading/discharging equipment, which may compromise the safety of the structure.

II.3.2 Deformation and failure modes

The structural strength shall be assessed against excessive deflection and failure modes, including but not limited to buckling, yielding and fatigue.

* Unrestricted navigation means that the ship is not subject to any geographical restrictions (i.e. any oceans, any seasons) except as limited by the ship's capability for operation in ice.

II.3.3 Ultimate strength

Ships shall be designed to have adequate ultimate strength. Ultimate strength calculations shall include ultimate hull girder capacity and related ultimate strength of plates and stiffeners, and be verified for a longitudinal bending moment based on the environmental conditions in functional requirement II.2.

II.3.4 Safety margins

Ships shall be designed with suitable safety margins:

.1 to withstand, at net scantlings*, in the intact condition, the environmental conditions anticipated for the ship's design life and the loading conditions appropriate for them, which shall include full homogeneous and alternate loads, partial loads, multi-port and ballast voyage, and ballast management condition loads and occasional overruns/overloads during loading/unloading operations, as applicable to the class designation; and

.2 appropriate for all design parameters whose calculation involves a degree of uncertainty, including loads, structural modelling, fatigue, corrosion, material imperfections, construction workmanship errors, buckling, residual and ultimate strength.

II.4 Fatigue life

The design fatigue life shall not be less than the ship's design life and shall be based on the environmental conditions in functional requirement II.2.

II.5 Residual strength

Ships shall be designed to have sufficient strength to withstand the wave and internal loads in specified damaged conditions such as collision, grounding or flooding. Residual strength calculations shall take into account the ultimate reserve capacity of the hull girder, including permanent deformation and post-buckling behaviour. Actual foreseeable scenarios shall be investigated in this regard as far as is reasonably practicable.

II.6 Protection against corrosion

Measures shall be applied to ensure that net scantlings required to meet structural strength provisions are maintained throughout the specified design life. Measures include, but are not limited to, coatings, corrosion additions, cathodic protection, impressed current systems, etc.

II.6.1 Coating life

Coatings shall be applied and maintained in accordance with manufacturers' specifications concerning surface preparation, coating selection, application and maintenance. Where coating is required to be applied, the design coating life shall be specified. The actual coating life may be longer or shorter than the design coating life, depending on the actual conditions

* The net scantlings should provide the structural strength required to sustain the design loads, assuming the structure is in intact condition and without any corrosion margin. However, when assessing fatigue and global strength of hull girder and primary supporting structures, a portion of the total corrosion margin may be added to the net scantlings to reflect the material thickness that can reasonably be expected to exist over the design life.

and maintenance of the ship. Coatings shall be selected as a function of the intended use of the compartment, materials and application of other corrosion prevention systems, e.g., cathodic protection or other alternatives.

II.6.2 Corrosion addition

The corrosion addition shall be added to the net scantling and shall be adequate for the specified design life. The corrosion addition shall be determined on the basis of exposure to corrosive agents such as water, cargo or corrosive atmosphere, or mechanical wear, and whether the structure is protected by corrosion prevention systems, e.g., coating, cathodic protection or by alternative means. The design corrosion rates (mm/year) shall be evaluated in accordance with statistical information established from service experience and/or accelerated model tests. The actual corrosion rate may be greater or smaller than the design corrosion rate, depending on the actual conditions and maintenance of the ship.

II.7 Structural redundancy

Ships shall be of redundant design and construction so that localized damage (such as local permanent deformation, cracking or weld failure) of any stiffening structural member will not lead to immediate consequential collapse of the complete stiffened panel.

II.8 Watertight and weathertight integrity

Ships shall be designed to have adequate watertight and weathertight integrity for the intended service of the ship and adequate strength and redundancy of the associated securing devices of hull openings.

II.9 Human element considerations

Ship's structures and fittings shall be designed and arranged using ergonomic principles to ensure safety during operations, inspection and maintenance. These considerations shall include, but not be limited to, stairs, vertical ladders, ramps, walkways and standing platforms used for means of access, the work environment, inspection and maintenance and the facilitation of operation.

II.10 Design transparency

Ships shall be designed under a reliable, controlled and transparent process made accessible to the extent necessary to confirm the safety of the new as-built ship, with due consideration to intellectual property rights. Readily available documentation shall include the main goal-based parameters and all relevant design parameters that may limit the operation of the ship.

CONSTRUCTION

II.11 Construction quality procedures

Ships shall be built in accordance with controlled and transparent quality production standards with due regard to intellectual property rights. The ship construction quality procedures shall include, but not be limited to, specifications for material, manufacturing, alignment, assembling, joining and welding procedures, surface preparation and coating.

II.12 Survey during construction

A survey plan shall be developed for the construction phase of the ship, taking into account the ship type and design. The survey plan shall contain a set of requirements, including specifying the extent and scope of the construction survey(s) and identifying areas that need special attention during the survey(s), to ensure compliance of construction with mandatory ship construction standards.

IN-SERVICE CONSIDERATIONS

II.13 Survey and maintenance

Ships shall be designed and constructed to facilitate ease of survey and maintenance, in particular avoiding the creation of spaces too confined to allow for adequate survey and maintenance activities. Areas shall be identified that need special attention during surveys throughout the ship's life. In particular, this shall include all necessary in-service survey and maintenance that was assumed when selecting ship design parameters.

II.14 Structural accessibility

The ship shall be designed, constructed and equipped to provide adequate means of access to all internal structures to facilitate overall and close-up inspections and thickness measurements.

RECYCLING CONSIDERATIONS

II.15 Recycling

Ships shall be designed and constructed of materials for environmentally acceptable recycling without compromising the safety and operational efficiency of the ship.

6 TIER III – VERIFICATION OF CONFORMITY

6.1 The rules for the design and construction of bulk carriers and oil tankers of an organization which is recognized by an Administration in accordance with the provisions of SOLAS regulation XI-1/1, or national rules of an Administration used as an equivalent to the rules of a recognized organization according to SOLAS regulation II-1/3-1, shall be verified as conforming to the Tier I goals and Tier II functional requirements, based on the guidelines developed by the Organization[*]. The final decision on verification of conformity shall be taken by the Maritime Safety Committee of the Organization which shall inform all Contracting Governments of the decision.

6.2 The term "verification" (and any variation of the word "verify") means that the rules for the design and construction of bulk carriers and oil tankers as described above have been compared to the Standards and have been found to be in conformity with or are consistent with the goals and functional requirements as set out in the Standards.

6.3 Once the rules for the design and construction of bulk carriers and oil tankers of an Administration or recognized organization have been verified as being in conformity with the Standards, this conformity shall be considered to remain in effect for rule changes, provided

[*] Refer to the Guidelines for verification of conformity with goal-based ship construction standards for bulk carriers and oil tankers, adopted by the Organization by resolution MSC.296(87).

that no verification of rule changes has resulted in a non-conformity. Unless the Maritime Safety Committee decides otherwise, any rule changes introduced as a result of verification of conformity shall apply to ships for which the building contract is placed on or after the date on which the rule change enters into force.

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ANNEX 4

RESOLUTION MSC.290(87)
(adopted on 21 May 2010)

ADOPTION OF AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO article VIII(b) of the International Convention for the Safety of Life at Sea (SOLAS), 1974 (hereinafter referred to as "the Convention"), concerning the amendment procedure applicable to the Annex to the Convention, other than to the provisions of chapter I thereof,

RECALLING FURTHER that among the strategic directions of the Organization relating to developing and maintaining a comprehensive framework for safe, secure, efficient and environmentally sound shipping is the establishment of goal-based standards for the design and construction of new ships,

CONSIDERING that ships should be designed and constructed for a specified design life to be safe and environmentally friendly, so that, if properly operated and maintained under specified operating and environmental conditions, they can remain safe throughout their service life,

HAVING CONSIDERED, at its eighty-seventh session, amendments to the Convention, proposed and circulated in accordance with article VIII(b)(i) thereof,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the Convention, the text of which is set out in the Annex to the present resolution;

2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the said amendments shall be deemed to have been accepted on 1 July 2011, unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;

3. INVITES SOLAS Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention the amendments shall enter into force on 1 January 2012 upon their acceptance in accordance with paragraph 2 above;

4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the Annex to all Contracting Governments to the Convention;

5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annex to Members of the Organization which are not Contracting Governments to the Convention;

6. RESOLVES to review the progress towards the implementation of SOLAS regulation II-1/3-10 in 2014 and, if proven necessary, to adjust the time periods set forth in paragraph 1 of the regulation.

ANNEX

AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

CHAPTER II-1
CONSTRUCTION – STRUCTURE, SUBDIVISION AND STABILITY, MACHINERY AND ELECTRICAL INSTALLATIONS

Part A
General

Regulation 2 – Definitions

1 The following new paragraph 28 is added after the existing paragraph 27:

"28 *Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers* means the International Goal-Based Ship Construction Standards for Bulk Carriers and Oil Tankers, adopted by the Maritime Safety Committee by resolution MSC.287(87), as may be amended by the Organization, provided that such amendments are adopted, brought into force and take effect in accordance with the provisions of article VIII of the present Convention concerning the amendment procedures applicable to the annex other than chapter I thereof."

Part A-1
Structure of ships

2 The following new regulation 3-10 is added after the existing regulation 3-9:

"Regulation 3-10
Goal-based ship construction standards for bulk carriers and oil tankers

1 This regulation shall apply to oil tankers of 150 m in length and above and to bulk carriers of 150 m in length and above, constructed with single deck, top-side tanks and hopper side tanks in cargo spaces, excluding ore carriers and combination carriers:

.1 for which the building contract is placed on or after 1 July 2016;

.2 in the absence of a building contract, the keels of which are laid or which are at a similar stage of construction on or after 1 July 2017; or

.3 the delivery of which is on or after 1 July 2020.

2 Ships shall be designed and constructed for a specified design life to be safe and environmentally friendly, when properly operated and maintained under the specified operating and environmental conditions, in intact and specified damage conditions, throughout their life.

2.1 *Safe and environmentally friendly* means the ship shall have adequate strength, integrity and stability to minimize the risk of loss of the ship or pollution to the marine environment due to structural failure, including collapse, resulting in flooding or loss of watertight integrity.

2.2 *Environmentally friendly* also includes the ship being constructed of materials for environmentally acceptable recycling.

2.3 *Safety* also includes the ship's structure, fittings and arrangements providing for safe access, escape, inspection and proper maintenance and facilitating safe operation.

2.4 *Specified operating and environmental conditions* are defined by the intended operating area for the ship throughout its life and cover the conditions, including intermediate conditions, arising from cargo and ballast operations in port, waterways and at sea.

2.5 *Specified design life* is the nominal period that the ship is assumed to be exposed to operating and/or environmental conditions and/or the corrosive environment and is used for selecting appropriate ship design parameters. However, the ship's actual service life may be longer or shorter depending on the actual operating conditions and maintenance of the ship throughout its life cycle.

3 The requirements of paragraphs 2 to 2.5 shall be achieved through satisfying applicable structural requirements of an organization which is recognized by the Administration in accordance with the provisions of regulation XI-1/1, or national standards of the Administration, conforming to the functional requirements of the Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers.

4 A Ship Construction File with specific information on how the functional requirements of the Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers have been applied in the ship design and construction shall be provided upon delivery of a new ship, and kept on board the ship and/or ashore[*] and updated as appropriate throughout the ship's service. The contents of the Ship Construction File shall, at least, conform to the guidelines developed by the Organization.[*]

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[*] Refer to the Guidelines for the information to be included in a Ship Construction File (MSC.1/Circ.1343)."

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ANNEX 12

RESOLUTION MSC.296(87)
(adopted on 20 May 2010)

ADOPTION OF THE GUIDELINES FOR VERIFICATION OF CONFORMITY WITH GOAL-BASED SHIP CONSTRUCTION STANDARDS FOR BULK CARRIERS AND OIL TANKERS

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

HAVING ADOPTED, by resolution MSC.287(87), the International Goal-Based Ship Construction Standards for Bulk Carriers and Oil Tankers (hereinafter referred to as "the Standards") and, by resolution MSC.290(87), SOLAS regulations II-1/2.28 and II-1/3-10 to make the Standards mandatory,

NOTING that section 6 of the Standards requires that the rules for the design and construction of bulk carriers and oil tankers of an organization which is recognized by an Administration in accordance with the provisions of SOLAS regulation XI-1/1, or national rules of an Administration used as an equivalent to the rules of a recognized organization according to SOLAS regulation II-1/3-1, shall be verified as conforming to the goals and functional requirements of the Standards, based on the guidelines developed by the Organization,

RECOGNIZING the need for guidelines on how to carry out such verification, so as to ensure uniformity of the verification process,

HAVING CONSIDERED, at its eighty-seventh session, the proposed Guidelines for verification of conformity with goal-based ship construction standards for bulk carriers and oil tankers,

1. ADOPTS the Guidelines for verification of conformity with goal-based ship construction standards for bulk carriers and oil tankers, the text of which is set out in the Annex to the present resolution;

2. REQUESTS Administrations and organizations recognized by Administrations in accordance with the provisions of SOLAS regulation XI-1/1 to utilize the Guidelines when applying for verification that their design and construction rules for bulk carriers and oil tankers conform to the Standards;

3. RESOLVES to review these Guidelines, as necessary, in view of experience gained with their application.

ANNEX

GUIDELINES FOR VERIFICATION OF CONFORMITY WITH THE INTERNATIONAL GOAL-BASED SHIP CONSTRUCTION STANDARDS FOR BULK CARRIERS AND OIL TANKERS

INTRODUCTION

1 The Organization has adopted, by resolution MSC.287(87), the International goal-based ship construction standards for bulk carriers and oil tankers (hereinafter referred to as "the Standards"), specifying goals, functional requirements and verification of conformity to ensure that ships are constructed in such a manner that, when properly operated and maintained, they can remain safe for their design life, and that all parts of a ship can be easily accessed to permit proper inspection and ease of maintenance.

2 These Guidelines for verification of conformity with goal-based ship construction standards for bulk carriers and oil tankers (hereinafter referred to as "the Guidelines") provide the procedures necessary for demonstrating and verifying that the ship design and construction rules for bulk carriers and oil tankers of an Administration or its recognized organization conform to the Standards, including both the method and criteria to be applied during the verification process.

3 The Guidelines are composed of two parts:

.1 Part A establishes the procedures to be followed in order to verify that ship design and construction rules conform to the Standards. It includes sections on initial verification and maintenance of verification of the rules.

.2 Part B provides detailed documentation requirements and evaluation criteria that should be used to verify that the rules conform to the Standards.

Definitions

4 For the purpose of the Guidelines, the following definitions apply:

.1 *Conformity* means fulfilment of a requirement.

.2 *Finding* means an observation or a non-conformity.

.3 *Non-conformity* means non-fulfilment of a requirement.

.4 *Objective evidence* means quantitative or qualitative information, records or statement of fact which are based on observation, measurement or test and which can be verified.

.5 *Observation* means statements of fact or proposals made during an audit which are based on objective evidence but are not a non-conformity.

.6 *Organization* means the International Maritime Organization.

.7 *Rules* or *rule set* means regulations for hull design and construction of bulk carriers and/or oil tankers operating in unrestricted worldwide service.

.8 *Secretary-General* means the Secretary-General of the International Maritime Organization.

.9 *Self-assessment* means the Submitter assesses its rules for the design and construction of bulk carriers and/or oil tankers for conformity with the goals and functional requirements as set out in the Standards.

.10 *SOLAS* means the International Convention for the Safety of Life at Sea, 1974, as amended.

.11 *Standards* means the International goal-based ship construction standards for bulk carriers and oil tankers, adopted by the Organization by resolution MSC.287(87).

.12 *Submitter* means any Administration or recognized organization that requests the Organization to verify that its ship design and construction rules for bulk carriers and/or oil tankers conform to the Standards.

.13 *Verification* (and any variation of the word *verify*) means the rules for the design and construction of bulk carriers and oil tankers have been compared to the Standards and have been found to be in conformity with or are consistent with the goals and functional requirements as set out in the Standards.

.14 *Verification audit* or *audit* means the process of evaluating the Submitter's rules, self-assessment and supporting documentation to ascertain the validity and reliability of information. The purpose of the audit is to assess the conformity of the submitted rules with the Standards based on work done on a sampling basis.

PART A
VERIFICATION PROCESS

Scope of verification

5 This part establishes the procedures to be followed in order to verify that design and construction rules for bulk carriers and/or oil tankers conform to the Standards. It includes sections on initial verification, maintenance of verification and establishment of a Goal-based Standards Audit Team (the Team). The verification process consists of two main elements: self-assessment of the rules by the Submitter and an audit of the rules, the self-assessment and the supporting documentation by the Organization.

Initial verification

Initiation

6 Any Administration or recognized organization wishing to have its rules verified as conforming to the Standards should initiate the process with a letter to the Secretary-General, requesting a verification audit of their rules. The letter should be accompanied by a complete technical documentation package (see paragraph 9) and a supporting letter from an Administration that has recognized the Submitter, if applicable.

7 The Secretary-General notifies the Submitter of his decision to accept or reject the request, and, if accepted, advises the expected date for establishment of the Team to audit the submission. If the request is rejected, the Secretary-General will include the reason for doing so.

8 The Submitter may withdraw the application at any time prior to consideration by the Maritime Safety Committee.

Submission

9 The Submitter should provide a technical documentation package for review in hard copy (one copy for each member of the Team and one for the Secretariat) and in electronic form in English, including:

.1 The rule set to be verified as conforming to the Standards.

.2 All items listed under information and documentation requirements in part B of these Guidelines which are not included in .1 above and are included in the internal quality management system or the rule development process as applicable.

.3 A self-assessment, addressing all items listed under information and documentation requirements and evaluation criteria in part B of these Guidelines.

.4 A clear indication of any instance where a functional requirement, or portions of it, are satisfied by IMO mandatory instruments that are not part of the submitted rules (e.g., SOLAS or MARPOL requirements).

.5 Any other documentation which, in the Submitter's opinion, supports their assessment that the rules conform to the Standards.

.6 A completed Submission Template (see appendix 1).

.7 A clear indication of any confidential and/or proprietary information submitted with the documentation package.

Audit process

10 The verification audit (audit) is an iterative process based on the following steps:

.1 the Secretary-General verifies that the submitted technical documentation package includes all of the elements specified in paragraph 9;

.2 the Secretary-General establishes the GBS Audit Team and forwards the request for audit and technical documentation package to the Team with the instructions given in paragraph 11;

.3 the Team reviews the information, confirms completeness of the documentation submitted, exchanges views and establishes an audit plan;

.4 the Team conducts the audit;

.5 the Team prepares an interim audit report for the Submitter that contains the preliminary findings of the audit, requests for additional information as needed, and possible non-conformities, using the report format specified in appendix 2. Where the Team has identified a possible non-conformity, they should explain the reasons for reaching that conclusion;

.6 upon receipt of the interim report, the Submitter may respond by submitting additional documentation to the Team to address the reported non-conformities and/or requests for additional information;

.7 the Team prepares a final audit report with a recommendation, using the report format specified in appendix 2, and provides it to the Secretary-General with a copy to the Submitter. Where the Team has identified an unresolved non-conformity, they should explain the reasons for reaching that conclusion; and

.8 the Team's observations on the audit process should be submitted in a separate report to the Secretary-General.

11 The Team is expected to conduct an audit to determine whether the submitted rules conform to each of the Tier II functional requirements, based on the criteria in Part B of the Guidelines. In undertaking this task, the Team should exercise their professional judgement in determining the depth of the audit.

12 Where the Submitter can clearly indicate that a functional requirement, or portions of it, are covered by IMO mandatory instruments (e.g., SOLAS or MARPOL requirements), but are not part of the submitted rules, the Team should accept this as part of the verification, provided that it does not affect other covered functional requirements. Mandatory IMO instruments used to satisfy functional requirements should be applied in a manner consistent with IMO interpretations.

Appeal

13 The Submitter, through their supporting Administration, can appeal a finding of the GBS Audit Team to the Secretary-General. Notification of intent to appeal must be made within 30 days after receiving the Team's final audit report. The appeal request should follow within six months of the notification with the documentation to support the appeal request. After the supporting documentation is received, the Secretary-General should establish an Appeal Board, independent of the original Team, to adjudicate the request. This Appeal Board should be comprised of three or five members and be selected by the Secretary-General from the same list of experts described in paragraph 22. These members should not have participated in the Team that conducted the audit that is being appealed.

Approval

14 The Secretary-General forwards the final audit report of the Team, supplemented by any appeal report, if applicable, to the Maritime Safety Committee for consideration and final decision.

15 Ships contracted to rules prior to the final decision of the MSC may be deemed to meet the Standards. Where non-conformities have been found, the rules should be revised and a new self-assessment submitted for audit. During this process ships contracted to the revised rules may be deemed to meet the Standards.

16 The Maritime Safety Committee considers the report prepared by the Team, supplemented by any appeal report, if applicable, with a view to confirming that the information provided by the Submitter demonstrates that the rules conform to the Standards.

17 Upon final decision by the Maritime Safety Committee, the Secretary-General notifies the relevant Administration and recognized organization as to whether the submitted rules conform to the Tier I goals and Tier II functional requirements of the Standards. In the case of non-conformity, the notification letter should include specific details to support the determination of non-conformity.

18 The Secretary-General circulates the results of successful verifications to Member Governments by appropriate means and maintains a list of all rule sets that have been verified for conformity as well as the original copy of the documentation package submitted.

Maintenance of verification

19 Changes to rules already verified as conforming to the Standards should be processed as follows:

.1 At least annually, each recognized organization whose rules have been verified as conforming to the Standards should notify and make available any rule changes, including any errata, corrigenda or clarifications, to the Secretary-General and to all Administrations that have recognized them. The notification should include a rule commentary, clearly indicating the impact of those changes on conformity with the Standards of those rules already verified, including, but not limited to:

.1 an explanation of why the changes were considered necessary, including a description of the issues under consideration;

.2 the extent to which the changes address the issues under consideration;

.3 an explanation of the way the rules were formulated/drafted;

.4 an indication of any impact on and/or contribution to safety, security or environmental protection; and

.5 an indication of any impact on net and gross scantlings.

.2 When an Administration considers a rule change described in .1 above to result in non-conformity with the Standards, it may request the Secretary-General to conduct a review of the change. The request should include supporting justification why such a review is necessary. The Secretary-General should establish a Team to assess the impact of the change(s) on conformity with the Standards. The findings of the Team should be forwarded to the Maritime Safety Committee by the Secretary-General, along with the request from the Administration and supporting documentation, for further consideration and final disposition.

.3 The Organization should aim to audit 10% of the rule changes received per .1 on an annual basis. The Secretary-General should establish a GBS Audit Team accordingly and forward the compilation of annual changes

received per .1 to it for consideration. The Team should conduct a preliminary review of the changes, exchange views and establish an audit plan. The Team should exercise their professional judgement in identifying the changes to be audited. The Team conducts the audit and prepares a maintenance of verification audit report with a recommendation and provides it to the Secretary-General. Where the Team has identified a non-conformity, they should explain the reasons for reaching that conclusion. The findings of the Team should be forwarded by the Secretary-General to the Maritime Safety Committee for further consideration and final disposition.

.4 Any Administration the rules of which have been verified as conforming to the Standards should submit rule changes as per .1 to .3 above, as applicable.

.5 Rules should be considered to be in conformity unless .2 or .3 above results in non-conformities. Where non-conformities have been found, the rules should be revised and a new self-assessment submitted for audit. During this process ships contracted to the revised rules may be deemed to meet the Standards.

20 The Maritime Safety Committee may request re-verification of rules if significant changes are made to the Standards or other IMO mandatory instruments or if there is a compelling need.

GBS Audit Team

21 A GBS Audit Team, established under the auspices of the Maritime Safety Committee, will conduct an audit of the Submitter's documentation package to verify whether the rules conform to the Standards. The Team will serve as an independent panel of technical experts which are not considered to be representing any Member State of the Organization or any organization in consultative status. The Team should consist of three (3) or five (5) members, depending on the complexity of the submission(s). A simple majority will be required to recommend a finding of non-conformity for a functional requirement. The voting of individual members will be kept confidential, with the resulting outcome considered as a decision of the Team. In any case, the view of the minority should be fully documented in the final audit report of the Team.

22 Administrations and non-governmental organizations in consultative status with the Organization may nominate individuals for inclusion in a list of experts, maintained by the Secretary-General, from which the members of the Team will be selected. Nominations should be provided to the Secretary-General and should be accompanied by a curriculum vitae.

23 Nominees should have adequate knowledge of, and experience in, ship structural design and construction, the Standards and classification society rules and rule development and be able to correctly interpret the rules for correlation with relevant regulatory requirements. Additionally, nominees should satisfy at least some of the following requirements:

.1 engineering degree in naval architecture and/or structural engineering;

.2 scientific or engineering knowledge of technical subjects addressed in ship structural standards including strength of materials, structural analysis, fatigue analysis, hydrodynamics and load calculations, and structural reliability;

.3 design, construction or operating experience with the type of ship addressed by the ship rules being verified;

.4 knowledge of ship safety construction requirements, including SOLAS requirements and industry standards, guidelines and practices;

.5 knowledge of environmental protection requirements related to ship structures;

.6 knowledge and experience in survey, inspection and maintenance of ship structures;

.7 knowledge and experience in shipbuilding and ship construction practices;

.8 knowledge and experience in auditing; and

.9 research experience in any of the areas referred to in .1 to .7 above.

24 The members of the Team will be selected by the Secretary-General as needed from the list of experts, giving due consideration to the qualifications listed in paragraph 23 and ensuring appropriate and balanced representation and expertise for the specific rules being considered. Additionally, the Secretary-General will select one of the members of the Team to be responsible for overall coordination of the audit. Team members should not have any conflict of interest relating to the rules being verified.

25 Each member of the GBS Audit Team or of the Appeal Board should sign a confidentiality agreement with the Secretary-General, stating that they will not disclose any proprietary information that is provided to them for the purpose of verifying rules, with the exception of the documentation required for the interim or final reports.

26 The Team should consider the need for transparency throughout their deliberations. The Team should meet in person with the Submitter during the audit process at a mutually agreed location to address any questions and issues that may arise during the audit process, review any additional documentation needed to complete the audit, and to share their preliminary findings.

27 The Secretary-General will provide the GBS Audit Team with adequate administrative assistance to support the verification process, including a permanent secretary.

PART B
INFORMATION/DOCUMENTATION REQUIREMENTS AND EVALUATION CRITERIA

INTRODUCTION

28 This part provides detailed information and documentation requirements and evaluation criteria to assist the Submitter to conduct a self-assessment that the rules conform to the Tier II functional requirements of the Standards, as outlined in part A. It includes a statement of intent, information and documentation requirements, and evaluation criteria for each Tier II functional requirement. Additionally, the information and documentation requirements and evaluation criteria serve as the audit standard for the GBS Audit Team.

29 The statement of intent links Tier II functional requirements to Tier III verification criteria by providing an overview of what the verification of the particular functional requirement should achieve.

30 The information and documentation requirements establish specific items that should be included and addressed in the submission supporting the verification.

31 The evaluation criteria should be considered as the basis for conducting the self-assessment and audit.

32 The rules, as referred to in this part, include the rule set, guidelines, interpretations, internal procedures, etc.

33 Justification means providing the supporting data, analysis or other study that demonstrates the adequacy of the methodology, process or requirement. It should include: (1) basis for the assumptions made; (2) description of the uncertainties associated with them; and (3) any sensitivity analyses carried out. It includes documented rationale on which the validity of the hypothesis or criteria used in the requirements or calculations are based. These may be the results of research work, historical data, statistics, etc. For example, justification of safety factors should describe how the many related assumptions and uncertainties, such as environmental conditions, loads, structural analysis methodology and strength criteria, are accounted for.

34 Where commentary or data are requested, it is sufficient for such information to be contained in a rule commentary or other supporting documentation.

35 Where the rules establish a process to evaluate and accept alternatives, the submission should clearly identify the process for determining that an equivalent level of safety is achieved.

36 INFORMATION AND DOCUMENTATION REQUIREMENTS AND EVALUATION CRITERIA

DESIGN

1 Design life

1.1 Statement of intent

Confirm that the specified design life is at least 25 years and properly incorporated in the rules.

1.2 Information and documentation requirements

1.2.1 Statement of the design life in years used in developing the rules.

1.2.2 Description of the assumptions and methods used to incorporate design life into the rules. This should include, but not be limited to, consideration of extreme loads, design loads, fatigue and corrosion.

1.3 Evaluation criteria

1.3.1 Are structural strength, fatigue and corrosions additions, and any other design parameters used in the rules based upon the specified design life?

1.3.2 Has the design life been properly applied in sections of the rules where specified?

2 Environmental conditions

2.1 Statement of intent

Confirm that the wave data and associated ship motions and loads are developed on the basis of North Atlantic environmental conditions and the relevant long-term sea state scatter diagrams for the specified design life.

2.2 Information and documentation requirements

2.2.1 Source of sea state data (scatter diagrams, etc.) including method and date of data collection and geographical location represented by the data.

2.2.2 Justification that sea state data and predictions used to develop motions and loads are representative of North Atlantic environmental conditions.

2.2.3 Justification of the methodology used to develop ship motions and loads, including assumptions related to speed, distribution of headings, number of cycles of wave encounters, probability of exceedance of design values, sea states, wave spectral shapes, hull form and other relevant parameters. Clearly define limits of applicability, and provide guidance for assessment when outside this range.

2.2.4 Description of how the methodology used to develop ship motions and loads has been benchmarked with experimental or service history data.

2.3 Evaluation criteria

2.3.1 Does the wave data properly represent North Atlantic conditions and include the regions where the most severe conditions are expected?

2.3.2 Do the rules specify the wave spectrum and statistical analysis methods used to obtain the design extreme value, including its probability of exceedance?

2.3.3 Are the design extreme motions and loads based on appropriate number of cycles of wave encounters corresponding to at least a 25-year design life?

2.3.4 Are the ship speeds and headings used for assessment of ship motions and loads based upon speeds and headings that can be expected in the sea states under consideration?

2.3.5 Do the rules properly specify the range of applicability of ship motions and loads, and when further analysis, such as direct sea-keeping analysis or model testing, is required? Do the rules clearly state the assumptions used in the methodologies to develop ship motions and loads?

2.3.6 Are the methodologies used to develop ship motions and loads validated by experimental or service history data?

3 Structural strength

3.1 Statement of intent

Confirm that the rules require a ship to be designed to withstand at net scantlings the operational and environmental loads for its specified design life. Confirm that the rules include the appropriate safety margins which reflect the degree of uncertainty.

3.2 Information and documentation requirements

3.2.1 Description of how the rules provide net scantlings that are sufficient to avoid excessive deformation (either elastic or plastic, as appropriate) and prevent failure modes including, but not limited to, those involving yielding and buckling of hull girder and structural members. Include the following:

.1 Description of the strength assessment methodology.

.2 Explanation of how the net scantlings concept is applied in the rules for structural design.

.3 Justification of the methodologies used to obtain the global and local, static and dynamic design loads.

.4 Justification of the acceptable limits of yielding and buckling.

.5 Explanation of how the rules prevent deformation from compromising the integrity of the ship's structure. The term "deformation" means translational and/or rotational displacement.

.6 Explanation of the requirements for finite element structural modelling, including load application, boundary conditions, element selection and mesh size. Explanation of how primary, secondary and tertiary stresses are considered.

.7 List of the loading conditions considered in the rules that are to be included in the structural evaluation. Justification of the loading conditions especially in terms of what parts of the structure may be critically loaded and stressed.

.8 Description of how construction tolerances and procedures, and material imperfections are accounted for in the rules.

.9 Justification of the rationale of the rules for weld design and procedures.

.10 Justification of how structural continuity is taken into account in the rules, including termination of primary structures at the fore and aft ends of the cargo block.

.11 Explanation of how the rules consider deformations or vibration levels that may damage or impair the ship structure, equipment or machinery.

.12 Description of the safety factors in conjunction with assumed design load(s) and justification as to why they are appropriate.

.13 Description of how the strength assessment methodology has been benchmarked with experimental and service history data.

.14 Application of the rules to representative design(s). Documentation should include an illustration of the midships section and of the cargo region showing net and gross scantlings, as well as a summary of the background calculations used to develop the scantlings.

3.2.2 Explanation of how the rules consider structural integrity at net scantlings for typical loading/discharging and ballast exchange scenarios, including criteria to determine acceptability and provide reasonably attainable sequences of loading, discharging and ballasting.

3.2.3 Justification of the methodology used for the calculation of local stresses, including stress concentration factors, if utilized.

3.2.4 Justification of how the rules account for sloshing effects.

3.2.5 Description of how the rules determine that the net scantlings are sufficient to provide adequate ultimate strength. Include the following:

.1 Description of the ultimate strength assessment methodology.

.2 Justification of how the net scantlings concept is applied in the rules for ultimate strength.

.3 Justification of the loads considered for the ultimate strength analysis.

.4 Explanation of the methodology used for calculating hull girder capacity and ultimate strength of plates and stiffeners, individually and in combination.

.5 Description of acceptable limits of ultimate strength, including safety factors, with justification why they are appropriate.

.6 Description of how the ultimate strength assessment methodology has been benchmarked with experimental and service history data.

3.2.6 Description of any protective arrangements and/or reinforcements required to avoid damage caused by loading/unloading equipment that would compromise the ship's structural integrity.

3.3 Evaluation criteria

3.3.1 Do the rules specify the probability of exceedance for which global and local dynamic loads are calculated?

3.3.2 Are the limits of yielding, buckling and ultimate strength set at levels that will maintain the structural integrity?

3.3.3 Do the rules satisfactorily consider deformations that may compromise the integrity of the ship's structure?

3.3.4 Do the rules adequately specify the required extent of finite element models and how ship structures should be modelled, including how boundary conditions and loads are to be

applied, and elements and mesh size selected? Are primary, secondary and tertiary stresses properly accounted for?

3.3.5 Are the following loading conditions included: homogeneous, partial, alternate loads, multi-port, ballast conditions including ballast management, and loading and offloading sequences and intermediate conditions? Are these, and any other conditions identified in the loading or stability manuals, considered without exceeding allowable bending moments, shear forces and stresses?

3.3.6 Is the methodology for developing the lightship and deadweight load distributions clearly defined, in a way that it will be consistently applied?

3.3.7 Do the rules satisfactorily consider workmanship standards and construction tolerances?

3.3.8 Do weld designs and procedures provide a level of strength of welds in their net condition to withstand the expected loads on the joints?

3.3.9 Are the requirements for tapering primary structures, including transitions fore and aft of the cargo block, defined in sufficient detail in the rules?

.1 Where prescriptive measures are specified, do these measures provide for adequate continuity and termination of primary structure and primary supporting members?

.2 Where analytical methods are allowed for evaluating structural continuity, is the methodology sufficiently defined to enable adequate assessment of the proposed arrangements for the termination of primary structure and primary supporting members? Do these analytical methods include both the local stress evaluation and the effect of the relative stiffness of the members at the termination?

3.3.10 Do the rules satisfactorily consider deformations or vibration levels that may damage or impair the ship structure, equipment or machinery?

3.3.11 Do the rules include adequate safety factors?

3.3.12 Do the rules include methodology for the development of local loads, including specifying the characteristics of intended cargoes relevant to loading (cargo arrangement, minimum density, angle of repose for bulk cargo) and minimum density of ballast to be applied?

3.3.13 Do the rules specify procedures for direct calculation of local stresses in structural details. If direct calculation is not required, do the rules include definition and application of stress concentration factors? If stress concentration factors are utilized, a justification of the definition and application of these factors should be included.

3.3.14 With regard to local strength:

.1 Do the rules require the structure in way of cargo and ballast spaces to be suitable for any level of filling, from empty to maximum capacity (where maximum capacity is either full or the clearly defined operational limit on filling height or cargo mass)?

.2 Do the rules define loading conditions for evaluation, including the loaded/empty condition of adjacent cargo and/or ballast spaces, and the draughts to be considered for each loading condition?

.3 For oil tankers, do the rules consider any reasonable combination of cargo or ballast space loading, including asymmetric loading and loading in any one athwartships row across to be empty at or near the scantling draught?

.4 Do the assumed draught limits and assumed densities and other cargo characteristics cover the expected operational range?

.5 Do the local strength evaluations consider the effects of maximum allowable still water and wave bending and shear loads on the structure?

.6 Are sloshing effects adequately covered by the rules?

3.3.15 Do the rules require adequate protective arrangements and/or reinforcements to avoid damage caused by loading/unloading equipment that would compromise the ship's structural integrity?

3.3.16 Have the results from the strength and ultimate strength assessments been benchmarked? Do they compare favourably with service history and other standards?

3.3.17 Do the illustrations of the representative designs show net and gross scantlings? Do the background calculations show how the structure at net scantlings withstands the operational and environmental loads for the specified design life?

4 Fatigue life

4.1 Statement of intent

Confirm that the fatigue life is not less than the specified design life.

4.2 Information and documentation requirements

4.2.1 Description of how the rules provide that structural arrangement and net scantlings are sufficient to meet a calculated fatigue life not less than the specified design life. Include the following:

.1 Description of the fatigue assessment methodology used in the rules including sea state data, long-term statistics of wave data applied in fatigue calculations, derivation of cyclic loads, calculation of stress ranges, modelling of their distribution functions, S-N curves used and factors of safety or margins taken.

.2 Explanation of where and how the net scantlings concept is applied in the rules for fatigue. Justification of the values of the scantlings used in the calculations.

.3 List of the loading conditions required by the rules to be considered as part of the fatigue evaluation. Justification of the selection of loading conditions.

.4 Justification of how the rules take into account dynamic loads and their combinations, including the probability level for which dynamic loads are calculated.

.5 Justification of the process for the selection of the structural members and typical critical design details required to be included in evaluation of ship's fatigue life.

.6 Justification of procedures for the calculation of cyclic stresses and stress ranges in structural details. Explanation of the method used to take into account stress concentrations, as may be applicable to the detail analysed.

.7 Explanation of the requirements for finite element structural modelling, including load application, boundary conditions, element selection and mesh size. Explanation of how primary, secondary and tertiary stresses are considered.

.8 Description of how construction tolerances and procedures are accounted for in the rules. Description of how surface treatment, such as grinding and peening, is addressed in the rules.

.9 Description of how the rules consider the effect on fatigue life of unprotected structural details in seawater (e.g., when the breakdown of coating leads to exposure to seawater).

.10 Description of how the rules take into consideration slamming (e.g., whipping) and vibratory-induced fatigue effects (e.g., springing or propeller induced vibrations). Justification should be provided if not explicitly considered in fatigue assessment.

.11 Explanation of the effect of uncertainties/assumptions on fatigue life, highlighting any margins used in fatigue calculations, taking into consideration the consequence of failure of the particular structural member.

.12 Description of how the fatigue assessment methodology has been benchmarked with experimental and/or service history data.

4.3 Evaluation criteria

4.3.1 Is the methodology used in fatigue life assessment properly justified? Are the explanations provided to cover the sea state data used, long-term statistics of wave data applied, derivation of cyclic loads, method of calculation of the stress ranges and their distribution functions, S-N curves used and the factors of safety or margins taken, satisfactory?

4.3.2 Are the values of the scantlings required to be used in the calculations properly justified according to the net scantlings concept?

4.3.3 Are the assumed operating conditions (e.g., loaded and ballast) specified by the rules in the long-term fatigue response analysis adequate for a representative ship's operating profile? Are the stress ranges so obtained appropriate to represent the long-term fatigue response?

4.3.4 Are the internal/external dynamic loads and their combinations based on the North Atlantic environment? Is the probability level for which these loads are calculated properly justified?

4.3.5 Do the rules require the systematic identification of areas prone to fatigue throughout the entire ship that are required to be included in the evaluation of the ship's fatigue life?

4.3.6 Are the procedures for the calculation of cyclic stresses and stress ranges in structural details properly justified?

4.3.7 Do the rules properly take into account stress concentrations, as may be applicable to the detail analysed?

4.3.8 Do the rules specify the required extent of finite element models and how ship structures should be modelled, including how boundary conditions and loads are to be applied, and elements and mesh size selected? Are primary, secondary and tertiary stresses properly accounted for?

4.3.9 Do the rules satisfactorily consider construction tolerances and procedures? Is surface treatment, such as grinding and peening, adequately considered?

4.3.10 Do the fatigue life calculations consider degradation of coating performance under seawater environment?

4.3.11 Do the rules take slamming (e.g., whipping) and vibratory-induced fatigue effects (e.g., springing or propeller induced vibrations) into consideration? If not explicitly considered in fatigue assessment, is adequate justification provided?

4.3.12 Do the rules satisfactorily account for uncertainties or assumptions on fatigue life assessment?

4.3.13 Have the results from the fatigue life assessment methodology been benchmarked? Do the results compare favourably with service history and other standards?

5 Residual strength

5.1 Statement of intent

Confirm that the rules provide a reasonable level of residual strength after damage (e.g., collision, grounding and flooding).

5.2 Information and documentation requirements

5.2.1 Description of how ships designed to the rules with intact structure at net scantlings have sufficient ultimate strength to sustain flooding as defined in relevant IMO instruments.

5.2.2 Justification that ships designed to the rules have adequate residual strength to survive a casualty event. Include the following:

.1 Description of the methodology used to assess residual strength.

.2 Description of the flooding scenarios and the corresponding structural damage. Explanation of the relationship of the flooding scenarios with IMO instruments.

.3 Description of the environmental conditions and period of exposure representative of the sea states expected for collision and grounding scenarios, and justification why they are appropriate.

.4 Description of the acceptance criteria for residual strength of the ship in damaged condition, and justification if different from ultimate strength.

.5 Where it is determined that the rules inherently provide adequate residual strength, justification should be provided that demonstrates through analysis of a range of representative ship designs and loading conditions.

5.2.3 Description of how the residual strength assessment procedure has been validated with experimental and/or casualty history data.

5.3 Evaluation criteria

5.3.1 Can a ship designed to the rules sustain flooding as defined in relevant IMO instruments and survive with intact structure at net scantlings?

5.3.2 Does a ship designed to the rules have sufficient residual strength to survive a more significant casualty event (e.g., flooding with structural damage due to collision or grounding) under environmental conditions consistent with the likelihood of occurrence? Are the assumed damage scenarios representative of the intent of damage in relevant IMO instruments?

5.3.3 Has the residual strength assessment procedure been validated with experimental and/or casualty data?

6 Protection against corrosion

6.1 Coating life

6.1.1 Statement of intent

Confirm that the coatings are properly selected and applied to protect the structure throughout the target useful life of the coating.

6.1.2 Information and documentation requirements

6.1.2.1 Provision of information on coating life and mandatory use of coatings, including:

.1 Mandatory locations and/or spaces where coatings are required to be used.

.2 Types of coating to be used for the various spaces.

.3 Required target useful life of the coating and explanation for selection.

.4 The coating performance standard to be followed (e.g., IMO PSPC[29] where mandated).

[29] Performance standard for protective coatings for dedicated seawater ballast tanks in all types of ships and double-side skin spaces of bulk carriers, adopted by the Organization by resolution MSC.215(82).

6.1.2.2 Description of the requirements to be followed in spaces where other corrosion prevention systems are used.

6.1.2.3 Description of the procedures used to verify that the selected coating system with associated surface preparation and application methods is compatible with the shipyard production processes.

6.1.2.4 Description of the procedures used to verify that the specified coating procedures have been followed.

6.1.2.5 If an alternative is proposed to that prescribed by IMO instruments, justification to support the selection of coating standards and target useful life of the coating or areas of application.

6.1.3 Evaluation criteria

6.1.3.1 Do the rules include appropriate requirements to achieve stated target useful life of the coating and fulfil SOLAS requirements as a minimum?

6.1.3.2 Do alternative or additional requirements allowed by the rules provide protection levels at least equivalent to those required by SOLAS?

6.1.3.3 Are the procedures indicated in 6.1.2.3 and 6.1.2.4 adequately documented in the rules?

6.1.3.4 Is adequate justification provided to support the use of alternatives to SOLAS or other IMO instruments?

6.2 Corrosion addition

6.2.1 Statement of intent

Confirm that the rules for corrosion addition values are rationally based and adequate for the specified design life.

6.2.2 Information and documentation requirements

6.2.2.1 Description of the methodology used to determine values for the design corrosion additions so that the scantlings remain above net scantlings over the specified design life.

6.2.2.2 Description of how assumed corrosion rates and rule design corrosion additions are determined based on ship type and location within the hull. Description should address how stress corrosion and any other modes of accelerated corrosion have been taken into consideration.

6.2.2.3 Description of any additional rule requirements that provide special consideration for other parameters such as unusual cargoes, loadings, trading patterns, material properties, etc.

6.2.2.4 Description of how corrosion of welds and heat-affected zones are considered.

6.2.2.5 Description of the steel/structure renewal criteria.

6.2.2.6 Description of how the methodology to determine corrosion addition and establish steel/structure renewal criteria has been benchmarked with experimental and service history data.

6.2.3 Evaluation criteria

6.2.3.1 Does the methodology and supporting statistical data justify the corrosion additions?

6.2.3.2 Confirm that reductions in the rule design corrosion additions are prohibited.

6.2.3.3 Is consideration given to the corrosion of welds and heat-affected zones?

6.2.3.4 Do the rules clearly establish the steel/structure renewal criteria? For ships in service, do the renewal criteria provide for scantlings that are not less than the required net scantlings and that produce a hull girder section modulus within SOLAS requirements?

6.2.3.5 Has the methodology used to determine corrosion addition and establish steel/structure renewal criteria been benchmarked? Does it compare favourably with experimental and service history data?

7 Structural redundancy

7.1 Statement of intent

Confirm that the rules require sufficient redundancy to withstand localized damage in any one stiffening structural member.

7.2 Information and documentation requirements

7.2.1 Demonstration that the rules have adequate requirements to provide ship structural redundancy.

7.2.2 Description of the requirements for localized damage assessments, including where applicable, modelling in finite element structural analysis.

7.2.3 Description of how the methodology used to assess structural redundancy has been benchmarked with experimental and/or service history data.

7.3 Evaluation criteria

7.3.1 Does a ship designed to the rules have sufficient structural redundancy to survive localized damage to a stiffening member?

7.3.2 Are the methods for assessing the consequences of localized damage satisfactorily described?

7.3.3 Has the methodology used to assess structural redundancy been benchmarked? Does it compare favourably with experimental or casualty history data?

8 Watertight and weathertight integrity

8.1 Statement of intent

Confirm that the rules require adequate watertight and weathertight integrity for North Atlantic environmental conditions, including adequate strength for the closing arrangements and adequate redundancy for the securing devices.

8.2 Information and documentation requirements

8.2.1 Description of the rule requirements for watertight and weathertight integrity.

8.2.2 Description of how the rules consider criteria from IMO instruments for determining which openings in the hull envelope are required to be watertight or weathertight.

8.2.3 Explanation of the criteria used in the development of the rules to determine that the strength and redundancy for closing arrangements, if appropriate, of the watertight and weathertight openings is adequate for the environmental conditions and specified design life.

8.3 Evaluation criteria

8.3.1 Do the rules satisfy all relevant IMO watertight and weathertight integrity requirements?

8.3.2 Do the rules require sufficient strength for closing arrangements and securing devices to meet environmental conditions, design loads and specified design life? Do the rules require securing devices to have adequate redundancy?

9 Human element considerations

9.1 Statement of intent

Confirm that the rules incorporate human element and ergonomic considerations into the structural design and arrangement to facilitate operations, inspection and maintenance activity.

9.2 Information and documentation requirements

9.2.1 Description of how the rules consider human element and ergonomics during the structural design and arrangement of the ship, including:

.1 Stairs, vertical ladders, ramps, walkways and work platforms used for permanent means of access and/or for inspection and maintenance operations.

.2 Structural arrangements to facilitate the provision of adequate lighting and ventilation, and to minimize noise and vibration in spaces normally occupied or manned by shipboard personnel.

.3 Structural arrangements to facilitate the provision of adequate lighting and ventilation in tanks or closed spaces (e.g., duct keels, pipe tunnels, etc.) for periodic inspections, survey and maintenance.

.4 Structural arrangements to facilitate emergency egress of inspection personnel or ships' crew from tanks, holds, voids, etc.

9.2.2 Description of how ergonomic design principles are factored into the design rules, including any guidance information provided to designers.

9.3 Evaluation criteria

9.3.1 Are human element and ergonomic considerations accounted for in the design of stairs, vertical ladders, ramps, walkways and work platforms?

9.3.2 Do the rules address structural or other arrangements to facilitate adequate lighting and ventilation in spaces normally manned or occupied by the crew?

9.3.3 Do the rules address structural or other measures to reduce the generation and transmission of vibration to a level at or below the acceptable ergonomic standards for spaces normally manned or occupied by the crew?

9.3.4 Do the rules address structural or other arrangements to facilitate adequate lighting and ventilation for the purposes of inspection, survey and maintenance?

9.3.5 Do the rules require structural arrangements to facilitate emergency egress from tanks or closed spaces?

9.3.6 Are relevant IMO requirements included or referred to in the rules (i.e. bow access, etc.)?

10 Design transparency

10.1 Statement of intent

Confirm that the design and construction process is transparent, and that design information is clearly stated and made available to the classification society, the owner and the flag State, with due consideration to intellectual property rights.

10.2 Information and documentation requirements

10.2.1 Description of how the rules require design specific information as required by SOLAS regulation II-1/3-10 to be included in the Ship Construction File (SCF), including:

.1 Areas requiring special attention throughout the ship's life.

.2 All design parameters limiting the operation of a ship.

.3 Any alternatives to the rules, including structural details and equivalency calculations.

.4 "As built" drawings and information which are verified to incorporate all alterations approved by the recognized organization or flag State during the construction process.

.5 Procedures for updating the SCF throughout the ship's life.

.6 Net (renewal) scantlings for all the structural constituent parts.

.7 Minimum hull girder section modulus along the length of the ship which has to be maintained throughout the ship's life.

10.2.2 Description of the process, requirements and criteria to be followed when assessing, documenting and communicating alternative methods as being equivalent to specific rule requirements.

10.2.3 Description of procedures for ensuring that all relevant design and construction information, including correspondence exchanged between shipyard and recognized organization, is available to the owner and flag State during the construction process.

10.3 Evaluation criteria

10.3.1 Do the rules establish requirements for including and updating design specific and critical information, including limitations, in the SCF?

10.3.2 Do the rules establish clear criteria and techniques for assessing alternative methods used in the design? Do the rules require that all equivalencies are documented in the SCF and are made available to the owner and/or flag State?

10.3.3 Do the rules establish procedures to provide all relevant design and construction information, including correspondence exchanged between shipyard and recognized organization, e.g., on net scantlings, corrosion margins used, etc., to be made available to the owner and flag State during the construction process?

CONSTRUCTION

11 Construction quality procedures

11.1 Statement of intent

Confirm that the rules contain provisions for ensuring that construction tolerances and procedures assumed during rule formulation are implemented during construction.

11.2 Information and documentation requirements

11.2.1 Demonstration that the rules require the shipyard's construction procedures and standards to meet a minimum level of quality. Include the following:

.1 Procedures for specifying the materials and their tracking.

.2 Assembly requirements, including alignment, joining, welding, surface preparation, coating, castings, heat treatment, etc.

.3 Approval scheme of welding procedures.

.4 Qualification scheme of welders.

.5 Requirements for yard fit-up and other quality control inspections.

11.2.2 Description of actions taken when a shipyard is determined as not meeting the minimum level of quality construction.

11.2.3 Description of the procedures followed when the "as built" is different than "design". Include the following:

.1 Criteria for determining when review of the "as built" drawings is required.

.2 Criteria for determining when re-evaluation for strength and/or fatigue life is required. This should include consideration of net scantlings where appropriate.

11.2.4 Description of the procedures for ensuring that construction tolerances are verified and maintained.

11.2.5 Description of the procedures used to continuously update the rules based on construction and in-service experience.

11.2.6 Description of how the quality construction requirements have been benchmarked with recognized international shipbuilding and repair quality standards.

11.3 Evaluation criteria

11.3.1 Are the construction tolerances used in rule formulations and calculations incorporated in the construction plan and verified during construction?

11.3.2 Do the quality requirements include continuous design improvement based on experience?

11.3.3 Have the rules' quality construction requirements been benchmarked? Do they compare favourably with recognized international shipbuilding and repair quality standards?

12 Survey during construction

12.1 Statement of intent

Confirm that the rules include provisions to ensure that the construction of ships is carried out to an acceptable quality level.

12.2 Information and documentation requirements

12.2.1 Description of the construction survey procedure requirements, including:

.1 Types of surveys (visual, non-destructive examination, etc.) depending on location, materials, welding, casting, coatings, etc.

.2 Establishment of a construction survey schedule for all assembly stages from the kick-off meeting, through all major construction phases, up to delivery.

.3 Inspection/survey plan, including provisions for critical areas identified during design approval.

.4 Survey criteria for acceptance.

.5 Interaction with shipyard, including notification and documentation of survey results.

.6 Correction procedures to remedy construction defects.

.7 List of items that would require scheduling or formal surveys.

.8 Qualification of surveyors.

.9 Determination and documentation of areas that need special attention throughout ship's life, including criteria used in making the determination.

.10 Procedures for determining the number and qualifications of surveyors for a project.

12.2.2 Description of procedures for providing shipowner and/or flag Administration representatives results of construction surveys.

12.2.3 Description of the requirements for testing during survey, including test criteria.

12.2.4 Description of how the construction survey requirements have been benchmarked with recognized international shipbuilding and repair quality standards.

12.3 Evaluation criteria

12.3.1 Do the rules require the development of a Survey Plan that is reviewed during the initial kick-off meeting? Does the survey plan address activities during ship construction sufficient to verify the ship is built in accordance with the appropriate rules or standards and address all elements in 12.2.1?

12.3.2 Do the rules contain provisions that areas of high stress or fatigue risk identified during design approval are surveyed with adequate detail and extent during construction?

12.3.3 Do the rules have procedures to provide for an adequate number of qualified surveyors to carry out proposed surveys in accordance with the size of the project?

12.3.4 Is survey related correspondence between shipyard and recognized organization relating to ship design and construction made available to the owner and flag Administration?

12.3.5 Do the rules include acceptance criteria for all tests required? Are the test criteria based on rule formulation parameters?

12.3.6 Have the rules' construction survey requirements been benchmarked? Do they compare favourably with recognized international shipbuilding and repair quality standards?

IN-SERVICE CONSIDERATIONS

13 Survey and maintenance

13.1 Statement of intent

Verify that the rules provide for spaces of adequate size to facilitate survey and maintenance. Confirm that the rules provide for the identification of areas requiring special attention over the life of the ship based on design parameter selection.

13.2 Information and documentation requirements

13.2.1 Description of the rule requirements to provide for spaces of adequate size to facilitate ship survey and maintenance.

13.2.2 Description of rule requirements to identify items for inclusion in an in-service Survey Plan, including:

.1 Areas of high stress and with special fatigue considerations.

.2 Any other areas that need special attention throughout the ship's life, including criteria used in making the determination (e.g., wave impact loading, mechanical impact areas, special materials, etc.).

.3 Structural design features that were selected on the basis of special in-service requirements.

13.3 Evaluation criteria

13.3.1 Do the rules include design requirements to provide for spaces of adequate size for ship survey and maintenance?

13.3.2 Do the rules contain provisions for the identification of areas of high stress or fatigue risk that require monitoring while in-service?

13.3.3 Do the rules include provisions for the identification of structural design features selected on the basis of special in-service requirements?

13.3.4 Do the rules include provisions for the identification of any other areas needing special attention during the ship's life?

14 Structural accessibility

14.1 Statement of intent

Confirm that the rules include provisions to facilitate access for internal structural inspection and thickness measurements.

14.2 Information and documentation requirements

Description of rule requirements to facilitate overall and close-up inspections and thickness measurements of the internal structure. Include the following:

.1 Standards for access.

.2 Requirements for development of an Access Plan.

14.3 Evaluation criteria

14.3.1 Are relevant IMO requirements included or referred to in the rules (i.e. permanent means of access, etc.)?

14.3.2 Are there provisions to provide for safe access to critical areas referred to in 13.2.2?

RECYCLING CONSIDERATIONS

15 Recycling

15.1 Statement of intent

Confirm that the rules require the listing of materials used for the construction of the hull structure with a view toward identification of environmentally acceptable or recyclable materials and the development of an inventory list.

15.2 Information and documentation requirements

15.2.1 Description of the rule requirements for listing of materials, including:

.1 List of materials used for the construction of the hull structure.

.2 Provisions for listing of materials in the Ship Construction File.

.3 Provisions for documenting changes to any of the above during the ship's service life.

15.3 Evaluation criteria

15.3.1 Do the rules include provisions for the listing of materials used for the construction of the hull structure within the scope of the Standard, including:

.1 List of materials used for the construction of the hull structure;

.2 Provisions for listing of materials in the Ship Construction File?

15.3.2 Do the rules include provisions for documenting changes to any of the above during the ship's service life?

APPENDIX 1

SUBMISSION TEMPLATE

1 FLAG STATE INFORMATION	
1 Name of flag State:	
2 Full contact details for the designated single point of contact:	
Name and title:	
Address:	
Telephone No.: Fax No.: E-mail address:	
3 Organization recognized by flag State:	

2 RECOGNIZED ORGANIZATION INFORMATION		
1 Name of recognized organization:		
2 Full contact details for the designated single point of contact:		
Name and title:		
Address:		
Telephone No.: Fax No.: E-mail address:		
3 Rules coverage:	Oil tanker	Bulk carrier

3 SELF-ASSESSMENT SUMMARY			
Functional requirement	**Fully covered in rules**	**Not covered in rules**	**Comments**
Design			
1 Design life			
2 Environmental conditions			
3 Structural strength			
4 Fatigue life			
5 Residual strength			
6 Protection against corrosion			
6.1 Coating life			
6.2 Corrosion addition			
7 Structural redundancy			
8 Watertight and weathertight integrity			
9 Human element considerations			
10 Design transparency			
Construction			
11 Construction quality procedures			
12 Survey during construction			
In-service considerations			
13 Survey and maintenance			
14 Structural accessibility			
Recycling considerations			
15 Recycling			

4 RULE LINKAGE SUMMARY TABLE

1 *(Title and text of the relevant functional requirement)*

1.1 *(Text of the Statement of intent)*

Information and documentation requirement		Regulation submitted (2)	Rule type (3)	Reference (4)
1.2.1	*(Text)* (1)			

Justification (If applicable) (5):

Evaluation criterion		Summarized comment (7)	Satisfied by rules (8)	Rule linkage (9)
1.3.1	*(Text)* (6)		(YES/NO)	

Detailed technical explanation (10):

Information and documentation requirement		Regulation submitted (2)	Rule type (3)	Reference (4)
1.2(n)	*(Text)* (1)			

Justification (If applicable) (5):

Evaluation criterion		Summarized comment (7)	Satisfied by rules (8)	Rule linkage (9)
1.3(n)	*(Text)* (6)		(YES/NO)	

Detailed technical explanation (10):

Notes:

Section 4 of the submission template should be filled for each information and documentation element and its associated evaluation criterion, for each functional requirement.

(1) Copy text of the relevant information and documentation requirement established in the Guidelines.
(2) Indicate the file name or internet link or title of the hard copy where the information/documentation provided is found in the documentation package.
(3) Specify type of information/documentation provided (public rule, internal procedure, unified requirement, guidelines, etc.).
(4) Indicate the reference in the rules where the information is found.
(5) Develop the justification required. If a justification is not required, detailed technical explanation should be submitted in any case.
(6) Copy text of the evaluation criterion established in the Guidelines for the relevant information and documentation requirement.
(7) Include a short comment explaining why the relevant evaluation criterion is satisfied.
(8) Indicate if the relevant evaluation criterion is satisfied by rules according to self-assessment.
(9) Specify all the rules locations where the relevant criterion is applied.
(10) Provide a technical explanation showing why the evaluation criterion is said to be satisfied or why it is not satisfied.

APPENDIX 2

FORMAT FOR GBS AUDIT TEAM REPORTS

1 EXECUTIVE SUMMARY

1.1 Subject of audit

1.2 Scope of verification audit (e.g., audit plan)

1.3 Findings of audit

1.4 Recommendation of the GBS Audit Team

2 SUBMISSION OF PARTICULARS

2.1 Submitting Administration(s)

2.2 Recognized organization name (if applicable)

2.3 Title and revision date of rules submitted

2.4 Submission date

2.5 Report type: [Interim] [Final]

2.6 GBS Audit Team members

3 AUDIT SUMMARY

Functional requirement	Conforming	Not conforming	Summary comment
Design			
1 Design life			
2 Environmental conditions			
3 Structural strength			
4 Fatigue life			
5 Residual strength			
6 Protection against corrosion			
6.1 Coating life			
6.2 Corrosion addition			
7 Structural redundancy			
8 Watertight and weathertight integrity			
9 Human element considerations			
10 Design transparency			
Construction			
11 Construction quality procedures			
12 Survey during construction			
In-service considerations			
13 Survey and maintenance			
14 Structural accessibility			
Recycling considerations			
15 Recycling			

4 MODEL FORM FOR AUDIT FINDINGS

<table>
<tr><th colspan="3">FINDINGS</th></tr>
<tr><td colspan="2">Recognized organization:

Audit date:</td><td>Functional requirement:</td></tr>
<tr><td colspan="2">Non-conformity No.:</td><td>Observation No.:</td></tr>
<tr><td colspan="3">FINDINGS:</td></tr>
<tr><td colspan="3">APPLICABLE PROVISION OF THE AUDIT STANDARD:</td></tr>
<tr><td colspan="2">Auditor:</td><td>Date:</td></tr>
<tr><td colspan="2">Team leader:</td><td>Date:</td></tr>
<tr><td colspan="2">Recognized organization:</td><td>Date received:</td></tr>
</table>

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MSC.1/Circ.1343
2 June 2010

GUIDELINES FOR THE INFORMATION TO BE INCLUDED IN A SHIP CONSTRUCTION FILE

1 The Maritime Safety Committee, at its eighty-seventh session (12 to 21 May 2010), approved the Guidelines for the information to be included in a Ship Construction File, set out in the annex, aiming at providing additional guidance on the application of the requirements in SOLAS regulation II-1/3-10.

2 Member Governments are invited to bring the annexed Guidelines to the attention of shipowners, operators, shipmasters, shipyards, recognized organizations and other parties involved in building, repairing, surveying and inspecting bulk carriers and oil tankers.

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ANNEX

GUIDELINES FOR THE INFORMATION TO BE INCLUDED IN A SHIP CONSTRUCTION FILE

1 Purpose

The aim of these Guidelines is to provide additional guidance on the content of the Ship Construction File (SCF) to be provided upon delivery of new bulk carriers and oil tankers in accordance with SOLAS regulation II-1/3-10.4, kept on board the ship and/or ashore and updated as appropriate throughout the ship's life in order to facilitate safe operation, maintenance, survey, repair and emergency measures. It is to be noted that parts of the content of the SCF may be subject to various degrees of restricted access and that such documentation may be appropriately kept ashore as indicated in these Guidelines.

2 Definition

Tier II items means the functional requirements included in the International Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers, adopted by resolution MSC 287(87).

3 Scope of information

3.1 The SCF should include the list of documents constituting the SCF and all information listed in the annex, which is required for a ship's safe operation, maintenance, survey, repair and in emergency situations. Details of specific information that is not considered to be critical to safety might be included directly or by reference to other documents.

3.2 When developing an SCF, all of the columns in the table annexed to these Guidelines should be reviewed to ensure that all necessary information has been provided.

3.3 It may be possible to provide information listed in the annex under more than one Tier II functional requirement as a single item within the SCF, for example, the Coating Technical File required by the PSPC* is relevant for both "Coating life" and "Survey during construction".

4 Availability and storage

The SCF should remain with the ship and, in addition, be available to its classification society and flag State throughout the ship's life. Where information not considered necessary to be on board is stored ashore, procedures to access this information should be specified in the onboard SCF. The intellectual property provisions within the SCF should be duly complied with.

5 Updates

The SCF should be updated throughout the ship's life at any major event, including, but not limited to, substantial repair and conversion, or any modification to the ship structure.

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* Performance standard for protective coatings for dedicated seawater ballast tanks in all types of ships and double-side skin spaces of bulk carriers, adopted by the Organization by resolution MSC.215(82).

APPENDIX

LIST OF INFORMATION TO BE INCLUDED IN THE SHIP CONSTRUCTION FILE (SCF)

Tier II items		Information to be included	Further explanation of the content	Example documents	Normal storage location
DESIGN					
1	Design life	• assumed design life in years	• statement or note on midship section	• SCF-specific • midship section	on board ship on board ship
2	Environmental conditions	• assumed environmental conditions	• statement referencing data source or Rule (specific rule and data) or; • in accordance with Rule (date and revision)	• SCF-specific	on board ship
3	Structural strength				
3.1	General design	• applied Rule (date and revision) • applied alternative to Rule	• applied design method alternative to Rule and subject structure(s)	• SCF-specific • capacity plan	on board ship on board ship

3.2	Deformation and failure modes	• calculating conditions and results;
		  • assumed loading conditions
		  • operational restrictions due to structural strength
			• allowable loading pattern
			• maximum allowable hull girder bending moment and shear force
			• maximum allowable cargo density or storage factor
				• loading manual
				• trim and stability booklet
				• loading instrument instruction manual
				• operation and maintenance manuals
				• strength calculation
					on board ship
					on board ship
					on board ship
					on board ship
					on shore archive

3.3	Ultimate strength				
3.4	Safety margins	• strength calculation results	• bulky output of strength calculation		

Tier II items		Information to be included	Further explanation of the content	Example documents	Normal storage location
		• gross hull girder section modulus • minimum hull girder section modulus along the length of the ship to be maintained throughout the ship's life	• plan showing highly stressed areas prone to yielding and/or buckling	• areas prone to yielding and/or buckling	on board ship
				• general arrangement	on board ship
		• gross scantlings of structural constituent parts • net scantlings of structural constituent parts	• structural drawings • rudder and stern frame • structural details of typical members	• key construction plans	on board ship
				• rudder and rudder stock	on board ship
				• structural details	on board ship
				• yard plans	on shore archive
		• hull form		• dangerous area plan	on board ship
			• hull form information indicated in key construction plans • hull form data stored within an onboard computer necessary for trim and stability and longitudinal strength calculations	• lines plan or equivalent	on shore archive on board ship
4	Fatigue life	• applied Rule (date and revision) • applied alternative to Rule • calculating conditions and results; • assumed loading conditions • fatigue life calculation results	• applied design method alternative to Rule and subject structure(s) • assumed loading conditions and rates • bulky output of fatigue life calculation	• SCF-specific • structural details	on board ship on board ship
				• fatigue life calculation	on shore archive

Tier II items		Information to be included	Further explanation of the content	Example documents	Normal storage location
			• plan showing areas prone to fatigue	• areas prone to fatigue	on board ship
5	Residual strength	• applied Rule (date and revision)		• SCF-specific	on board ship
6	Protection against corrosion				
6.1 6.2	Coating life Corrosion addition	• coated areas and target coating life and other measures for corrosion protection in holds, cargo and ballast tanks, other structure-integrated deep tanks and void spaces • specification for coating and other measures for corrosion protection in holds, cargo and ballast tanks, other structure-integrated deep tanks and void spaces • gross scantlings of structural constituent parts • net scantlings of structural constituent parts	• plans showing areas prone to excessive corrosion	• SCF-specific • Coating Technical File required by PSPC* • areas prone to excessive corrosion • key construction plans	on board ship on board ship on board ship on board ship
7	Structural redundancy	• applied Rule (date and revision)		• SCF-specific	on board ship

* Performance standard for protective coatings for dedicated seawater ballast tanks in all types of ships and double-side skin spaces of bulk carriers, adopted by the Organization by resolution MSC.215(82).

Tier II items		Information to be included	Further explanation of the content	Example documents	Normal storage location
8	Watertight and weathertight integrity	• applied Rule (date and revision) • key factors for watertight and weathertight integrity	• details of equipment forming part of the watertight and weathertight integrity	• SCF-specific • structural details of hatch covers, doors and other closings integral with the shell and bulkheads	on board ship on board ship
9	Human element considerations	• list of ergonomic design principles applied to ship structure design to enhance safety during operations, inspections and maintenance of ship		• SCF-specific	on board ship
10	Design transparency	• applied Rule (date and revision) • applicable industry standards for design transparency and IP protection • reference to part of SCF information kept ashore		• intellectual property provisions • summary, location and access procedure for part of SCF information on shore	on board ship on board ship
CONSTRUCTION					
11	Construction quality procedures	• applied construction quality standard	• recognized national or international construction quality standard	• SCF-specific	on board ship
12	Survey during construction	• survey regime applied during construction (to include all owner and class scheduled inspections during construction) • information on non-destructive examination	• applied Rules (date and revision) • copies of certificates of forgings and castings welded into the hull	• SCF-specific • tank testing plan • non-destructive testing plan • Coating Technical File required by PSPC	on board ship on board ship on board ship on board ship

Tier II items		Information to be included	Further explanation of the content	Example documents	Normal storage location
IN-SERVICE CONSIDERATIONS					
13	Survey and maintenance	• maintenance plans specific to the structure of the ship where higher attention is called for	• plan showing highly stressed areas prone to yielding, buckling, fatigue and/or excessive corrosion	• SCF-specific	on board ship
				• operation and maintenance manuals (e.g., hatch covers and doors)	on board ship
		• preparations for survey	• arrangement and details of all penetrations normally examined at dry-docking	• docking plan	on board ship
		• gross hull girder section modulus	• details for dry-docking	• dangerous area plan	on board ship
		• minimum hull girder section modulus along the length of the ship to be maintained throughout the ship's life	• details for in-water survey	• Ship Structure Access Manual	on board ship
				• Means of access to other structure-integrated deep tanks	on board ship
				• Coating Technical File required by PSPC	on board ship
		• gross scantlings of structural constituent parts		• key construction plans	on board ship
		• net scantlings of structural constituent parts		• rudder and rudder stock	on board ship
				• structural details	on board ship
				• yard plans	on shore archive
		• hull form	• hull form information indicated in key construction plans	• lines plan or equivalent	on shore archive on board ship
14	Structural accessibility	• means of access to holds, cargo and ballast tanks and other structure-integrated deep tanks	• plans showing arrangement and details of means of access	• Ship Structure Access Manual	on board ship
				• means of access to other structure-integrated deep tanks	on board ship

Tier II items		Information to be included	Further explanation of the content	Example documents	Normal storage location
RECYCLING CONSIDERATIONS					
15	Recycling	• identification of all materials that were used in construction and may need special handling due to environmental and safety concerns	• list of materials used for the construction of the hull structure	• SCF-specific	on board ship

Notes:

1 "SCF-specific" means documents to be developed especially to meet the requirements of these Guidelines.

2 "Key construction plans" means plans such as midship section, main O.T. and W.T. transverse bulkheads, construction profiles/plans, shell expansions, forward and aft sections in cargo tank (or hold) region, engine-room construction, forward construction and stern construction drawings.

3 "Yard plans" means a full set of structural drawings, which include scantling information of all structural members.

4 "Hull form" means a graphical or numerical representation of the geometry of the hull. Examples would include the graphical description provided by a lines plan and the numerical description provided by the hull form data stored within an onboard computer.

5 "Lines plan" means a special drawing which is dedicated to show the entire hull form of a ship.

6 "Equivalent (to Lines plan)" means a set of information of hull form to be indicated in key construction plans for SCF purposes. Sufficient information should be included in the drawings to provide the geometric definition to facilitate the repair of any part of the hull structure.

7 "Normal storage location" means a standard location where each SCF information item should be stored. However, those items listed as being on board in the table above should be on board as a minimum to ensure that they are transferred with the ship on a change of owner.

8 "Shore archive" is to be operated in accordance with applicable international standards.

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