

IMO DEVELOPMENTS ON INTACT AND DAMAGE STABILITY: THE WORK OF THE SLF SUB-COMMITTEE

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Abstract

This paper contains a brief description of the work the International Maritime Organization (IMO) has undertaken in the field of intact and damage stability, principally by the Sub-Committee on Stability and Load Lines and on Fishing Vessels Safety (SLF), with particular emphasis on developments just finalized or currently underway. Specifically, the paper touches upon the progress made to date on the harmonization of damage stability provisions in the SOLAS Convention, whereby the damage stability of passenger and cargo ships will be subject to a uniform calculation regime based on the probabilistic method, at present applicable under SOLAS to cargo ships only. This effort is being expanded to cover other IMO instruments, such as the High-Speed Craft Code and the 1993 Torremolinos Protocol.

The paper also provides information on the work being done on the revision of the Code of Intact Stability for all types of ships covered by IMO instruments, especially regarding the weather criterion. Other topics covered in the paper include subdivision and stability aspects of large passenger ships and the revision of the Code of safety for fishermen and fishing vessels and the Voluntary Guidelines for the design, construction and equipment of small fishing vessels.

A brief account is given of the revised Annex B to the 1988 Load Lines Protocol, adopted by the Maritime Safety Committee at the beginning of June 2003 and expected to enter into force on 1 January 2005, and also of developments concerning the safety of large passenger ships and bulk carriers.

1. PREAMBLE

The International Maritime Organization (IMO) was established some 55 years ago with the main objectives of providing machinery for cooperation among Governments in the field of governmental regulation and practices relating to technical matters of all kinds affecting shipping engaged in international trade; and facilitating the general adoption of the highest practicable standards in matters concerning

maritime safety, efficiency of navigation and prevention and control of marine pollution from ships. More recently, in the aftermath of the terrorist attacks of 11 September 2001, a new dimension, that of addressing security threats affecting ships and port facilities used in the international trade, was added to the Organization's mandate.

What started in 1948 with a small number of traditionally maritime nations has grown to be

one of the more efficient and effective of all the United Nations specialized agencies, with 162 Member States; 3 Associate Members; 36 cooperating intergovernmental organizations; and 61 non-governmental international organizations in consultative status, all of which are committed to working for safe, secure and clean seas.

The Organization has adopted around 40 conventions and protocols, like SOLAS, MARPOL and Load Lines, and most of them have been amended on several occasions to ensure that they keep pace with developments in science, technology and industrial practices. In addition, IMO has produced a large number of international codes (some of them mandatory), recommendations and guidelines which, together with the above conventions, constitute the corpus of international legislation that enables the Organization to discharge its global mandate.

The regulatory framework adopted at IMO now applies to most of the world shipping fleet. That means that virtually all ships on international voyages should adhere to IMO Conventions and other instruments in force.

Safety matters in general are dealt with by the Maritime Safety Committee (MSC) and include subjects such as ship design and equipment; fire protection; bulk liquids and gases; dangerous goods, solid cargoes and containers; safety of navigation; standards of training and watchkeeping; search and rescue; radiocommunications; and, of course, stability, load lines and fishing vessel safety.

Specific issues relating to the above subjects and requiring detailed consideration by experts on the relevant fields are referred by the Committee to subsidiary sub-committees, each specializing on the required technology and broadly bearing the name of the subject concerned. Thus, the subsidiary body of the MSC that addresses matters of interest to this

Conference is called the Sub-Committee on Stability and Load Lines and on Fishing Vessels Safety, or SLF Sub-Committee for short.

The SLF Sub-Committee considers matters related to buoyancy, subdivision and intact and damage stability of all types of ships, vessels and craft covered by IMO instruments; load line matters; tonnage measurement matters; and safety of fishermen and fishing vessels.

The regulatory work entails the development of any necessary amendments to relevant conventions and other mandatory instruments, such as the 1974 SOLAS Convention and its Protocol of 1988 (chapters II-1 and XII), the 1966 LL Convention and the 1988 Protocol relating thereto; MARPOL 73/78 (Annex I); the 1969 Tonnage Convention; the HSC, IBC and IGC Codes; and the 1993 Torremolinos Protocol. The Sub-Committee is also entrusted with the development of relevant guidelines and recommendations, which, following approval by the Committee, are issued by means of MSC circulars or resolutions.

The reminder of this paper offers an insight into the recent work accomplished by the SLF Sub-Committee on matters of interest to the Conference and provides an outline of the developments being, and likely to be, undertaken by the Sub-Committee in the coming years. The information is narrative in nature and does not contain technical details, as these will, in all probability, be the subject of elaborate discussion during the appropriate Conference sessions and workshops. Instead, the content of this paper is intended to trigger opportunities for participation in the work of the Sub-Committee through national delegations or international organizations in consultative status attending IMO.

2. INTACT STABILITY

Recognizing the need to amalgamate in a single document all the intact stability provisions developed over the years, the IMO Assembly adopted in 1993 the Code on Intact Stability for All Types of Ships Covered by IMO Instruments (IS Code) [1], by resolution A.749(18). The Code was amended in 1998 by resolution MSC.75(69) in the light of experience gained from its implementation.

The main purpose of the IS Code is to recommend stability criteria and other measures aimed at ensuring the safe operation of cargo ships, including those carrying timber deck cargo, grain in bulk or containers on deck; containerships; passenger ships; fishing vessels; special purpose ships; offshore supply vessels; mobile offshore drilling units; pontoons; dynamically supported craft; and high-speed craft.

The present IS Code's structure is built around design stability criteria applicable to all the ships and craft mentioned above and include fundamental principles such as general precautions against capsizing; weather criterion; effect of free surfaces and icing; and watertight integrity. The IS Code also addresses related operational aspects like information for the master, including stability and operating booklets and operational procedures in heavy weather, and provides guidance for the determination of light-ship displacement and centre of gravity (inclining test), as well as initial stability by means of rolling period tests.

Although the IS Code had been regarded as a very useful tool by designers and masters over the years, the SLF Sub-Committee in September 2001, having considered concerns by some Member Governments regarding, *inter alia*, the issues of parametric rolling of large containerships and passenger ships; avoidance of dangerous situations in following and

quartering seas; and the applicability of the weather criterion to large passenger ships, decided to initiate a revision of the IS Code, starting at SLF 45 in September 2002.

At that session, the Sub-Committee examined several submissions, some expanding on the above concerns and others raising new considerations, principally proposals to make mandatory some parts of the IS Code.

After looking into the preferred work methodology and scope for the revision exercise, SLF 45 agreed to a two-way approach whereby, in the short term, some of the more immediate revision tasks would be completed by 2004 and, in the longer term, a redevelopment of the Code would be undertaken on the principle of performance-based criteria. This redevelopment, which may possibly take up to five years to complete, will entail first the identification of the areas of concern; the collection of information on what is known about these areas and identification of related research needs; the setting up of a framework of performance-based stability criteria; and the definition of the criteria with appropriate standards. An *ad hoc* correspondence group was established to start work on the first two tasks and report to SLF 46.

The Sub-Committee agreed as well that compliance with the requirements of the future revised Code could be demonstrated also by other means, such as mathematical simulation of dynamic behaviour; scale model testing; and full-scale trials, provided the alternative method chosen could be shown to provide an equivalent level of safety.

With respect to the short-term part of the revision exercise, SLF 45 considered proposals relating to free surface effects; steering capability in extreme heavy weather; the suitability of the existing weather criterion for certain types of ships; anti-rolling devices; and

head-sea parametric rolling, and asked the correspondence group mentioned above to further review them and compile a set of proposed amendments to the Code for consideration by SLF 46.

Regrettably, at the time of writing, the report of the correspondence group had not been submitted to IMO. Therefore, the findings of the group, together with the associated decisions of the Sub-Committee, will be reported orally by the author to the Conference.

3. DAMAGE STABILITY

Unlike the intact stability provisions, which, as we have seen, have been grouped together in a single Code, the requirements concerning subdivision and damage stability are contained in several separate mandatory IMO instruments, referring to specific ship types (SOLAS chapters II-1 and XII; Load Lines Convention and Protocol; MARPOL Annex I; Torremolinos Protocol (not in force); and the IBC [2], IGC [3] and HSC [4] Codes). In 1973, the IMO Assembly adopted Regulations on subdivision and damage stability of passenger ships by resolution A.265(VIII) based on the probabilistic concept, which are considered as equivalent to the corresponding requirements in SOLAS chapter II-1. In addition, there are non-mandatory provisions applicable to offshore supply vessels [5], special purpose ships [6] and mobile offshore drilling units (MODUs) [7].

In February 1992, a new SOLAS chapter II-1, Part B-1 entered into force, applicable to cargo ships, including ro-ro ships, of 100 m in length and over. The new requirements were based on the probabilistic concept referred to above, which takes the probability of survival after a collision as a measure of the safety standard of the ship in the damage condition. In these requirements, it is recognized that the subdivision of a particular ship is adequate if

an “attained subdivision index A”, calculated as the summation of the product of the probability that the one compartment or group of compartments under consideration may be flooded by the probability of survival after flooding of the compartment or group of compartments in question ($A = \sum \phi_{s_i}$), is not less than the “required subdivision index R”, calculated according to a simple formula derived from analyses of statistical data corresponding to existing ships:

$$R = (0.002 + 0.0009 L_s)^{1/3}, \quad (1)$$

where L_s is the ship’s subdivision length.

The above regulations were later extended to apply to cargo ships of 80 m in length and over but less than 100 m, by developing a modified formula for the “required subdivision index R” for this size range:

$$R = 1 - [1 / (1 + L_s / 100 \cdot R_0 / 1 - R_0)], \quad (2)$$

where R_0 is the value of R calculated according to formula (1).

The regulatory regime applicable to passenger ships under the SOLAS Convention, though, kept its traditional deterministic character, even after the 1990 amendments (SOLAS 90) introduced more stringent requirements relating to the minimum range of, and area under, the positive residual righting lever curve and stipulated a maximum permissible angle of heel after flooding, except where the Administration chose to apply resolution A.265(VIII) instead. For that reason, the SLF Sub-Committee initiated in 1994 the task of harmonizing the damage stability provisions in all the relevant IMO instruments, with the ultimate purpose of establishing a common regime based on the probabilistic concept and applicable to all types of ships, vessels and craft to which the above instruments refer, starting with passenger and cargo ships, covered by SOLAS chapter II-1.

The SLF Sub-Committee has been working since then on the harmonization of damage stability provisions for passenger and cargo ships and is due to finalize the exercise at its 46th session in September 2003, where a draft revised SOLAS chapter II-1 is expected to be agreed for submission to the Maritime Safety Committee in May 2004 with a view to approval and subsequent adoption in December of the same year. If this schedule of events is kept, the harmonized requirements could enter into force on 1 July 2006.

The harmonization work has been possible in no small measure due to the help received from the HARDER consortium, a European Union-sponsored project [8], with which the Sub-Committee has been liaising since its 43rd session in September 2000 through its *ad hoc* intersessional correspondence group. These collective efforts have produced a thoroughly re-arranged and modified draft SOLAS chapter II-1, parts A, A-1, B, B-1, B-2, B-3 and B-4, which are very succinctly described hereunder (at the time of writing, the outcome of SLF 46 was not known; therefore, the summary below may have to be modified verbally by the author during the Conference).

Part A contains application provisions and definitions. New definitions have been introduced and others modified or deleted to reflect the comprehensive shift from deterministic to probabilistic principles, in particular those referring to the ship length and the term *watertight*, and the possible disappearance of the *margin line* concept.

Part A-1 has been expanded by adding a new regulation on *Access to and within spaces in the cargo area of oil tankers and bulk carriers*, which is an amended version of existing regulation II-1/12-2.

Part B is made up of a single regulation and signals the end of the deterministic floodable length concept, overriding it with the

probabilistic method laid down in Parts B-1 to B-4, all applicable to cargo ships of 80 m in length and upwards and to all passenger ships regardless of length, but excluding cargo ships which are shown to comply with subdivision and damage stability of other relevant IMO instruments.

Part B-1 sets out requirements concerning intact stability (inclining test), with reference to the Intact Stability Code mentioned in section 2 above, and the stability information to be supplied to the master and, principally, lays down the fundamentals behind the probabilistic concept of subdivision and damage stability, as follows.

Regulation 6 prescribes that the subdivision of a ship is considered sufficient if the Attained Subdivision Index A, determined in accordance with the procedures shown later on, is not less than the Required Subdivision Index R given by a formula which, at the time of writing had been proposed for consideration by the Sub-Committee:

$$R = 1 - C_1/(L_s + C_2N + C_3), \quad (3)$$

where N is the maximum number of persons permitted to be on board on any sea condition, and C₁, C₂ and C₃ are coefficients whose values were being determined at the time of preparing this paper.

Regulation 7 enables the calculation of the Attained Subdivision Index A by the summation of three partial indices A_s, A_l and A_p, themselves calculated respectively for the summer draught, light service draught and partial draught (the light service draught plus 60% of the difference between the other two), with an appropriate weighting, presently proposed as:

$$A = [0.4] A_s + [0.4] A_p + [0.2] A_l \quad (4)$$

Each partial index is calculated as the summation of contributions from all damage

cases taken into consideration, using the formula:

$$A = \prod p_i s_i, \quad (5)$$

where “i” represents each compartment or group of compartments under consideration; “ p_i ” accounts for the probability that only the compartment or group of compartments under consideration may be flooded, disregarding any horizontal subdivision; and “ s_i ” accounts for the probability of survival after flooding the compartment or group of compartments under consideration, and includes the effect of any horizontal subdivision.

Regulations 7-1 and 7-2 set out the detailed calculation procedure for the factors “ p_i ” and “ s_i ” respectively, whereas regulation 7-3 determines the permeability values to be used for each compartment or part thereof, according to the nature and use of the compartment in question, for the purpose of the subdivision and damage stability calculations, at the three draughts defined in regulation 7. As in some of the previous draft regulations, at the time of writing the Sub-Committee had not yet considered, and taken a decision on, the proposed formulae.

Regulation 8, entitled *Special requirements concerning passenger ship stability*, contains some inevitable deterministic requirements, whose inclusion in the purely probabilistic calculation methodology was proved either impracticable or unnecessarily complicated. This regulation requires that the survivability index “ s_i ” is not to be less than 1, i.e. the ship will not capsize or sink, in case of damage involving the forepeak and the next adjacent compartment of passenger ships intended to carry [400] or more persons; or where the extent of damage along the side shell has a certain vertical extent, length and penetration inboard, according to the number of passengers the ship in question is intended to carry.

Part B-2, entitled *Subdivision, watertight and weathertight integrity*, encompasses most of the relevant provisions presently required in Part B, rearranged, and many of them amended, in a user-friendly fashion. Thus, it addresses construction and arrangement of double bottoms and bulkheads, including peak and machinery space bulkheads and stern tubes; openings in watertight bulkheads and in the shell plating; construction and initial testing of watertight doors and watertight decks; internal watertight integrity of passenger ships; and some special damage prevention and control provisions applicable to ro-ro passenger ships.

Part B-3 consists of a single regulation 18 titled *Assigning, making and recording of subdivision load lines for passenger ships*, currently regulation 13 of Part B. **Part B-4**, finally, deals with operational aspects of stability management and covers most of the actual requirements in Part B, augmented and rearranged in a logical and easy-to-follow manner.

As mentioned above, the author will point out during the Conference any decisions made by SLF 46, which may not coincide with the expected action outlined in the previous paragraphs.

As per the case of resolution A.265(VIII) and the current subdivision and damage stability requirements in SOLAS chapter II-1 Part B-1, a set of explanatory notes to the newly revised chapter II-1 are being prepared by the SLF Sub-Committee to ensure that the relevant regulations are applied thoroughly and uniformly. It is expected that the explanatory notes will be circulated by the Maritime Safety Committee well before the revised chapter enters into force.

The SLF Sub-Committee has also started work on the revision of resolution A.266(VIII) entitled *Recommendation on a standard*

method of establishing compliance with the requirements for cross-flooding arrangements in passenger ships, taking into account the new provisions introduced in draft regulation II-1/7-2.4.2 requiring air pipes or equivalent means for equalization to have sufficient cross-section to ensure that the flow of water into the intact compartment is not delayed, and including the cross flooding of double bottoms. This revision exercise should also be completed before the entry-into-force date of the new regulations.

A wider effort to harmonize the subdivision and damage stability provisions in other IMO instruments, aiming at extending the probabilistic method to other mandatory conventions and codes, has been initiated and will necessitate full co-operation from Member Governments and international organizations.

4. LOAD LINES

4.1. New regulatory regime

The International Convention on Load Lines, 1966 has been modified several times, but the stringent amendment procedure laid down in its articles made it impossible for the amendments to become effective until the 1988 Protocol relating to the Convention (hereinafter referred to as the LL Protocol) entered into force on 3 February 2000, giving effect to the modifications adopted thus far and introducing the possibility of amending the Convention as modified by the Protocol by the tacit amendment procedure.

Under this regime, the Maritime Safety Committee, at the beginning of June, adopted a comprehensive set of amendments to the LL Protocol, which had been developed over the years by the SLF Sub-Committee. With the tacit procedure, it is expected that these amendments will enter into force on 1 January 2005.

Although some of the amendments do not bear direct relation to subdivision or stability, as a package they are considered to represent a significant step forward in safeguarding the ship's first line of defence, that is, its structural and weathertight integrity. For that reason, a brief description of some of the modifications to Part B of the 1988 LL Protocol which may be of interest to the Conference is offered in the following paragraphs.

4.2. Hatch covers

A new regulation 16-1 titled *Hatch covers* has been introduced, requiring much higher minimum design loads for hatch covers according to ship length and their position on board. As an example, for ships of more than 100 m in length, position 1 hatch covers located in the forward quarter of the ship's length shall be designed for wave loads at the forward perpendicular, calculated from the following equation:

$$\text{Load} = 5.0 + (L_H - 100)a \quad \text{t/m}^2, \quad (6)$$

where L_H is L for ships of not more than 340 m but not less than 100 m in length and equal to 340 m for ships of more than 340 m in length; L is the length of the ship as defined in regulation 3; 'a' is a coefficient to take account of the assigned freeboard. The load is reduced linearly to 3.5 t/m² at the end of the forward quarter's length. All other position 1 hatch covers shall be designed to 3.5 t/m², whereas position 2 hatch covers shall be designed to 2.6 t/m².

These design load values, together with those applying to ships down to 24 m in length, are appropriately tabulated in the new regulation. The stresses determined in accordance with the above loads are subject to a safety factor of 1.25 and a deflection limit of 0.0056 times the span.

This regulation also stipulates that the strength of hatch cover securing arrangements be sufficient to withstand horizontally acting loads in any sea conditions, following recent findings from extensive tank testing research that horizontal forces exerted by green seas on hatchway covers and coamings are much higher than previously thought.

4.3. Bow height and reserve buoyancy

Existing regulation 39 was modified and augmented to include reserve buoyancy requirements. A new, more rational, formula was developed to calculate the minimum bow height as a function of ship length, breadth, draught at 85% of the depth, block coefficient and waterplane area coefficient forward of amidships.

Additionally, ships assigned type ‘B’ freeboard will have to comply with new provisions requiring additional reserve buoyancy in the fore end, determined by a simplified profile area method, and which will tend to encourage, albeit indirectly, the incorporation of sheer and/or forecastle in new designs, especially of bulk carriers.

4.4. Openings in the weathertight envelope

Several regulations have been amended to tighten the prescriptions applicable to any openings which might jeopardize the weathertight integrity of the ship. These include openings into machinery spaces and in freeboard and superstructure decks; ventilators; air pipes; cargo ports; scuppers, inlets and discharges; garbage chutes; spurling pipes and cable lockers; and side scuttles, windows and skylights.

4.5. Matters identified for further study

Having completed the above revision work, SLF 46 identified further issues for further consideration in a future revision of the 1988 LL Protocol, i.e. the evaluation of reduced type ‘B’ freeboard assignment; effect of superstructures; effect of sheer; reserve buoyancy distribution; harmonization with respect to damage stability recommendations; structural strength in the damage condition; freeboard assignment on the basis of deck wetness for conventional and novel hull forms; ships with non-conventional features, including vessels (like cable layers) which operate with open hatches; and further refinements of hatch cover loads for all ships. These matters will be subject to consideration by the Sub-Committee during the coming sessions.

5. FISHING VESSEL SAFETY

5.1. The Torremolinos Protocol

Judging by past and current fishing vessel statistics, this sector of the maritime industry is by far the worst affected concerning fishermen’s lives and vessels lost. And yet, the only international treaty adopted to address the situation, i.e., the 1993 Torremolinos Protocol relating to the International Torremolinos Convention for the safety of fishing vessels, 1977, has not come into force despite all efforts made in that direction.

The IMO Assembly, in November 2001, concerned that the unacceptable loss of life thus far suffered could be substantially reduced by global and effective implementation of the 1993 Torremolinos Protocol and the 1995 STCW-F Convention, adopted resolution A.925(22) [9], urging Governments to consider accepting both international treaties at the earliest opportunity.

5.2. Other fishing vessel instruments

Currently, the SLF Sub-Committee is engaged in the comprehensive revision of the fishing vessel Safety Code [10] and Voluntary Guidelines [11], which it started several years back in collaboration with other technical sub-committees of the Organization, as well as FAO and ILO. The purpose of the Code is to provide information on the design, construction and equipment of decked fishing vessels of 24 m in length and above. The Guidelines have similar aims but apply to decked vessels with a length of 12 m and over but less than 24 m.

The revision exercise is meant to bring both non-mandatory instruments up to present-day standards without exceeding the corresponding provisions of the 1993 Torremolinos Protocol and taking into account the various Regional Agreements on fishing vessel safety now in force.

6. OTHER DEVELOPMENTS

In recent sessions, the SLF Sub-Committee has worked on several other important matters related, either directly or indirectly, to subdivision and stability, as briefly described below.

6.1. Large passenger ship safety

This is a topic to which the Maritime Safety Committee has assigned high priority, mainly during the past three years, and work has been assigned to all the technical sub-committees. The SLF Sub-Committee has been charged with characterizing the designed survivability of the ship to be able to link its design to the availability of search and rescue services and to the area of operation. At the same time, the Sub-Committee has been instructed to combine the structural performance of the ship after damage with the survivability criteria.

Work on these tasks has progressed with the help of an intersessional correspondence group, which, among other things, has been developing a methodology and analytical relationship between “time to sink” in the damage condition and the ship’s design characteristics, and has studied the need and feasibility for investigating the structural integrity of ships after damage.

At the time of writing, the correspondence group’s findings were not known. The author will, however, report them verbally to the Conference, together with the associated decisions taken by the Sub-Committee.

6.2. Bulk carrier safety

Although not directly related with the work of the SLF Sub-Committee, it is worth mentioning that MSC 76, in December 2002, recognizing the vulnerability of certain bulk carriers to undetected water ingress into cargo holds and other spaces, adopted new SOLAS regulation XII/12, requiring new and existing bulk carriers to be fitted with hold, ballast and dry space water level detectors. The Committee also adopted new regulation XII/13, addressing the availability of pumping systems and requiring that all the means for draining and pumping ballast tanks forward of the collision bulkhead and other spaces in the fore end, must be capable of being operated from a readily accessible enclosed space.

In addition, the damage stability provisions in SOLAS chapter XII, which applies specifically to bulk carriers, are being reviewed as part of an on-going and more general exercise on bulk carrier safety which is nearing completion. In this connection, the SLF Sub-Committee is also preparing, in collaboration with the DE Sub-Committee, guidelines providing detailed, comprehensive and user-friendly information covering stability and longitudinal stress

characteristics of bulk carriers during loading and unloading operations.

6.3. Containership hatchway covers

In collaboration with two other sub-committees, the SLF Sub-Committee developed Guidelines for partially weathertight hatchway covers on board containerships which, in addition to addressing fire protection and cargo segregation issues, lays down design considerations and criteria for the installation of such covers and their sealing arrangements. The Guidelines are being disseminated under cover of an MSC circular.

6.4. Model test methods

The SLF Sub-Committee has recently developed Interim Guidelines for the conduct of high-speed craft model tests, which MSC 75 approved by MSC/Circ.1029, as well as a Revised Model test method under resolution 14 of the 1995 SOLAS Conference, applicable to ro-ro passenger ships, which was adopted by MSC 76 by resolution MSC.141(76).

7. CLOSING REMARKS

We have seen a sample of the many facets that the general topic of subdivision and stability may present, as well as the varied ramifications it can produce, within the remit of the SLF Sub-Committee of IMO. In all cases, the subject is intricate and complex, and its proper consideration, invariably, necessitates the input of expert delegations, themselves backed at home by academics and scientists, as well as by ship designers, builders and operators, and even by international consortia, such as the HARDER project.

The quest for safer ships is a perennial endeavour of the Organization, backed by its Member Governments. But to achieve tangible results, i.e. further reductions in the already

declining number of severe casualties and pollution incidents worldwide, we need the combined efforts of all those involved in the marine industry, so that their input may be brought for consideration and agreement by consensus to the IMO, which, in the words of the Secretary-General, should always and without exception be regarded as the only forum where safety and pollution prevention standards affecting international shipping should be considered and adopted.

8. REFERENCES

- [1] Code on Intact Stability for All Types of Ships Covered by IMO Instruments (resolution A.749(18), as amended by resolution MSC.75(69).
- [2] International Code for the construction and equipment of ships carrying dangerous chemicals in bulk (IBC Code).
- [3] International Code for the construction and equipment of ships carrying liquefied gases in bulk (IGC Code).
- [4] International Code of Safety for High-Speed Craft, 2000 (2000 HSC Code).
- [5] Guidelines for the design and construction of offshore supply vessels.
- [6] Code of safety for special purpose ships.
- [7] Code for the construction and equipment of mobile offshore drilling units, 1989 (MODU Code).
- [8] Harmonization of rules and design rationale (HARDER) project (EU).
- [9] Resolution A.925 – Entry into force and implementation of the 1993 Torremolinos Protocol and the 1995 STCW-F Convention.
- [10] FAO/ILO/IMO Code of safety for fishermen and fishing vessels.
- [11] FAO/ILO/IMO Voluntary Guidelines for the design, construction and equipment of small fishing vessels.