



Focus on IMO



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Surviving disaster - life-saving at sea

There will always be a risk that maritime accidents will happen, but preparing for such eventualities can mean the difference between lives lost and lives saved. Life-saving appliances and procedures for abandoning ship are covered by the International Convention for the Safety of Life at Sea (SOLAS) - the first version of which was adopted in 1914 when maritime nations gathered to develop international ship safety regulations following the loss of the **Titanic** two years earlier.

SOLAS, which since 1914 has been revised and updated many times, came under the auspices of the United Nations International Maritime Organization (IMO), when it assumed global responsibility for shipping safety at its first meeting in 1959 (it was then called the Inter-Governmental Maritime Consultative Organization - IMCO).

SOLAS includes important requirements governing the safety of navigation (Chapter V) and the construction of ships (Chapter II), while the Global Maritime Distress and Safety System (GMDSS) - a worldwide network of automated emergency communications for ships - is contained in Chapter IV of the Convention. Another Convention, the International Convention on Maritime Search and Rescue (SAR), is aimed at providing a global system for responding to emergencies.

The requirements for life-saving equipment on board vessels and how to ensure that people survive if they have to abandon a ship are to be found in Chapter III.

On 1 July 1998 a completely revised SOLAS Chapter III entered into force, replacing a text that was adopted in 1983. At the same time a new mandatory International Life-Saving Appliance (LSA) Code, which contains minimum technical specifications, became effective. This new Chapter and its accompanying Code provide a

comprehensive set of requirements covering all aspects of life-saving appliances, from lifeboats to lifejackets, as well as focusing on the human side of arrangements for saving the lives of passengers and crew when a ship must be abandoned. The revised chapter accommodates lessons learned from shipping accidents in the last two decades and incorporates technological advances.

This paper looks at how IMO has developed regulations and recommendations on surviving disasters at sea and includes the following sections:

- **History of SOLAS**
- **The 1983 Chapter III of SOLAS**
- **The new Chapter III of SOLAS**
- **Symbols for life-saving appliances**
- **International Safety Management (ISM) Code**
- **Global Maritime Distress and Safety System (GMDSS)**
- **International Convention on Maritime Search and Rescue (SAR)**
- **International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW)**
- **Standard Marine Vocabulary**
- **Summary of new Chapter III of SOLAS**
- **Resolutions and recommendations on life-saving**
- **Publications**

International Convention for the Safety of Life at Sea (SOLAS)

History - from sail to steam

In the 19th Century, sail gave way to steam and to some extent seafarers and passengers stood a better chance of dealing with the everyday hazards of sea

transport, since ships could use their own power to avoid storms, rocks or other ships.

Nonetheless, a sea voyage inevitably retained an element of risk. Meanwhile, the growth in passenger liner services meant more people were exposed to that risk. Figures on the Transatlantic liner services suggest that in the two decades after Samuel Cunard began regular Transatlantic passages in 1840, 13 vessels sank, with the loss of more than 2,200 lives.

If there were an emergency at sea, those on board ship could do little but rely on flotation vests and wooden lifeboats - and hope that another ship soon spotted them. Regulations concerning ship safety varied from country to country, although significant moves were made towards international regulations on ship safety in 1857, with the introduction of the International Code of Signals and in 1863, when the Rule of the Road at Sea was established as an international agreement aimed at avoiding collisions between ships.

But it was the loss of the White Star liner **Titanic** in 1912 which gave the greatest impetus to the development of international rules governing safety of life at sea. After the disaster in which 1,503 people lost their lives, the United Kingdom called together maritime nations to a conference to draft a new International Convention for the Safety of Life at Sea - the 1914 SOLAS Convention.

1914 SOLAS

The 1914 SOLAS Convention, which was signed by 13 countries on 20 January 1914, took into account many of the lessons learned from the **Titanic** disaster - but more than that, it laid down internationally applicable rules for the first time.

The Convention included eight chapters:

- **Chapter I - Safety of Life at Sea** - Article 1 (in which Parties undertake to give effect to the convention);
- **Chapter II - Ships to which this Convention applies** - Articles 2-4 (Article 2 states that the Convention applies to mechanically-propelled merchant ships carrying more than 12 passengers on international voyages);
- **Chapter III - Safety of Navigation** - Articles 5-15 (includes the establishment of the North Atlantic ice patrol);
- **Chapter IV - Construction** - Articles 16-30 (includes requirements for watertight bulkheads);
- **Chapter V - Radiotelegraphy** - Articles 31-38 (includes requirement for a continuous watch on radio frequencies during navigation);
- **Chapter VI - Life-saving appliances and fire protection** Articles 39-56;

- **Chapter VII - Safety Certification** - Articles 57-63 (requires ships to obtain a safety certificate);
- **Chapter VIII - General** Articles 64-74 (covers entry into force, accession by other States, modification of the Convention); and
- The 1914 SOLAS also included a section of **Regulations**, covering technical details and expanding on the Articles.

SOLAS 1914 - Life-saving appliances

Chapter VI of SOLAS 1914 addressed the problem of insufficient numbers of lifeboats aboard the **Titanic** in Article 40 "*Fundamental principle*" which stated that "*At no moment of its voyage may a ship have on board a total number of persons than that for whom accommodation is provided in the lifeboats (and the pontoon lifeboats) on board*".

It also required lifejackets to be carried for every person on board (Article 51), with a sufficient number of lifejackets for children, and included requirements for embarkation (Article 44) and stowage of lifeboats and liferafts (Article 47).

The Convention required emergency lighting to be provided on ships (Article 53) and set regulations for manning of lifeboats by certificated lifeboatmen (Article 54). It called for special duties in the event of an emergency to be allocated to each member of the crew (Article 56 - *Muster roll and Drills*).

The Regulations of the Convention included technical specifications for lifeboats, pontoon lifeboats, davits, lifejackets and lifebuoys. The Convention required musters of the crews at their boat and fire stations, followed by boat and fire drills, to be held at least once a fortnight.

1929 and 1960 SOLAS

The outbreak of World War I meant that SOLAS 1914 did not enter into force as planned in 1915, although many of its provisions were adopted by individual nations.

However, in 1929, 18 countries attended another international conference, which adopted a new SOLAS Convention. It entered into force in 1933.

A third SOLAS was adopted in 1948 - this was a greatly expanded version which covered a wider variety of ships and went into greater detail in terms of the requirements. In particular, it required cargo ships of 500 gross tons and above to obtain a safety certificate - recognising the need to protect people on board cargo ships and not just those on passenger ships.

In 1960, another new SOLAS Convention was adopted, this time by the recently formed International Maritime Organization, then called the Inter-Governmental Maritime Consultative Organization (IMCO). In SOLAS 1960, many safety provisions previously only applicable to passenger ships were also applied to cargo ships.

The Convention also took into account developments in lifeboats and allowed for some of the lifeboats to be substituted with liferafts.

The 1960 SOLAS Convention was more specific on the number of lifeboats to be carried - stating that passenger ships on international voyages should carry on each side of the ship lifeboat capacity for 50 percent of the total people on board, making a total capacity of 100%. Some boats could be replaced by liferafts. The Convention also required additional liferafts to be provided for 25 percent of the people on board, plus buoyant apparatus for 3 percent.

Amendments to the 1960 Convention adopted in 1967, 1969 and 1973 included updates to specification for lifebuoys and lifejackets as well as specific requirements for life-saving arrangements on tankers and certain cargo ships, many amendments being a response to specific accidents as well as updates accounting for technological changes.

Unfortunately, it became increasingly apparent as the years went by that these efforts to respond to the lessons learnt from major disasters and keep the SOLAS Convention in line with technical developments were doomed to failure - because of the nature of the amendment procedure adopted at the 1960 conference. This stipulated that amendments would enter into force twelve months after being accepted by two-thirds of Contracting Parties to the parent Convention.

With a small number of Parties, this procedure was not a problem, but as more countries ratified SOLAS, the number of ratifications required to meet the two-thirds target needed to secure entry into force of SOLAS amendments also increased. It became clear that it would take so long for these amendments to become international law that they would be out of date before they did so.

As a result, IMO decided to introduce a new SOLAS Convention which would not only incorporate all the amendments to the 1960 Convention so far adopted but would also include a new procedure which would enable future amendments to be brought into force within an acceptable period of time.

SOLAS 1974

An IMO Conference in 1974, attended by 71 countries, adopted a new, revised SOLAS Convention, which was intended to incorporate all the amendments introduced since the 1960 Convention as well as a simpler amendment procedure - which assumes that Governments are in favour of the amendment unless they take positive action to make their objection known.

The tacit acceptance procedure deems amendments to have entered into force by a certain date unless they are rejected within a specified period by one-third of Contracting Governments or by

Contracting Governments whose combined merchant fleets represent not less than 50 per cent of world gross tonnage.

Life-saving appliances came under Chapter III (Life-saving appliances) of the 1974 Convention, although many requirements were initially similar to those in the 1960 Convention.

The 1974 Chapter III consisted of three parts: Part A contained general requirements, which applied to all ships, described appliances by type, their equipment, construction specifications, methods of determining their capacity and provisions for maintenance and availability. It also described procedures for emergency and routine drills. Parts B and C contained additional requirements for passenger and cargo ships respectively.

1983 Amendments to SOLAS

In 1983, IMO adopted a revised Chapter III, which entered into force in 1986, increasing the number of regulations from 38 to 53 and retitling the Chapter "*Life-saving appliances and arrangements*".

The main changes were to ensure operational readiness of ships and to guarantee as far as possible that following an incident, survivors could safely abandon ship, survive at sea, be detected and be retrieved by rescuers.

The revisions were designed not only to take into account new developments but also to provide for the evaluation and introduction of novel life-saving appliances or arrangements.

Like the original chapter, the revised chapter contained three parts, but it was re-arranged logically. Part A dealt with general matters such as application, exemptions, definitions, evaluation and testing and production tests. Part B was concerned with ship requirements and contained three sections: Section I (regulations 6 to 19) dealt with passenger ships and cargo ships; Section II (regulations 20 to 25) contained additional requirements for passenger ships and Section III (regulations 26 to 29) included additional requirements for cargo ships. Part C dealt with life-saving appliance requirements and contained 24 regulations divided into eight sections.

Among the more important changes were those involving lifeboats and liferafts. Generally speaking, the lifeboats required by the original Chapter III of SOLAS 1974 were the traditional open design, most of them without power. The revised chapter required all lifeboats to be totally or partially enclosed, and for these to be equipped with an engine.

The idea behind enclosed lifeboats was to provide greater protection from the elements than the traditional design. Partially enclosed lifeboats were included as they are easier to board in an emergency. This can be a crucial factor on a

passenger ship where large numbers of untrained - or elderly, young or infirm - persons are involved. Partially enclosed lifeboats must have rigid covers extending over not less than 20% of the length from the stern and not less than 20% of the length from the aftermost part of the lifeboat and be equipped with a foldable canopy to protect the rest.

Totally enclosed lifeboats must be capable of righting themselves automatically if they capsize. Rescue boats - that is, boats which are designed to rescue persons in distress and to marshal survival craft - were also required.

One important new requirement was that survival craft on passenger ships must be capable of being launched with their full complement of persons and equipment within 30 minutes from the time the abandon ship signal is given.

This is sometimes erroneously taken to mean that ships must be designed to stay afloat for 30 minutes after an accident - something that is impossible to guarantee, since there is no way of saying what damage the ship might sustain.

Under another regulation, the chapter required that survival craft be capable of being launched when the ship has a list of 20 degrees in either direction: the original Chapter III of SOLAS 1974 only required launching to be possible with a 15 degree list.

The 1983 Chapter III required cargo ships to carry sufficient totally enclosed lifeboats on each side to accommodate all on board. Chemical and oil tankers were required to carry totally enclosed lifeboats equipped with a self-contained air support system (if the cargo emits toxic gases). When carrying flammable cargoes, lifeboats must afford protection against fire for at least eight minutes.

The requirements and minimum specifications for inflatable and rigid liferafts were rewritten and

expanded, including several regulations designed to ensure that all life-saving appliances are kept in good condition and can be used promptly in the event of an emergency.

The 1983 Chapter III also included a new requirement that lifeboats on cargo ships of 20,000 gross tonnage and above be capable of being launched when the ship is making headway at speeds of up to 5 knots. This was in response to the fact that ships have increased greatly in size since the original chapter was drafted and could now take much longer to stop following an emergency.

Survival after abandoning ship

Another focus of the revised Chapter III was on survival of persons faced with severe elements after abandoning ship, particularly the effects of hypothermia.

The sinking of the **Titanic** in 1912 provided a dramatic example of the effects of cold water immersion. Partly due to a lack of adequate clothing, flotation equipment and a knowledge of survival procedures, none of the 1,489 persons who ended up in the sea was alive when rescue vessels arrived one hour and fifty minutes after the sinking. Countless lives could have been saved had they known more about how to cope with cold water.

Pocket Guide to Cold Water Survival

The Guide, first published by IMO in 1981, examines the hazards of exposure to cold when immersed in sea water and provides advice on how to prevent or minimize these dangers. The 1992 edition also contains information on how to treat victims of hypothermia. The Guide states:

"It is important to realize that you are not helpless to effect your own survival in cold water. Body heat loss is a gradual process, and research shows that in calm water at 5°C a normally dressed person has only a 50 per cent chance of surviving one hour. Simple, self-help techniques can extend this time, particularly if the person is wearing a lifejacket. You can make the difference."

The final section of the booklet sums up important information for anyone on board a ship:

- 1 Plan your emergency moves in advance.**
- 2 Know how your survival equipment works.**
- 3 Wear many layers of clothing to offset cold.**
- 4 Put on a lifejacket as soon as possible in an emergency situation.**
- 5 Try to board the lifeboat or life raft without entering the water.**
- 6 If you need to enter water, enter the water gradually.**
- 7 Swim only if it is to reach a safe refuge nearby.**
- 8 Try to float with legs together, elbows to side, arms across chest – to avoid heat loss.**

9 Force yourself to have the will to survive.

Another example came during the Second World War, when the Royal Navy of the United Kingdom lost some 45,000 men at sea, of whom it is estimated some 30,000 died from drowning and hypothermia. Many of those who drowned were incapacitated by the cold.

The 1983 Amendments to Chapter III included a number of regulations designed to reduce the threat of hypothermia. These included requirements for improved personal life-saving appliances: including immersion suits (protective suits which reduce the body heat-loss of a person in cold water) and thermal protective aids (a bag or suit made of waterproof material with low thermal conductivity).

The 1983 Chapter III also made it easier for survivors to be located. Lifejackets must be fitted with lights and a whistle and provision is made for the use of retro-reflective materials.

The New Chapter III

In 1996, IMO adopted another completely revised version of Chapter III of SOLAS, taking into account changes in technology since the chapter was last revised in 1983.

The new chapter entered into force on 1 July 1998 and applies to all ships built on or after that date, although some of the amendments also apply to existing ships. Specific technical requirements are contained in a new International Life-Saving Appliance (LSA) Code, which also became mandatory on 1 July 1998. The Code is made mandatory under Regulation 34, which states that all life-saving appliances and arrangements shall comply with the applicable requirements of the LSA Code.

The text of the new Chapter takes into account technological changes, such as the development of marine evacuation systems: these systems involve the use of slides, similar to those installed on aircraft.

The amendments also reflect public concern over safety issues, raised by a series of major accidents in the 1980s and 1990s. Many of the passenger ship regulations have been made applicable to existing ships, and extra regulations have been introduced specifically for ro-ro passenger ships.

They must, for example, be equipped with fast rescue boats and must be equipped with means for recovering survivors from the water and rescue units. They must also be equipped with a helicopter pick-up area while passenger ships of 130 m in length and over, built after 1 July 1999, must be fitted with a helicopter landing area.

Counting passengers

The new Chapter says that all passengers on passenger ships "shall be counted prior to departure" and that not later than 1 January 1999 "the names and gender of all persons on board, distinguishing between adults, children and infants shall be recorded for search and rescue purposes".

The revised chapter also puts considerable emphasis on the abilities of officers and crews. There are requirements for training manuals and on-board training aids, instructions for on-board maintenance and passenger ships will be required to carry a decision support system on the bridge for the use of masters. This describes what action should be taken in the event of various emergencies.

The new Chapter is reinforced by the use of footnotes which refer to other measures adopted by IMO, including codes of practice, recommendations and performance standards.

Communications

Important emphasis is also placed on communications - between crew, and between crew and passengers.

Summary of SOLAS Chapter III

(Life-saving appliances and arrangements)

Entry into force: 1 July 1998

Part A - General

Regulation 1 - Application: The chapter applies to ships built on or after 1 July 1998. Ships constructed before that date should comply with the chapter in force prior to 1 July 1998, but when life-saving appliances or arrangements on existing ships are replaced or repaired they should, as far as is reasonable and practicable, comply with the new requirements.

Regulation 2 - Exemptions: Allows Administrations to exempt ships from specific requirements where those ships do not proceed more than 20 miles from land or when ships are involved in special trades for the carriage of large numbers of special trade passengers (in which case the ships must comply with the Special Trade Passenger Ships Agreement 1971).

Regulation 3 - Definitions: Gives definitions of terms used in the chapter.

Regulation 4 - Evaluation, testing and approval of life-saving appliances and arrangements: Life-saving appliances and arrangements must be

approved by the Administration and must comply with the requirements of the LSA Code.

Regulation 5 - Production Tests: Life-saving appliances must be subjected to production tests to ensure they are manufactured to the same standards as the prototypes.

Part B – Requirements for Ships and Life-Saving Appliances

Section 1 – Passenger Ships and Cargo Ships

Regulation 6 – Communications: Gives requirements for carriage of VHF radiotelephones, radar transponders and distress flares. A general emergency alarm system (which complies with the requirements in the LSA Code) must be provided for summoning crew and passengers to muster stations. All passenger ships must be fitted with a public address system.

Regulation 7 - Personal life-saving appliances: Covers the requirements for lifebuoys, lifejackets and immersion suits and anti-exposure suits. Life - jackets must be provided for every person on board ship, plus additional lifejackets should be provided for children and for persons on watch and at remotely located survival craft stations.

Regulation 8 - Muster list and emergency instructions: On all ships, clear instructions to be followed in an emergency must be provided to everyone on board and muster lists and emergency instructions must be exhibited in conspicuous places throughout the ship. In passenger ships the instructions should be drawn up in the language or languages required by the flag State and in the English language. Illustrations and instructions in "appropriate languages" must be posted in passenger cabins and be conspicuously displayed at muster stations and other passenger spaces, to inform passengers of their muster stations; the essential actions they must take in an emergency; and the method of donning lifejackets.

Regulation 9 - Operating instructions: Posters and signs must be provided near to survival craft and launching stations. They must:

- illustrate controls and operation of the appliances;
- be easily seen under emergency lighting conditions;
- use symbols recommended by IMO.

Regulation 10 - Manning of survival craft and supervision: Requires sufficient number of trained persons on board for mustering and assisting untrained persons; gives requirements for manning of survival craft.

Regulation 11 - Survival craft muster and embarkation arrangements: Gives requirements for location of lifeboats, liferafts and muster stations; requirements for lighting of alleyways, stairways and exits

Regulation 12 - Launching stations: Launching stations should be located to provide safe launching of survival craft.

Regulation 13 - Stowage of survival craft: Gives requirements for where and how survival raft should be kept on board ship. Survival craft should be stowed "in a state of continuous readiness so that two crew members can carry out preparations for embarkation and launching in less than 5 minutes".

Regulation 14 - Stowage of rescue boats: Gives requirements for stowage of rescue boats, which must also be kept in a state of continuous readiness for launching in not more than 5 minutes.

Regulation 15 - Stowage of marine evacuation systems: Gives requirements for location of marine evacuation systems, which should be positioned to ensure safe launching "having particular regard to clearance from the propeller and steeply overhanging positions of the hull".

Regulation 16 - Survival craft launching and recovery arrangements: Gives requirements for provisions for launching and recovery of survival craft. Survival craft must be fitted with launching and embarkation appliances that comply with the requirements in the LSA Code, with certain exceptions, such as survival craft carried in excess of survival craft for 200% of the total number of persons on board ship.

Regulation 17 - Rescue boat embarkation, launching and recovery arrangements: The rescue boat should be able to be boarded and launched in the shortest possible time. All rescue boats should be capable of being launched with the ship making headway at speeds up to 5 knots in calm water.

Regulation 18 - Line-throwing appliances: A line throwing appliance complying with the LSA Code must be provided.

Regulation 19 - Emergency training and drills: Gives requirements and procedures for carrying out emergency drills (including abandon ship drills, fire drills) and training for all crew. Whenever new passengers embark, a passenger safety briefing must be made immediately before or after sailing.

Regulation 20 - Operational readiness, maintenance and inspections: Requires that all life-saving appliances be in working order and ready for use before the ship leaves port and at all times during the voyage. Gives details of which

life-saving appliances require weekly and monthly tests and inspections.

Section II – Passenger Ships (Additional Requirements)

Regulation 21 - Survival craft and rescue boats: Passenger ships on international voyages which are not short must carry partially or totally enclosed lifeboats on each side to accommodate not less than 50% of total number of persons on board (in other words, the two sides together must equal at least 100%). Some lifeboats can be substituted by liferafts. In addition, inflatable or rigid liferafts to accommodate at least 25% of the total number of persons on board.

Passenger ships on short international voyages must carry partially or totally enclosed lifeboats for at least 30% of persons on board, plus inflatable or rigid liferafts to make total capacity of 100% with the lifeboats. In addition, they must carry inflatable or rigid liferafts for 25% of total number of persons on board.

All survival craft required to provide for abandonment by the total number of persons on board must be capable of being launched with their full complement of persons and equipment within a period of **30 minutes** from the time the abandon ship signal is given.

Regulation 22 - Personal life-saving appliances Gives requirements for number of lifebuoys; immersion and thermal suits; and extra lifejackets that passenger ships must carry. Each lifejacket must be fitted with a light.

Regulation 23 - Survival craft and rescue boat embarkation arrangements: Gives requirements for embarkation arrangements.

Regulation 24 - Stowage of survival craft: Gives stowage requirements.

Regulation 25 - Muster stations: Muster stations must be in the vicinity of, and allow easy access to, embarkation stations and must have ample room, at least 0.35 m² per passenger.

Regulation 26 - Additional requirements for ro-ro passenger ships: Includes requirements for ro-ro passenger ship's liferafts to be served by either marine evacuation systems or launching appliances compliant with the LSA Code. At least one of the rescue boats must be a fast rescue boat. Ro-ro passenger ships must be equipped with efficient means for rapidly recovering survivors from the water and transferring them from rescue units or survival craft to the ship. A sufficient number of lifejackets must be stored in the vicinity of muster stations so passengers do not have to return to their cabins for lifejackets.

For existing ships, the lifejacket requirements must be complied with not later than the first periodical

survey after 1 July 1998. All other requirements must be complied with by the first periodical survey after 1 July 2000.

Regulation 27 - Information on passengers: All persons on board all passenger ships must be counted before departure, with details of persons with needs for special care or assistance communicated to the master. Details must also be kept ashore. By 1 January 1999, names and gender of all persons, distinguishing between adults, children and infants should be recorded for search and rescue purposes (Administrations may exempt passenger ships from this requirement if the scheduled voyages of the ship make it impracticable to comply).

Regulation 28 - Helicopter landing and pick-up areas: All ro-ro passenger ships must be fitted with a helicopter pick-up area. All passenger ships 130m in length and over constructed after 1 July 1999 must be fitted with a helicopter landing area. This part of the regulation is under review by the Maritime Safety Committee.

Regulation 29 - Decision support system for masters of passenger ships: In all passenger ships, a decision support system for emergency management must be provided on the navigation bridge. This should consist of, as a minimum, printed emergency plan or plans covering all foreseeable emergency situations, including fire, damage to ship, pollution, unlawful acts threatening the safety of the ship and security of passengers and crew, personnel accidents, cargo-related accidents and emergency assistance to other ships. Passenger ships constructed before 1 July 1997 must comply not later than the first periodical survey after 1 July 1999.

Regulation 30 - Drills: On all passenger ships, an abandon ship drill and fire drill must take place weekly.

Section III – Cargo Ships (Additional Requirements)

Regulation 31 - Survival craft and rescue boats: Gives requirements for carriage of survival craft for cargo ships. Lifeboats carried must accommodate all persons on board, additional liferafts must also be carried. Chemical tanker and gas carriers carrying cargoes emitting toxic vapours or gases must carry lifeboats with a self-contained air support system that comply with the LSA Code. Oil tankers, chemical tankers and gas carriers carrying cargoes with a flashpoint not exceeding 60° C must carry fire-protected lifeboats that comply with the LSA Code.

Regulation 32 - Personal life-saving appliances: Gives requirements for carriage of lifebuoys,

lifejackets, lifejacket lights, immersion suits, thermal suits aboard cargo ships.

Regulation 33 - Survival craft embarkation and launching arrangements: Gives requirements for cargo ship survival craft embarkation and launching arrangements.

Section IV - Life-Saving Appliances and Arrangement Requirements

Regulation 34 - States that all life-saving appliances and arrangements shall comply with the applicable requirements of the LSA Code.

Section V - Miscellaneous

Regulation 35 - Training manual and on-board training aids: On all ships, a training manual must be provided in each crew mess room and recreation room or in each crew cabin. The training manual must contain instructions and information in easily understood terms, illustrated wherever possible, on the life-saving appliances provided on the ship and the best methods of survival. The regulation lists the elements which must be explained in detail.

Regulation 36 - Instructions for on-board maintenance: Instructions for on-board maintenance of life-saving appliances should be easily understood, illustrated wherever possible, and include specific details for each appliance,

such as schedule of periodic maintenance and maintenance and repair instructions.

Regulation 37 - Muster list and emergency instruction: Details what the muster list should include. The muster list should: specify details of the general alarm and public address system; show the duties assigned to each member of the crew, such as closing of watertight doors, muster of passengers; specify which officers are assigned to ensure life-saving and fire appliances are maintained and ready for use; the muster list must be prepared before the ship proceeds to sea.

Resolutions relating to SOLAS Chapter III

IMO has adopted numerous recommendations and guidelines relating to survival at sea, in the form of Resolutions and Circulars. While these are not mandatory - it is up to each Member State to decide on implementing them - they form a core element of the technical recommendations issued by IMO and many are accepted as industry standard even though not mandatory.

The following table lists resolutions and circulars relating to life-saving appliances and arrangements and survival at sea.

A.830(19)	Code on Alarms and Indicators
A.689(17)	Recommendation on testing of life-saving appliances
A.602(15)	Revised guidelines for marine portable fire extinguishers
A.657(16)	Instructions for action in survival craft
A.760(18)	Symbols related to life-saving appliances and arrangements
A.658(16)	Recommendation on the use and fitting of retro-reflective materials on life-saving appliances
A.520(13)	Code of practice for the evaluation, testing and acceptance of prototype novel life-saving appliances and arrangements
A.809(19)	Recommendation on performance standards for survival craft two-way VHF radiotelephone apparatus
A.802(19)	Recommendation on performance standards for survival craft radar transponders for use in search and rescue operations
A.691(17)	Safety instructions to passengers
MSC/Circ.570	Recommendation on maximum stowage height of survival craft on passenger ships
MSC/Circ.544	Fire drills and on-board training
A.624(15)	Guidelines on training for the purpose of launching lifeboats and rescue boats from ships making headway through the water
	Recommendation on conditions for the approval of servicing stations for inflatable

A.761(18)	liferafts
MSC/Circ.614	Guidelines on inspection and maintenance of lifeboat on-load release gear
A.656(16)	Guidelines for fast rescue boats
A.771(18)	Recommendation on training requirements for crews of fast rescue boats
A.229(VII)	Merchant Ship Search and Rescue Manual (MERSAR) - which is being updated and incorporated in the joint ICAO/IMO SAR manual ... added
MSC/Circ.760	Guidelines for the structure of an integrated system of contingency planning for shipboard emergencies
A.690(17)	Periodical inspections of abandon ship and fire drills on passenger ships
A.657(16)	Instructions for action in survival craft
MSC/Circ.587	Fumes from totally enclosed lifeboats
A.692(17)	Guidelines and specifications for hyperbaric evacuation systems
MSC/Circ.616	Evaluation of free-fall launch performance

Symbols related to life-saving appliances and arrangements

The symbols recommended by IMO for use on board ships were first adopted in 1987 under Resolution A.603(15) and were updated in 1993 by Assembly Resolution A.760(18), which added emergency exit signs.

In marine terminals, the manual *International Signs to Provide Guidance to Persons at Airports and Marine Terminals*, published jointly by the International Civil Aviation Organization (ICAO) and IMO, provides signs and symbols for use in both marine and air terminals.

The International Life-Saving Appliance (LSA) Code

The LSA Code, which gives technical details and minimum specifications for life-saving appliances, consists of seven chapters:

- **Chapter I General:** definitions and general requirements for life-saving appliances
- **Chapter II Personal Life-saving appliances:** lifebuoy; lifejackets; immersion suits; anti-exposure suits; thermal protective aids
- **Chapter III Visual signals:** rocket parachute flares; hand flares; buoyant smoke signals
- **Chapter IV Survival Craft:** general requirements for liferafts; inflatable liferafts; rigid liferafts; general requirements for lifeboats; partially enclosed lifeboats; totally enclosed lifeboats; free-fall lifeboats; lifeboats with a self-contained air support system; fire-protected lifeboats
- **Chapter V Rescue boats**

- **Chapter VI Launching and embarkation appliances:** Launching and embarkation appliances; marine evacuation systems
- **Chapter VII Other life-saving appliances:** line-throwing appliances; general alarm and public address system.

The ISM Code

The International Safety Management (ISM) Code was introduced by means of amendments to SOLAS in 1994 and entered into force on 1 July 1998. It is contained in a new Chapter IX of the Convention and applies to all tankers, bulk carriers, gas carriers, passenger ships and cargo high-speed craft of 500 gross tonnage and above from 1 July 1998. It will be extended to other ships in 2002.

The ISM Code is widely regarded as one of the most important measures to be adopted by IMO during the last few years because it is designed to ensure that shipowners make safety a priority. Ships covered by the Code must carry appropriate documentation, showing compliance with all relevant regulations, which can be inspected when they visit ports in other countries. The procedures required by the Code should be documented and compiled in a Safety Management Manual, a copy of which should be kept on board.

The Code requires a safety management system (SMS) to be established by "the Company", which is defined as the shipowner or any person, such as the manager or bareboat charterer, who has assumed responsibility for operating the ship. Regular checks and audits should be held by the company to ensure that the SMS is being complied with and the system itself should be reviewed periodically to evaluate its efficiency. The SMS

should include a number of functional requirements:

- a safety and environmental protection policy;
- instructions and procedures to ensure safe operation of ships and environmental protection;
- defined levels of authority and lines of communication between and amongst shore and shipboard personnel;
- procedures for reporting accidents, etc;
- procedures for responding to emergencies;
- procedures for internal audits and management review.

The Company is required to establish and implement a policy for achieving these objectives. This includes providing the necessary resources and shore-based support.

The requirement to include procedures for responding to emergencies, and the requirement for an SMS, means that all the requirements of SOLAS must be met - and that emergency plans must be drawn up. The ISM Code is effectively seen as a means of ensuring that those responsible for the ship and its crew and passengers comply with all the requirements established by IMO to ensure safety and to enable people to survive if there is an emergency on board.

The Global Maritime Distress and Safety System (GMDSS)

The **Global Maritime Distress and Safety System (GMDSS)** - which became fully effective from 1 February 1999 - is essentially a worldwide network of automated emergency communications for ships at sea. The basic concept is that search and rescue authorities ashore, as well as shipping in the immediate vicinity of the ship in distress, will be rapidly alerted through satellite and terrestrial communication techniques to a distress incident so that they can assist in a coordinated SAR operation with the minimum of delay.

The GMDSS was introduced by means of amendments to SOLAS which were adopted in 1988 and entered into force on 1 February 1992 with a phase-in period to 1 February 1999. By that date the Morse Code was phased out and all passenger ships and all cargo ships of 300 gross tonnage and upwards on international voyages are now required to carry equipment designed to improve the chances of rescue following an accident, including satellite emergency position indicating radio beacons (EPIRBs) and search and rescue transponders (SARTs) for the location of the ship or survival craft.

More details on GMDSS are contained in IMO Focus Paper:

Shipping emergencies - search and rescue and the GMDSS

International Convention on Maritime Search and Rescue

Although the obligation of ships to go to the assistance of vessels in distress was enshrined both in tradition and in international treaties (such as SOLAS), there was until two decades ago no international system covering search and rescue operations. In some areas there was a well-established organization able to provide assistance promptly and efficiently, in others there was nothing at all.

In 1979, a conference convened by IMO in Hamburg adopted the **International Convention on Maritime Search and Rescue** (it entered into force in 1985). The aim was to develop an international SAR plan, so that, no matter where an accident occurs, the rescue of persons in distress at sea will be co-ordinated by a SAR organization and, when necessary, by co-operation between neighbouring SAR organizations.

Co-operation of this type is encouraged by SOLAS 1974, Parties to which undertake "to ensure that any necessary arrangements are made for coast watching and for the rescue of persons in distress round its coasts. These arrangements should include the establishment, operation and maintenance of such maritime safety facilities as are deemed practicable and necessary".

Parties to the SAR Convention are encouraged to enter into SAR agreements with neighbouring States involving the establishment of SAR regions, the pooling of facilities, establishment of common procedures, training and liaison visits. The Convention states that Parties should take measures to expedite entry into its territorial waters of rescue units from other Parties. The Convention then goes on to establish preparatory measures which should be taken, including the establishment of rescue co-ordination centres and sub-centres. It outlines operating procedures to be followed in the event of emergencies or alerts and during SAR operations. This includes the designation of an on-scene commander and his duties.

Under the Convention, the world's oceans have been divided into 13 areas for search and rescue purposes.

Revised SAR Convention

A revised SAR Convention was adopted in May 1998, entering into force (under tacit acceptance) on 1 January 2000.

The revised SAR Convention clarifies the responsibilities of Governments and puts greater emphasis on the regional approach and co-ordination between maritime and aeronautical SAR operations.

The revision applies to the main body of the Convention, contained in an Annex, which is divided into chapters.

Terms and definitions contained in Chapter 1 have been updated and Chapter 2, which deals with Organization and Co-ordination, has been re-drafted to make the responsibilities of Governments clearer.

The new text requires Parties, either individually or in co-operation with other States, to establish basic elements of a search and rescue service, and describes how SAR services should be arranged and national capabilities be developed. Parties are required to establish rescue co-ordination centres and to operate them on a 24-hour basis with trained staff having a working knowledge of English.

Under the revised Chapter 2, Parties are required to “ensure the closest practicable co-ordination between maritime and aeronautical services”. IMO and the International Civil Aviation Organization (ICAO) have jointly developed the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual, to replace the earlier Merchant Ship Search and Rescue Manual (MERSAR), first published in 1971, and the IMO Search and Rescue Manual (IMOSAR), first published in 1978.

Other Chapters in the revised SAR Convention deal with Co-operation between States (Chapter 3) and Operating Procedures (Chapter 4), which incorporates the previous Chapters 4 (Preparatory Measures) and 5 (Operating Procedures). Chapter 4 gives procedures to be followed, such as during initial action, emergency phases, initiation of search and rescue operations when the position of the search object is unknown and co-ordination of SAR activities. The revised Chapter 4 says that “Search and rescue operations shall continue, when practicable, until all reasonable hope of rescuing survivors has passed”.

The original Chapter 6 (Ship Reporting Systems) has been updated and renumbered as Chapter 5. It says that ship-reporting systems should provide up-to-date information on the movements of vessels in the event of a distress incident to help the SAR activities.

More details on SAR are contained in IMO Focus Paper:

Shipping emergencies - search and rescue and the GMDSS

The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW)

The training of seafarers to deal with emergencies at sea is crucial for the Safety of Life at Sea. SOLAS includes in Chapter III references to safety and fire drills, while the minimum standards for crew involved in ship operations are set out in the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), first adopted in 1978. The Convention was considerably revised in 1995, when IMO adopted a new STCW Code, to which many technical regulations of the original STCW Convention have been transferred. The revised STCW entered into force on 1 February 1997. The Convention establishes standards for the deck department, engine department and radio department and deals with all members of the ship's complement. In each case the Convention prescribes minimum age levels, minimum periods of sea-going service and certification requirements.

In **Chapter II: Master-deck department**, Regulations establish mandatory minimum requirements for certificating masters and chief mates of ships of less than 500 gross tonnage, ships of 500 to 3,000 gross tonnage, and ships of 3,000 gross tonnage or more. Masters and chief mates must prove their knowledge of life-saving, alongside navigational aspects and ship-handling; ship stability, construction and damage control; power plants; cargo handling and stowage; fire prevention; medical care; maritime law (including SOLAS and other IMO conventions); personnel management and training; communications; and search and rescue.

Chapter III covers minimum requirements for seafarers in the **Engine Department** and Chapter IV covers **Radiocommunication and radio personnel**.

Chapter V sets out **Special training requirements for personnel on certain types of ships** and Regulation V/2 establishes minimum mandatory requirements for crew on ro-ro passenger ships. In particular:

- Masters, officers and other personnel designated on muster lists to assist passengers in emergency situations must have training in crowd management;

- Personnel providing direct service to passengers must have completed specified safety training, to include ability to communicate with passengers in the appropriate language or languages, or in basic English, and ability to demonstrate to passengers the use of personal life-saving appliances; and
- Masters, chief mates, chief engineer officers, second engineer officers and any person with responsibility for the safety of passengers in emergency situations must have completed approved training in crisis management and human behaviour.

In **Chapter VI**, on *Proficiency in survival craft*, regulations establish requirements governing the issuing of certificates of proficiency in survival craft. These include approved sea-going service of not less than 12 months, or nine months if the candidate has attended an approved training course. There is provision for testing "by examination or continuous assessment during an approved training course". An appendix lists the minimum knowledge required for the issue of certificates of proficiency.

More details on the revised STCW Convention are contained in IMO Focus paper: **The new STCW Convention – The 1995 amendments to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), 1978**

Standard marine vocabulary

The importance of effective communication between shipmasters, crew and coastal authorities, especially during an emergency, has long been recognized by IMO. In 1977, IMO adopted a specially developed English language vocabulary designed for use at sea, called the *Standard Marine Navigational Vocabulary* (SMNV).

In 1981, IMO adopted a resolution recommending the SMNV be used for communications on board ship as well as those between ships and between ship and shore.

SMNV is now being updated by *Standard Marine Communication Phrases* or SMCP, which is designed to be more comprehensive than SMNV.

Following agreement at IMO's Maritime Safety Committee at its 68th session in May-June 1997, the SMCP has been distributed to Governments, maritime training institutes and others involved in maritime communications so that trials in its use can be conducted with a view to the SMCP being

reviewed and finally put forward for formal adoption at IMO's 22nd Assembly in 2001.

The SMCP includes phrases which have been developed to cover the most important safety-related fields of verbal shore-to-ship (and vice-versa), ship-to-ship and on-board communications. The aim is to get round the problem of language barriers at sea and avoid misunderstandings which can cause accidents.

The SMCP builds on a basic knowledge of English and has been drafted in a simplified version of maritime English. It includes phrases to be used in routine situations such as berthing as well as standard phrases and responses to be used in emergency situations.

IMO Publications

The following publications relating to safety at sea and Chapter III of SOLAS are available from IMO.

- * SOLAS (Consolidated edition, 1997)
- * International Safety Management Code (ISM Code) (1994 edition)
- * ISM Code and Guidelines on Implementation (1997 edition)
- * International Code of Safety for High-speed Craft (HSC Code) (1995 edition)
- * Amendments to SOLAS 1974 concerning Radiocommunications for the Global Maritime Distress and Safety System (1989 edition)
- * GMDSS Handbook (1995)
- * STCW 95 (1996)
- * Pocket Guide to Cold Water Survival (1992 edition)
- * International Conference on Maritime Search and Rescue, 1979 (1979 edition)
- * Merchant Ship Search and Rescue Manual (MERSAR Manual) (1993 edition)
- * IMO Search and Rescue Manual (IMOSAR Manual) (1993 edition)
- * Poster: Life-saving Appliances Symbols (1995 edition)
- * International Life-Saving Appliance Code (LSA Code) (1997 edition)
- * Testing and Evaluation of Life-saving Appliances (1992 edition)
- * Standard Marine Navigational Vocabulary (1985 edition)
- * International Code of Signals (1987 edition)
- IMO Model Courses:
 - * Medical Emergency – Basic Training (Model Course 1.13 plus Compendium; 12 hours)
 - * Medical Emergency – First Aid (Model Course 1.14 plus Compendium; 21 hours)
 - * Medical Care (Model Course 1.15 plus Compendium; 40 hours)
 - * Personal Survival (Model Course 1.19; 15 hours)
 - * Basic Fire Fighting (Model Course 1.20; 18 hours)
 - * Human Relationships (Model Course 1.21 plus Compendium; 30 hours)
 - * Proficiency in Survival Craft (Model Course 1.23; 30 hours)
 - * Survey of Life-Saving Appliances and Arrangements (Model Course 3.06 plus Compendium; 36 hours)

To order or for further information, please contact: IMO Publications, 4 Albert Embankment, London SE1 7SR. Telephone: +44 (0)20 7735 7611; Fax no. +44 (0)20 7587 3210; Telex: 23588; E-mail: publications@imo.org.