



FOCUS ON IMO



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

BACKGROUND

The concept of goal-based ship construction standards was introduced in IMO at the eighty-ninth session of the Council in November 2002 through a joint proposal from the Governments of Bahamas and Greece, suggesting that: “*IMO should play a larger role in determining the standards to which new ships are built...*”, which has been traditionally the responsibility of classification societies and shipyards.

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

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

WHAT ARE GOAL-BASED REGULATIONS?

Over the past decade, IMO has been undergoing significant changes in the way it approaches the regulation of ship design. The ever increasing speed of computers has opened a new world for designers and researchers and, as a result, IMO Member Governments have started approaching safety from a completely new perspective – one that is goal and performance oriented, in lieu of the traditional prescriptive-based approach, taking into account the sophisticated nature of the industry.

Prescriptive regulations tend to be a representation of past experience and, as such, become less and less relevant over time and can hold back ship designers, who are technically innovative, from being able to properly address future design challenges. As a result, safety regulations need to be frequently updated to keep pace with lessons learned and the latest technologies.

Example below demonstrates the difference between goal-based and prescriptive regulations:

- **Goal-based:** “People shall be prevented from falling over the edge of a cliff.”
- **Prescription:** “You shall install a 1 meter high rail at the edge of the cliff.”

Going back to the 1990s, the Maritime Safety Committee recognized that the prescriptive-based regulations were unable to cope with the new ship design challenges and already took action to incorporate the goal-based philosophy into the technical regulations of the Safety of Life at Sea Convention (SOLAS).

With the approval of the goal-based philosophy, the Maritime Safety Committee, in effect, also agreed to a new way of viewing the regulatory development process. Traditionally, issues related to fire protection, marine engineering, naval architecture and other maritime disciplines would, in most circumstances, be considered in isolation of each other and, after deliberations, prescriptive regulations would be prepared on a piecemeal basis to address each specific area of safety. However, the new regulatory approach is holistic in nature and focuses on achieving goals such as “a ship should be designed for improved survivability so that, in the event of a casualty, persons can stay safely on board (in a safe haven) as the ship proceeds to port”.

BASIC PRINCIPLES AND METHODOLOGY

After in-depth discussions within the Maritime Safety Committee (MSC) and its ad hoc Working Group on Goal-Based Standards (GBS) over several years, the Committee, in May 2005, agreed the IMO goal-based standards are:

- broad, over-arching safety, environmental and/or security standards that ships are required to meet during their lifecycle;
- the required level to be achieved by the requirements applied by class societies and other recognized organizations, Administrations and IMO;
- clear, demonstrable, verifiable, long standing, implementable and achievable, irrespective of ship design and technology; and
- specific enough in order not to be open to differing interpretations.

It is understood that these basic principles were developed to be applicable to all goal-based standards developed by IMO and not only to ship construction standards, in recognition that, in the future, IMO may develop goal-based standards for other safety areas, e.g. machinery, equipment, fire-protection, etc., as well as security and environment protection related areas, and that all goal-based standards developed by the Organization should follow the same basic principles. It was agreed to proceed with the development of GBS using a deterministic approach, while, at the same time, the use of risk-based methodologies was to be further explored over the next few sessions of the Committee.

In May 2006, MSC 81 agreed to limit the scope of the GBS work initially to bulk carriers and oil tankers and consider expansion to other ship types and areas of safety at a later time. For GBS, in general, the following five-tier system was agreed:

Tier I – Goals

High-level objectives to be met.

Tier II – Functional requirements

Criteria to be satisfied in order to conform to the goals.

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.

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.

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.

INSTRUMENTS APPROVED AND ADOPTED

Goal-Based Standards (Tiers I to III) became mandatory on 1 January 2012 under the SOLAS Convention (new SOLAS regulation II-1/3-10), subsequent to the adoption of the following instruments at MSC 87 (May 2010):

- SOLAS regulation II-1/3-10 “Goal-based ship construction standards for bulk carriers and oil tankers” (resolution MSC.290(87));
- International goal-based ship construction standards for bulk carriers and oil tankers (resolution MSC.287(87)) (the GBS Standards); and
- Guidelines for the verification of conformity with goal-based ship construction standards for bulk carriers and oil tankers (resolution MSC.296(87)) (the GBS Verification Guidelines).

The new SOLAS regulation II-1/3-10 made goal-based standards applicable to bulk carriers and oil tankers of 150 m in length and above,

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

The new SOLAS regulation also requires that a Ship Construction File be provided upon delivery of a new ship and kept on board the ship and/or ashore (see also the Guidelines for the information to be included in a Ship Construction File (MSC.1/Circ.1343)).

MSC 89 (May 2011), with a view to providing the process for the development, verification, implementation and monitoring of GBS to support regulatory development within IMO, approved the Generic guidelines for developing IMO goal-based standards (MSC.1/Circ.1394).

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.

Tier II – Functional requirements

Tier II consists of the following functional requirements, applicable to new oil tankers and bulk carriers. The fifteen functional requirements below have been structured to form three groups: design, construction and in-service considerations.

- 1 **Design life** — Not less than 25 years
- 2 **Environmental conditions** — Designed for North Atlantic
- 3 **Structural strength** — Ship design to be compatible with purpose
- 4 **Fatigue life** — Not less than ship's design life
- 5 **Residual strength** — Sufficient for foreseeable casualty scenarios
- 6 **Protection against corrosion** — Net scantlings maintained for design life
- 7 **Structural redundancy** — Localized damage not lead to total collapse
- 8 **Watertight and weathertight integrity** — Adequate for intended service
- 9 **Human element considerations** — Using ergonomic principles
- 10 **Design transparency** — Design parameters shall be accessible
- 11 **Construction quality procedures** — Quality production standards
- 12 **Survey during construction** — Survey plan required
- 13 **Survey and maintenance** — Designed to ensure easy survey
- 14 **Structural accessibility** — Provide adequate means of access
- 15 **Recycling** — Constructed of materials that are recyclable

Tier III – Verification of conformity

The verification of conformity of ship construction rules of individual recognized organizations (e.g. classification societies) and/or national maritime administrations with the GBS will be carried out by GBS Audit Teams established by the IMO Secretary-General in accordance with the Verification Guidelines (resolution MSC.296(87)). These Guidelines set out the procedures for recognized organizations and/or national maritime Administrations to submit requests for verification of their ship construction rules to the IMO Secretary-General, who will forward these requests to the Audit Teams to be established for a verification of the submitted information through an independent review. The final reports of the Teams with relevant recommendations are then forwarded to the MSC for consideration and approval.

WHO ARE THE GBS AUDITORS?

Each 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 is considered 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 Teams consist of three (3) or five (5) members, depending on the complexity of the submission(s).

By means of Circular Letter No.3076, Administrations and non-governmental organizations in consultative status with the Organization have been invited to nominate individuals for inclusion in a list of experts, maintained by the Secretary-General, from which the members of the Audit Teams are selected. Nominations should be provided to the Secretary-General and should be accompanied by a curriculum vitae.

Nominees should have an 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.

INITIAL VERIFICATION AUDITS

In accordance with the timetable approved by MSC 87 (May 2010), the deadline for receipt of initial verification requests from classification societies was 31 December 2013 and, by that time, twelve IACS members and one non-IACS recognized organization submitted requests for GBS verification audit. After having examined the documentation submitted, the IMO Secretary-General has accepted all requests and Audit Teams have now officially been established in accordance with the GBS Guidelines (resolution MSC.296(87)).

The outcome of the audits will be submitted to the MSC 96 in May 2016 and, if approved by the Maritime Safety Committee, those construction rules will be applied to bulk carriers and oil tankers to be built on or after 1 July 2016.

Queries and further information

The IMO Secretariat regularly reports to the Maritime Safety Committee on the latest progress and developments associated the GBS Programme. For more information on the GBS Programme see the IMO website or send an email to gbs@imo.org.
