

NATO STANDARD

ANEP-77 PART 1

**NAVAL SHIP CODE: GOALS,
FUNCTIONAL OBJECTIVES AND
PERFORMANCE REQUIREMENTS**

Edition G Version 3

JULY 2019



NORTH ATLANTIC TREATY ORGANIZATION

ALLIED NAVAL ENGINEERING PUBLICATION

**Published by the
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NATO LETTER OF PROMULGATION

16 July 2019

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INTRODUCTION

The Naval Ship Code provides a goal based framework that enables ships to be certified within a navy's safety management system as safe to operate. It includes processes and potential solutions for the defined technical areas which can be applied to any naval ship, within the context of its operational requirements. It is published by NATO, having been developed by the International Naval Safety Association (INSA), a group of like-minded navies and Classification Societies. The Code has been derived from various international conventions that provide the safety management system for commercial ships.

The Code is applicable to all surface naval craft, coastguard and other vessels operated by a government which are not for commercial purposes. It does not cover propulsion systems of nuclear powered vessels nor does it cover the bulk carriage of low flash point fuels.

Overall ship safety is dependent on other factors, such as manning, organisation and operation, which are outside the scope of the Code and these must also be in place in order that the safety of naval personnel can be assured to be in line with a navy's safety policy.

The Code does not address environmental protection legislation that a naval vessel would also be expected to comply with.

To cover the various operating practices of different vessels within a navy or similar organisation, the Code is 'Goal Based'. This means that the development of the Code has considered the risks and issues that may have an impact on safety and aggregated them into high level Goals that need to be addressed through the application of suitably justified technical standards, use of the solutions proposed in the Code, or by a robust engineering argument that the solution meets the safety targets of the Naval Administration. It requires that a clearly articulated Concept of Operations Statement (ConOpS) must be available against which the relevance of the acceptance criteria chosen (the technical standards, etc.) can be validated and then the design, construction and through life upkeep can be verified for compliance.

In order to satisfy the top level goal of the Code, all of the lower level Goals, Functional Objectives and Performance Requirements need to be satisfied. Because of this structure, the Code is very flexible in the way that certification can be achieved. Use of only parts of the Code is not recommended because many of the hazards are interdependent. Compliance with the Code should be applied throughout a vessel's lifecycle, but can be initiated at any time, either at concept or after the ship has entered into service.

The Code does not specifically address hazards caused by external military operations (weapons attack), but links are identified in the Code where a Naval Administration may require additional criteria to be applied.

The Code may be used by any navy that wishes to apply the process to their ships. They are strongly encouraged to join INSA in order that they have full access to the underlying philosophy and development decisions that have shaped the Code into its present arrangement and to share their experience of naval ship safety with existing members.

Application of the Code is achieved through the use of Chapters I to X inclusive, with Chapter I describing how a Naval Ship Safety Certificate is issued. Chapter 0 provides guidance as to how this is achieved overall.

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DEFINITIONS & ABBREVIATIONS

Term	Definition	Source Chapter
"A" class divisions	<p>Divisions formed by bulkheads and decks which comply with the following criteria:</p> <ol style="list-style-type: none"> a. they are constructed of steel or other equivalent material; b. they are suitably stiffened; c. they are insulated with approved non-combustible materials such that the average temperature of the unexposed side will not rise more than 140°C above the original temperature, nor will the temperature, at any one point, including any joint, rise more than 180°C above the original temperature, within the time listed below: <ol style="list-style-type: none"> i. class "A-60" 60 minutes ii. class "A-30" 30 minutes iii. class "A-15" 15 minutes iv. class "A-0" 0 minutes <p>Note: Insulated "A" class bulkheads and decks used on board ships, including the means of affixing the insulation to the "A" class structural members, should be consistent with the materials, details and arrangements used during, and documented in the test reports issued for, the approval test for that insulating material.</p> <ol style="list-style-type: none"> d. they are constructed as to be capable of preventing the passage of smoke and flame to the end of the one-hour standard fire test; e. they have been prototype tested to the satisfaction of the Naval Administration in accordance with the FTP Code or other standard agreed by the Naval Administration to ensure that it meets the above requirements for integrity and temperature rise. <p>Note: "Light-weight constructions" (honeycomb type, etc.) of steel or equivalent material may be used as non load-bearing internal "A" class division in accommodation and service spaces provided they have successfully passed the relevant standard fire test to the satisfaction of the Naval Administration in accordance with the FTP Code or other standard agreed by the Naval Administration. These "light-weight constructions" should not be used as an integral part of main fire zone bulkheads and stairway enclosures on ships designed to carry more than 60 non-crew.</p>	VI
Accident	An accident is defined as an identifiable event or series of events which can be foreseen but which is unexpected.	II
Accommodation Spaces	<p>Crew spaces such as corridors, heads & bathrooms, cabins, offices, mess decks, hospitals, pantries containing no cooking appliances and similar spaces.</p> <p>These spaces may contain:</p> <ol style="list-style-type: none"> a. toasters, microwave ovens, induction heaters and similar appliances each of them with a power not more than 5kW; b. electrically heated cooking plates and hot plates for keeping food warm each of them with a maximum power less than 2kW and a surface temperature not above 150°C. c. coffee machines, dish washers and water boilers regardless of their power. 	VI/VII
Activation	The intended use of a dangerous good (Class 1).	X
Additional Bridge functions	Functions related to ship operations which should be carried out on the Bridge in addition to primary navigation functions, but not necessarily by the Officer of the Watch. Examples of such functions are extended communication functions, monitoring and control of ballasting and cargo operations, monitoring and control of machinery, and monitoring and control of domestic systems.	IX
Afloat	For the waterline not to exceed the submergence limit.	III
Agreed	Documented confirmation between the owner, the designer and the Naval Administration.	IV
Agreed standard	The standard selected by the Owner and agreed by the Naval Administration, compliance with which will be deemed to meet the requirements of this Code.	II

Term	Definition	Source Chapter
Aircraft hangars	Enclosed spaces for aircraft storage, maintenance and preparation, into and from which aircraft can be moved and to where crew and non-crew have access. Such spaces may be accommodated on more than one deck provided that the total overall clear height for aircraft does not exceed 10m.	VI
Alert system	A means of providing information to the operator that a parameter has deviated from a norm by a defined amount.	IV
Alternate Conning Position	A position not on the Bridge from where from the primary navigation functions, with exception of manual manoeuvring, are exercised using reduced resources.	IX
Ammunition spaces	See Dangerous Goods Preparation Area and Dangerous Goods Stowage Area.	VI
Anchoring and mooring equipment	Fixed and non-fixed devices to hold a ship in position such as anchors, windlasses, bollards, fairleads, chains and mooring ropes.	V
Anniversary date	The day and the month of each year which will correspond to the date of expiry of the relevant certificate.	I
Anticipated List or Trim for Damaged Conditions	Worst case trim and list as determined from Chapter III and as a minimum shall be 10° of trim and 20° of list either way.	VII
Anti-exposure suit	Protective suit for use by rescue craft crews and MES parties.	VII
Appropriate degree of certainty	A quantified or experienced-based degree of certainty adjudged by the Naval Administration's interpretation of society's demands.	II
Approval Procedure	Procedure that verifies the compliance of a ship with the objectives of the Chapters of this Code.	VII
Approved	Approved by the Naval Administration	I
Approved type	A device that is approved by the Naval Administration.	III
"B" class divisions	Divisions formed by bulkheads, decks, deck-heads or linings which comply with the following criteria: <ul style="list-style-type: none"> a. they are constructed of approved non-combustible materials and all materials used in the construction and erection of "B" class divisions are non-combustible, with the exception of combustible veneers which may be permitted provided they meet other appropriate requirements of Chapter VI (e.g. Regulations 4 and 5); b. they have an insulation value such that the average temperature of the unexposed side will not rise more than 140°C above the original temperature, nor will the temperature at any one point, including any joint, rise more than 225°C above the original temperature, within the time listed below: <ul style="list-style-type: none"> i. class "B-15" 15 minutes ii. class "B-0" 0 minutes c. they are constructed as to be capable of preventing the passage of flame to the end of the first half hour of the standard fire test; d. they have been prototype tested to the satisfaction of the Naval Administration in accordance with the FTP Code or other standard agreed by the Naval Administration to ensure that it meets the above requirements for integrity and temperature rise. 	VI
BAM	Bridge Alert Management	IX
Boarding equipment	MES, ladders, nets, etc.	VII
Breadth	The extreme width from outside of frame to outside of frame at or below the Full Load Draught. For High Speed Craft, it is the breadth of the broadest part of the moulded watertight envelope of the rigid hull, excluding appendages, at or below the design waterline in the displacement mode with no lift or propulsion machinery active.	I
Bridge	comprises a wheelhouse and where fitted Bridge wings, from which primary navigation and additional Bridge functions are performed.	IX
Bridge Resource Management	The process of co-ordinating and directing all the available assets of the Bridge and its staff for the safe and efficient conduct of navigation	IX
Bridge Wings	Open parts of the Bridge on both sides of the ship's wheelhouse which extend to the ship's side.	IX
Bridge-to-bridge communications	Safety communications between ships from the position from which the ships are normally navigated.	VIII

Term	Definition	Source Chapter
Bridge Workstation	A position on the Bridge at which one or several primary navigation functions or tasks constituting a particular activity are carried out.	IX
Bulk Fuel Carriage	See Special Functions	I
"C" class divisions	Divisions constructed of approved non-combustible materials. They need meet neither requirements relative to the passage of smoke and flame nor limitations relative to the temperature rise. Combustible veneers are permitted provided they meet the requirements of Chapter VI.	VI
Capacity	The capacity of the structure to meet the demand.	II
Capsize	Roll, heel or list to the point of angle of vanishing stability	III
Cargo Oil Tanks	Tanks for the carriage of oils fuel in bulk not for the ships own use or use in ship borne equipment.	VI
Cargo spaces	Spaces used for cargoes and trunks to such spaces.	VI
Carriage and Use / Carriage or Use	All activity associated with the, stowage, handling, movement, transport, transfer, preparation, and activation of dangerous goods under normal and fault conditions. Note: Use is assumed to include any activity involving the dangerous goods for any purpose other than to transfer it.	X
CASEVAC	CASualty EVACuation	VII
Casualty Potential	The number of people that can be injured as the result of a fire or release of the fire extinguishing media.	VI
Casualty Threshold (in the context of a Fire)	The casualty threshold, in the context of a fire, includes: <ul style="list-style-type: none"> • Loss of space of origin up to the nearest "A" class boundaries, which may be a part of the space of origin, if the space of origin is protected by a fixed fire extinguishing system; or • Loss of the space of origin and adjacent spaces up to the nearest "A" class boundaries, which are not part of the space of origin. 	VI
Catastrophic event	An extreme event where the ship is rapidly lost	III
Catastrophic Failure	Failure which diminishes below an acceptable level the proper operation of any Escape, Evacuation and Rescue measure.	VII
CBRN	Chemical, Biological, Radiological and Nuclear Also known as NBC	VI
CCTV	Closed Circuit Television	VI
Central control station	The primary station in which the following control and indicator functions are centralised: <ol style="list-style-type: none"> a. fixed fire detection and fire alarm systems; b. fire pumps and emergency fire pumps; c. fire main isolation and monitoring; d. fixed fire fighting, sprinkler and local application systems; e. fire door indicator panels; f. fire door closure; g. flood detection systems; h. internal and external watertight door indicator panels; i. internal and external watertight door closures; j. all powered ventilation systems; k. general emergency alarm system; l. internal communication systems; m. shore telephones when alongside; n. microphones to main broadcast systems; o. emergency evacuation systems; p. CCTV where required by this Code. 	VI
Characteristic value	A quantified measure of a demand or a capacity that has a known probability of occurrence.	II
Classification	Compliance with the requirements of the regulations of the classification society throughout the life of the ship.	II
Classification of Dangerous Goods (see also Dangerous Goods)	As defined in the UN Recommendations on the Transport of Dangerous Goods – Model Regulations.	X

Term	Definition	Source Chapter
Classification Society	An organisation that establishes and applies technical standards in relation to design, construction and through-life survey of ships for the purpose of enhancing safety.	II
Clear Width of an Escape Route	The net width of an escape route when the width of equipment, handrails and any other items are subtracted.	VII
Climbing net	Net used for disembarkation of persons to the survival craft and for the rescue of persons from the water.	VII
Closed down conditions	Operational conditions where the ship is secured for enhanced levels of integrity as defined by the Naval Administration. This may include watertight integrity or protection in a Chemical, Biological, Radiological or Nuclear environment.	IV
Closed ro-ro spaces	All Spaces which are neither open ro-ro spaces nor open deck spaces.	VI
Closed vehicle and boat spaces	All Spaces used for vehicles or boats which are neither open nor open deck spaces.	VI
Closure	A device for ensuring an opening in a watertight structure can be closed watertight or weathertight.	III
Collision Bulkhead	A watertight transverse bulkhead in the fore part of a ship, that extends from the keel to the submergence limit, to prevent water flowing aft in the event of a collision.	III
COLREGS	International Regulations for Preventing Collisions at Sea	V
Combustible material	Any material other than a non-combustible material.	VI
Commanding Officer	Person in command of the Ship. All embarked persons are under the Commanding Officer's authority and are the Commanding Officer's responsibility. Other terms used outside the Code for the Commanding Officer are Captain and Master.	I
Compartment	A sub-divided volume of a main sub-division compartment so as to facilitate the normal working of the ship. Large compartments may be main sub-division compartments in their own right (e.g. a main machinery space). Compartments may be required to be fitted with fire detection and extinguishing appliances and, depending upon their use and the use of adjoining compartments, provide a degree of structural fire protection between adjacent compartments	I
Compatibility	Compatibility is defined in the UN Recommendations on the Transport of Dangerous Goods – Model Regulations.	X
Complex electronic component	The term complex electronic component refers to software and hardware. The complex electronic component is generally part of a larger system, but there may be cases where the entire technological system is composed of complex electronic components. Complex electronic components include, but are not limited to: <ul style="list-style-type: none"> a. All forms of electronically executed algorithm(s) and associated data (such as configuration data, digital maps, look-up tables). Bespoke software including both embedded and computer platform type elements. b. Databases, spreadsheets and other data. c. Firmware including all forms of programmable logic and associated data. d. COTS software and other legacy software elements that would fall into one of the above categories if they were being used in the development of a project. e. Bespoke hardware and hardware that is modifiable after manufacture. f. COTS hardware (including processors and computer platform hardware) and custom manufactured hardware, including Application Specific Integrated Circuits (ASICs). 	IV

Term	Definition	Source Chapter
Condition of Certification	<p>A notice (from the Naval Administration or its Recognised Organisation) to the ship Owner, advising of a non-compliance with the relevant rules, standards, criteria or convention, which requires permanent rectification but does not need to be addressed immediately.</p> <hr/> <p>Note: A due date is always to be associated with a Condition of Certification. Failure to complete permanent rectification of a Condition of Certification by the due date will invalidate the certificate.</p>	I
Conning Position	where from the primary navigation functions are exercised.	IX
Continuous "B" class ceilings or linings	Those "B" class ceilings or linings which terminate at an "A" or "B" class division.	VI
Continuous watch	The radio watch concerned shall not be interrupted other than for brief intervals when the ship's receiving capability is impaired or blocked by its own communications or when the facilities are under periodical maintenance or checks.	VIII
Continuously manned control station	Control station which is continuously manned by a responsible member of the crew.	VI
Control station	<p>A location from where the machinery or equipment can be operated or from which operations can be directed.</p> <p>Control Stations include the following spaces:</p> <ol style="list-style-type: none"> Central Control Station. Damage Control Stations. Wheelhouse and chartroom. Spaces containing the ship's radio equipment. Fire-extinguishing spaces and spaces with equipment for fire extinguishing. Control room for propulsion machinery when located outside the propulsion machinery space. Spaces containing centralised fire alarm equipment. Spaces containing centralised emergency public address system operating positions and equipment. Spaces containing naval systems for detection, command, defence, offence, communication, combat or weapon/control operation. Spaces containing centralised ship's operation equipment. <hr/> <p>Note:</p> <p>Main navigational equipment includes, in particular, the steering stand and the compass, radar and position-finding equipment. Steering gear rooms containing an emergency steering position are not considered to be control stations. Where in the regulations of Chapter VI and where relevant to fixed fire-extinguishing systems, there are no specific requirements for the centralisation within a control station of major components of a system, such major components may be placed in spaces which are not considered to be a control station.</p> <p>Spaces containing, for instance, the following battery sources should be regarded as control stations regardless of the battery capacity:</p> <ul style="list-style-type: none"> - emergency batteries in separate battery room for power supply from black-out until the start of the emergency generator; - emergency batteries in separate battery room as reserve source of energy to radio installation; - batteries for start of the emergency generator; - in general, all emergency batteries required for the emergency source of electrical power. 	IV & VI
Conventional Monohull	<p>A Conventional Monohull is a Ship of rigid construction, meeting the following definition:</p> $V \leq 4\sqrt{L_{wl}} \text{ where:}$ <p>V = Maximum Velocity (knots) Lwl = Length (waterline) (m)</p>	III
Crew members	See Embarked Persons.	I
Critical structure	Structure where the loss of a single element of structure such as a pillar, deck or bulkhead could lead to collapse of the hull girder or a main deck.	VI

Term	Definition	Source Chapter
Cyclic demand	A repetitive demand that requires assessment using formulations or methods which take into account the repetitive nature of the demand or response.	II
Damage	<p>Damage is an abnormal state that has resulted in physical harm to a ship or its systems. For the purposes of this Code:</p> <p>a. Foreseeable damage is damage that can be foreseen for the type of ship;</p> <hr/> <p>Note: Foreseeable damage includes damage that could be caused by one's own cargo or weapons, navigational hazards (collision, grounding), naval exercises (certain types of navigational exercise, replenishment at sea, landings, boat operations, etc), system failures or mal-operation.</p> <hr/> <p>b. Extreme damage is damage that could be experienced as a result of environmental conditions in excess of the defined foreseeable conditions and for which the ship is required to survive. Some capabilities will be compromised as a result.</p> <hr/> <p>Note: Extreme damage includes damage that could be caused by freak waves or typhoons.</p> <hr/> <p>c. Extreme threat damage is damage that may result under extreme threat conditions.</p> <hr/> <p>Note: Extreme threat damage includes damage that could be caused by weapon attacks and extreme acts of aggression.</p>	I
Damage Control Deck	<p>A watertight deck at a location above the submergence limit for the purposes of safe continuous access along the length of the ship, communication and recovery activities.</p> <hr/> <p>Note: This may be referred to as the bulkhead or communications deck.</p>	I
Damage control station (Secondary)	<p>A control station which is to include as a minimum the following control and indicator functions:</p> <p>a. Fire and flood control and monitoring;</p> <p>b. Communications and main broadcast system.</p> <p>c. And may also contain the following control and indicator functions;</p> <p>d. Essential machinery;</p> <p>e. CBRN protection.</p>	VI
Damage control zone(s)	Areas of the ship, bounded by watertight bulkheads and decks where located below the damage control deck, that have been identified by a qualitative risk analysis and which are considered necessary for controlling the spread of damage following an external event by providing each zone with own damage control measures.	VI
Damage tolerant design	Damages that are tolerated if they do not lead to a catastrophic failure before the next scheduled survey period at which all damage may be detected. For example, the corrosion of a hull that is rendered damage tolerant by the inclusion of a corrosion margin.	II
Dangerous Goods (see also Classification of Dangerous Goods)	Dangerous Goods are substances, mixtures or articles that, because of their physical, chemical (physicochemical) or acute toxicity properties, present an immediate hazard to people, property or the environment. An alternative term within some navies is Dangerous Materiel – Materiel is defined in NATO AECTP-100 Environmental Guidelines for Defence Materiel as 'A generic term covering military systems, sub-systems, equipment, supplies and associated packaging'.	VI, X

Term	Definition	Source Chapter
Dangerous Goods Incident	A Dangerous Good Incident includes: a. any accident - an occurrence involving dangerous goods that results in, or contributes to: personal injury or death, material losses or damage to the environment. b. any unintended event or action that affects the inherent safety of the dangerous good. c. a near miss - any unintended event or action that could have affected the inherent safety of the dangerous good. d. the theft or loss of a dangerous good. e. the failure of a dangerous good or its system to function in it's intended manner.	X
Dangerous Goods Preparation Area	A part of the ship where dangerous goods are worked on and during such activity the safety risk is modified compared to the level of risk associated with stowage of the item.	X
Safety Management System (for Dangerous Goods)	This relates to the Ship Arrangements and supporting body of evidence that demonstrates that the risks associated with the dangerous goods are managed to an acceptable level.	X
Dangerous Goods Stowage Area	A designated part of the ship specifically designed, assessed operated for the stowage of dangerous goods.	X
Deadweight	For ships subject to the Loadline Convention, means the difference in tonnes between the displacement of a ship in water of a specific gravity (density) of 1.025 at the load waterline corresponding to the assigned summer freeboard and the Lightship Displacement. For ships not subject to the Loadline Convention, deadweight is to be taken as the difference between the Full Load Displacement and the Lightship Displacement.	I
Demand	A demand made on the structure which is generally a load, but may also be an imposed deflection, thermal effect, the avoidance of an environmental impact, or a human demand (e.g. To avoid sharp edges).	II
Design Draught	The Full Load Draught with any additional margins, such as for through life growth.	I
Design life	The nominal period that the ship is assumed to be exposed to operating and/or environmental conditions and/or the corrosive environment which is used for selecting appropriate ship design parameters. 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.	II
Designer	The organisation charged with responsibility for designing the ship.	I
Digital selective calling (DSC)	A technique using digital codes which enables a radio station to establish contact with, and transfer information to, another station or group of stations, and complying with the relevant recommendations of the Radiocommunications Sector of the International Telecommunications Union (ITU-R)	VIII
Direct-printing telegraphy	Automated telegraphy techniques which comply with the relevant recommendations of the ITU-R	VIII
Disturbance	Any event (internal or external to the ship) that has the potential to change the equilibrium state of the ship, including but not limited to, environment (wind, waves, ice build-up, navigational obstructions), cargo, towing, lifting, crowding, turning, conditions of no or reduced load (lightship, minimum operating condition), entrained water, loss of watertight integrity and collision not causing loss of watertight integrity (such as grounding or use of tug boats).	III
Downflooding point	A large opening above the submergence limit that when submerged will cause unrestricted flooding and may lead to loss of the ship.	III
Due date	See Condition of Certification.	I
Duty Holder	See Owner	I
Dynamic demand	A demand that requires assessment using formulations or methods which take into account the dynamic nature of the demand or response. Includes inertial demands.	II

Term	Definition	Source Chapter
Electrical items	Electrical Items shall be taken to include electrical installations and equipment, where installations refer to permanent or fixed items within the Dangerous Goods area and equipment refer to portable or non-permanent items taken into a Dangerous Goods area	X
Electrically Powered Directional Sound System	A system which requires electrical power for its operation and uses sound to identify escape routes or escape exits.	VII
Electrically Powered Low Location Lighting System	Low Location Lighting system which requires electrical power for its operation, such as systems using incandescent bulbs, light emitting diodes, electro luminescent strips or lamps, electro fluorescent lamps, etc.	VII
Embarkation Arrangements	Both the evacuation station and boarding equipment.	V, VII
Embarkation Equipment	Equipment that enables safe transfer of persons into survival craft and aimed at dry-shod embarkation.	V, VII
Embarkation ladder	Ladder provided at evacuation stations to permit safe access to survival craft after launching.	VII
Embarkation Station	Location on board from which embarked persons can safely evacuate into survival craft. These locations may not be designated for evacuation purposes only and may in some ships be considered to be the whole upper deck.	VII
Embarked forces	See Embarked Persons.	I
Embarked Persons	<p>Embarked Persons shall fall into one of two categories:</p> <ol style="list-style-type: none"> a. Crew members. Persons carried on board the ship to provide navigation and maintenance of the ship, operation and maintenance of its machinery and systems (including weapon and radio-communication systems), and arrangements essential for propulsion and safe navigation or to provide services for other embarked persons. Crew members are expected to be well-disciplined and able-bodied, and have an excellent knowledge of the layout of the ship and its safety equipment; b. Non-crew. Includes embarked forces, special personnel, wounded personnel, and passengers for whom permanent accommodation is provided on board. <ol style="list-style-type: none"> i. Embarked forces. Persons who are not members of the crew who are carried on board in connection with the special purpose of the ship. Embarked forces are expected to be very fit, well-disciplined and able-bodied; ii. Special personnel. Persons who are not members of the crew who are carried on board in connection with the special purpose of the ship or the special work being carried out aboard the ship. Special personnel (which may include pilots and air crew of organic aircraft, scientific staff, trials personnel and equipment engineers, surveyors, or persons under training) are expected to be fit, well-disciplined and have a fair knowledge of the layout of the ship and its safety equipment; iii. Wounded Personnel. Injured persons carried onboard as part of the planned function of the ship. <hr/> <p>Note: This Code make no specific provision for unplanned Wounded Personnel and it is the responsibility of the Naval Administration to determine the need for such provision and be satisfied that the arrangements are adequate.</p> <hr/> iv. Passengers and other embarked persons. Persons embarked who are not employed or engaged in any capacity on board the ship and who do not fall into any of the other Categories. Passengers and other embarked persons may include visiting dignitaries, and families. 	I

Term	Definition	Source Chapter
	<p>Note: Unless specifically stated otherwise, this Code make no specific provision for passengers and other embarked persons, and it is the responsibility of the Naval Administration to determine the need for such provision and be satisfied that the arrangements are adequate.</p> <hr/> <p>v. Persons carried in an emergency. For the purposes of rescuing persons in order to avoid a threat to their safety the Naval Administration may permit the carriage of a larger number of persons than is otherwise permitted.</p> <hr/> <p>Note: Where the ship's primary role includes carriage of people in an emergency then those people should be treated as passengers.</p>	
Emergency Conning Position	A position, on the upper deck but not on the Bridge, from where route planning, route monitoring, conning and internal communication functions are exercised using only limited resources.	IX
Emergency Escape Breathing Devices	Device solely provided for local escape purposes.	VII
Emergency generator	A fully independent generator located above the submergence limit for autonomous operation in supplying the Essential Electrical Services. (The independence extends to the fuel storage and supply system, an associated switchboard, transitional power and electrical distribution).	IV
Emergency Manoeuvring Position	A control position, not on the Bridge, from where a person operates the manoeuvring equipment thereby causing the ship to change heading.	IX
Emergency operation	A machine or system has suffered a failure and functionality is reduced to the minimum level required to maintain the safety of the system or ship.	IV
Enclosed Space	Enclosed spaces are all those spaces which are bounded by the ship's hull, by fixed or portable partitions or bulkheads, by decks or coverings other than permanent or movable awnings. No break in a deck, nor any opening in the ship's hull, in a deck or in a covering of a space, or in the partitions or bulkheads of a space, nor the absence of a partition or bulkhead, shall preclude a space from being included in the enclosed space.	VI
Enclosed Escape Route	An escape route which offers fire and smoke protection in accordance with the requirements of Chapter VI Fire Safety.	VII
Engineering systems	Machinery and its associated control, auxiliaries and support systems including electrical generation, distribution, lighting and other electrical services.	IV
Enlarged Smoke Containment Zone	On ships designed for special purposes, with spaces crossing multiple Smoke Containment Zones, such as vehicle spaces, ro-ro vehicle spaces or hangars, where the provision of Smoke Containment Zone boundaries would defeat the purpose for which the ship is intended. The space is to be considered as an Enlarged Smoke Containment Zone, the boundary of which must meet the requirements of a Smoke Containment Zone.	VI
Environmental Conditions	The environmental conditions in which the Naval ship is expected to operate. This covers the external environment (from sea state, temperature, humidity, wind, precipitation, ice through to airborne particles, wildlife and indeed land mass) and the internal environment (temperature, humidity, ship motion, noise and so on).	I
Environmental Data	Data relating to the environment in which the ship is or expects to operate including, but not limited to, meteorological, oceanographic, electromagnetic signal propagation	IX
Escape	The movement of persons to a place of relative safety on board the ship following an emergency.	VII
Escape and Evacuation Analysis	Both types of escape and evacuation analysis: simplified (hydraulic representation) and advanced (individuals modelled).	VII
Escape and Evacuation Demonstration	Trial on the ship as built.	VII

Term	Definition	Source Chapter
Escape and Evacuation Time	Time it takes for persons to undergo all steps of the escape and evacuation process from the initiating announcement to evacuate the ship until the last person has evacuated in a survival craft and all survival craft are cleared from the ship.	VII
Escape Route	A designated route ultimately leading from a compartment to the evacuation station, thereby including both primary and secondary routes, for the purposes of local and global escape.	VII
Escape, Evacuation and Rescue Equipment Stowage	Tiny stowage such as containers, brackets, racks and other similar stowage locations designated for any Escape, Evacuation and Rescue equipment.	VII
Escape, evacuation and rescue lighting	A combination of secondary and tertiary lighting specifically arranged to enable escape, evacuation and rescue.	IV
Escape, Evacuation and Rescue Measures	Any Escape, Evacuation and Rescue arrangement, equipment or procedure.	VII
Essential safety functions	Those functions that safeguard life in both Foreseeable Operating Conditions and systems required for the provision of Safe Areas. <hr/> Essential Safety Functions should be agreed in the ConOpS	I
Evacuation	The movement of persons to a place of relative safety away from the damaged ship.	VII
Evacuation Time	Time required to provide for the evacuation of the total number of embarked persons, including the time for launching, inflating, securing of survival craft alongside ready for evacuation, boarding the survival craft and safely for clearing all survival craft away from the damaged ship. The Evacuation Time is not to be less than the structural fire protection time in Chapter VI.	VII
Existing ship	A ship which is not a new ship.	I
External Communication System	Includes all Global Maritime Distress and Safety Systems, flares, radios, transponders, day-light signalling lamp, etc.	VII
Extreme event	An event beyond Foreseeable Operating Conditions	III
Extreme Threat Conditions	Abnormal conditions arising from military operations (weapon attack) by a third party.	0
Extreme threat damage	See Damage.	I
Fail safe	Fail to the least hazardous or known state to prevent further damage to the equipment, platform or personnel.	IV
Field of vision	An angular size of a scene that can be observed from a position on the ship's Bridge.	IX
Fire Awareness and Suppression	This assessment is to reflect the speed at which a fire is detected and suppressed, taking in to consideration manning levels, operating procedures, fixed systems, etc. It assumes that once detected a fire will be subjected to a continuous and aggressive attack using fixed or portable means, and subsequently extinguished and/or contained. Awareness and Suppression: Rapid, Quick, Medium, Slow, Very Slow (see Chapter VI, Part 3).	VI
FI (Fire Integrity)	A methodology used to determine the Fire Resistance and Insulation requirements based on the Risk and Value of adjacent compartments, considering the combinations in both directions across the boundary. See Chapter VI Part 3 for details. <hr/> Note: FI specifically relates to the methodology used to determine the capability requirements of a boundary division. The term 'fire integrity' in ANEP 77 as a generic description of the inherent resistance to fire of a division.	VI
Fire main	Piping system for supplying pressurised water for fire fighting.	VI

Term	Definition	Source Chapter
Fire resisting divisions	<p>Those divisions formed by bulkheads and decks which comply with the following:</p> <ol style="list-style-type: none"> They shall be constructed of non-combustible or fire-restricting materials which by insulation or inherent fire-resisting properties satisfy the requirements of this code. They shall be suitably stiffened. They shall be so constructed as to be capable of preventing the passage of smoke and flame up to the end of the appropriate fire protection time. Where required they shall maintain load-carrying capabilities up to the end of the appropriate fire protection time. They shall have thermal properties such that the average temperature on the unexposed side will not rise more than 140°C above the original temperature, nor will the temperature, at any one point, including any joint, rise more than 180°C above the original temperature during the appropriate fire protection time. A test of a prototype bulkhead or deck to the satisfaction of the Naval Administration in accordance with the FTP Code or other standard agreed by the Naval Administration shall be required to ensure that it meets the above requirements. 	VI
Fire Resistance – Notations	<p>S – Smoke Tight – The division has been demonstrated to be smoke tight in accordance with an internationally recognised standard or other standard specified by the Naval Administration.</p> <p>H – Hydrocarbon Test – The division has been tested against an internationally recognised standard or other standard defined by the Naval Administration, for a hydrocarbon fire.</p> <p>N – The fire resistance properties of the prototype division have been tested in against a hydrocarbon fire (see notation H), for the times specified by the REI, after a shock test specified by the Naval Administration (for example MIL-SPEC-2030).</p> <p>R – The load bearing capacity, R, is the ability of a fire resisting division to support an external load when exposed to fire on either side for the duration required by the FI Matrix. The ability of a division to maintain its load bearing capacity is represented by the maximum permitted temperature of the structural core, as defined below:</p> <ol style="list-style-type: none"> Steel divisions (Critical elements only) – 400°C Aluminium Divisions – 200°C Composite Divisions – the temperature where deterioration of the construction will occur to such an extent that the load carrying capability of the division will be impaired. Composite divisions with the ‘R’ notation will have been tested to the requirements of the FTP Code, part 10 or other standard agreed by the Naval Administration. <hr/> <p>Note: Other notations can be added to reflect other integrity requirements, e.g. Watertight, Gas Tight, etc.</p>	VI
Fire Safety Systems Code	The International Code for Fire Safety Systems (FSS), as amended, as adopted by the International Maritime Organisation.	VI
Fire Station	A Fire Station (also known as a Fire And Repair Party Post) may be required by the Naval Administration for each fire zone. The station co-ordinates fire fighting activities for the zone and may be sited in a space normally designated for another purpose. The station may require access to whole ship information as well as that relative to its designated area of the ship. The station may encompass an Incident display, Ventilation and Fire main system information display (status, configuration, pressure, etc) plus an ability to call up additional whole ship information including electrical supply and repair data.	VI
Fire Test Procedures Code	The International Code for Application of Fire Test Procedures (FTP), as amended, as adopted by the International Maritime Organisation.	VI

Term	Definition	Source Chapter
Fire-restricting materials	Materials which have properties complying with the FTP Code or IMO Resolution MSC.40(64) or other standard agreed by the Naval Administration.	VI
Fixtures and fittings on Escape Routes	Doors, hatches, stairways, ladders, scuttles, panels, handrails, etc.	VII
Flag State Administration	The Administration as defined in the Annex to the IMO SOLAS Convention.	I
Flammable Liquids	<p>Flammable liquid or mixtures of liquids contain solids in solution or suspension which give off a flammable vapour. It includes IMDG Class 3 Flammable liquids and Combustible liquids in accordance with Section 1.7 of NFPA 30.</p> <p>Flammable liquid includes the following definitions:</p> <ol style="list-style-type: none"> Oil fuel Lube oil Low flash point fuel Other flammable liquids <p>Fuels for military use are specified in STANAG 1135.</p> <p>For the transport of flammable liquids in packaged form, see Chapter VI, Regulation 13.</p>	VI
Flashpoint	The temperature in degrees Celsius (closed cup test) at which a product will give off enough flammable vapour to be ignited, as determined by an approved flashpoint apparatus. The term 'low flashpoint' is a flashpoint of less than 60°C. The flash points of common NATO fuels are given in STANAG 1135 <i>Interchangeability of Fuels, Lubricants and Associated Products Used by Armed Forces of the North Atlantic Treaty Nations, Edition 5</i> . The flashpoint of other common products is defined in the IMDG Code.	I
Foreseeable damage	See Damage.	I
Foreseeable Operating Conditions	Conditions in which the ship can be foreseen to operate in an intact, degraded, aged and/or damaged state in accordance with Part 1, Chapter I, Regulation 1a, paragraphs 1a.4.1 and 1a.4.2, normally defined in the Concept of Operations Statement. Subject to Naval Administration approval, Foreseeable Operating Conditions will generally also be limited by the conscious imposition of an environmental or other operating restrictions (e.g. a sea state/ speed restriction, a restriction on navigating sea ice, limiting the number of persons that may be embarked, specification of the ship life, reversionary modes and breakdown drills etc).	I
Founder	When the ship sinks below the submergence limit (or where the ship is sitting on the seabed and would sink below the submergence limit if the water depth is increased).	III
Free cross-sectional area of ventilation duct	The area calculated on the basis of the inner diameter of the duct, even in the case of a pre-insulated duct.	VI
Freeboard	The minimum distance from the edge of the weatherdeck to the maximum depth of submergence of the intact ship.	III
FSS Code	IMO Resolution MSC.98(73) "International Code for Fire Safety Systems".	VII
Full Load Displacement	The displacement of the ship when the ship is in all respects complete, and is fully loaded with full complement, stores, fuel, water and payload.	I
Full Load Draught	The draught amidships at the Full Load Displacement.	I

Term	Definition	Source Chapter
Furniture and furnishings of restricted fire risk	Furniture and furnishings of restricted fire risk are such that: <ul style="list-style-type: none"> a. case furniture such as desks, wardrobes, dressing tables, bureaux, or dressers, are constructed entirely of approved non-combustible materials, except that a combustible veneer not exceeding 2 mm may be used on the working surface of such articles; b. free-standing furniture such as chairs, sofas, or tables, are constructed with frames of non-combustible materials; and for non steel ships fire restricting materials. c. draperies, curtains and other suspended textile materials have qualities of resistance to the propagation of flame not inferior to those of wool having a mass of 0.8 kg/m², this being determined in accordance with the FTP Code or other standards agreed by the Naval Administration to ensure that it meets the requirements; d. upholstered furniture has qualities of resistance to the ignition and propagation of flame, this being determined in accordance with the FTP Code or other standard agreed by the Naval Administration; e. bedding components have qualities of resistance to the ignition and propagation of flame, this being determined in accordance with the FTP Code or other standards agreed by the Naval Administration to ensure that it meets the requirements. f. Additional smoke generation and toxicity requirements may be defined by the Naval Administration. g. For ships not constructed of steel, 'Furniture and furnishings of restricted fire risk' above shall be of fire restricting materials or non combustible materials. 	VI
Galleys	Enclosed spaces containing cooking facilities with exposed heating surfaces, or which have any cooking or heating appliances each having a power of more than 5 kW.	VI
General Emergency Alarm System	An alarm which is used to notify all embarked persons of an emergency incident.	VII
General radiocommunications	Operational and public correspondence traffic, other than distress, urgency and safety messages, conducted by radio.	VIII
Geo	Of, or relating to the Earth	IX
Geospatial	Pertaining to the location and characteristics of natural or constructed features and boundaries on, above or below the Earth's surface; especially referring to data that is geographic and spatial in nature.	IX
Global Maritime Distress and Safety System (GMDSS) identities	Maritime mobile services identity, the ship's call sign, Inmarsat identities and serial number identity which may be transmitted by the ship's equipment and used to identify the ship.	VIII
Green seas	Wash and waves that break over the weatherdeck and exposed ship parts.	III
Handling	The manipulation of an item and the associated equipment to enable safe movement, transport or transfer.	X
Hazardous area	Any space that represents a risk to personnel or platform. This could be as a result of but is not limited to the following: <ul style="list-style-type: none"> a. flammable atmospheres including dust laden atmospheres; b. areas that contain electrical and electronic equipment; c. confined spaces or spaces where oxygen content may be depleted; d. gas storage rooms; e. Areas of high noise level; f. Areas with equipment that may move unexpectedly; g. Refrigeration spaces; h. Cleaning or chemical stores; i. Areas with radiation hazards (inc. sonar dome spaces, antennas etc); j. All areas where Dangerous Goods are stowed, handled, maintained or used. 	IV
Headquarters	Compartment from which damage control, fire-fighting or escape and evacuation activities are controlled.	VII

Term	Definition	Source Chapter
High Speed Craft	A craft capable of a maximum speed, in metres per second (m/s), equal to or exceeding ($3.7 \times \text{Displacement}^{0.1667}$) where the displacement in cubic metres corresponds to the design waterline.	I
Immersion Suit	Protective suit which reduces the body heat loss of a person wearing it in cold water.	VII
Inertial demand	See Dynamic demand.	II
Inherent Safety	The ability of an item to retain its safety under specified accidental or intended stimuli due to its design, safety features and materiel employed as an inseparable part of its system.	X
Inmarsat	The Organisation established by the Convention on the International Maritime Satellite Organization adopted on 3 September 1976.	VIII
In-service	A ship is in-service at all times after delivery unless it is declared not in service by the Naval Administration, for example when undergoing repairs at a shore based facility, undergoing conversion or is laid-up..	I
Inspection and Maintenance	All measures for the preservation and/or restoration of the original conditions of the technical elements of a system as well as measures for the determination and evaluation of the actual material condition.	VII
Integrated Bridge System (IBS)	A combination of systems which are interconnected in order to allow centralised access to sensor information or command/control from workstations, with the aim of increasing safe and efficient ship's management by suitably qualified personnel.	IX
Integrated Navigation Bridge System (INBS)	An IBS that incorporates INS functionality	IX
Integrated Navigation System (INS)	A composite navigation system which performs at least the following tasks: collision avoidance, route monitoring thus providing 'added value' for the operator to plan, monitor and safely navigate the progress of the ship.	IX
Integrity	Capability of a system to satisfactorily perform the required functions under all the stated conditions within a stated period of time.	IV
Intended Operating Conditions	The operating conditions that are relevant for the Ship based on the information in ConOpS.	I
International NAVTEX service	The co-ordinated broadcast and automatic reception on 518 kHz of maritime safety information by means of narrow-band direct-printing telegraphy using the English language.	VIII
International voyage	A voyage from a country to a port outside such country, or conversely. It also includes any voyage that takes the vessel outside of its own country's territorial waters.	I
Isolation	The disconnection, separation and dissipation of every source of energy from the equipment in such a way that this disconnection and separation is secure.	IV
Justification	The process of validation of solutions against performance requirements, functional objectives and goals. It is required for Code solutions and external solutions such as Classification Society Rules in Tier 4. Justification is normally undertaken against the adjacent Tier, for example Tier 4 against Tier 3 and Tier 3 against Tier 2 etc. Part 3 Chapter 1 provides guidance on the process to be followed. See also Validation and Verification.	I
Ladders	In accordance with ANEP 26 <i>Ergonomic Data for Shipboard Space Design in NATO Surface Ships, Edition 1</i> , acceptance angles for ladders are 75° - 90°.	VII
Landing spot	Unique position marked for aircraft landing and storage which will allow simultaneous landing at other landing spots.	VI
Launching Arrangements	Launching station and its equipment.	VII
Launching Equipment	Equipment designated for transferring survival and rescue craft from its stowed position safely to the water and from the water to the stowed position.	V, VII
Launching Stations	Designated positions for launching survival and rescue craft. Launching stations may coincide with evacuation stations.	VII

Term	Definition	Source Chapter
Length Between Perpendiculars	That length measured between perpendiculars taken at the extremities of the Full Load Displacement. For High Speed Craft, it is the overall length of the underwater watertight envelope of the rigid hull, excluding appendages, at or below the design waterline in the displacement mode with no lift or propulsion machinery active.	I
Length Overall	That distance measured parallel to the waterline at the Full Load Displacement from the fore side of the stem to the after side of the stern or transom.	I
Lifting appliance	Fixed or non fixed equipment used to lift a mass from a horizontal surface. This includes loose gear such as strops, ropes, slings, hooks, D-rings etc.	IV
Lightship Displacement, or Lightweight	The displacement of the ship without any complement, stores, fuel, water or payload.	I
Lightweight	See Lightship Displacement.	I
Limit state	A condition at which a structure or structural member fails to perform the function expected of it.	II
Limit state design	Design to avoid a limit state with an appropriate degree of certainty.	II
Locating	The finding of ships, aircraft, units or persons in distress.	VIII
Low flame-spread	Means that the surface will adequately restrict the spread of flame, this being determined in accordance with the FTP Code or other standards agreed by the Naval Administration.	VI
Low flash point fuel	Liquid petroleum product with a flash point of less than 60°C (closed cup) carried on board and used for the role of the ship e.g. aviation, vehicles, ship's emergency power generation or ship's emergency fire pumps.	VI
Low-Location Lighting	Electrically powered lighting or photo luminescent indicators placed throughout a ship to readily identify escape routes and escape exits.	VII
LSA Code	IMO Resolution MSC.48(66) "International Life-Saving Appliance Code"	VII
Lube oil	Petroleum fractions, vegetable oils or synthetic liquids with a flash point greater than 60°C used for the lubrication of machinery onboard.	VI
Machinery control position	An area or areas within the machinery spaces from which the propulsion and manoeuvring machinery may be directly monitored and controlled.	IV
Machinery control room	An area or room, other than the Bridge, from where the propulsion and manoeuvring machinery may be remotely monitored and controlled.	IV
Machinery Enclosure	Machinery may be installed in an enclosure for the reduction of noise, for operation in a CBRN environment and/or to provide a fire boundary. Enclosures containing machinery are to be treated as unattended machinery spaces, independent from the spaces that contain them.	VI
Machinery Spaces	Those machinery spaces of Category A and other spaces containing propulsion machinery, boilers, oil fuel units, steam and internal combustion engines, generators and major electrical machinery, oil filling stations, oil transfer and handling equipment, refrigerating, stabilising, ventilation and air conditioning machinery, and similar spaces, and trunks to such spaces. Also included are steering gear spaces and other spaces containing hydraulic power equipment with an aggregate power rating of more than 110 kW and which use flammable hydraulic fluids.	I
Machinery Spaces of Category A	Those spaces and trunks to such spaces which contain either: <ul style="list-style-type: none"> a. internal combustion machinery used for main propulsion; b. internal combustion machinery used for purposes other than main propulsion where such machinery has in the aggregate a total power output of not less than 375 kW; c. any oil-fired boiler or oil fuel unit, or any oil-fired equipment other than boilers, such as inert gas generators, incinerators, pyrolysis units, gasification equipment etc; or d. gas turbines. 	I

Term	Definition	Source Chapter
Magazine	Spaces (integral magazines, independent magazines, small magazines, magazines lockers, magazines boxes and pyrotechnics lockers) used for the storage of munitions, explosives and pyrotechnics for use by the ship and embarked forces. This does not include munitions transported in cargo spaces.	VI
Main Broadcast System	A system that permits one-way verbal communication to all embarked persons, in merchant shipping known as public address system. Where in any referenced IMO documents the term "public address system" is used, it should be read to mean "main broadcast system" for the purpose of the Code.	VII
Main electrical services	All electrical loads required for maintaining the operational status of the ship and habitable crew conditions.	IV
Main Fire zones	A division of the hull, superstructure and deckhouses to contain fire and smoke. They are formed by continuous "A(S)" class divisions, the mean length and width of which is limited. The length or width of a main fire zone is the maximum distance between the furthestmost points of the bulkheads bounding it. Main fire zones may be co-incident with damage control or smoke containment zones.	VI
Main sub-division compartment	An enclosed compartment into which the main hull of the ship is divided so as to preserve the maximum amount of buoyancy following damage consistent with the convenient working of the ship. Main subdivision compartments are: a. weathertight; b. watertight to the point beyond which the ship will be lost as defined in the stability standard; c. able to provide structural fire protection; d. smoke tight; e. gas tight if so determined by the Naval Administration.	I
Mal-operation	The faulty or incorrect operation of a device, process or system.	I
Malicious Act	An intentional act to cause damage not including weapon attack, e.g. collision.	II
Manned Spaces	Spaces on the ship that persons would frequently occupy.	III
Manoeuvring equipment	Manoeuvring equipment includes the use of conventional electric and electro hydraulic steering gear as well as, but not limited to, Azimuthing thrusters, Athwartships thrusters, water jets and propulsion machinery in the case of ships fitted with more than one shaft.	IV
Manual manoeuvring workstation	a workstation at which the helmsman manoeuvres the ship manually in normal conditions.	IX
Marine Evacuation Systems	Appliance for the rapid transfer of persons from the evacuation station into a floating survival craft.	VII
Maritime safety information	Navigational and meteorological warnings, meteorological forecasts and other urgent safety related messages broadcast to ships.	VIII
Materiel	A generic term covering military systems, sub-systems, equipment, supplies and associated packaging.	X
Mechanical Locking	Hydraulic locking or any other condition where the equipment becomes mechanically locked and so can not be operated.	IV
Memorandum Item	A record within the survey records of the ship, which documents: a. an unusual feature which should be recorded for future reference; or b. that there is a non-compliance with the relevant rules, standards, criteria or convention but the arrangement has been justified as fully equivalent to the intent of the Standard in accordance with Regulation 5.	I
Motion Induced Interruption (MII)	The occasion when a crew member would have to stop working on a task to hold on to prevent loss of balance.	III
Motion Sickness Incidence (MSI)	The percentage of personnel on board that vomit within two hours of exposure to a defined seaway.	III
Movement	To change the location or orientation of an item within a dedicated space.	X

Term	Definition	Source Chapter
Muster Station	An area of relative safety where embarked persons can be gathered in the event of an emergency and prepared for evacuation. Muster stations may coincide with evacuation stations and are otherwise known as emergency or assembly stations.	VII
Naval Administration	The Department of Government of the State responsible for providing safety regulation for naval ships. The Naval Administration may be assisted or supported by other government departments or agencies who, by mutual agreement of the Naval Administration and the department or agency concerned, have agreed to enact this Code for specified ships of that department or agency.	I
Naval ship	A ship which the Naval Administration has determined shall comply with these regulations. Generally, a naval ship is a ship: <ul style="list-style-type: none"> a. belonging to or operated by the armed forces, coastguard or other protection and security department or agency of a State, and b. not operated for commercial purposes. 	I
Navigation	The process of planning, recording and controlling the movement of a ship from berth to berth, including operations and evolutions undertaken during the voyage.	IX
Navigation bridge	See Bridge.	IV
Navigation systems	Systems, equipment and aids used to assist in navigation.	IX
NBC	See CBRN	VI
New ship	A ship, the keel of which is laid or which is at a similar stage of construction on or after the date defined by the Naval Administration.	I
Non-combustible material	Material which neither burns nor gives off flammable vapours in sufficient quantity for self-ignition when heated to approximately 750°C, this being determined in accordance with the FTP Code or other standard agreed by the Naval Administration.	VI
Non-crew	See Embarked Persons.	I
Normal operation	Full functionality of the machinery or system is available.	IV
Normally Occupied Compartment	Any compartment which regularly occupied by embarked persons.	VII
Novel arrangements	Any piece of equipment or system with an unconventional design, construction, installation or operation. Acceptance of the arrangements shall be agreed with the Naval Administration.	IV
Novel Life-Saving Measure	Life-saving measure which embodies new features not fully covered by the provisions of Chapter VII but which provides an equal or higher standard of safety.	VII
Officer of the Watch (OOW)	A person who, for the time being, has been delegated responsibility for the conduct of safe navigation and conning (manoeuvring) the ship.	IX
Oil fuel	Liquid petroleum product carried on board and used for the role of the ship e.g. aviation, vehicles, propulsion or power generation. See also Flash Point.	VI
Oil fuel unit	Includes any equipment for the preparation of oil fuel and delivery of oil fuel, heated or not, to boilers and engines (including gas turbines) at a pressure of more than 0,18 N/m m ² .	VI
On Board Documentation	Posters, plans and other guidance information on any Escape, Evacuation and Rescue measures.	VII
On Board Two-Way Communication System	System providing two-way verbal transmission and may include fixed or portable system or a combination of both.	VII
Open deck spaces	A deck which is completely exposed to the weather from above and from at least two sides.	VI
Open ro-ro spaces	Those ro-ro spaces that are either open at both ends or have an opening at one end, and are provided with adequate natural ventilation effective over their entire length through permanent openings distributed in the side plating or deckhead or from above, having a total area of at least 10% of the total area of the space's sides.	VI

Term	Definition	Source Chapter
Open vehicle and boat spaces	Those spaces that are either: a. open at two sides providing with adequate natural ventilation effective over the entire space; b. having an opening at one side and provided with adequate natural ventilation effective over the entire space through permanent distributed openings having a total area of at least 10% of the total area of the space's sides.	VI
Operating position	A position from which a system can be controlled.	VI
Operational lighting (external)	Lighting used for specific military purposes (e.g. aviation, replenishment at sea) or internationally recognised external lighting used in a different manner or at lower intensities to that required in the COLREGs.	IX
Operational lighting (internal)	Fixed lighting as required for special purposes with different levels of illumination from primary and secondary lighting.	IV
Organic aircraft	Aircraft for which there is a permanent facility on board the ship for landing, parking and storage.	VI
Other flammable liquids	Petroleum fractions, vegetable oils or synthetic liquids carried onboard and used for the role of the ship. This includes hydraulic oil, medical spirits, seed oil, paints and cooking oils etc.	VI
Owner, or Duty Holder	The organisation charged as the authority with responsibility for ship safety. This is normally the nominated Department of Government of the State or industry supplier. Noting that this responsibility may be delegated to a number of organisations, in which case a nominated lead is to be identified.	I
Pantries	Spaces containing cooking appliances which may contain: a. toasters, microwave ovens, induction heaters and similar appliances each of them with a power of more than 5kW; b. electrically heated cooking plates and hot plates for keeping food warm each of them with a power greater than 2kW but less than 5kW. c. coffee machines, dish washers and water boilers regardless of their power. Accommodation spaces such as dining rooms or crew ready rooms are not considered pantries and can contain electrically heated cooking and beverage appliances as listed in the definition.	VI
Passengers and other embarked persons	See Embarked Persons.	I
Periodically Unattended Machinery Space	See Unattended Machinery Space	IV/VI
Personal Thermal Protection Suits	Suits that are designed to prevent hypothermia and/or cold shock, i.e., immersion suits, anti-exposure suits.	VII
Personnel spaces	Spaces such as corridors, heads & bathrooms, cabins, offices, mess decks, hospitals.	VI
Persons carried in an emergency	See Embarked Persons.	I
Photo Luminescent Low Location Lighting System	Low Location Lighting system which uses PL material. PL material contains a chemical (example: zinc sulphide) that has the quality of storing energy when illuminated by visible light. The PL material emits light which becomes visible when the ambient light source is less effective. Without the light source to re-energize it, the PL material gives off the stored energy for a period of time with diminishing luminance.	VII
Place of refuge	Any naturally or artificially sheltered area which may be used as a shelter by a ship under conditions likely to endanger its safety.	I
Planned Maintenance System	A paper and / or software-based system which allows ship owners or operators to carry out maintenance in intervals according to manufacturers and relevant rules and regulations.	I

Term	Definition	Source Chapter
Plan Appraisal	Technical review of the platform design plans and related documents to verify compliance with the rules or standards to which the ship or system has been designed. The responsibility for undertaking Plan Appraisal activity lies with the Naval Administration or its Recognised Organisation.	I
Plunging	The event where the ship's submergence limit repeatedly dips below the waterline for a short period.	III
Polar orbiting satellite service	A service which is based on polar orbiting satellites which receive and relay distress alerts from satellite EPIRBs and which provides their position.	VIII
Portable lighting	Non-fixed, portable lighting which may be used to support other lighting systems.	IV
Power Supply to Escape, Evacuation and Rescue Systems	Both normal and emergency electrical supplies essential for Escape, Evacuation and Rescue activities.	VII
Preparation	The modification of an item that affects its inherent safety parameters.	X
Prescriptive requirements	The construction characteristics, limiting dimensions, or fire safety systems, specified in Chapter VI.	VI
Pressure systems	A system containing pressure other than at atmospheric which may include boilers, piping, heat exchangers, accumulators, pumps, compressors and valves.	IV
Primary Escape Route	The most direct route of escape from a compartment or number of compartments to the evacuation station. The primary escape route may or may not be coincident with the general access arrangements.	VII
Primary lighting	Fixed lighting provided for safe access around the ship and those compartments accessed during normal operations and carrying out operations at control stations.	IV
Primary navigation functions	Functions performed on the Bridge related to determination, execution and maintenance of safe course, speed and position of the ship in relation to the waters, traffic and weather conditions. Such functions are route planning, navigating, monitoring safety, manoeuvring, monitoring, conning, docking, external and internal communication, and manual manoeuvring.	IX
Propulsion machinery	Propulsion machinery includes all the equipment and systems required to generate thrust including but not limited to: a. prime mover (internal combustion engine (e.g. Diesel engine, Gas turbine), Electric motors, Steam turbine); b. Combined propulsion and manoeuvring devices (including but not limited to, azimuthing thrusters, athwartship thrusters, water-jets); c. Boilers; d. Gearing; e. Shafting and couplings; f. Propellers (fixed pitch or controllable pitch); g. Auxiliaries (Generators, oil supply, sources of lube oil pressure, sources of water pressure, combustion air supply (if applicable), starting systems, main propulsion control systems (hydraulic, pneumatic, electrical)).	IV
Public Address System	see Main Broadcast System.	VII
Public spaces	Those portions of the accommodation which are used for halls, mess rooms, wardrooms and similar permanently enclosed spaces.	VI
Quasi-static demand	A dynamic or inertial demand that may be treated as static by the inclusion of a load enhancement factor to embrace the inertial or dynamic effects.	II
Radio Regulations	The Radio Regulations annexed to, or regarded as being annexed to, the most recent International Telecommunication Convention which is in force at any time.	VIII
Recognised Organisation	An organisation authorised to undertake certain activities on behalf of the Naval Administration.	I

Term	Definition	Source Chapter
Recovery Time for a Rescue Craft	Time required to raise the craft to a position where persons can disembark from it to the deck of the naval ship. Recovery time includes the time required to make preparations for recovery on board the rescue craft such as passing and securing a painter, connecting the rescue craft to the launching appliance, and the time to raise the rescue craft. Recovery time does not include the time needed to lower the launching appliance into position to recover the rescue craft.	VII
Re-location	The act of changing the location of the item between spaces.	X
Replenishment at Sea RAS	The operations required to make a transfer of personnel and or supplies when at sea.	V
Rescue	The survival and recovery of persons to a safe haven, which offers an equivalent or higher level of safety than that prior to the incident.	VII
Rescue Arrangements	The rescue station and equipment.	VII
Rescue Craft	Craft to rescue persons over board which may also be used to marshal survival craft which are not self-propelled.	VII
Rescue Equipment	Any equipment that may be used for the recovery of persons from the sea and/or survival craft, i.e. rescue craft, ladders, scramble nets, life buoys, light markers, harnesses, MES etc.	VII
Reversionary operation	A machine or system is reconfigured to maintain the agreed level of functionality.	IV
Risk Category Cat-A Cat-B Cat-C Cat-D Cat-E	For Reg 8, Solution 2, all spaces are categorised to reflect the fire risk of a space, taking into consideration the risk of ignition, the potential for escalation and the means for fire detection and fire suppression within that space. The risk category for a type of space, appropriate to the ship type, is to be determined from Reg 8, Table 8-10. Where the risk category of a space cannot be determined from the table, a risk assessment of the space is to be undertaken using a recognised risk assessment methodology and agreed by the Naval Administration. Naval Administration may change the category of a space to reflect the Concept of Operations Statement.	VI
Ro-ro spaces	Spaces not normally subdivided in any way and normally extending to either a substantial length or the entire length of the ship in which motor vehicles with fuel in their tanks for their own propulsion and/or goods (packaged or in bulk, in vehicles, trailers, containers, pallets, demountable tanks or in or on similar stowage units or other receptacles) can be loaded and unloaded normally in a horizontal direction.	VI
Routine Escape, Evacuation and Rescue Procedures	All procedures normally performed on board which are to ensure effective Escape, Evacuation and Rescue performance, except inspection, maintenance and training.	VII
Ruggedness	The ability of an apparatus or system, to withstand extreme local and impact loads which may result from a conceivable environment in which it is expected to operate, while retaining its intended functions.	II
Rules	Detailed requirements developed by IMO, National Administrations or Classification Societies and applied in order to demonstrate that the ship under consideration meets the Goals and Functional Objectives applicable.	I
Safe area	Safe area in the context of a casualty is, from the perspective of habitability, any area(s) which is not flooded or which is outside the main vertical zone(s) in which a fire has occurred such that it can safely accommodate all Embarked Persons to protect them from hazards to life or health and provide them with basic services.	VI
Safe life design	There is a high degree of certainty that no damage will occur during the specified design life. An example might be a fatigue assessment of the hull for the design life.	II
Safety margin	Ratio of capacity over expected demand. The factor can be expressed as a series of partial factors of safety (or gamma factors) to represent the likelihood of deviation from the characteristic value or the severity of the consequences. An appropriate factor should be assigned for all design parameters whose calculation involves a degree of uncertainty, including loads, structural modelling, fatigue, corrosion, material imperfections, construction workmanship errors, buckling and residual strength.	II

Term	Definition	Source Chapter
Sauna	A hot room with temperatures normally varying between 80°-120°C where the heat is provided by a hot surface (e.g. by an electrically-heated oven). The hot room may also include the space where the oven is located and adjacent bathrooms.	VI
Sea area A1	An area within the radiotelephone coverage of at least one VHF coast station in which continuous DSC alerting is available, as may be defined by a Contracting Government.	VIII
Sea area A2	An area, excluding sea area A1, within the radiotelephone coverage of at least one MF coast station in which continuous DSC alerting is available, as may be defined by a Contracting Government.	VIII
Sea area A3	An area, excluding sea areas A1 and A2, within the coverage of an Inmarsat geostationary satellite in which continuous alerting is available.	VIII
Sea area A4	An area outside sea area A1, A2 and A3.	VIII
Secondary Escape Route	Escape route which provides an alternative option to the primary escape route.	VII
Secondary lighting	Fixed replacement lighting in the event of primary lighting failure. This may be at a lower illumination level.	IV
Sensitiveness	The degree to which the Dangerous Good will respond to external stimuli outside of its design mode.	X
Service spaces	Those spaces used for galleys, pantries containing cooking appliances, lockers, mail and specie rooms, storerooms, workshops other than those forming part of the machinery spaces, and similar spaces and trunks to such spaces.	VI
Ship	A generic term which includes “ship”, “vessel”, “craft”, “cutter” and “boat”.	I
Ship Arrangements	The physical, positional and procedural processes for equipment, systems, structure and personnel whose design, and operation ensures the safe management of the safety risks associated with the carriage and use of dangerous goods.	X
Ship Types	Ship Type A: Any naval ship with a total number of Embarked Persons of 240 or greater, or which will foreseeably carry greater than 36 passengers. Ship Type B: Any naval ship with between 60 and 239 total number of Embarked Persons, of which there are no more than 36 passengers. Ship Type C: Any naval ship with less than 60 Embarked Persons in total, of which there are no more than 12 passengers.	VI
Ships Not Constructed of Steel	Ships on which the material of construction of the hull, bulkheads and decks (or significant parts thereof) are not constructed from steel, e.g. ships constructed of aluminium or composite (a material with an organic or inorganic matrix reinforced by fibres with suitable orientation).	VI
Smoke tight or capable of preventing passage of smoke	A division made of non-combustible or fire-restricting materials which is capable of preventing the passage of smoke demonstrated in accordance with a suitable standard defined by the Naval Administration. Note: Standards could include Smoke tight standards (suitable smoke tight standards include ISO 5925/1 (2007) NFPA 105 (2013) UBC 7-2/2 (1997) DIN 18095-2 (1991) BS 476-31.1 (1983) EN 1634-2 (2008) EN13501-2 (2010)) or Gas tight standards for CBRN. The NA may require smoke tight penetrations to pass smoke and toxicity tests.	VI
Space	Any other area of a ship that is not a main sub-division compartment or a compartment.	I
Spatial	Of, or relating to space.	IX
Special category spaces	Those enclosed spaces above and below the submergence limit, into and from which vehicles can be driven, boats can be docked/housed, aircraft parked and to which crew and non-crew have access. Special category spaces may be accommodated on more than one deck provided that the total overall clear height for vehicles does not exceed 10 metres.	VI

Term	Definition	Source Chapter
Special Functions	<p>Special Functions are specific parts of a ship's role. For each Special Function there are additional regulations within the Code. The Special Functions that exist are:</p> <p>a. Bulk Fuel Carriage – where fuel comprises more than 50% (by weight) of the ship's displacement when fully loaded and where the flash point(s) of the fuel(s) is not less than 60°C. If a ship carries between 25% - 50% fuel, a risk assessment shall be undertaken to determine whether the additional requirements are applicable.</p> <hr/> <p>Note: The Code is not applicable to ships that carry substantial quantities of fuel with a flash point less than 60°C. Small quantities can be carried in accordance with Chapter VI, Regulation 14.</p> <hr/> <p>Note: Fuel includes all oil fuel – ship's fuel, aviation fuel and cargo fuel.</p>	I
Special personnel	See Embarked Persons.	I
Stair Ladders	In accordance with ANEP 26 <i>Ergonomic Data for Shipboard Space Design in NATO Surface Ships Edition 1</i> , acceptable angles for stair ladders are 50° - 75°.	VII
Stairs	In accordance with ANEP 26 <i>Ergonomic Data for Shipboard Space Design in NATO Surface Ships, Edition 1</i> , acceptable angles for stairs are 20° - 50°.	VII
Standard fire test	<p>A test in which specimens of the relevant bulkheads or decks or other construction are exposed in a test furnace by a specified test method in accordance with the FTP Code or other standard satisfying the FTP requirements and agreed by the Naval Administration.</p> <p>Additional tests may be required by the Naval Administration.</p>	VI
Standard or Standards	Published technical specifications against which an item, equipment or system can be certified for compliance. Includes criteria, conventions, specification or, drawings, against which the design, construction, maintenance and procedures are assessed.	I
Standards Plan	A document, agreed by the Naval Administration, listing the standards, specifications, conventions etc. or other criteria that are being used to demonstrate that a vessel meets the Performance Requirements, Functional Objectives and Goals of the Technical Areas of Part 1 of the Code. The plan includes the roles and responsibilities of organisations undertaking verification and certification activities.	I
Static demand	A demand that can be considered as permanent.	II
Steel or other equivalent material	Any non-combustible material which, by itself or due to insulation provided, has structural and integrity properties equivalent to steel at the end of the applicable structural fire protection time when exposed to the tests required by the FTP code or other standard agreed by the Naval Administration.	VI
Stowage	The act of storing an item such that its inherent safety parameters are preserved.	X
Stretchers	Equipment designated to transport persons who are incapable of walking to muster and/or evacuation stations.	VII
Structural capacity	Structural strength of the ship defined in terms of, but not limited to the following: deflection, corrosion, buckling, yielding and fatigue.	II
Structural Fire Protection Time (SFP)	<p>The time during which the structure maintains sufficient load bearing capabilities when tested to the FTP Code or standard approved by the Naval Administration, see Regulation 2. The Naval Administration may define an enhanced structural fire protection time in the Concept of Operations Statement.</p> <p>For non-steel ships the SFP shall be between 60 and 30 minutes depending on evacuation time of the ship.</p>	VI

Term	Definition	Source Chapter
Structure	All items of the ships hull that contribute to its ability to withstand global and local loads, maintain watertight and weathertight integrity, support all equipment or other applied loads.	II
Submergence Limit	That limit approved by the Naval Administration in accordance with the agreed stability standard up to which the main subdivision boundaries are to be watertight and which determines where equipment and systems for essential safety functions may be located. Note: This may be referred to as the margin line or the V-line and may lead to the designation of a bulkhead deck (the uppermost deck up to which the transverse watertight bulkheads are carried) or a damage control deck (the deck, or combination of linked decks, on which damage control operations are co-ordinated).	I
Survey	The examination of the design and/or material state of a ship, equipment or system to ascertain whether it is in compliance or otherwise with: a. the intent of a defined specification, standard or drawing, or b. the intended duties of the ship, system or equipment. Note: A survey is said to be complete when the deficiencies or other departures have been rectified or justified as adequate. Surveys are normally carried out under the direction of a third party, not directly responsible for operations, repair or maintenance of the item under survey	I
Survival Craft	Any type of craft such as lifeboat (free-fall or davit launched), liferaft or rescue craft, capable of sustaining the lives of persons within, following the evacuation of the main ship.	VII
Tertiary lighting	Fixed independent lighting system to provide a minimum level of illumination on failure of primary and secondary lighting.	IV
The Code	The regulations and guidance contained in this document	I
Transfer	The act of moving an item and the responsibility for its safety to or from the ship.	X
Transitional lighting	Fixed lighting provided upon loss of primary lighting and prior to the operation of the secondary lighting, where a level of continuous illumination must be maintained for operational purposes.	IV
Certified Equipment	Certified Equipment has been through a process to assure the conformity of a product with declared design, test and construction standards. Through a combination of: manufacturer's declaration, type approval, independent 3rd party design appraisal, audit of production or direct inspection.	I
Ultimate limit state (ULS)	That condition beyond which a loss of equilibrium or failure of a part or whole of the structure may be expected to occur (e.g. collapse, fracture).	II
Unattended Machinery Space	A machinery space that is arranged with controls, alerts and alarm systems to permit machinery to operate without the direct attention of an engineer either in or remote from the space. Periodic visits for routine machinery inspection are expected. Alert and alarm systems are arranged to inform duty engineers of any deviations from normal system operating parameters. The system would include a hierarchical notification protocol for engineers.	IV/VI
Upper deck	See Weatherdeck Any part of the ship or submarine outside the weathertight boundary or outside the pressure hull for a submarine.	
Upright	For intact, near vertical; for damaged, the angle of list acceptable to the Naval Administration.	III
Validation	The process of demonstrating that the Standards Plan nominated for a specific ship or submarine is acceptable to the Naval Administration. Validation will demonstrate that the nominated standards and acceptance criteria against which the design is being verified (whether it adopts the Part 2 solution, Classification Rules, International Convention or other set of criteria), are appropriate for the Concept of Operations Statement. Note: Performance criteria such as Classification Rules, International Conventions, national standards or defence standards that have been Justified as meeting the performance requirements, functional objectives and goals and the Sample ConOpS is not significantly different to the ship's ConOpS, will not need to be re-validated. See also Justification and Verification	0

Term	Definition	Source Chapter
Value Category Cat-5 Cat-4 Cat-3 Cat-2 Cat-1	For Reg 8, Solution 2, all spaces are categorised to reflect the importance of keeping the space free from the effects of fire and smoke, to protect life and/or maintain operational capabilities. The value category for a type of space, appropriate to the ship type, is to be determined from Chapter VI, Reg 8, Table 8-10. Where the value category of a space cannot be determined from the table, an assessment of the space is to be undertaken using a recognised assessment methodology and agreed by the Naval Administration. The Naval Administration may change the category of a space to reflect the Concept of Operations Statement.	VI
Vehicle and boat spaces	Spaces intended for carriage of wheeled or tracked motor vehicles and/or boats with fuel in their tanks for their own propulsion.	VI
Ventilation Ducts –A-60 Integrity	Where a ventilation duct passes through a space bounded by divisions with an integrity of A-60, without serving the space, and is required to maintain the integrity of the division, the duct shall be either: a. Constructed of steel having a thickness of at least 3 mm, and is suitably stiffened and supported; or b. Fitted with a fire damper at all boundary penetrations. Note: For ducts with an alternative construction, the arrangement is to be tested to the satisfaction of the Naval Administration to demonstrate the arrangement is able to maintain the integrity of divisions penetrated. Note: Where a duct penetrates a watertight division the wall thickness may need to be increased to maintain the watertight integrity of the division. Note: For very large ducts, the wall thickness may need to be increased for structural reasons, especially where there is insufficient stiffening or support.	VI
Verification	The process of ensuring that a ship or submarine meets the Code Solution agreed by the Naval Administration, which may include Tier 4 of the Code. Evidence of the verification can be in the form of plan approval, analysis, testing or survey. The verification evidence is to be maintained for the life of the ship or submarine. See, Part 1 Chapter 1 Regulation 8. See also Justification and Validation.	I
WAIS	Warship Automatic Identification System	IX
Washroom Corridor	A dedicated sanitary space onto which a number of individual wet space cubicles open. It may be a separate sanitary space or a branch of a corridor. Where open to a corridor it should be treated as a separate space and not used as a through escape route.	VI
Watertight	Prevent the passage of water in either direction with a head of water commensurate with the submergence limit in all Foreseeable Operating Conditions.	III
Way Finding System	Any system which is provided to enable embarked persons to find escape routes and escape exits.	VII
Weatherdeck	All decks exposed to the external environment.	III, V
Weathertight	Prevent the passage of water into the ship in all Foreseeable Operating Conditions.	III, V
WECDIS	Warship Electronic Chart Display and Information System	IX
Wheelhouse	An enclosed area of the Bridge.	IX
Workstation	Any location that a person onboard is required to stand or sit during the normal operation of the ship. See also Bridge Workstation	
Wounded Personnel	See Embarked Persons.	I
Zone	One or more main sub-division compartments grouped for the purposes of damage control in accordance with a definition determined by the Naval Administration.	I

PART 1 CHAPTER 0 USING THE NAVAL SHIP CODE

Contents

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4. The Naval Administration	Part1-0-3
5. Arrangement and Principles of the Code	Part1-0-3
6. Documenting Compliance with the Naval Ship Code	Part1-0-4
7. Deviations from Code Requirements	Part1-0-4
8. Exemptions from Part 1 requirements	Part1-0-5

1. Purpose of the Code

The Code provides a Goal Based Structure against which a vessel can be certified by a Naval Administration to demonstrate that materially, the vessel is safe to operate in accordance with the navy's safety policy objectives. This chapter provides a detailed description of the philosophy of the Code; and guidance on how to apply it to a naval vessel in order to issue a Naval Ship Safety Certificate.

The Code is derived from international conventions that will allow a navy to demonstrate that a vessel is materially safe to operate, subject to the scope of the Code itself and the operational practices for the vessel. As such, it provides a tool for the management of material safety of naval surface ships. It recognises their operational usage which is different from those associated with vessels operated for commercial purposes.

It includes goals associated with both routine and foreseeable damage conditions associated with operations during peacetime and maritime security roles of a warship, it excludes damages inflicted from Extreme Threat Conditions¹ or when involved in Combat Operations (see Figure P1-0-1). Links are contained in the Code such that a Naval Administration can extend the scope of the vessel's certification to cover these excluded areas if required.

	Peacetime Operations	Maritime Security	Combat Operations
Intended Operating Conditions	Included within the scope of the Code	Included within the scope of the Code	Not Applicable
Foreseeable Damage Conditions	Included within the scope of the Code	Included within the scope of the Code	To be defined by the Naval Administration
Extreme Threat Conditions	Not Applicable	To be defined by the Naval Administration	To be defined by the Naval Administration

Figure P1-0-1: Applicability of the Naval Ship Code

[Justification & Guidance](#) for this Section are contained in Part 3.

¹ Extreme Threat Conditions and other capitalised terms are defined in Part 1 Definitions and Abbreviations

2. Limitations

The Code does not cover all aspects of a naval vessel and does not include safety associated with use of a nuclear powered propulsion plant nor does it cover the bulk carriage of low flash point fuel.

It does not address aspects associated with a vessel's combat or weapon system; the competences necessary to operate a vessel safely; aspects of workplace health and safety; living conditions; operation of aircraft; manning levels; or protection of the environment. These items will need to be included as part of the wider Safety (and Environment Protection) Management System that a navy implements as part of its safety and environment policy.

The Code assumes that the majority of persons normally embarked on a naval ship are able-bodied, with a fair knowledge of the layout of the ship and have received training in safety procedures and the handling of the ship's safety equipment.

Compliance with this Code does not replace the responsibility to comply with IMO conventions and other international and national treaties, conventions and regulations including UNCLOS applied through national and international laws.

[Justification & Guidance](#) for this Section are contained in Part 3.

3. Management of Naval Ship Safety

In order to demonstrate that the safety of a naval ship meets agreed criteria, a number of processes need to be in place which include a:

- Safety (and Environmental Protection) Policy endorsed by the Navy;
- Safety (and Environmental Protection) Management System;
- Through Life verification process for revalidation of certification.

The NSC assumes that a navy has established a Naval Administration or similar within its organisation to administer safety management processes.

How the NSC fits into this concept is shown in Figure P1-0-2:

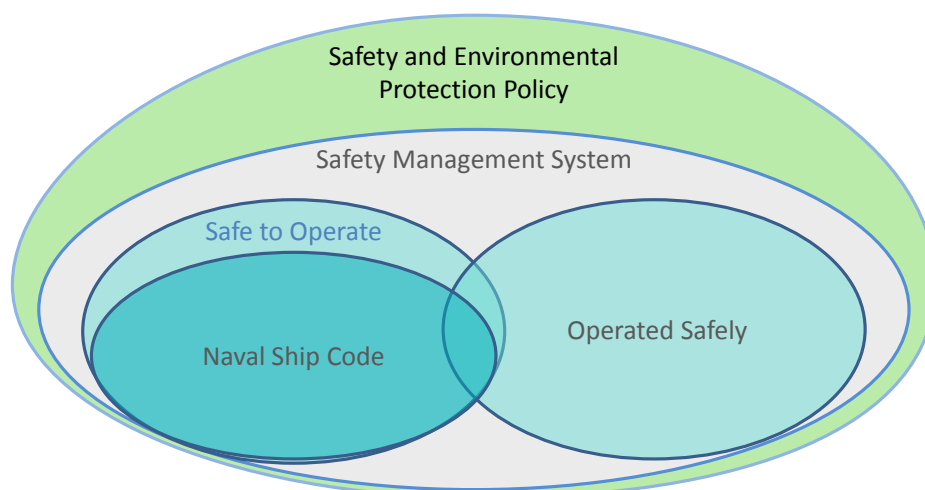


Figure P1-0-2: Relationship between elements of naval safety assurance

[Justification & Guidance](#) for this Section are contained in Part 3.

4. The Naval Administration

The role of the Naval Administration (or equivalent) includes, but is not limited to:

- Control of the application and implementation of the Code;
- Implementation of a system for verification of the ship's construction and equipment by adequate means of reviews, testing and inspection to confirm compliance with the Code;
- Application of periodic survey arrangement(s) to ensure that compliance with the Code and its safety goal is maintained;
- implement and maintain procedures for the delegation, appointment and auditing of Recognised Organisations carrying out duties on behalf of the Naval Administration, e.g. Classification Societies.

The Naval Administration would be expected to be subject to the wider Safety (and Environmental Protection) Management System adopted by the navy.

Justification & Guidance for this Section are contained in Part 3.

5. Arrangement and Principles of the Code

The Code is divided in three parts, as below.

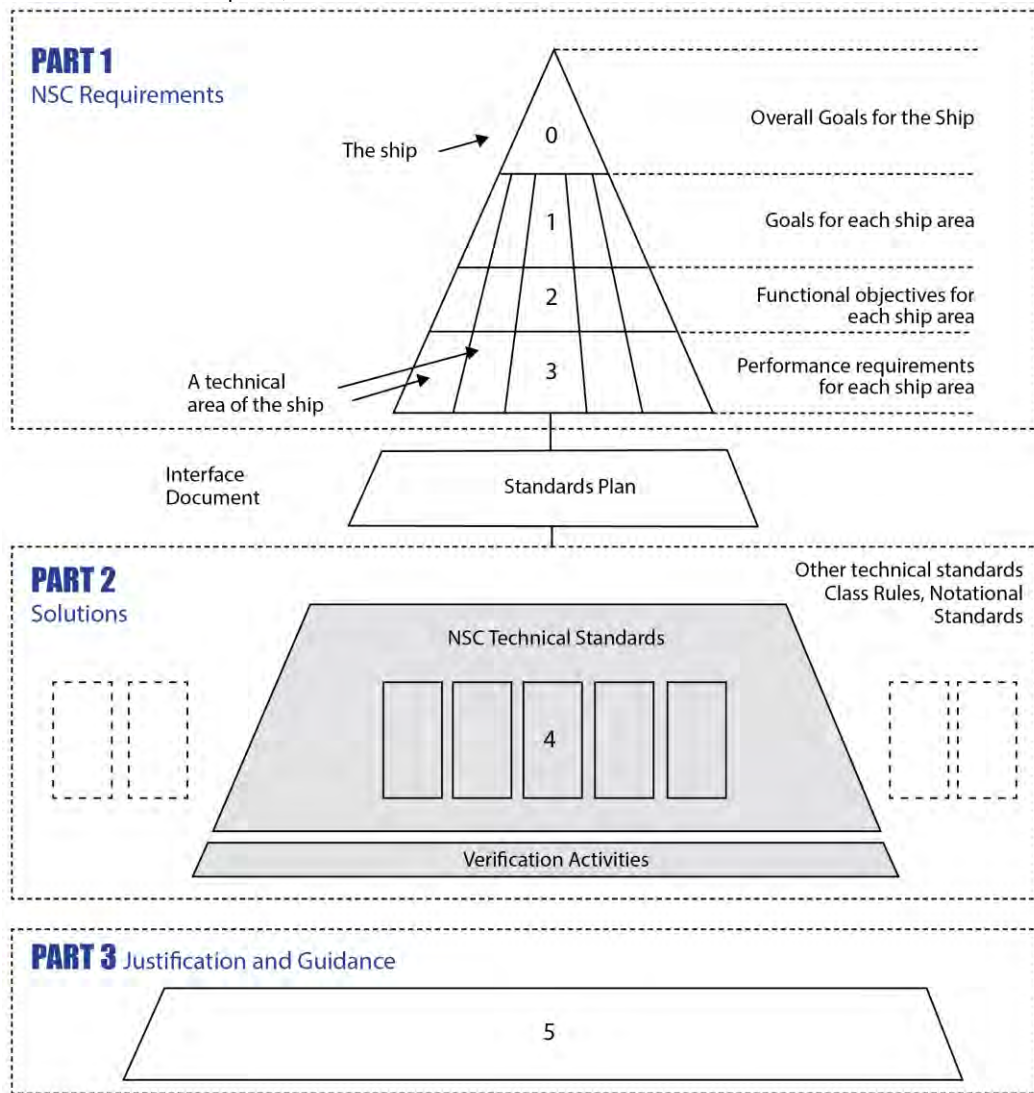


Figure P1-0-3: Arrangement of the Naval Ship Code

- Part 1 specifies mandatory requirements and is separated into Chapters, each addressing a specific functional area. At the highest level, an overall safety Goal for the vessel is defined in Chapter I (Tier 0). Each subsequent chapter then has a goal for the specific subject area, Tier 1, a set of Functional Objectives (FO's), Tier 2 and Performance Requirements (PR's), Tier 3 that in greater levels of detail, describe the issues that need to be addressed in order to meet the overall Goal of the Code.

Chapter I of the Code provides a process by which a Naval Administration may demonstrate compliance with the remainder of the Code (Chapters II to X inclusive).

- Part 2, Tier 4, provides possible solutions for satisfying Part 1 requirements. These solutions are not mandatory and can be substituted by other solutions agreed by the Naval Administration, e.g. standards, Class rules; etc., that are agreed as appropriate for the ship and Justified as meeting the Functional Objectives and Performance Requirements set out in Part 1. A Standards Plan lists all the relevant standards used in each project and makes the link between Part 1 and the selected solution.
- Part 3, Tier 5, provides guidelines and justifications and is informative only.

Justification & Guidance for this Section are contained in Part 3.

6. Documenting Compliance with the Naval Ship Code

In order to demonstrate that a vessel is compliant with the Code the following approach is to be applied:

- i. A Concept of Operations Statement (ConOpS) document, agreed with the Naval Administration is to be developed by the operators of the vessel covering the aspects set out in Ch I, Regulation 3;
- ii. Justification of a set of technical standards that meet the Functional Objectives and Performance Requirements of Part 1. This is normally described as the Standards Plan.
- iii. Agreement by the Naval Administration for each ship project that the justified technical standards are appropriate for the basic design of the ship and the ConOpS. Technical standards can include a variety of sources, including the Solutions indicated in Part 2 of the Code.
- iv. The design, construction, materials and equipment are certified by a competent organisation against the referenced standards to attest to the material condition of the vessel. This will include a comprehensive set of tests and trials to prove that equipment and systems function safely. This is termed Verification.
- v. A certificate attesting to the process described above can then be issued with a defined period of validity and conditions under which the validity remains. The Certificate will demonstrate that the vessel has met the Goals, Functional Objectives and Performance Requirements of both the Code and any additional criteria imposed by the Naval Administration.
- vi. A Technical File for the ship, describing the above would also be delivered as part of this process and should be available on-board the vessel to which it applies and be accessible to all stakeholders.

Justification & Guidance for this Section are contained in Part 3.

7. Deviations from Code Requirements

A ship design or arrangement not conforming to a particular requirement in the Code, is considered equivalent if it satisfies the requirements of higher Tiers by way of compensating or alternative measures. The acceptance of an equivalent solution shall be based on an engineering analysis. A template for this (based on SOLAS Regulation 17) is given in Part 3.

An equivalent (technical) solution will require the agreement of the Naval Administration and the Owner. Deviations from Goals; Functional Objectives; or Performance Requirements to justify an equivalent technical solution will require the agreement of the Naval Administration.

A Naval Administration which allows equivalent technical solutions or deviations from the Tiers 1 - 3 is encouraged to share the particulars and justification with other navies applying the Code through INSA.

[Justification & Guidance](#) for this Section are contained in Part 3.

8. Exemptions from Part 1 requirements

The basis for certification against the Code is that all the relevant Performance Requirements are fulfilled. In some cases Performance Requirements may not be appropriate or the Naval Administration may exempt ships from parts of the Code. In all cases, noncompliance with the Code should be justified and documented in the standards plan. Exemptions from Code requirements may result that the safety goal in Chapter I is not reached. Where the Naval Administration allows such an exemption, it is encouraged to share the technical justifications and reasons with other Naval Administrations for their information.

[Justification & Guidance](#) for this Section are contained in Part 3.

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PART 1 CHAPTER I NAVAL SHIP SAFETY CERTIFICATION

Contents

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Regulation 0 General	Part1-I-1
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Regulation 4 Standards Plan	Part1-I-3
Regulation 5 Management of a Ship's Technical Information	Part1-I-3
Regulation 6 Safety Certification	Part1-I-5

Regulation 0 General

0.1 The purpose of this chapter is to define the overall safety goals for the ship, and to formally define the regulatory elements that are needed to document compliance with the overall safety goals. The main regulatory elements in the certification process are shown in the Figure I-1.

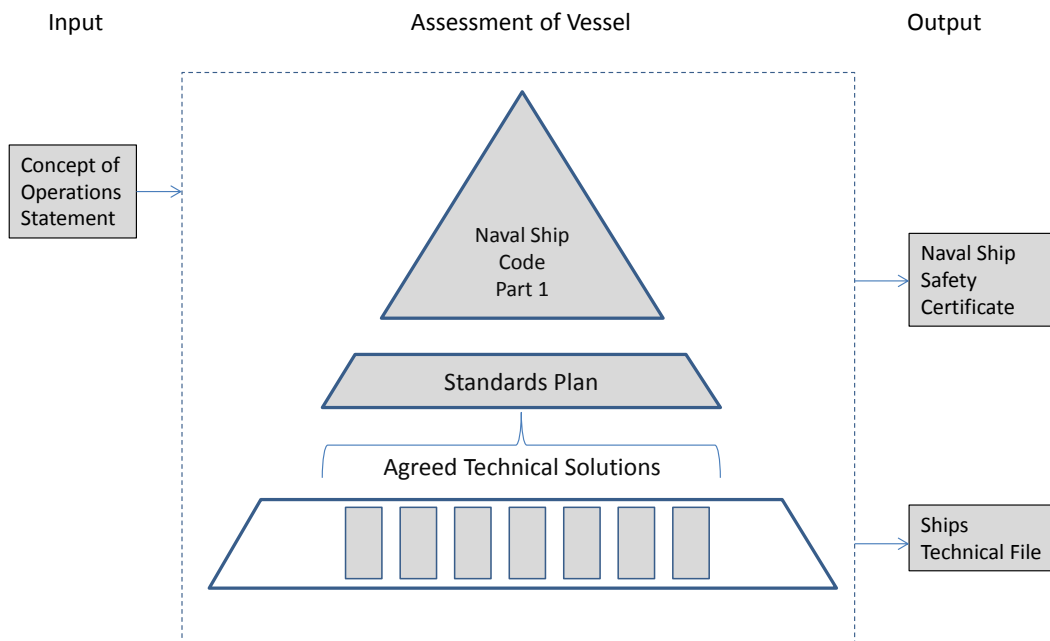


Figure P1-I-1 Main regulatory elements in the certification process of ships

Solutions (Part 2) are not applicable to Chapter I.

Justification & Guidance for this Regulation are contained in Part 3.

Regulation 1 Goals for the ship

- 1.1 Naval ships shall be designed, constructed and maintained throughout life, so that when properly operated, the following goals are fulfilled:
- 1.1.1 For the defined operating conditions, the ship shall be safe to operate and prevent injury of persons onboard;
- 1.1.2 For all foreseeable damage events, the ship may have reduced capability, but is to maintain availability of essential safety functions for persons onboard.

Note: The Code meets the goals of the scope. For the scope that is covered, see Pt 1 Ch 0 section 2.1

- 1.2 For special ship concepts where the sub-goals in paragraph 1.1.1 and 1.1.2 are not reasonably possible to achieve, the goals may be modified from that of Regulation 1, where agreed by the Naval Administration. In that case the risk levels are to be kept as low as reasonably practicable.

[Solutions](#) (Part 2) are not applicable to Chapter I.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 2 Ship Goals Imposed by Naval Administration

- 2.1 In addition to the mandatory goals for all ships in Regulation 1, naval ships shall be designed, constructed and maintained throughout life, so that when properly operated, the following goals are also fulfilled:
- 2.1.1 Additional safety functions for persons onboard are maintained for all foreseeable damage events required by the Naval Administration;
- 2.1.2 Comply with specified damage and post-damage requirements for all extreme threat conditions required by the Naval Administration.
- 2.2 For hazards occurring under extreme threat conditions, the code requires the Naval Administration to determine acceptable solutions.

[Solutions](#) (Part 2) are not applicable to Chapter I.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 3 Concept of Operations Statement

- 3.1 The certification of the ship shall be based on a Concept of Operations Statement (ConOpS) defining the ship's function, operational areas and characteristics.
- 3.2 The ConOpS is the formal basis for the certification against this Code.
- 3.3 The ConOpS is a standardized table listing:
- 3.3.1 Particulars;
- 3.3.2 Owner;
- 3.3.3 Naval Administration;

- 3.3.4 Primary and secondary roles;
- 3.3.5 Ship attributes;
- 3.3.6 Operational area;
- 3.3.7 Environment;
- 3.3.8 Operating philosophy;
- 3.3.9 Survey, maintenance and disposal philosophy.

[Solutions](#) (Part 2) are not applicable to Chapter I.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 4 Standards Plan

- 4.1 The requirements of Regulation 1 and 2 shall normally be achieved by using technical standards justified against the Goals, Functional Objectives, and Performance Requirements validated by the Naval Administration recognising the ConOpS of this code. This includes: applicable requirements of Part 2 of this Code, and/or applicable requirements of a Class Society, or other solutions (standards or first principles) acceptable by the Naval Administration.
- 4.2 Applicable requirements mean technical standards that are relevant for the specific ship and operation, and shown to fulfil the Goals, Functional Objectives, and Performance Requirements through a formal justification process.
- 4.3 The list of the technical standards used as basis for Tier 4 Solutions shall be collated in a Standards Plan.

[Solutions](#) (Part 2) are not applicable to Chapter I.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 5 Management of a Ship's Technical Information

- 5.1 A Ship's Technical File with specific information on how the requirements of this Code have been applied for the ship design and construction shall be made. The technical file shall be provided upon delivery of a new ship, and updated as appropriate throughout the life of the ship.
- 5.2 Typical information in a Ship's Technical File includes, but not limited to:

Main Data:

- 5.2.1 Main data of the ship;
- 5.2.2 Copy of ConOpS;
- 5.2.3 Other important design information;

Compliance with NSC Goals:

- 5.2.4 Applicable NSC Chapters;
- 5.2.5 List of standards used for each NSC Chapter (table);
- 5.2.6 List of other relevant standards;
- 5.2.7 List of special interpretations of NSC;
- 5.2.8 List of Naval Administration instructions/interpretations;
- 5.2.9 List of important assumptions;

Class information:

- 5.2.10 List of Class Notations and class remarks;

Statutory certificates:

- 5.2.11 List of Statutory Certificates and remarks;

Specified Data:

- 5.2.12 List of specified loads;
- 5.2.13 List of helicopters and landing conditions;
- 5.2.14 List of docking conditions;
- 5.2.15 List of special operating conditions;

Design limitations:

- 5.2.16 List of operating limitations;
- 5.2.17 List of Helicopter landing limitations;
- 5.2.18 List of deviations;

Operating information:

- 5.2.19 Reference to operational info documents as defined in NSC;
- 5.2.20 Reference to other info documents.

Solutions (Part 2) are not applicable to Chapter I.

Justification & Guidance for this Regulation are contained in Part 3.

Regulation 6 Safety Certification

- 6.1 A ship's compliance with the overall requirements in Regulations 1 and 2 shall be demonstrated by Naval Ship Safety Certification.
- 6.2 The Naval Ship Safety Certificate (NSSC) shall confirm that the ship complies with the Goals in Regulation 1 and with Goals in Regulation 2 (if specified), see Figure 2. The NSSC shall refer to: functions and characteristics as specified in the ConOpS; the technical standards as listed in the Standards Plan; and assumptions, evaluations and deviations as listed in the Ship Construction File.
- 6.3 The NSSC shall be endorsed and renewed at regular intervals as required by the NA during the operation of the ship, including periods of trials. If significant changes are made to the operation (as specified in the ConOpS), or the construction of the ship, the NSSC may need to be updated to reflect this.
- 6.4 The NSSC shall give unambiguous references to how the ship has been approved, and what technical standards the ship has been approved to. This includes any operational limitations, deviations, assumptions, and technical standards.
- 6.5 Where a Naval Administration issues certification for one part or parts of the Code, the Naval Administration is responsible for ensuring the integration of all safety certification at the ship level within the context of the safety management system.
- 6.6 For items where compliance with the Code has been based on technical solutions deduced directly from the Goals, Functional Objectives or Performance requirements without the use of a technical standard, the NSSC shall give reference to an unambiguous line of reasoning for the chosen solution.

Solutions (Part 2) are not applicable to Chapter I.

Justification & Guidance for this Regulation are contained in Part 3.

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PART 1 CHAPTER II STRUCTURE

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Regulation 0 Goal

- 0.1 For the design life of the ship, the structure shall be designed, constructed and maintained to:
- 0.1.1 Provide weathertight and watertight integrity;
- 0.1.2 Carry all loads that may be foreseen;
- 0.1.3 Permit embarked persons to carry out their duties safely;
- 0.1.4 Protect the embarked persons and essential safety functions in the event of all foreseeable emergencies and accidents at least until the persons have reached a place of safety or the threat has receded;
- 0.1.5 Minimise the risk of loss of the ship.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 1 General

Functional Objective

- 1.1 The purpose of this Regulation is to outline the principles and framework of Chapter II Structure.

Purpose

- 1.2 Chapter II Structure is written as a “standard for the selection of standards” rather than a standard for direct application in a design office or construction/repair facility. As a consequence, the primary target audience for this Chapter is the Naval Administration and its Recognised Organisations.

Scope

- 1.3 This Chapter defines the requirements for the structure of ships. It is not constrained to:
- 1.3.1 Hull structure alone. This Chapter applies to all structure required to meet the Goal of this Chapter.

- 1.3.2 The structure only when afloat. This Chapter equally applies while the ship is intentionally beached or aground.
- 1.3.3 Strength issues alone where “strength” is synonymous with failure to carry load. The structure must not present a hazard in itself, and may be limited by criteria such as deflection (e.g. structural misalignment leading to premature buckling, mast deflection, etc).

Note: Some structural materials may present a hazard during manufacture, repair or when they degrade due to age.

Application

- 1.4 In addition to the requirements contained elsewhere in the present regulations, ship structure shall be designed, constructed, and maintained in compliance with the structural requirements of a Classification Society whose rules and procedures are recognised and validated by the Naval Administration as meeting the Goal of this Chapter or with applicable national standards of the Naval Administration which have been demonstrated to provide an equivalent level of safety.
- 1.5 The requirements of this Chapter apply to ships the keels of which are laid or which are at a similar stage of construction on or after the date of implementation of this Chapter or any amendments thereto. The Naval Administration may direct retrospective application.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 2 Concept of Operations Statement

Functional Objective

- 2.1 The Owner’s vision of how the structure of the ship is to be operated and maintained throughout the design life shall be shared with the Naval Administration and, where appointed, its Recognised Organisation.

Performance requirements

- 2.2 The scope of the information to be agreed is defined in the Concept of Operations Statement. For the purposes of this Chapter, particular importance is to be attached to defining the following as they relate to structure:
- 2.2.1 Hazards created by the natural environment,
- 2.2.2 Hazards created by the man-made and built environment (operations, accidents and malicious acts).
- 2.2.3 Environmental hazards inside the ship. Includes (a) hazards created by the payload (cargoes, weapons, systems and equipments (including vibration, and corrosive atmospheres and fluids)), (b) hazards introduced from outside the ship (e.g. flood loading), (c) hazards created by the structure itself, (d) fire, and (e) hazards created by human beings (accidents and malicious acts).
- 2.2.4 Survey and maintenance philosophy.
- 2.3 It is the responsibility of the Owner to define and document the Concept of Operations Statement.
- 2.4 The Naval Administration may impose additional requirements where it feels that the Concept of Operations Statement is too restrictive or not consistent with the ships of similar type regulated under SOLAS.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 3 Structural Design

Functional Objective

3.1 The structural design shall be appropriate to meet the Goal of this Chapter.

Performance requirements

3.2 Structural demand and capacity models. This Chapter expresses its requirements in terms of a rational philosophy – limit state philosophy – for structural design and assessment. However, limit state methods are not mandated, and compliance with this Chapter relies upon the selection and implementation of an appropriate standard or coherent standards to verify that the goals are met.

3.3 The structure is to remain effective so that it meets the Goals of this Chapter throughout the design life of the ship.

3.4 For safe operation:

$$\text{Structural capacity} \geq \text{Structural demand} \times \text{Safety Margin}$$

where: Structural capacity = (limit state) x (Safety Margin)

3.5 For the analysis of damaged ships, it is valuable (but not obligatory) to keep the safety margins separately identified with both the capacity and demand so that appropriate advice can be balanced against non-structural threats.

3.6 Limit state design methods are not mandatory; authoritative “allowable stress” methods are entirely valid and should be seen as a specific case of limit state design methods in which the partial factors of safety have been combined to a single margin against failure. Irrespective of format, it must be possible to justify that the overall requirements expressed in this code are fulfilled for the ship strength.

3.7 This Chapter requires due consideration to be given to designing damage tolerant structures. Adequate structural capacity provided either by protecting the structure or providing alternative load paths.

3.7.1 For all demands other than disregarded demands identified below, Regulation 0 sub-goals 0.1.4 and 0.1.5 of this Chapter are always to be fully met.

3.7.2 Other Regulation 0 sub-goals 0.1.1, 0.1.2, and 0.1.3 are to be met with an appropriate probability of non-exceedance as determined either by the use of limit state assessment or by the use of experience-based rules appropriate for the ship.

Design for manufacture and repair

3.8 Consideration shall be given to the working practices and processes of the build yards, their suppliers and their sub-contractors.

Design assessment – General

- 3.9 In addition to the normal demands that are expected for a ship of the type under consideration, all demands specified in the Concept of Operations Statement must be assessed where relevant to the structural capacity of the ship.
- 3.10 In determining the extent and depth to which a demand should be addressed, consideration should be given to the probability of its occurrence and the consequence if it does occur. Additionally, consideration is to be given to loads occurring in combination.
- 3.11 When selecting structural requirements consideration should be given to limitations of state of the art.
- 3.12 The Performance Requirements under this regulation are now divided into two; Normal Operations and Damage scenarios.

Design assessment – Normal Operations – natural environment

- 3.13 As a minimum it is mandatory to assess the structural capacity of all ships when subjected to the following demands:
 - 3.13.1 Above water: Wind, air temperatures (high and low), ice accretion, solar radiation.
 - 3.13.2 Sea surface: Waves, green seas, ice navigation, ship motions (including slamming).
- 3.14 Structural capacity. The ship shall not suffer any structural damage. Regulation 0 sub-goals 0.1.1 to 0.1.5 of this Chapter shall be fully met.

Design assessment – Normal Operations – built and man-made environment

- 3.15 As a minimum it is mandatory to assess the structural capacity of all ships when subjected to the following demands:
 - 3.15.1 Anchoring, mooring and towing, beaching and grounding (where these are normal operations).
 - 3.15.2 Human intervention:
 - 3.15.2.1 Permanent loads: permanent weights, solid ballast,
 - 3.15.2.2 Variable functional loads from cargo, fuel and ballast, stores and equipment.
- 3.16 Structural capacity. The ship shall not suffer any structural damage. Regulation 0 sub-goals 0.1.1 to 0.1.5 of this Chapter shall be fully met.

Design assessment – Normal Operations – demands limited by capacity

- 3.17 The Naval Administration may limit the demand where dictated by the capacity . Any limitations applied to the structure must be consistent with the Owner's expectations as detailed in the Concept of Operations Statement. Operator Guidance on the limitations must be provided in a form that is readily understandable by the operator of the ship.
- 3.18 As a minimum it is mandatory to provide adequate structural capacity to all ships when subjected to the following demands:
 - 3.18.1 Emergency towing: from either bow or stern

- 3.19 Structural capacity. The ship shall not suffer any structural damage. Regulation 0 sub-goals 0.1.1 to 0.1.5 of this Chapter shall be fully met.

Design assessment – Normal Operations – unquantifiable demands

- 3.20 Structural demands that are not practically quantifiable shall be addressed by providing adequate structural capacity based upon proven records of satisfactory performance of a similar type of ship in similar operating conditions.
- 3.21 As a minimum it is mandatory to provide adequate structural capacity to all ships when subjected to the following demands not addressed elsewhere:
- 3.21.1 Ruggedness: cargo and equipment operations, berthing
- 3.21.2 Structural continuity
- 3.21.3 Environmental degradation: corrosion, erosion
- 3.22 Structural capacity. The ship may suffer minor structural damage. Regulation 0 sub-goals 0.1.1 to 0.1.5 of this Chapter shall be fully met.

Design assessment – Normal Operations – access, layout and arrangement

- 3.23 The structure is to be designed so that it permits safe access by embarked persons to all areas required to undertake their normal duties in all Foreseeable Operating Conditions.
- 3.23.1 The need for special arrangements to permit all persons (including shore-based surveyors and maintenance personnel) to undertake their duties safely is to be minimised.
- 3.23.2 All fixed arrangements provided for survey of structure are to be assessed.
- 3.23.3 All fixed arrangements identified as requiring special consideration in order to satisfy the Goals of other parts of this Code shall be assessed.
- 3.24 The structural capacity is to be assessed. Regulation 0 sub-goals 0.1.1 to 0.1.5 of this Chapter shall be fully met.

Design assessment – Normal Operations – Disregarded demands and disregarded capacity

- 3.25 Disregarded structural capacity. The ship may be subject to demands that are so low in magnitude and/or effect that the structural capacity may be assumed without justification (e.g. machinery vibration in a heavily-built low-speed ship, movement of persons about the ship).
- 3.26 Structural capacity. There is no requirement to demonstrate the structural capacity when subjected to disregarded demands.

Design assessment – Damage Scenarios - Foreseeable Damage

- 3.27 As a minimum it is mandatory to assess the structural capacity of all ships when subjected to the following demands:
- 3.27.1 Foreseeable damage. Events that should be avoided, but the possibility of their occurrence cannot be ignored in the design of the ship:
- 3.27.1.1 Navigation errors: Grounding, flooding, collision;

- 3.27.1.2 Fire and explosion;
- 3.27.1.3 Mal-operation;
- 3.27.1.4 Failure of a single structural member.
- 3.28 Structural capacity. The ship may suffer structural damage from this event that requires unprogrammed remedial action. Regulation 0 sub-goals 0.1.1 to 0.1.3 of this Chapter may be compromised, but sub-goals 0.1.4 and 0.1.5 shall be fully met.

Design assessment – Damage Scenarios – Extreme Threat Damage

- 3.29 As a minimum it is mandatory to assess the structural capacity of all ships when subjected to the following demands:
- 3.29.1 As required by the Owner after consultation with the Naval Administration.
- 3.30 Structural capacity. The ship may suffer structural damage from this event that requires unprogrammed remedial action. Regulation 0 sub-goals 0.1.1 to 0.1.3 of this Chapter may be compromised, but sub-goals 0.1.4 and 0.1.5 shall be fully met.

Design assessment – All Damage Scenarios – access, layout and arrangement

- 3.31 The structure is to be designed so that it permits embarked persons to respond appropriately in the event of damage as safely as reasonably practicable.
- 3.32 All fixed arrangements identified as requiring special consideration in order to satisfy the Goals of other parts of this Code shall be assessed.
- 3.33 The structural capacity is to be assessed. Regulation 0 sub-goals 0.1.1 to 0.1.3 of this Chapter may be compromised, but sub-goals 0.1.4 and 0.1.5 shall be fully met.

Design assessment – All Damage Scenarios– Disregarded demands and disregarded capacity

- 3.34 Disregarded demand. The ship may suffer critical damage, but the probability of such an event is so low that the safety risk for the embarked persons is still acceptable even if the demand is disregarded. In such cases there is no requirement to quantify the demand (though there may be a requirement to demonstrate its probability of occurrence is so low as to be legitimately disregarded).
- 3.35 Structural capacity. There is no requirement to demonstrate the structural capacity when subjected to disregarded demands.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 4 Construction

Functional Objective

- 4.1 The quality of construction shall be consistent with the structural design requirements necessary to meet the Goal of this Chapter. The design basis and essential construction information are to be recorded.

Performance Requirements

Quality of materials and workmanship

- 4.2 The design standard will assume or require a certain quality of construction, modification and repair. Ship structure is to be:
- 4.2.1 Constructed and repaired in compliance with the selected standard, and
 - 4.2.2 Verified as having been so constructed and/or repaired.
- 4.3 Manufacturing organisations must be able to construct – and demonstrate they can construct – at least to:
- 4.3.1 Normal shipbuilding standards as defined in the industry’s well accepted quality standards, and
 - 4.3.2 Where more onerous, a standard consistent with the design solution.
- 4.4 The quality of work and work processes is to be undertaken to the satisfaction of the Naval Administration in facilities that are appropriately accredited by persons who are appropriately experienced.
- 4.5 A survey plan shall be developed for the construction phase of the ship, taking into account the ship type and design. The survey plan shall contain a set of requirements, including specifying the extent and scope of the construction survey(s) and identifying areas that need special attention during the survey(s), to ensure compliance of construction with mandatory ship construction standards.

Solutions for this Regulation are contained in Part 2.

Justification & Guidance for this Regulation are contained in Part 3.

Regulation 5 Ships in Operation

Functional Objective

- 5.1 The ship shall be operated in a manner necessary to meet the Goal of this Chapter consistent with the design and material solutions, and the material state of the ship continues to meet the Goal of this Chapter.

Performance Requirements

- 5.2 The survey, maintenance and repair philosophy to be adopted is to be considered at all stages, and any constraints imposed on the design by reason of the repair philosophy identified (e.g. if in-theatre repairs are envisaged).
- 5.3 Unless explicitly agreed otherwise by the Naval Administration the ship shall be deemed to be in operation when afloat, aground (landing ships, road or air transportable craft) and in dry-dock when all of the following criteria are met:
- 5.3.1 Under the command of the Commanding Officer,
 - 5.3.2 Crew members are embarked,
 - 5.3.3 Available for sea service at less than 72 hours’ notice,

- 5.3.4 Not undergoing any structural repairs that would, for example, prevent the ship from putting to sea.
- 5.4 Operation: The ship is to be provided with operational information consistent with the design solution that can be readily understood onboard. Where possible, the information is to be in a form that allows the operator to understand the increased risk and ultimate failure point if the normal operating limits are exceeded. These normal operating limits are to be defined by the designer and approved by the Naval Administration or Recognised Organisation.
- 5.5 Survey: The ship is to be surveyed in accordance with Chapter I and all repairs of modifications undertaken to the satisfaction of the Naval Administration. Surveys are conducted for two primary reasons:
- 5.5.1 To ascertain that any structural degradation normal for the type of ship and its material of construction is identified before it gets to a stage at which the structural capacity of the ship is compromised (e.g. corrosion),
- 5.5.2 To identify damages that have resulted from specific events (e.g. berthing damage) that may have gone unnoticed or unreported by the embarked persons.
- 5.6 Modification and repair: In general, the Naval Administration is to apply the same standard of assurance to work undertaken in the SiO phase as would be applied for new construction ships. Where defects arise because of inadequacies in design or construction, the owner is to take action to improve the structural capacity.
- 5.7 The Naval Administration is to assure itself that the material state philosophy and operator guidance are consistent with the designer's intentions. Where the Concept of Operations Statement has been altered, the ship shall not be authorised for more demanding use until a certification review has been conducted and agreed by the Naval Administration.
- 5.8 The Naval Administration is to apply the same or a demonstrably equivalent standard of assurance to work undertaken in the SiO phase as would be applied for new construction ships.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 6 Disposal

Functional Objective

- 6.1 Ships shall be designed and constructed of materials for environmentally acceptable recycling without compromising the safety and operational efficiency of the ship. Recycling shall be carried out in facilities with sound working practices and environmental standards

Performance Requirements

- 6.2 Where possible the IMO Guidelines on Ship Recycling are to be followed, as provided in IMO Resolution A.962(23), 5th December 2003.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 7 Materials

Functional Objective

- 7.1 The materials have been characterised in sufficient scope and depth in their installed form to enable reliance to be placed on them to perform in a manner that is consistent with the design and material solutions in the environment in which they are used.

Performance Requirements

- 7.2 This Code primarily considers ships constructed of steel, aluminium and fibre-reinforced thermo-setting polymers. Where it is intended to construct ships of other materials, these may need to be specially considered.
- 7.3 The structure shall not be constructed of materials or combinations of materials that, in the design configuration in which they are used and the Foreseeable Operating Conditions and accident conditions, endanger embarked persons or hinder the safe evacuation of the ship. Examples could include loss of mechanical properties (strength, elasticity, creep), result in excessive deformation (thermal expansion), produce smoke, or give off toxic fumes when heated by solar radiation, high machinery temperatures or a fire.
- 7.4 Particular attention must be given when making use of materials that have reduced properties under all Foreseeable Operating Conditions at elevated temperatures (e.g. aluminium in a fire), and materials that are combustible, fibre reinforced plastic with or without structural sandwich core, combustible insulation for structure, ducts and pipes, lining materials, and paint. Protection of structural materials that exhibit such tendencies is, subject to appropriate approvals, acceptable as a solution.
- 7.5 The Naval Administration is to assure itself that the manufacturing processes and procedures are consistent with the assumptions made during design appraisal. This assurance must include a significant degree of engineering product audit; audit of management processes alone is not sufficient.
- 7.6 For all ships, new installation of materials which contain asbestos shall be prohibited.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 8 Coatings

Functional Objective

- 8.1 Coatings for the protection of structure shall be properly selected and applied to protect the structure throughout the target useful life of the coating.

Performance Requirements

- 8.2 All dedicated seawater ballast tanks and void spaces shall be coated during construction in accordance with the Performance standard for protective coatings (IMO PSPC)).
- 8.3 Coatings shall be applied and maintained in accordance with manufactures' specifications concerning surface preparation, coating selection, application and maintenance. Where coating is required to be applied, the design coating life shall be specified. The actual coating life may be longer or shorter than the design coating life, depending on the actual conditions and maintenance of the ship. Coatings shall be selected as a function of the intended use of the compartment, materials and application of other corrosion prevention systems, e.g., cathodic protection or other alternatives.

8.4 Information on coating life and use of coatings shall be maintained including:

8.4.1 Locations and/or spaces where coatings are required to be used;

8.4.2 Types of coating to be used for various spaces;

8.4.3 Required target useful life of the coating and explanation for selection;

8.4.4 The coating performance standard to be followed (e.g., IMO PSPC).

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 9 Additional Requirements for Ships with the Special Function of Bulk Fuel Carriage

Functional Objective

9.1 The structural survey of ships with the Special Function of Bulk Fuel Carriage shall be at least as good as required by SOLAS.

Performance Requirements

9.2 Ships with a Special Function of Bulk Fuel Carriage shall be subject to an enhanced programme of survey. The scope of each successive annual, intermediate and renewal survey is to be tailored to reflect the increased risk of significant structural degradation as the ship ages, and hence the increased risk of an escape of fuel from cargo spaces to the environment.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

PART 1 CHAPTER III BUOYANCY, STABILITY AND CONTROLLABILITY

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Regulation 0 Goal

- 0.1 The buoyancy, freeboard, main sub-division compartment and stability characteristics of the ship shall be designed, constructed and maintained to:
- 0.1.1 Provide an adequate reserve of buoyancy in all foreseeable intact and damaged conditions, in the environment for which the ship is to operate;
- 0.1.2 Provide adequate stability to avoid capsizing in all foreseeable intact and damaged conditions, in the environment for which the ship is to operate, under the precepts of good seamanship;
- 0.1.3 Permit embarked persons to carry out their duties as safely as reasonably practical;
- 0.1.4 Protect the embarked persons and essential safety functions in the event of foreseeable accidents and emergencies at least until the persons have reached a place of safety or the threat has receded including preventing the malfunction of the life-saving systems and equipment.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 1 General

Functional Objective

- 1.1 The purpose of this Regulation is to outline the principles and framework of Chapter III Stability.

Purpose

- 1.2 Adequate reserve of buoyancy and stability shall be provided to safeguard life and property at sea whilst maintaining freedom of manoeuvre.
- 1.3 In addition to the hazards facing merchant shipping, the risk of collision from operation in close proximity to other shipping, particularly during replenishment at sea, blockade, interdiction or multi-platform operations shall be considered in determining foreseeable damage.

- 1.4 The ability to be deployed to any area of interest to the Navy defined in the Concept of Operations Statement shall be maintained.

Note: This may include constabulary roles, areas of conflict or aid in humanitarian crisis.

Application

- 1.5 Any changes to the ship during design, construction or through life that impacts on the compliance with this chapter shall be approved by the Naval Administration.

General Performance Requirements

- 1.6 The ship shall:

- 1.6.1 Be capable of operating in the environment defined in the Concept of Operations Statement;
- 1.6.2 Have a level of inherent seaworthiness including motions tolerable by equipment and embarked persons, controllability and the ability to remain afloat and not capsize;
- 1.6.3 Be designed to minimise the risk faced by hazards to naval shipping including but not limited to the impact of the environment causing dynamic capsize, broach or damage to crew & equipment, loss of watertight integrity from collision, grounding or hostile acts, static capsize due to changing loading conditions and errors in ship handling;
- 1.6.4 Remain afloat, stable when damage to the hull causes subsequent loss of watertight integrity to no more than one main watertight compartment. The consequences of this flooding are not to impair the provision of essential safety functions and the ability to safely return to port under its own propulsion.
- 1.6.5 Be provided with operator guidance, as required in Regulation 8 Provision of Operational Information, to facilitate safe handling of the ship.

Note: Assumptions of good seamanship are inherent in practically all stability methods that can be applied to verify the performance requirements of this chapter.

Note: Guidance on hazard identification and bounding the Foreseeable Operating Conditions for buoyancy and stability is provided in Part 3.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 2 Watertight Integrity

Functional Objective

- 2.1 The ship shall have watertight and weather tight boundaries that prevent the accumulation of water in any undamaged main sub-division compartment, in any Foreseeable Operating Condition.

Performance Requirements

Watertight & Weathertight Boundaries

- 2.2 The structure of any main sub-division compartment shall ensure any watertight or weathertight boundary satisfies the functional objectives of this chapter in any Foreseeable Operating Condition.

- 2.3 The external ship's structure and fittings shall be weathertight above the submergence limit, defined in Regulation 4, in all Foreseeable Operating Conditions.

Note: The Naval Administration requires that all reasonable and practicable measures shall be taken to limit the entry and spread of water above the submergence limit.

- 2.4 Main sub-division compartment boundaries shall be watertight below the submergence limit in all Foreseeable Operating Conditions.
- 2.5 Manned spaces and compartments supplying or containing emergency devices within the ship are to be protected from the ingress of water in case of damage to the bottom of the ship.
- 2.6 Compartments containing devices providing or supporting Essential Safety Functions are to be protected from subsequent progressive flooding following ingress of water to no more than one Main Watertight Compartment.
- 2.7 The Damage Control Deck is to be watertight and located above the submergence limit to provide safe continuous access along the length of the ship, communication and recovery activities (such as rapid closure of openings & penetrations in watertight boundaries).

Note: This may be referred to as the bulkhead or communications deck.

- 2.8 Main and auxiliary machinery space boundaries shall be designed and maintained to be watertight.

Note: Other spaces considered as vital to the safety of the crew should be considered to be provided with watertight boundaries.

- 2.9 The fore and aft regions of the ship shall provide protection to the remainder of the ship (extending from keel to weatherdeck) from the consequences of a collision.
- 2.10 Access trunks, tunnels or scuttles shall have watertight boundaries.
- 2.11 Damage to or loss of any appendage fitted to the ship shall not cause the loss of watertight integrity to any main sub-division compartment.
- 2.12 The ship shall be protected from ingress of water in case of damage to stern tube arrangements.

Openings

- 2.13 Where down-flooding points (such as air intakes and exhausts) are required they shall limit the ingress of water from weather or waves in any Foreseeable Operating Condition.
- 2.14 Openings in all main sub-division compartment boundaries shall be reduced to a minimum compatible with the design and proper working of the ship.
- 2.15 Openings in the hull and watertight boundaries shall:
- 2.15.1 Be fitted with closures of an approved type;
 - 2.15.2 Not be fitted in bulkheads below the first watertight deck above the submergence limit unless approved by the Naval Administration; and
 - 2.15.3 Not be fitted in the collision bulkhead unless approved by the Naval Administration.
- 2.16 Openings above the submergence limit, other than approved downflooding points shall be fitted with weathertight closing devices of an approved type that shall;
- 2.16.1 for openings in decks, have coamings of adequate height and strength to allow access and protection against ingress of water in all Foreseeable Operating Conditions;

- 2.16.2 be of adequately robust construction to withstand minor damage; and
- 2.16.3 be capable of being closed in a safe manner.
- 2.17 Openings formed by air pipes, ventilators and similar systems shall terminate at a location above the submergence limit.
- 2.18 Moving parts penetrating the hull below the submergence limit are to be fitted with watertight sealing arrangements of an approved type.
- 2.19 Discharges below the submergence limit shall be, of an approved type and fitted with efficient and accessible means of preventing water from passing inboard.

Closures

- 2.20 Closures to openings in watertight boundaries shall;
 - 2.20.1 Permit embarked persons to carry out their duties safely;
 - 2.20.2 Be capable of being operated by embarked persons;
 - 2.20.3 Be able to be closed rapidly in all Foreseeable Operating Conditions, in sufficient time to maintain an adequate reserve of stability and buoyancy;
 - 2.20.4 Provide the same level of watertight integrity as the surrounding structure when closed;
 - 2.20.5 Allow the watertight compartment to be entered following the flooding of any adjacent compartment;
 - 2.20.6 Be minimised in number throughout the ship;
 - 2.20.7 Be located away from areas of foreseeable damage in order to retain their watertight effectiveness;
 - 2.20.8 Indicate to a manned central control station and other control stations as required by the Naval Administration, if open;
 - 2.20.9 Only be opened whilst afloat at times approved by the Naval Administration and marked accordingly to reflect the operational system for opening at sea;
 - 2.20.10 When power operated, closures in watertight boundaries are to;
 - 2.20.10.1 Operate locally from each side of the bulkhead and from a manned central control station and close within a suitable timescale against an angle of inclination. Closures are to be not capable of remote opening when power operated. Where locally opened, closures are to return to the closed position automatically.
 - 2.20.10.2 Be provided with an individual local hand-operated mechanism on both sides of the closure which is also operable from a position above the submergence limit. The closure is to be able to be closed within a suitable timescale.
 - 2.20.10.3 Be provided with an audible alarm when the closure is closing;
 - 2.20.10.4 Be provided with electrical power supplied from the emergency switchboard;
 - 2.20.10.5 Be provided with two independent power sources with sufficient reserve for three operations in event of power failure, power sources are to have suitable alarms and indication;

2.20.10.6 Be provided with an approved control system suitable for the operating environment and designed such that there are no single points of failure in the control system or power operating system. Failure of the power operating system should not impair the hand operation of the system.

2.21 Portable plates shall not be permitted except where acceptable to the Naval Administration.

Penetrations

2.22 Penetrations (for all piping, cabling, ducting or other purpose) shall:

2.22.1 Provide the same level of watertight and weathertight integrity as the surrounding structure;

2.22.2 Prevent the flow of water through watertight boundaries unless approved by the Naval Administration;

2.22.3 Be able to be closed rapidly in all Foreseeable Operating Conditions, and where required by the Naval Administration by remote operation from above the first watertight deck above the submergence limit;

2.22.4 Not be fitted in the forward most watertight bulkhead unless approved by the Naval Administration;

2.22.5 Not be made of materials that would impair the watertight integrity in the event of a fire or shock under Foreseeable Operating Conditions; and

2.22.6 Be of an approved type.

Drainage

2.23 A system capable of removing liquid from the bilges of any undamaged main sub-division compartment in any Foreseeable Operating Condition shall:

2.23.1 Be fitted to the ship;

2.23.2 Be of an approved type;

2.23.3 Have at least the capacity to remove water at the rate it can accumulate due to any credible scenario which could lead to simultaneous ingress from penetrations, down flooding points and any intact onboard systems (such as fire fighting systems or localised flooding from domestic services);

2.23.4 Have a liquid leakage detection system for spaces where flooding will cause great danger to the ship.

2.24 Adequate provision shall be made for the drainage of enclosed spaces, capable of operation in all foreseeable conditions.

2.25 All exposed decks shall be free draining.

2.26 Flooding of any main sub-division compartment shall be indicated to a main control station and other control stations as required by the Naval Administration.

Solutions for this Regulation are contained in Part 2.

Justification & Guidance for this Regulation are contained in Part 3.

Regulation 3 Reserve of Buoyancy

Functional Objective

- 3.1 The ship shall have sufficient freeboard and buoyancy to prevent excessive shipping of green seas, plunging or foundering in any Foreseeable Operating Condition.

Performance Requirements

- 3.2 The ship shall, in all Foreseeable Operating Conditions:
- 3.2.1 Have adequate freeboard;
 - 3.2.2 Have adequate freeboard forward to minimise shipping of green seas;
 - 3.2.3 Remain afloat; and
 - 3.2.4 Have sufficient reserve of buoyancy to meet Regulation 7 Preservation of Life.

Design

- 3.3 Buoyancy in a damaged state shall be provided by sub-division or an equivalent method agreed with the Naval Administration.
- 3.4 The maximum submergence limit shall be determined from the damaged stability calculations.
- 3.5 The ship shall have a minimum freeboard and sub-division or any other mechanism to ensure an adequate reserve of buoyancy.

Ship Condition

- 3.6 Draught marks that enable the ships displacement, trim and list to be determined shall be marked on the hull.
- 3.7 Means to determine the fluid levels of ships tanks shall be provided;
- 3.8 A survey shall be conducted by the Naval Administration during construction to confirm the design arrangements and through life at intervals acceptable to the Naval Administration to ensure the agreed level of performance is maintained.
- 3.9 An inclining, witnessed and approved by the Naval Administration, shall be conducted at the completion of construction to validate the design and through life at intervals acceptable to the Naval Administration to ensure the agreed level of performance is maintained.
- 3.10 A lightweight survey (displacement check) shall be witnessed and approved by the Naval Administration at intervals through the life of the ship to establish if a degradation in stability and buoyancy has occurred.

Provision of Operational Information

- 3.11 The minimum freeboard acceptable to the Naval Administration shall be provided to the ship (see Regulation 8).

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 4 Reserve of Stability

Functional Objective

- 4.1 The ship shall have adequate resistance to inclination to prevent capsize when disturbed and, adequate restoring energy to return to upright once the disturbance is removed, in any Foreseeable Operating Condition.

Performance Requirements

- 4.2 The ship shall, in any Foreseeable Operating Condition:
- 4.2.1 Adequately resist roll, heel or list caused by a disturbance to an extent that permits embarked persons to carry out their duties as safely as reasonably practical;
- 4.2.2 Return to upright from a roll, heel or list caused by a disturbance subsequent to the removal of the disturbance.

Note: Compliance with this regulation relies on all operations being conducted to standards of good seamanship.

- 4.3 The requirements of this Regulation shall be demonstrated by a stability analysis based on the results of the first inclining and prior to the ship proceeding to sea.

Note: This is separate to any operator guidance to be provided under Regulation 8 Provision of Operational Information

- 4.4 Any standards, models (numerical or physical), calculations, tests, trials or procedures used to determine the centre of gravity and restoring energy of the ship and the magnitude of foreseeable disturbances shall be made available for approval by the Naval Administration.
- 4.5 Any operator guidance as defined in Regulation 8 Provision of Operational Information shall be made available for approval by the Naval Administration. This may include but not be limited to trim & stability handbook, damage control book (where relevant to reserve of stability), stability or loading computer, weather routing advice, operational restrictions, loading guidance, poster, simulator or electronic display required by the crew to safely operate the ship.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 5 Controllability

Functional Objective

- 5.1 The ship in all Foreseeable Operating Conditions shall have adequate controllability to maintain speed and heading when underway in order to avoid normal shipping hazards.

Performance Requirement

- 5.2 The ship shall have a system that allows its velocity (speed and direction) to be changed to avoid normal shipping hazards.
- 5.3 Crash stop, turning circle and initial turning predictions and manoeuvring trials shall be conducted to confirm the ability of the ship to avoid normal shipping hazards.

- 5.4 Controllability prediction; Zig-zag and spiral manoeuvre trials shall be conducted to confirm the ability of the ship to control heading and identify any control dead band.
- 5.5 Operator Guidance pertaining to the manoeuvring characteristics as defined in Regulation 8 shall be made available for approval by the Naval Administration.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 6 Safety of Embarked Persons

Functional Objective

- 6.1 The ship shall behave in a manner that allows embarked persons to carry out their duties as safely as reasonably practical, in all Foreseeable Operating Conditions.

Performance Requirements

- 6.2 The behaviour of the ship in a seaway shall;
- 6.2.1 Be optimised considering the stability requirements and the safety of embarked persons in heavy weather;
- 6.2.2 Be assessed to determine any limitations to safe operation, in all Foreseeable Operating Conditions;
- 6.2.3 Not prevent the essential safety functions from remaining operational.

Protection of Personnel

- 6.3 Where embarked persons can access an exposed deck, that deck shall have means of preventing a person falling from that deck (whether overboard or to another deck).

Note: This includes temporary openings in decks for maintenance or other purposes.

- 6.4 Both internal and external access routes to all work spaces and emergency positions shall have means (such as handholds) to assist cautious movement about the ship by embarked persons in adverse weather conditions.

Note: This includes access to all work spaces and emergency positions such as the emergency towing point, muster stations and any access points to inspect main sub-division compartments after a breach of watertight integrity.

- 6.5 All workstations shall have means (such as handholds, seatbelts or harnesses) to assist embarked persons to remain in position and conduct normal duties in adverse weather conditions.
- 6.6 A survey shall be conducted by the Naval Administration during construction to validate the design and at acceptable intervals through life to ensure the agreed level of performance is maintained.
- 6.7 Visual inspection of guardrails, handrails and safety points shall be conducted routinely at intervals acceptable to the Naval Administration.
- 6.8 Load testing of guardrails, handrails and safety points shall be conducted during construction to validate the design and through life at intervals acceptable to the Naval Administration.
- 6.9 A log of visual inspection and load testing results shall be maintained.

Ship Motions

- 6.10 The ship shall have acceptable Motion Induced Interruptions (MII), Motion Sickness Incidence (MSI), deck wetness and other measures to permit embarked personnel to undertake their duties safely. Appropriate methods shall be used to determine the limitations of safe operation and impact of motions on essential safety functions.

Note: Normally requires a combination of at least two methods such as numerical calculation, simulation, model test and full-scale trials.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 7 Preservation of Life

Functional Objective

- 7.1 The ship shall provide a safe haven following an extreme event, for at least the duration required to evacuate all embarked persons using the ships own escape and evacuation system.

Performance Requirements

- 7.2 Subsequent to an extreme event, the ship shall not take up an attitude that prevents:
- 7.2.1 Movement through the ship by embarked persons to a safe haven;
- 7.2.2 The use of sufficient evacuation arrangements and life saving equipment provided under Chapter VII of the Naval Ship Code to evacuate the ship.
- 7.3 The ship shall have a margin of reserve of buoyancy and stability beyond the Foreseeable Operating Conditions that will allow embarked persons to evacuate the ship using available evacuation arrangements and life saving equipment as provided under Chapter VII of the Naval Ship Code.
- 7.4 This regulation shall not apply following a catastrophic event.
- 7.5 Model tests, numerical analysis, calculation, simulation or other methods are to be used to determine the margin of buoyancy, stability, ship attitude and the ability for embarked persons to evacuate following extreme threat damage or extreme flooding.
- 7.6 The attitude of the ship and the margin on buoyancy and stability following extreme threat damage or extreme flooding, including transient effects, shall permit embarked personnel to carry out any necessary action following an extreme event.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 8 Provision of Operational Information

Functional Objective

- 8.1 Information required by the ships crew, pertaining to the stability and buoyancy of the ship, shall be provided & maintained with the ship to facilitate its' safe operation in all Foreseeable Operating Conditions and for escape, evacuation and rescue.

Performance Requirements

Watertight & Weathertight Boundaries

- 8.2 The Commanding Officer shall be provided with information to maintain the watertight & weathertight integrity of the ship. The content of this information shall contain as a minimum;
 - 8.2.1 The extent, location and capabilities of watertight and weathertight boundaries, including access trunks, tunnels & scuttles;
 - 8.2.2 The locations of watertight and weathertight closing devices, including portable plates, for personnel & cargo/payload access;
 - 8.2.3 The location of penetration closing devices including remote actuation points;
 - 8.2.4 The locations of downflooding points;
 - 8.2.5 The operational system & markings for opening closures at sea;
 - 8.2.6 The drainage arrangements of enclosed spaces; and,
 - 8.2.7 The location & capacity arrangements for the removal of liquids.

Stability & Buoyancy

- 8.3 The Commanding Officer shall be provided with information, in paper format, to maintain adequate buoyancy and stability of the ship. The content of the buoyancy and stability information shall contain as a minimum:
 - 8.3.1 Instructions on operation including:
 - 8.3.1.1 The stability standard or requirements;
 - 8.3.1.2 General precautions against capsizing;
 - 8.3.1.3 Loading & operating restrictions;
 - 8.3.1.4 Crossflooding arrangements [if fitted];
 - 8.3.1.5 Verifying compliance with the stability standard;
 - 8.3.1.6 Trim and draught limitations;
 - 8.3.1.7 Free surface effects;
 - 8.3.1.8 Payload heeling effects;
 - 8.3.1.9 Loading and unloading precautions;
 - 8.3.1.10 Securing arrangements;
 - 8.3.1.11 Control of openings;

- 8.3.1.12 Loll;
- 8.3.1.13 Hull strength;
- 8.3.1.14 Stability or loading computer [if fitted];
- 8.3.1.15 Non sailing conditions [if applicable]; and
- 8.3.2 Particulars of the ship;
- 8.3.3 Details of the lightship & its derivation;
- 8.3.4 Details of hydrostatics & cross curves of stability;
- 8.3.5 Total capacity, centroid and maximum free surface moment of tanks stores & cargo spaces plus other payload data;
- 8.3.6 Sounding or ullage tables for each tank including capacity, centroid and free surface moment;
- 8.3.7 Example calculations of stability;
- 8.3.8 Example ship conditions compliant with stability requirements;
- 8.3.9 Damage stability information demonstrating ship survivability following foreseeable, extreme & catastrophic damage; and
- 8.3.10 Methods to recover margins of buoyancy and stability.

Note: The methods documented should assist the operator by providing recommended trigger points for the commencement of evacuation.

- 8.4 If a stability or loading computer is fitted to the ship then it is to reflect the contents of paragraph 8.3. If it is the main source of verifying compliance with stability and buoyancy requirements for conditions outside the scope of the paper format examples provided, then a duplicate backup facility shall be provided on board.

Note : Onboard stability or loading computers can be beneficial to determine the survivability of the ship in the event of foreseeable & extreme damage

Note: Refer to the Guidelines for the Approval of Stability Instruments, developed by the IMO. (MSC/Circ.1229).

Collision Avoidance

- 8.5 The Commanding Officer shall be provided with information pertaining to the manoeuvring characteristics of the ship to assist in the avoidance of collisions and groundings. The content of this information shall contain as a minimum:
 - 8.5.1 The turning characteristics including initial turning;
 - 8.5.2 The stopping & accelerating characteristics;
 - 8.5.3 The effects of squat & manoeuvring in shallow water;
 - 8.5.4 The effects of wind on manoeuvring; and,
 - 8.5.5 The minimum manoeuvring speed.

Note: Examples of Collision Avoidance Operational Information are i) ANEP-79 Controllability and safety in a seaway, and ii) IMO resolution A.601(15) Provision and display of manoeuvring information on board ships

Dynamic Motions

- 8.6 The Commanding Officer shall be provided with information pertaining to ship operations (e.g. in heavy weather) or manoeuvres in order to minimise risk/reduce hazards to crew and equipment. The content of this information shall contain as a minimum information on;
- 8.6.1 The risk of broaching;
 - 8.6.2 The shipping of green seas;
 - 8.6.3 Slamming;
 - 8.6.4 Heel in turn characteristics;
 - 8.6.5 The impact of motions on the safety of the crew and essential safety functions; and
 - 8.6.6 Practices or methods specific to the ship to reduce the impact of motions on the safety of the crew and equipment.

Solutions for this Regulation are contained in Part 2.

Justification & Guidance for this Regulation are contained in Part 3.

PART 1 CHAPTER IV ENGINEERING SYSTEMS

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Regulation 0 Goal

- 0.1 The engineering systems shall be designed, constructed, operated and maintained to:
- 0.1.1 Enable their operation in all Foreseeable Operating Conditions;
 - 0.1.2 Minimise danger to embarked persons in all Foreseeable Operating Conditions;
 - 0.1.3 Operate in a predictable manner with a level of integrity commensurate with operational requirements;
 - 0.1.4 Ensure the watertight and weathertight integrity of the hull, and meet the requirements of Chapter III (Buoyancy, Stability and Controllability);
 - 0.1.5 Enable the restarting of shut-down systems and equipment necessary to provide essential safety functions (“dead ship” starting) without external aid in all Foreseeable Operating Conditions;
 - 0.1.6 Minimise the risk of fire, explosion or contamination of the atmosphere;
 - 0.1.7 Provide support to the embarked persons and provide essential safety functions in the event of all foreseeable damage at least until the persons have reached a place of safety or the threat has receded;

- 0.1.8 Enable the maintenance and repair in the ship's maintenance plan.
- 0.2 Additional systems or equipment not directly covered by this Chapter, shall not impact on the ship's Engineering or Safety Systems.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 1 General

Functional Objective

- 1.1 The purpose of this Regulation is to outline the principles and framework of Chapter IV Engineering Systems and its application.

Scope

- 1.2 The scope of this chapter is to describe the Goal, Functional Objectives and Performance Requirements for engineering systems on ships. It includes general elements including but not limited to the Concept of Operations Statement, provision of information, essential safety functions, control, safety, systems integration, human element, hazardous areas and health etc as well as individual systems such as propulsion, piping, electrical generation & distribution etc.
- 1.3 Where the requirements of other chapters such as Fire Safety, Escape, Evacuation & Rescue etc. impact on the considerations of the items described in this chapter, then the over-riding requirements shall be derived in order to meet the relevant Functional Objectives and Goals for both Chapters. Specifically on the interface with Chapter X Dangerous Goods, Chapter IV contains the overarching requirements for Engineering Systems which apply to the carriage and use of Dangerous Goods (Class 1-9) and Chapter X supplements Chapter IV by providing additional requirements applicable to Class 1 Dangerous Goods (Explosives).

Application

- 1.4 In addition to the requirements contained elsewhere in the present regulations, ships shall be designed, constructed and maintained in accordance with the structural, mechanical and electrical requirements of a classification society whose rules and procedures are recognised and validated by the Naval Administration, or with applicable standards of the Naval Administration which provide an equivalent level of safety.
- 1.5 Chapter IV Engineering Systems is written in a goal based format which specifies high level objectives and relies upon verification against an agreed standard for compliance.
- 1.6 For certain ship types, novel craft or for operational reasons the compliance in full with the regulations of this chapter may not be required subject to justification and acceptance by the Naval Administration.

General Performance Requirements

- 1.7 Engineering systems shall be designed and constructed to operate in all Foreseeable Operating Conditions.
- 1.8 For all engineering systems installed, the choice of materials and components construction as well as the design, location and ship installation shall be made according to the environmental, maintenance and operating conditions in order to ensure the continued function of the equipment during all Foreseeable Operating Conditions and reduce the risk of:
- 1.8.1 Injury to embarked persons;

- 1.8.2 Damage to the equipment, the system it is contained within or adjacent equipment and systems;
- 1.8.3 Damage to the ship;
- 1.8.4 Damage to third parties.
- 1.9 Where applicable, engineering systems including system components may be required to operate in one of three modes as agreed by the Naval Administration:
 - 1.9.1 Normal operation;
 - 1.9.2 Reversionary operation;
 - 1.9.3 Emergency operation.
- 1.10 Safe access shall be provided to all machinery and systems including access provision in the event of equipment failure or for maintenance.
- 1.11 Engineering systems shall be designed in such a way that the essential safety functions can be continuously available following one single operational error and/or system/equipment fault.
- 1.12 The reliability and availability of engineering systems associated with essential safety functions shall be sustained or restored by means of:
 - 1.12.1 Reliability, to reduce the likelihood of single points of failure occurring, taking account of e.g. erosion, fatigue, corrosion and mechanical damage due to vibration; and/or
 - 1.12.2 Redundancy to minimise single points of failure.
- 1.13 Where the required availability of essential safety functions is achieved through the use of reconfigurable systems, the safe means of achieving the reconfiguration shall be ensured. Inadvertant reconfiguration shall be controlled.
- 1.14 Means shall be provided to ensure isolation of equipment and systems (and where necessary dissipation of stored energy) to allow maintenance to take place safely.
- 1.15 Emergency sources of electrical power, fire pumps, bilge pumps except those specifically serving the spaces forward of the collision bulkhead, any fixed fire-extinguishing system required by Chapter VI and other emergency installations which are essential for the safety of the ship, except anchor windlasses, shall not be installed forward of the collision bulkhead.
- 1.16 Flammable liquids with a low flash point as defined in Part 1 Definitions and Abbreviations, shall not be used in the engineering systems covered by this Chapter.
- 1.17 Where the ship has an operational shock requirement according to Concept of Operations Statement all equipment shall either:
 - 1.17.1 Be designed to remain captive at the maximum shock design level for the ship; or
 - 1.17.2 Be provided with secure stowage so that it cannot injure persons, damage essential equipment or obstruct access/escape routes within compartments.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 2 Concept of Operations Statement

Functional Objective

- 2.1 The Concept of Operations Statement is the Owner's vision of how the engineering systems of the ship are to be operated and maintained throughout the life of the ship and shall be shared by the Naval Administration and, where appointed, its Recognised Organisation.

Performance Requirements

- 2.2 The scope of the information to be provided is defined in Annex A of Part 3, Chapter I of the Code. For the purposes of this Chapter, particular importance is to be attached to:
- 2.2.1 Mobility - within the operational requirement, a ship's ability to manoeuvre, as and when required by the Command but still remaining within the designed or imposed limitations;
- 2.2.2 Operating and maintenance procedures - documentation relating to equipment and systems, operating and maintenance procedures and requirements, including reversionary modes and breakdown drills;
- 2.2.3 Personnel - including all individuals whose intervention is relied upon to maintain safety.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 3 Provision of Operational Information

Functional Objective

- 3.1 Operators shall be provided with adequate information and instructions for the safe operation and maintenance of all machinery and systems.

Performance Requirements

- 3.2 Information and instructions shall be supplied to the operator to ensure the safe operation, fault finding and maintenance of machinery, under all Foreseeable Operating Conditions. For essential safety functions, clear system diagrams and instructions shall be provided detailing the changeover procedures and the actions to be completed in the event of machinery breakdown.
- 3.3 Instructions shall define the safe operating limits and make it clear that operation outside these limits is unsafe and can damage equipment and systems.
- 3.4 Instructions shall be presented in a language and format that can be understood by the operator in the context in which it is required.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 4 Propulsion

Functional Objective

- 4.1 The propulsion machinery shall enable the ship to manoeuvre as and when required by the Command but still remain within the designed or imposed limitations.

Performance Requirements

- 4.2 To enable the ship to manoeuvre, this regulation shall be applied in conjunction with Regulation 5 Manoeuvring.
- 4.3 Redundancy of propulsion equipment shall be provided. The Naval Administration shall give consideration of the reliability of single essential propulsion components on application.
- 4.4 The requirements for manoeuvrability as required by Chapter III Regulation 5 Controllability and Chapter IX Regulation 11 Collision Avoidance apply in addition to these requirements.
- 4.5 Effective means of communicating orders from the normal and emergency conning positions to any position from which the speed and direction of thrust of the propellers can be controlled shall be provided.
- 4.6 Means shall be provided whereby normal operation of propulsion machinery can be sustained or restored even though one of the essential auxiliaries becomes inoperative.
- 4.7 Means shall be provided to ensure that the propulsion machinery can be brought into operation from the dead ship condition without external aid.
- 4.8 Fuel supply arrangements from internal storage tanks shall be such that adequate reserve of fuel is available without continuous transfer of fuel and that means are provided to ensure that this reserve is of a suitable quality for use.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 5 Manoeuvring

Functional Objective

- 5.1 The manoeuvring equipment shall enable the ship to manoeuvre as and when required by the Command whilst remaining within the design or imposed limitations.

Performance Requirements

- 5.2 Machinery and systems required for manoeuvring shall meet the relevant requirements of Chapter III Regulation 5 Controllability and Chapter IX Regulation 11 Collision Avoidance.

Note: Consideration should be given to the effects of the failure of stabilisers (if fitted) and use of steering gear for roll compensation.

- 5.3 The manoeuvring equipment system shall exhibit sufficient redundancy to cope with single failures without the loss of manoeuvring capability.
- 5.4 It shall be possible to operate the manoeuvring equipment from a number of locations to be agreed with the Naval Administration.

- 5.5 The operational status of the manoeuvring equipment shall be clearly visible at each control station.
- 5.6 The manoeuvring equipment control system shall exhibit sufficient redundancy to cope with single failures of components and electrical supply.
- 5.7 Effective means of communicating orders from the normal and emergency conning positions to any position from which the speed and direction of thrust of the propellers can be controlled shall be provided.
- 5.8 The motive power supply shall exhibit a level of redundancy, diversity and capacity to ensure that the manoeuvring equipment remains operational and shall exhibit a level of continuity to ensure continuous operation.

Note: This is to include provision of supplies and control in the event of damage to the platform.

- 5.9 The manoeuvring equipment shall fail safe and exhibit alternative modes of operation to fulfil the manoeuvring requirements during a failure.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 6 Pressure and Piping Systems

Functional Objective

- 6.1 Pressure vessels and associated piping systems and fittings shall be of a design and construction adequate to safely contain media, taking account of the anticipated pressure and temperature profiles and the service for which they are intended.

Performance Requirements

- 6.2 The system shall be designed and constructed to operate safely in static and transient conditions.
- 6.3 Surface temperatures of pipes shall not pose a danger to embarked persons or become a source of ignition in case of flammable fluid leaks.
- 6.4 Provision shall be made to reduce to a minimum the entry of contaminants into pressure systems and to provide drainage points for systems as required.
- 6.5 Where media quality is required to be maintained, system materials and system operation shall be compatible with the media. Means of testing and treatment shall be provided.
- 6.6 Valves associated with maintaining watertight integrity shall be operable from a position as defined in Chapter III Buoyancy, Stability and Controllability.
- 6.7 Suitable precautions against the build up of electrostatic charges shall be provided.
- 6.8 Pressure relief arrangements shall be fitted to prevent overpressure in excess of the design pressure in any part of a pressure system. The relief setting, quantity, location and flow capacity of the pressure relief devices installed shall be suitable to mitigate the consequences of excessive overpressure.
- 6.9 Pressure relief arrangements shall not pose a danger to embarked persons, the environment or any other ship system. Where the media contained poses a safety hazard to embarked persons or the environment, arrangements shall be put in place to minimise the risk following release.

- 6.10 Failure of a joining arrangement shall not pose a further risk (e.g. due to atomisation of hydrocarbons, leakage of water onto electrical equipment etc).
- 6.11 The design of piping systems, including supports, couplings and valves shall be made of fire resistant and corrosion resistant materials.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 7 Ship Stabilising Systems

Functional Objective

- 7.1 Where considered necessary, Ship Stabilising Systems shall be fitted to reduce ship motions to limits compatible with embarked persons endurance and the ships sea-keeping requirements.

Performance Requirements

- 7.2 The requirements for manoeuvrability as required by Chapter III Regulation 5 Controllability apply in addition to these requirements.
- 7.3 The requirements for watertight integrity and stability required by Chapter III Regulation 2 Watertight Integrity and Regulation 4 Reserve of Stability apply in addition to these requirements.
- 7.4 The requirements of Part 2, Chapter VII, Regulation 22, Paragraph 22.2.5 apply in addition to these requirements.
- 7.5 The ships stability requirements shall not be reliant on ship stabilising systems.
- 7.6 The ship stabilising system shall be fully automatic in operation.
- 7.7 Control systems shall be in accordance with Regulation 16 Machinery Control.
- 7.8 Alerts and indicators shall be in accordance with Regulation 17 Alerts and Safety Systems.
- 7.9 It shall be considered whether a single failure in the ship's stabilising equipment could lead to the possibility of mechanical locking.
- 7.10 It shall be possible to lock the stabiliser fins in a known position.
- 7.11 Failure of any part of the stabiliser unit or its control system shall not result in an unsafe condition which will have detrimental effect on the ship's operating or sea-keeping capability.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 8 Not Used

Regulation 9 Other Essential Safety Functions

Functional Objective

- 9.1 The ship's machinery outfit shall provide services for essential safety functions not described elsewhere in this Code.

Performance Requirements

- 9.2 Arrangements for the continuous supply of energy to essential machinery shall be provided.
- 9.3 A fire main system shall be available which is capable of providing essential safety functions required by Chapter VI Fire Safety Regulation 9.
- 9.4 Where a ship is expected to receive low flash point fuels, a suitable system is required for its storage, use or safe disposal.
- 9.5 Bilge pumping arrangements shall comply with the requirements of Chapter III Buoyancy, Stability and Controllability.
- 9.6 Where operation of essential safety functions is reliant on the continuous removal of heat, they shall be provided with appropriate redundancy or an alternative method of cooling.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 10 Electrical Generation and Power Supplies

Functional Objective

- 10.1 Sufficient electrical power shall be provided to supply the required services and habitability requirements during all operational conditions without recourse to the emergency electrical supply.
- 10.2 Sufficient electrical power shall be provided to supply services for essential safety systems for the duration of the emergency conditions.
- 10.3 Transitional power supplies shall be provided where no interruption of the electrical supply to essential safety systems is required.

Performance Requirements

- 10.4 Suitable arrangements shall be provided for the supply of electricity sufficient to supply the consumers agreed by the Naval Administration.
- 10.5 The Quality of Power Supply (QPS) shall be agreed by the Naval Administration and consider the following:
- 10.5.1 All operational conditions;
- 10.5.2 Irrespective of the direction of the propulsion shaft rotation;
- 10.5.3 Without any requirement to use emergency supplies.

- 10.6 The electrical power generation and power supplies shall be designed and arranged with a high level of integrity and availability.
- 10.7 Suitable redundancy arrangements shall be provided to supply essential safety functions in the event of loss or unavailability of any one generator.
- 10.8 Suitable protection measures shall be provided in accordance with Regulation 15 Electrical Protection Arrangements.
- 10.9 No electrical generation and supply equipment shall be put into use where the supplied equipment's strength and capability may be exceeded in such a way as may give rise to danger or may affect essential safety functions.
- 10.10 Where applicable, facilities to safely connect shore side electrical power shall be provided.
- 10.11 Facilities shall be provided to regain sufficient power to restore essential safety functions from a dead ship condition.
- 10.12 Suitable arrangements for the safe installation and use and maintenance of energy storage devices shall be provided.
- 10.13 In the event of failure of the Main Electrical Supply, a means to supply sufficient electricity to supply the Essential Electrical Services shall be provided within a specified time and a duration accepted by the Naval Administration.
- 10.14 Where a main generator is used in lieu of the emergency generator, subject to complying with necessary requirements, the requirements of the emergency source of power shall be applied to the main source of power.
- 10.15 For essential safety functions for which an interruption to supply is unacceptable, transitional electrical supplies with sufficient capacity and duration accepted by the Naval Administration shall be provided.
- 10.16 The power supply to Escape, Evacuation and Rescue systems shall be provided as per the requirements of Chapter VII Regulation 14 Power Supply to Escape, Evacuation and Rescue Systems.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 11 Not Used

Regulation 12 Not Used

Regulation 13 Electrical Distribution and Equipment

Functional Objective

13.1 Electrical power shall be distributed safely to consumers.

Performance Requirements

- 13.2 Electrical equipment shall meet the requirements of Part 1, Regulation 10, paragraph 10.5 in terms of suitability for the Quality of Power Supply (QPS).
- 13.3 Electrical equipment and distribution systems shall meet the requirements of Regulation 15 Electrical Protection Arrangements.
- 13.4 The electrical system voltages and frequencies shall ensure safe provision of electrical power to systems and to minimise the risk of exposure to embarked persons.
- 13.5 The design of the type and configuration of the distribution system, including earthing arrangements as necessary, shall minimise the risk to embarked persons and equipment under normal and foreseeable abnormal conditions and is to be agreed by the Naval Administration.
- 13.6 The number, size, installation and arrangement of electrical switchboards and distribution centres shall be suitable for the functional requirements of the vessel.
- 13.7 The distribution system shall be designed and arranged with a high level of integrity and availability.
- 13.8 Cables shall be installed such that risk of injury to embarked persons or damage to the system is minimised when equipment is operating in foreseeable or under fault conditions.
- 13.9 Main and emergency supplies, where required for a single consumer, shall be separated as widely as possible.
- 13.10 The continuity of supply to Essential safety functions shall be ensured.
- 13.11 Suitable arrangements for the isolation and switching of distribution circuits shall be provided.
- 13.12 Installation of cables shall not cause mutual interference between systems. Also electrical and electronic equipment shall not be impaired in its function by electromagnetic energy. Electromagnetic Compatibility (EMC) shall be achieved by application of a policy and/or standard agreed with the Naval Administration.
- 13.13 Suitable protection arrangements for the use of portable or temporary electrical equipment shall be provided.
- 13.14 Effective means of communications, complying with the requirements of Chapter VIII, Regulation 6, shall be provided between all switchboards.
- 13.15 Where a damage control emergency distribution system is installed, it shall not introduce additional risk of harm to embarked persons, equipment or the platform.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 14 Lighting

Functional Objective

- 14.1 Illumination shall be provided appropriate for location and operational requirements in both normal and emergency conditions.

Definitions

- 14.2 For the purpose of this regulation the following descriptions of lighting systems have been used to provide a common vocabulary (Reproduced from Part 1 Definitions and Abbreviations):
- 14.2.1 Primary lighting: Fixed lighting provided for safe access around the ship and those compartments accessed during normal operations. Carrying out operations at control stations.
- 14.2.2 Secondary lighting: Fixed replacement lighting in event of primary lighting failure. This may be at a lower illumination level.
- 14.2.3 Tertiary lighting: Fixed independent lighting system to provide a minimum level of illumination on failure of primary and secondary lighting.
- 14.2.4 Transitional lighting: Fixed lighting provided upon loss of primary lighting and prior to the operation of the secondary lighting, where a level of continuous illumination must be maintained for operational purposes.
- 14.2.5 Escape, evacuation and rescue lighting: A combination of secondary and tertiary lighting specifically arranged to enable escape, evacuation and rescue.
- 14.2.6 Operational lighting: Fixed lighting as required for special purposes with different levels of illumination from primary and secondary lighting.
- 14.2.7 Portable lighting: Non-fixed, portable lighting which may be used to support other lighting systems.

Performance Requirements

- 14.3 The light fittings selected for a particular space shall be appropriate for the hazardous zone classification of the space. Refer to Regulation 21 Hazardous Areas.
- 14.4 Illumination levels shall be appropriate for all foreseeable operating conditions.
- 14.5 Lighting systems shall permit the ship to be operated in accordance with the Concept of Operations Statement.
- 14.6 Primary lighting systems shall provide a suitable level of illumination:
- 14.6.1 To allow safe access to areas of the ship that require it for normal operations;
- 14.6.2 To allow operation and control of the ship.
- 14.7 The lighting system shall be arranged such that a single failure will not cause total loss of illumination in any compartment or control location.

- 14.8 In the event of loss of primary lighting, at locations where a level of illumination must be maintained for operational purposes, transitional lighting shall be provided until the secondary lighting is operational. The transitional lighting shall be available for a period acceptable to the Naval Administration.
- 14.9 Operational lighting shall be provided in areas where there is an operational requirement for different levels of illumination from that provided by the primary system.
- 14.10 To meet operational requirements, lighting levels shall be controllable locally.
- 14.11 Siting of light fittings shall consider the transfer of heat to adjacent surfaces.
- 14.12 Lighting required for escape, evacuation and rescue shall be as defined in Chapter VII Regulation 15 Lighting During Escape, Evacuation and Rescue Emergencies and Regulation 18 Way Finding System.
- 14.13 Navigation lights shall be as defined in Chapter IX Regulation 11.
- 14.14 Where provided, portable lighting shall be appropriate for the hazardous zone classification of the compartment in which it will be used. Refer to Regulation 21 Hazardous Areas.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 15 Electrical Protection Arrangements

Functional Objective

- 15.1 All electrical equipment shall be suitably protected against damage to itself under normal, reasonably foreseeable abnormal and fault conditions and to prevent injury to embarked persons or damage to other equipment.

Performance Requirements

- 15.2 Exposed conductive parts of electrical machines or equipment which are not intended to be live but which are liable under fault conditions to become live shall be earthed or arrangements provided to protect embarked persons.
- 15.3 A means to detect and alert of insulation breakdown with respect to earth within equipment and distribution systems shall be provided.
- 15.4 Suitable arrangements shall be provided to minimise the effects of arc flash on embarked persons.
- 15.5 Suitable protection arrangements from the ingress of solids, liquids and gases shall be provided for all electrical equipment and distribution systems.
- 15.6 Efficient means, suitably located, shall be provided for protecting from excess of current every part of a system as may be necessary to prevent danger.
- 15.7 Suitable arrangements for the protection of mechanically connected equipment due to the effects of electrical overloads shall be provided.
- 15.8 Suitable arrangements for the protection of electrical equipment due to the effects of mechanical overloads shall be provided.

- 15.9 Essential safety functions agreed by the Naval Administration shall be supplied using fire-resistant cable.
- 15.10 Electrical Equipment and distribution systems shall be suitably protected from mechanical damage.
- 15.11 Suitable Security arrangements to prevent unauthorised access to live electrical connections and electrical control shall be provided.
- 15.12 Suitable protection arrangements for lightning strikes shall be provided.
- 15.13 Alternative arrangements for cooling of essential machinery and systems in the event of a forced cooling system failure shall be provided.
- 15.14 Suitable arrangements shall be provided to minimise the effects of radiation hazards to embarked persons.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 16 Machinery Control

Functional Objective

- 16.1 Main and Auxiliary Machinery & Systems essential for the safety of the ship and embarked persons shall be provided with effective means for its operation and control during all operational conditions defined in the Concept of Operations Statement.

Performance Requirements

- 16.2 The design, construction and operation of the control systems shall consider human element requirements in accordance with Regulation 20 Human Element.
- 16.3 Provisions shall be made to ensure a continuous electrical supply to the essential machinery/systems control system. An audible and visual alert shall be initiated in the event of the failure of any of the power supplies.
- 16.4 The control system shall operate essential machinery & systems in a safe, controlled and stable manner throughout the machinery/s/systems defined operational limits and shall recover automatically in a safe manner after a loss of power supply.
- 16.5 It shall not be possible for any item of machinery to be controlled from more than one location at one time. Where alternative control locations are available, clear indication showing the location of the control shall be provided. Transfer between control stations without altering the control set points shall be provided. Transfer of control location will be indicated with visual and audible indication.
- 16.6 Appropriate indication and feedback shall be provided at each control station to confirm that the system has responded to operator demands. The status of automatic control systems shall be indicated.
- 16.7 It shall be possible to disable the automatic or remote control operation of essential machinery & systems to allow inspection and maintenance tasks to be safely performed on the machinery and systems.
- 16.8 Indications of impending slow-down / shut-down of essential machinery and systems shall be provided at applicable locations with provision to take alternative actions if approved

- 16.9 Automated control systems which utilise stored energy to start essential machinery shall be configured not to exhaust the stored energy completely and to provide an alert when the stored energy is below a critical limit.
- 16.10 The monitoring system for system parameters shall have integrity appropriate for its intended purpose. Where it is not considered practical to have the normal machinery control system with sufficiently high integrity to provide the required level of safety, sufficient direct reading gauges shall be provided to enable potentially hazardous fault conditions or abnormal conditions to be identified and to allow the machinery to be operated safely.
- 16.11 For unattended machinery spaces, a machinery control and alarm position shall be provided.
- 16.12 Failure of the external control systems for essential safety functions shall initiate an audible and visual alert at the relevant control stations. It shall be possible to override the control system to regain control of the machinery or system.
- 16.13 The control system shall fail safe. The fail safe conditions are to be derived and agreed with the Naval Administration.
- 16.14 Operators shall have an independent, high integrity method to disconnect all energy sources that shall put machinery for essential safety functions into a known safe state.

Solutions for this Regulation are contained in Part 2.

Justification & Guidance for this Regulation are contained in Part 3.

Regulation 17 Alerts and Safety Systems

Functional Objective

- 17.1 The alert system shall inform operators as soon as reasonably practicable of deviations from normal operation of essential machinery and systems during all ship operations.
- 17.2 A safety system shall be installed to ensure that any serious malfunctions of machinery or system which present an immediate danger shall initiate a corrective action where appropriate to remove the risk of danger.

Performance Requirements

- 17.3 An alert system shall be arranged with necessary panels at key locations as agreed with the Naval Administration.
- 17.4 The design, construction and operation of the alert and safety systems shall consider human element requirements.
- 17.5 The operational status of the computer based system should be easily recognisable. Alerts should be visually and audibly presented with priority over other information in every operating mode of the system and should be clearly distinguishable from other information. When using general purpose graphical user interfaces, only functions necessary for the respective process should be available.
- 17.6 The alert system and safety system shall be provided with a continuous supply of power.
- 17.7 Where parameters of the alert system can be adjusted, the integrity of the system shall be maintained.

- 17.8 The status of an alert shall be clearly visible and a means to accept it from all appropriate locations as agreed with the Naval Administration shall be provided. Visual indication of the alarm shall remain until the fault is cleared.
- 17.9 Machinery and Systems shut-down by the safety system shall be manually reset before allowing a restart.
- 17.10 Naval Administration may agree to an override feature , where the function of a safety system may lead to a greater hazard than the loss of the equipment.
- 17.11 The status of standby machinery & systems shall be indicated at appropriate control stations as agreed with the Naval Administration.
- 17.12 As far as reasonably practicable the alert and safety systems shall be designed to fail to a safe state.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 18 Software Integrity

Functional Objective

- 18.1 For any activity that relies on the integrated use of equipment or sub-systems that includes software, the risks associated with software and its integration into the equipment or sub-system shall be properly managed to ensure that the software is safe to use. A failure or unspecified behaviour of the software shall not result in:
- 18.1.1 an event that escalates to a hazard;
 - 18.1.2 impairment of the mitigation of a hazard;
 - 18.1.3 impairment of recovery from a hazard.

Performance Requirements

- 18.2 These requirements apply in addition to Regulation 16 Machinery Control and Regulation 17 Alerts and Safety Systems.
- 18.3 The requirements specified within Regulation 19 Systems Integration shall be met.
- 18.4 The way software could be a stimulus event to a hazard, impair the mitigation of a hazard, or impair recovery following such a hazardous event shall be communicated to the appropriate parties.
- 18.5 The production of software shall be managed so that the safety risks arising from the software production are reduced to an acceptable level.
- 18.6 Provision shall be made to protect systems against:
- 18.6.1 intentional or unintentional viruses or unauthorised code;
 - 18.6.2 unauthorised installation, change, or deletion of software or associated data;
 - 18.6.3 the installation or use of unauthorised software, (e.g. running games or office applications);

- 18.6.4 modification of the software function by additional or modified physical devices.
- 18.7 A system safety justification shall be developed to include the risks posed by the use of software and how those risks are reduced to an acceptable level.
- 18.8 The configuration status of the software on each ship shall be captured and recorded, and the record maintained up-to-date for the life of the ship.
- 18.9 The development and testing of changes to the software and data, including specific arrangements for on-board testing, shall be managed so that safety of the system, sub-system or equipment is not compromised.
- 18.10 The retention and release of earlier versions of software shall be managed to enable restoration of a previous known and trusted state when necessary.
- 18.11 The release and installation of software to each ship shall be appropriately and actively managed so that changes to software are controlled. The installation process shall include a strategy for managing a failed installation.
- 18.12 The computer based system shall comply with the EMC requirements specified in Regulation 13 Electrical Distribution and Equipment.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 19 Systems Integration

Functional Objective

- 19.1 Essential safety functions shall be designed such that risks of harm to embarked persons, damage to the platform or the environment are reduced to a level acceptable to the Naval Administration, both in normal operation and under fault conditions. Functions shall be designed to fail safe.

Performance Requirements

- 19.2 The integrity of essential machinery or systems, during normal operation and fault conditions shall be demonstrated.
- 19.3 Any imposed equipment limitations shall be reflected in system design.
- 19.4 Systems shall be designed such that they will not unduly affect any other system (even under failure conditions).
- 19.5 Failure of one part of the integrated system shall not affect the functionality of other parts except for those functions directly dependant on the defective part.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 20 Human Element

Functional Objective

- 20.1 The layout of different equipment and local control facilities shall be such that human operation is logical and can be performed without unintended mistakes.
- 20.2 Physical arrangements for machinery and equipment shall not pose a risk to embarked persons.

Performance Requirements

- 20.3 The ergonomics of the equipment and local control facilities shall be in accordance with Naval Administration requirements.
- 20.4 The layout of control positions shall enhance usability and reduce human error in Operators' tasks.
- 20.5 The working environment shall be designed to be safe, have the minimum of distractions, be sufficiently comfortable, help to maintain vigilance, and maximise communication amongst Operators at main control stations.
- 20.6 User interfaces shall be designed to enhance the usability of systems and equipment, reduce human error, enhance situational awareness, and support safe and effective monitoring and control under normal and foreseeably abnormal modes of operation.
- 20.7 The design of lighting shall facilitate visual task performance, Operator safety and visual comfort.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 21 Hazardous Areas

Functional Objective

- 21.1 Machinery and systems located in hazardous areas shall not create an additional risk.
- 21.2 The risks to embarked persons associated with hazardous areas shall be minimised.

Performance Requirements

- 21.3 The categorisation of hazardous areas with potentially flammable atmospheres shall be in accordance with a national or international standard agreed by the Naval Administration.
- 21.4 Electrical machinery and systems shall not normally be located in spaces with potentially flammable atmospheres unless required for operational purposes and agreed by the Naval Administration.
- 21.5 Where machinery or electrical equipment is required to be fitted in a space with a potentially flammable atmosphere, it shall be of a type suitable for the environment for which it will be operated.
- 21.6 Where machinery is operated in a potentially flammable atmosphere, a means shall be provided to detect any abnormal parameters which may lead to ignition of the atmosphere.

- 21.7 Any failure that can change the categorisation of a hazardous area shall be indicated by an alert.
- 21.8 The integrity of the boundary of the hazardous area shall not compromise the safety of the adjacent space.
- 21.9 Suitable indication of the nature of the potential hazards shall be provided at the entrance(s) to the space, and on the equipment where applicable.
- 21.10 Arrangements to prevent unauthorised or inadvertent access to hazardous or potentially hazardous areas or equipment shall be provided in accordance with Naval Administration requirements.
- 21.11 Measures shall be taken to reduce machinery noise in machinery spaces and transmitted noise to adjacent spaces to acceptable levels, as determined by the Naval Administration.
- 21.12 Embarked persons, equipment and platform shall be protected from the risk of static electricity.
- 21.13 Any hazardous area which has a risk of embarked persons becoming inadvertently locked in shall have a means to escape.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 22 Materials

Functional Objective

- 22.1 Materials, especially hazardous materials, shall be managed effectively to identify, reduce or mitigate adverse affects.

Performance Requirements

- 22.2 The ship shall have a system to identify and demonstrate control of hazardous materials and to restrict or mitigate known hazards.
- 22.3 A method of recording the use of hazardous materials shall be provided.
- 22.4 Materials which are banned or restricted by national or international legislation due to their known hazards to human health or the environment shall not be used. Where the use of such materials is required for operational reasons, the Naval Administration may permit their use based on a suitable justification being provided and mitigations to manage the hazards being put in place.

Note: Examples include asbestos, PCBs, CFCs, TBTs.

- 22.5 Materials shall be selected to minimise the smoke and toxic products released when exposed to the effects of elevated temperatures and/or fire, in accordance with the requirements of Chapters VI Regulation 5.
- 22.6 The risks posed by hazardous materials shall be communicated to the crew and training provided as necessary in their handling and management.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 23 Heating Ventilation and Air Conditioning (HVAC)

Functional Objective

- 23.1 Ambient conditions shall be controlled to suit machinery requirements.
- 23.2 Ambient conditions shall be controlled for crew habitability.
- 23.3 Ventilation shall be provided for hazardous areas.

Performance Requirements

- 23.4 Suitable ambient conditions in spaces containing machinery or equipment shall be maintained.
- 23.5 Suitable ambient conditions for all accessible spaces shall be maintained.
- 23.6 The ventilation requirements of Chapter VI Fire Safety and Chapter IX Navigation (Regulation 2) shall be met.
- 23.7 Watertight Integrity (see Chapter III) and Fire Zone (see Chapter VI) boundaries are not to be compromised by HVAC systems.
- 23.8 Provisions to "Crash Stop" ventilation in case of fire shall be provided.
- 23.9 Hazardous areas shall be provided with appropriate ventilation systems.
- 23.10 For remote controlled ventilation machinery & systems, appropriate indication, monitoring, alerts and protection shall be provided.
- 23.11 Continuity of operation of essential safety functions in the event of a ventilation failure shall be provided. See also Regulation 9 Other Essential Safety Functions.
- 23.12 The routing of ventilation systems for spaces with hazardous atmospheres shall not pose a risk to other spaces.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 24 Tanks

Functional Objective

- 24.1 Bulk fluids, required for machinery systems and crew habitability, shall be safely stored.

Performance Requirements

- 24.2 Suitable arrangements to safely determine the level of fluid in a tank shall be provided.
- 24.3 Tanks shall be provided with suitable arrangements to prevent overpressure and underpressure during all operational evolutions.

- 24.4 Vent pipes for oil fuel service, settling and lube oil tanks shall be located or protected to minimise the risk of damage and subsequent ingress of seawater or rainwater.
- 24.5 The overflows from a vent shall be directed to a receptacle of suitable capacity so as not to cause a hazard to adjacent equipment.
- 24.6 Suitable arrangements to prevent the ignition of vapours in a tank shall be provided.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 25 Not Used

Regulation 26 Novel Arrangements

Functional Objective

- 26.1 The use of Novel Arrangements shall be allowed whilst maintaining the overall safety of the ship and protection of embarked persons.

Performance Requirements

- 26.2 All novel arrangements shall be considered by the Naval Administration and accepted on the basis of a submission.
- 26.3 The submission shall include but not be limited to the following aspects:
- 26.3.1 Operational requirements: A description of the agreed functionality of the arrangement including normal, failure and emergency modes.
 - 26.3.2 Project management: A description of the process that the designer will adopt to address the design, construction, installation, commissioning and acceptance process.
 - 26.3.3 Quality assurance: The internal quality management system shall be in accordance a recognised national or international standard.
 - 26.3.4 Engineering safety assessment: Documentation of the hazard identification and mitigation processes required to demonstrate equivalency to conventional arrangements with respect to safety function and protection of embarked persons.
 - 26.3.5 Configuration management: Documentation of the process that enables the traceability of changes throughout the life of the system or equipment to be demonstrated.
 - 26.3.6 Integration: Demonstration that the requirements of Regulation 19 Systems Integration are complied with.
 - 26.3.7 Maintenance: Identification of any specific through life requirements to maintain the overall safety of the arrangement.
- 26.4 The requirements of other applicable regulations shall be complied with.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

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PART 1 CHAPTER V SEAMANSHIP SYSTEMS

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Regulation 0 Goal

- 0.1 The Seamanship Systems shall be designed, constructed, operated and maintained to:
- 0.1.1 Enable their operation for the seamanship functions such as mooring, anchoring, towing, replenishment or transferring persons, provisions or cargo, and aviation in all Foreseeable Operating Conditions;
 - 0.1.2 Minimise danger to Embarked Persons in all Foreseeable Operating Conditions;
 - 0.1.3 Enable recovery of persons from the sea;
 - 0.1.4 Operate in a predictable manner with a level of integrity commensurate with operational requirements;
 - 0.1.5 Ensure the watertight integrity of the hull, and meet the requirements of Chapter III.
 - 0.1.6 Enable the independent operating of Seamanship Systems with an Essential Safety Function in all Foreseeable Operating Conditions.

Justification and Guidance for this Regulation are contained in Part 3.

Regulation 1 General

Functional Objective

- 1.1 The purpose of this Regulation is to outline the principles and framework of Chapter V Seamanship Systems and its application.

Scope

- 1.2 The Naval Ship Code excludes training requirements. Chapter V Seamanship Systems assumes all embarked persons have an appropriate level of competence for the operation of the installed systems. Part 3 contains some guidance on typical training requirements.

General Performance Requirements

- 1.3 Seamanship systems shall be designed, constructed and maintained to operate in all environmental conditions as defined in the Concept of Operations Statement.
- 1.4 Seamanship Systems shall be designed in such a way that the Essential Safety Functions can be continuously available following one single operational error and/or system/equipment fault.
- 1.5 The availability of Seamanship Systems associated with Essential Safety Functions shall be sustained or restored by means of:
 - 1.5.1 Reliability, especially of any single points of failure,
 - 1.5.2 Redundancy to minimise single points of failure.
- 1.6 Means shall be provided to ensure isolation of equipment and systems to allow maintenance to take place safely.
- 1.7 The ship shall be capable of meeting any safety requirement imposed by a supporting Organisation appointed by the Duty Holder, Naval Administration or other Authority.
- 1.8 Appliances and equipment for use in the escape and evacuation of a casualty vessel are covered in Chapter VII. Where discrepancies exist between this Chapter and Chapter VII the requirements of Chapter VII take precedent.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 2 Concept of Operations Statement

Functional Objective

- 2.1 The Concept of Operations Statement is the Owner's vision of how Seamanship Systems are to be operated and maintained throughout the life of the ship. The Naval Administration may share this information where appointed its Recognised Organisation.

Performance Requirements

- 2.2 The Concept of Operations Statement shall address, but not be limited to, the following considerations:
 - 2.2.1 The anticipated operating environment of the ship;
 - 2.2.2 The impact of operations in extreme temperature climates;
 - 2.2.3 The impact of rare events such as heavy aeolian deposits;
 - 2.2.4 The effect of heavy weather;
 - 2.2.5 Notice at which the system may be required for operation;
 - 2.2.6 The level of Qualification and Experience required by Embarked Persons for safe operation;
 - 2.2.7 The provision of adequate numbers of Suitable Qualified and Experienced operators;
 - 2.2.8 The method of provision of a robust maintenance and inspection schedule to support the equipment throughout its lifespan;
 - 2.2.9 The method of provision of a robust reporting regime to track equipment performance and reliability;

- 2.2.10 Any requirement the ship may have to transfer personnel or stores whilst underway.
- 2.3 When the ship is not able to manoeuvre, Seamanship Systems shall provide for the availability of mooring, anchoring, towing and personnel transfer.
- 2.4 Special emphasis is to be placed on systems for the effective and expeditious recovery of personnel from the water whilst the ship has lost mobility.
- 2.5 Operating Documentation, Procedures and Signage should all emphasise the importance of remaining within the design limits of the equipment or system in use.
- 2.6 The scope of the information to be provided is defined in Chapter I and Chapter I Annex A. For the purposes of this Chapter, particular importance is to be attached to:
- 2.6.1 Operating and maintenance procedures and documentation relating to seamanship equipment and systems (including their reversionary modes and breakdown drills) shall capture the requirements for safe operation throughout the envelope of the Concept of Operations Statement.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 3 Provision of Operational Information

Functional Objective

- 3.1 Operators shall be provided with adequate information and instructions for the safe operation and maintenance of all Seamanship Systems.

Performance Requirements

- 3.2 Information and instructions shall be supplied to the Operator to provide for the safe operation, fault finding and maintenance of Seamanship Systems, under all Foreseeable Operating Conditions.
- 3.3 Information and instructions shall define safe operating limits.
- 3.4 Information shall be presented in a language and format that can be understood by the Operator in the context in which it is required.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 4 Access to the Upper Deck and Working on the Upper Deck

Functional Objective

- 4.1 The accessibility to and working environment of the upper deck shall enable the Embarked Persons to safely fulfil their tasks as and when required by the Command.

Performance Requirements

- 4.2 To enable access to the upper deck, stairs, ladders, doors and hatches shall be provided to facilitate the activities required to fulfil the Concept of Operations Statement.
- 4.3 Redundancy of access points shall be provided. The Naval Administration may give consideration to the reliability of alternative routes to access the upper deck.

- 4.4 The access equipment and systems shall be designed, constructed and maintained to minimise risk to embarked persons in all Foreseeable Operating Conditions:
- 4.4.1 Hatches and doors shall be capable of being operated from both sides;
- 4.4.2 Means shall be provided to ensure that access hatches and doors can be opened and closed manually.
- 4.5 Where required access to Seamanship Systems and equipment with an Essential Safety Function shall be continuously available.
- 4.6 Provision of lighting shall be provided at access points and working areas of the upper deck.
- 4.7 The requirements for watertight integrity and safety of Embarked Persons as defined by Chapter III in addition to those of Chapter VII apply in addition to the requirements of this Chapter.
- 4.8 Effective means for communicating orders from the normal and emergency conning positions to any position from which access to the upper deck can be controlled shall be provided.
- 4.9 At least one hatch or door shall be arranged to be opened without any damaging ingress of water when the ship is in any condition of trim.
- 4.10 There shall be sufficient space on the upper deck for the requisite Embarked Persons to undertake functions associated with the role defined in the Concept of Operations Statement.
- 4.11 There shall be a means of preventing personnel on the upper deck from being lost overboard without impeding their ability to carry out functions in paragraph 4.10.
- 4.12 Ships shall be capable, where required, of safely accommodating leisure activities of Embarked Persons on the upper deck.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 5 Embarkation and Disembarkation

Functional Objective

- 5.1 The ship shall be capable of safely embarking and disembarking Embarked Persons or stores in all operating conditions covered by the Concept of Operations Statement.

Performance Requirements

- 5.2 Means shall be provided for the safe embarkation and disembarkation of Embarked Persons and/or stores for port related operations. The Naval Administration may impose additional requirements for civilians.
- 5.3 Means shall be provided for the safe embarkation and disembarkation of Embarked Persons and/or stores from ships while secured to a mooring buoy or at anchor.
- 5.4 Means shall be provided for the safe embarkation and disembarkation of Embarked Persons from ships while underway.
- 5.5 Where the Concept of Operations Statement requires the capability to conduct a mass recovery of persons in response to a SOLAS incident the ship shall be provided with equipment for the recovery of mass casualties.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 6 Pilot Transfer Arrangements

Functional Objective

6.1 The ship shall provide a safe means of embarkation and disembarkation acceptable to civilian pilots.

Performance Requirements

- 6.2 Effective means of communication shall be provided between normal and emergency steering positions, the pilot transfer boat and the pilot embarkation point.
- 6.3 The pilot transfer station shall be located such that it provides unobstructed access for embarkation and disembarkation from the ship.
- 6.4 Arrangements permitting pilot access to, or egress from the ship shall be either available on both sides of the ship, or be capable of being transferred for use on either side.
- 6.5 Adequate lighting shall be provided to illuminate the transfer arrangements over the side of the ship and the position on deck used for embarkation and disembarkation.
- 6.6 All equipment used in the transfer operation shall be maintained and tested in accordance with manufacturers' specifications or to a recognised standard.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 7 Man Overboard Recovery

Functional Objective

7.1 Rescue arrangements shall enable persons to be rescued from the sea, or recovered from rescue units or survival craft.

Performance Requirements

- 7.2 Rescue arrangements shall:
- 7.2.1 Permit effective and rapid rescue of persons from the water, rescue units or survival craft.
- 7.2.2 Minimise the risk levels imposed on the rescue crew;
- 7.3 Effective means of communication shall be provided between the primary conning position, rescue station and rescue unit.
- 7.4 When employing a boat the requirements of paragraph 5.5 shall be met.
- 7.5 When employing a boat the requirements of Regulation 12 shall be met.
- 7.6 When employing a helicopter the requirements of Regulation 13 shall be met.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 8 Mooring

Functional Objective

- 8.1 Ships shall be capable of being secured and maintained in position alongside or to a buoy without the use of their own propulsion machinery.

Performance Requirements

- 8.2 The ship shall be equipped with the necessary number and length of appropriate mooring lines to provide for mooring in all Foreseeable Operating Conditions in the Concept of Operations Statement.
- 8.3 The securing points on the ship shall be available independent of the ship's own power.
- 8.4 Where means to tension the mooring lines with use of winches are provided, the controls shall be in a position such that the operation of the winch may be directly observed by the operator.
- 8.5 Means shall be provided to securely stow mooring lines when not in use.
- 8.6 Consideration shall be given to Regulation 10 Towing if the mooring equipment may be used for towing.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 9 Anchoring

Functional Objective

- 9.1 Ships shall be capable of being secured in position without the use of propulsion machinery at sea in limited water depths.

Performance Requirements

- 9.2 The Concept of Operations Statement shall define the depths of water within which the ship is to be capable of anchoring.
- 9.3 In water depths defined by the Concept of Operations Statement, means to maintain the ship's position in the event of a loss of steering or propulsion shall be provided.
- 9.4 Means to allow the controlled deployment of the anchor, independent of the ship's power, shall be provided. This is to include an indication of the length of anchor chain deployed.
- 9.5 Means to lock the anchor in the desired position independent of the ship's power shall be provided.
- 9.6 Means shall be provided to abandon the anchor independent of the ship's power.
- 9.7 Consideration shall be given to Regulation 8 Mooring and Regulation 10 Towing if the anchoring equipment may be used for mooring or towing.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 10 Towing

Functional Objective

10.1 Facilities shall be provided to allow ship to tow or be towed as defined in the Concept of Operations Statement.

Performance Requirements

10.2 The operational scope of use of towing equipment shall be defined in the Concept of Operations Statement.

10.3 The Safe Working Load (SWL) of equipment is to meet or exceed the maximum design load which may be imposed in all foreseeable operations.

10.4 The Naval Administration may require a facility for the remote control for the ship to be able to disengage the tow.

10.5 Appliances used for towing shall comply with the requirements of Regulation 15 Lifting and Hoisting Appliances.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 11 Replenishment at Sea (RAS)

Functional Objective

11.1 Ships shall be capable, where required, of transferring solid stores, munitions, liquids or personnel between ships whilst underway.

Performance Requirements

11.2 The Naval Administration may where interoperability is required, identify a recognised Naval, national or international standard to be applied.

11.3 Effective means of communications, complying with the requirements of Chapter VIII shall be provided between:

11.3.1 Ship to ship conning stations

11.3.2 Ship to ship RAS stations;

11.3.3 RAS station and conning position;

11.3.4 RAS station to equipment operating positions;

11.4 Ships shall have sufficient space for the anticipated loads to be handled and transferred.

11.5 Ships shall have sufficient working space for Embarked Persons involved in Replenishment at Sea operations to fulfil their duties.

11.6 Ship engaged in the transfer of liquids controlled by International Convention shall have means to contain accidental spillage during transfer and prevent any loss into the sea.

11.7 The requirements of Chapter II are applicable for local structural loads.

11.8 The requirements of Chapter III are applicable for seakeeping, stability and manoeuvrability.

11.9 The requirements of Chapter IV are applicable for propulsion and machinery redundancy.

11.10 The requirements of Chapter X are applicable for the transfer of Dangerous Goods.

11.11 The requirements of Regulation 15 Lifting and Hoisting Appliances are applicable for the lifting appliances associated with RAS operations.

11.12 Means to rapidly stop RAS operations and disconnect shall be provided.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 12 Boat Operations

Functional Objective

12.1 Ships shall be capable of launching and recovering boats whilst alongside or underway (including while making way), within the envelope defined in the Concept of Operations Statement.

Performance Requirements

12.2 The person controlling the launch and recovery of the boat shall be able to visually observe both the boat and any associated appliance operator at all times.

12.3 Means of communications, complying with the requirements of Chapter VIII shall be provided between:

12.3.1 The launch/recovery control position and the conning position;

12.3.2 The launch/recovery control position and the boat;

12.3.3 The boat and the conning position.

12.4 Means of transferring personnel and equipment into and out of boats shall be provided.

12.5 The requirements of Regulation 15 Lifting and Hoisting Appliances are applicable for the lifting appliances associated with boat operations.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 13 Helicopter Transfers

Functional Objective

13.1 Ships shall be capable, where required by the Concept of Operations Statement, of transferring by helicopter, stores, munitions or personnel.

Performance Requirements

13.2 Arrangements for Replenishment by helicopter shall be suitable for transfer/evacuation operations where defined by the Concept of Operations Statement, using internal and/or under slung loads. Where applicable the following conditions shall be met:

13.2.1 The replenishing area shall be safe and accessible;

13.2.2 The replenishing area shall be clear of obstructions which may impede the transfer operation;

- 13.2.3 A suitable means for the earthing of persons and cargo shall be available.
- 13.2.4 The replenishing area shall be clearly marked and visible from the air.
- 13.2.5 The replenishing area shall be equipped for prevention of man overboard.
- 13.3 Effective means of communications, complying with the requirements of Chapter VIII, shall be provided between the conning position, the replenishment area and the helicopter.
- 13.4 The requirements of Chapter II are applicable for local structural loads.
- 13.5 The requirements of Chapter III are applicable for sea keeping, stability and manoeuvrability.
- 13.6 The requirements of Chapter VII are applicable for CASEVAC operations.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 14 Diving Operations

Functional Objective

- 14.1 Ships shall be capable of supporting diving operations on the hull and underwater fixtures and fittings consistent with the areas of operation and environmental conditions defined in the Concept of Operations Statement.

Performance Requirements

- 14.2 Where required by the Concept of Operations Statement the ship shall provide means of ingress, egress and recovery of divers to and from the water.
- 14.3 Where required by the Concept of Operations Statement ships shall carry the means to replenish breathing apparatus. In such instances the following shall be applied:
- 14.3.1 The ship shall be provided with means to ensure the adequate quality of air provided for diving purposes.
- 14.4 The ship shall be provided with means to inhibit the movement and/or transmission of underwater fittings, sensors and machinery which may present a hazard to diving operations.
- 14.5 They Naval Administration may require that the hull be provided with a system to assist diver orientation.
- 14.6 Dedicated First Aid capability shall be provided for diving operations.
- 14.7 The Naval Administration may require the certification of the diving system, shall conform to a recognised Naval, national or international standard.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 15 Lifting and Hoisting Appliances

Functional Objective

- 15.1 The ship shall be provided with means to raise, lower and traverse loads as required by the Concept of Operations Statement.

Performance Requirements

15.2 Lifting appliances and equipment must satisfy an applicable Naval, National or International Standard and be subject to a regime of periodic inspection and certification. The Naval Administration may require additional standards and define the inspection regime.

15.3 Lifting appliances shall be equipped with requisite safety devices.

Note: For this chapter lifting and hoisting are synonymous

15.4 The operational use of each item of lifting equipment shall be defined.

15.5 The lifting appliance shall remain under control during all modes of operation.

15.6 Operation of lifting appliances shall minimise the risk to Embarked Persons, the lifting equipment and the platform during lifting operations.

15.7 Necessary instructions for assembly, use and maintenance shall be present. Identification of the Safe Working Load (SWL) and the maximum test load shall be displayed on or adjacent to the equipment.

Note: The Naval Administration shall specify which organisation/personnel are authorised to carry out testing, along with the periodicity and method of testing and shall mandate that records of all testing are maintained and readily available.

15.8 As far as reasonably practicable, the location of the lifting appliance shall be such that the load can be viewed directly by the operator. In the event that the load cannot be viewed directly by the operator, an effective means of communication, complying with the requirements of Chapter VIII, shall be provided between the load area and the operating position.

15.9 The lifting appliance shall not be able to be controlled from more than one operating position at the same time.

15.10 The Naval Administration may require additional requirements for lifting appliances used for personnel or munitions.

15.11 Lifting equipment required for life saving functions shall be in accordance with the requirements of Regulation 12 Boat Operations and Chapter VII.

15.12 Upon motive power failure the load shall remain in position.

15.13 After motive power failure, means shall be provided to safely move the load to a pre-determined location.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

PART 1 CHAPTER VI FIRE SAFETY

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Regulation 0 Goal

- 0.1 For effective fire safety, the ship and its arrangements shall be designed, constructed, maintained and operated in such a way that as far as is practicable, fire can be prevented, detected, contained and extinguished whilst maintaining essential safety functions during and after the outbreak of a fire.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 1 General

Functional Objective

- 1.1 The purpose of this Regulation is to outline the principles and framework of Chapter VI Fire Safety and its application.

Scope

- 1.2 There is an interface with Chapter Dangerous Goods. Chapter VI contains the overarching requirements for Fire Safety which apply to the carriage and use of Dangerous Goods (Class 1-9). Chapter X supplements Chapter VI by providing additional requirements applicable to Class 1 Dangerous Goods (Explosives).
- 1.3 The Naval Ship Code excludes training requirements. Chapter VI Fire Safety assumes all embarked persons have an appropriate level of competence for the operation of the installed systems. Part 3 contains some guidance on typical training requirements.

Application

- 1.4 Alternatives to the requirements will be accepted provided that they have been demonstrated to be equivalent to meet the fire safety goal and functional objectives of this Chapter to the satisfaction of the Naval Administration.

- 1.5 The Naval Administration may define equivalent alternative standards, codes, rules or regulations in place of those referenced in this Chapter in accordance with the provisions of Chapter 0 Regulation 7.
- 1.6 The function of the ship as defined in the Concept of Operations Statement will determine the applicability of the Tier 4 Solutions.
- 1.7 For complex naval ships, the Naval Administration will advise on the applicability of the Tier 4 solution and may require an enhancement of some of the Solutions in this chapter.

Note: Revised assumptions can be defined in the Concept of Operations Statement and at a more detailed level in the Default Concept of Operations Statement, see Part 3.

General Performance Requirements

- 1.8 The fire safety policies are to be defined which reflect the Concept of Operations Statement for the ship and address the Functional Objectives of this Chapter.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 2 Structural Integrity

Functional Objective

- 2.1 Structural integrity of the ship shall be maintained preventing partial or whole collapse of the ship structures due to strength deterioration by heat consistent with the Concept of Operations for the ship.

Performance Requirements

- 2.2 The hull, superstructure, structurally effective bulkheads, decks, deckhouses and pillars shall be constructed of approved non combustible materials or fire restricting materials having adequate structural properties or having suitable protection from fire.
- 2.3 The primary structure of the ship when subjected to fire for a defined period of time and after a fire shall not:
 - 2.3.1 Deform such that it prevents access for escape, maintenance of essential services and fire fighting activities;
 - 2.3.2 Threaten the structural integrity of the vessel through loss of structural member e.g. bulkhead strut or pillar, in or adjacent to a compartment which has a fire;
 - 2.3.3 Threaten or degrade structure supporting "A" and "B" class fire divisions, and fire resistant divisions for ships not constructed of steel;
 - 2.3.4 Threaten or degrade structure supporting components of columns, stanchions and other structural members required to support lifeboat and life raft stowage, and launching and embarkation areas such that they are unable to operate;
 - 2.3.5 Threaten or degrade structure supporting naval systems or specific compartments as defined by the Naval Administration.
- 2.4 Fittings that preserve external water tight integrity shall remain efficient during and after a fire.

- 2.5 Minor structure that is essential for escape, maintenance of essential services or fire fighting activities shall remain effective during or after a fire.

Note: Examples of minor structure are raised floor plating in Category A machinery spaces, staircases, and access ladders.

- 2.6 The Naval Administration may require a significant structural loading from an extreme load event or damage event to be considered co-incident with a fire.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 3 Risk of Ignition

Functional Objective

- 3.1 The ignition of combustible materials or flammable liquids, gasses and vapours shall be prevented.

Performance Requirements

- 3.2 The following performance requirements shall be satisfied:

- 3.2.1 Means shall be provided to control leaks of flammable liquids and gasses;
- 3.2.2 Means shall be provided to limit the accumulation of flammable gasses and vapours;
- 3.2.3 The ignitability of combustible materials shall be restricted;
- 3.2.4 Ignition sources shall be restricted;
- 3.2.5 Ignition sources shall be separated from combustible materials, flammable liquids and gases;
- 3.2.6 Flammable liquids and gasses shall be stored in dedicated spaces.

Note: Additional requirements for machinery and electrical installations that present a risk of ignition are identified in Chapter IV, Regulation 19 – Hazardous Areas.

- 3.3 Flammable gas concentrations shall be limited to a level below their explosion limit, e.g. hydrogen from batteries.
- 3.4 Except as otherwise agreed, flammable liquids used shall not be of low flash point.
- 3.5 A margin between the maximum ambient temperature of a space, consistent with the Concept of Operations Statement and the minimum flash point of oil fuel contained in piping in a space, is to be maintained.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 4 Fire Growth Potential

Functional Objective

4.1 The fire growth potential shall be limited in every space of the ship.

Performance Requirements

4.2 The following performance requirements shall be met:

- 4.2.1 Means of control for the air supply to a space or group of spaces shall be readily accessible from outside the spaces concerned;
- 4.2.2 Means of control for flammable liquids in a space or group of spaces shall be provided readily accessible from outside the spaces concerned;
- 4.2.3 The use of combustible materials shall be restricted. Exposed surfaces in normally occupied locations and access routes shall have low flame spread characteristics.
- 4.2.4 Storage of flammable liquids within high risk spaces shall be restricted to the minimum.
- 4.2.5 Storage of flammable gasses shall be appropriately located and restricted to the minimum.
- 4.2.6 Pressure systems for flammable liquids and gasses shall be designed to minimise any potential effect from fire.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 5 Smoke Generation and Toxicity

Functional Objective

5.1 The hazard to life shall be reduced in spaces where persons work, live and may have regular access, from smoke and toxic products generated during a fire from spaces that contain the fire or adjacent to the fire.

Performance Requirements

- 5.2 Smoke and toxic products released from materials exposed to the effects of elevated temperatures and/or fire are to be limited and demonstrated to be in accordance with Naval Administration requirements.
 - 5.2.1 Paints, Varnishes and other surface finishes, excluding surfaces of voids, tanks and exterior surfaces exposed to weather.
 - 5.2.2 Primary deck coverings and floor finishes.
 - 5.2.3 Combustible Insulation Materials.
 - 5.2.4 Electric and fibre optic cabling.

5.2.5 Other materials identified by the Naval Administration which may include:

5.2.5.1 Non combustible Insulation Materials.

5.2.5.2 Soft Furnishings, textiles and mattresses.

5.2.5.3 Non metallic piping.

5.2.5.4 Non-metallic armour.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 6 Control of Smoke Spread

Functional Objective

6.1 The spread of smoke in and the removal of smoke out of the ship shall be controlled in order to minimize the hazards from smoke.

Performance Requirements

6.2 A means for controlling the spread of smoke is to be provided within;

6.2.1 Main fire zones, ventilation zones and smoke containment zones;

6.2.2 Machinery spaces;

6.2.3 Special category spaces of high fire risk;

6.2.4 Concealed spaces behind ceilings, panelling or linings;

6.2.5 Muster stations and Evacuations stations.

6.3 Smoke clearance is to be provided for machinery spaces and other spaces nominated by the Naval Administration following a fire.

6.4 Control stations shall have arrangements that, in the event of fire, ensure that ventilation, visibility, freedom from smoke and the functions of the control station can be maintained, unless these functions can be accomplished at an alternative location, suitable for occupation for the duration of the incident.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 7 Detection and Alarm

Functional Objective

7.1 A fire in the space of origin shall be detected and an alarm shall be provided for safe escape and fire-fighting activity.

Performance Requirements

- 7.2 An effective means of detecting and locating fires and alerting the Bridge, continuously manned control station and fire teams is to be provided.
- 7.3 Fixed fire detection and fire alarm system installations shall be suitable for the nature of the space, fire growth potential and potential generation of smoke and gases.
- 7.4 Manually operated call points shall be placed effectively to ensure a readily accessible means of notification.
- 7.5 The fire alarm is to activate the general alarm if not responded to within a defined timescale.
- 7.6 Fixed fire detection and fire alarm system installations are to be demonstrated in accordance with a recognised standard and shall be tested periodically in accordance with a recognised procedure.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 8 Containment of Fire

Functional Objective

- 8.1 A fire shall be contained in the space of origin.

Performance Requirements

- 8.2 The ship shall be subdivided by thermal and structural boundaries or equivalent.
 - 8.2.1 Fire containment at boundaries shall have due regard to the fire risk of the space, function of the space, and function of adjacent spaces.
 - 8.2.2 The fire integrity of the boundary shall be maintained at openings and penetrations.
 - 8.2.3 Active or passive containment arrangements shall be provided.
- 8.3 Fire boundaries, openings and penetrations shall be demonstrated in accordance with a recognised standard.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 9 Fire Fighting

Functional Objective

- 9.1 Suppression, containment and quick extinction of fires shall be effective within the space of origin.

Performance Requirements

- 9.2 For all foreseeable fire hazards there shall be defined effective and proportionate means of extinguishing each such fire.
- 9.3 Fixed fire-extinguishing systems shall be installed, having due regard to the risk of ignition, fire growth potential, casualty potential, and operational importance of the protected spaces.
- 9.4 Fire fighting systems and appliances are to be readily available throughout the ship.
- 9.5 Fire extinguishing systems are to be suitable for application at the initiation of a fire and for all stages through to the maximum potential escalation.
- 9.6 Automatic activation of fire fighting systems should have due regard for the function of the space and or equipment protected.
- 9.7 Controls for fire fighting systems shall be operable from a safe location.
- 9.8 Fire fighting media should have due regard for the fire risk and the function of the space and or equipment protected.
- 9.9 Selection of fire fighting media should have due regard to potential environmental impact, toxicity of the agent and its fire breakdown products and potential short and long term effects on space recovery.
- 9.10 Means of purging spaces with a gaseous fire fighting system shall be provided, operable outside the space.
- 9.11 Reversionary means of fire fighting are to be provided to mitigate the failure of fixed systems.
- 9.12 Fire extinguishing systems and appliances are to be demonstrated in accordance with a recognised standard and shall be tested periodically.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 10 Maintain Capability

Functional Objective

- 10.1 In case of Fire, the capability of essential safety functions and other defined services shall be maintained and/or recovered to a defined level.

Performance Requirements

- 10.2 The ship shall be able to safely return to port under its own propulsion after a casualty that does not exceed the casualty threshold.
- 10.3 The ship shall be provided with safe areas that maintain basic services to ensure that the health and effectiveness of embarked persons is maintained after a casualty that does not exceed the casualty threshold.

- 10.4 Systems required to remain operational to support the orderly evacuation and abandonment of the ship shall remain operational if the casualty threshold is exceeded.
- 10.5 In addition to the central control station, a damage control station shall be provided on larger ships as a reversionary space to assist with the management of emergency situations.
- 10.6 The Naval Administration may define other ship functions that need to be maintained after a casualty that does not exceed the casualty threshold.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 11 Not Used

Regulation 12 Provision of Operational Information

Functional Objective

- 12.1 Information shall be provided to address operational effectiveness and readiness of crew for the installed fire safety arrangements.

Performance Requirements

- 12.2 To operate, maintain and monitor the effectiveness of the fire safety measures, the following information and instructions shall be provided:
- 12.2.1 Information for the operation including: operating locations, performance capability, limitations and restrictions of all fire protection systems, fire fighting systems and appliances;
- 12.2.2 Information for the maintenance of all fire protection systems, fire-fighting systems and appliances, incorporated into the ships maintenance plan;
- 12.2.3 Information for the safe testing of fire protection systems, fire-fighting systems and appliances, including recommended test schedules which are to be incorporated in the ship's maintenance plan;
- 12.2.4 Information and instructions for proper ship and handling operations of cargo or other dangerous goods carried in relation to fire safety.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 13 Special Requirements

Functional Objective

- 13.1 Any special features of the ship shall be consistent with the fire safety goal and other functional objectives of this Chapter.

Note: Examples include aviation facilities and carriage of vehicles, dangerous goods, bulk liquids and materials.

Performance Requirements

- 13.2 For ships carrying dangerous goods as defined in the Concept of Operations Statement the following performance requirements shall be met in addition to other requirements in this Code:
- 13.2.1 Fire protection systems shall be provided to protect the ship from the additional fire hazards associated with carriage of these dangerous goods;
 - 13.2.2 Dangerous goods posing a fire or explosion hazard shall be separated from ignition sources and other areas of high fire risk as far as reasonably practical;
 - 13.2.3 Appropriate Personal Protective Equipment (PPE) shall be provided for the hazards associated with the carriage of dangerous goods. Operation manuals and training shall be provided.
- 13.3 For ships fitted with vehicle, special category and ro-ro spaces as defined in the Concept of Operations Statement, the following performance requirements shall be met:
- 13.3.1 Fire protection systems shall be provided to adequately protect the ship from the fire hazards associated with vehicle, special category and ro-ro spaces;
 - 13.3.2 Ignition sources shall be separated from vehicle, special category and ro-ro spaces;
 - 13.3.3 Vehicle, special category and ro-ro spaces shall be adequately ventilated.
 - 13.3.4 Vehicle, special category and ro-ro spaces shall not be adjacent to cargo oil tanks.
- 13.4 For ships fitted with special facilities for aircraft as defined in the Concept of Operations Statement, the following performance requirements shall be met:
- 13.4.1 Flight deck and hangar structure shall be adequate to protect the ship from the fire hazards associated with aircraft operations;
 - 13.4.2 Fire-fighting appliances shall be provided to adequately protect the ship from the fire hazards associated with aircraft operations;
 - 13.4.3 Refuelling and hangar facilities and operations shall provide the necessary measures to protect the ship from the fire hazards associated with aircraft operations;
 - 13.4.4 Operation manuals and training shall be provided.
- 13.5 For ships fitted with well docks and boat handling areas as defined in the Concept of Operations Statement, the following performance requirements shall be met.
- 13.5.1 Fire protection systems shall be provided to adequately protect the ship from the fire hazards associated with boat operation and handling.
 - 13.5.2 Ignition sources shall be separated from well docks and boat handling areas.
 - 13.5.3 Well docks and boat handling areas shall be adequately ventilated.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 14 Carriage of Low Flash Point Fuels

Functional Objective

- 14.1 Safe storage of low flash point fuel shall be provided where this is required by the Concept of Operations Statement.

Performance Requirements

- 14.2 Small quantities of low flash point fuel shall be stored in independent containers or tanks and shall be readily jettisonable overboard.
- 14.3 Large quantities of low flashpoint fuel, and small quantities for which paragraph 14.2 can not be met, shall be stored in independent tanks. Tanks shall be located in spaces where there are no other sources of fire risk.
- 14.4 Spaces containing independent tanks are to be treated as High Fire Risk Spaces and:
- 14.4.1 Fitted with vapour detection;
 - 14.4.2 Adequately ventilated, with ventilation led to a safe location;
 - 14.4.3 Fitted with a fixed fire detection and extinguishing system;
 - 14.4.4 Electrical systems are to minimise the risk of ignition, including by electro magnetic radiation.
- 14.5 Tanks are to be adequately ventilated and the vent led to a safe location.
- 14.6 Other spaces connected directly to the tank, are to be treated as being common with equivalent safety arrangements.
- 14.7 Means are to be provided to prevent the uncontrolled release of tank contents into the space containing the tank or adjacent spaces.
- 14.8 Tanks are to be arranged to prevent the contents being raised to a temperature above the auto-ignition point.
- 14.9 Means are to be provided to control the overflow from tanks.
- 14.10 Means to allow for safe fuelling, refuelling and defuelling of equipment shall be provided consistent with the Concept of Operations Statement and in accordance with Naval Administration requirements.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

PART 1 CHAPTER VII ESCAPE, EVACUATION AND RESCUE

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Regulation 0 Goal

- 0.1 The arrangements for the Escape, Evacuation and Rescue of embarked persons shall be designed, constructed and maintained to:
- 0.1.1 Provide effective escape for all embarked persons from all manned spaces to a place of safety in the event of foreseeable accidents and emergencies at least until the threat has receded;
- 0.1.2 Provide an effective means of evacuation from the ship;
- 0.1.3 Provide an effective means of recovering persons from the sea.

Justification & Guidance for this Regulation are contained in Part 3.

Regulation 1 General

Functional Objective

- 1.1 The purpose of this Regulation is to outline the principles and framework of Chapter VII Escape, Evacuation and Rescue.

Abbreviations

DS	Directional Sound
FMEA	Failure Mode Effect Analysis
FSS Code	International Code for Fire Safety Systems
IMO	International Maritime Organization
ISO	International Organization for Standardization
LSA Code	International Life Saving Appliance Code
MES	Marine Evacuation System
MSC	Maritime Safety Committee

Purpose

- 1.2 Escape, Evacuation and Rescue measures are to be in place to ensure that the vessel is as safe as reasonably practicable for all embarked persons to conduct Escape, Evacuation and Rescue, by:
- 1.2.1 Allowing embarked persons to escape as effectively as practicable to the evacuation station, whether or not by assembling at a separate muster station first;
- 1.2.2 Allowing embarked persons to evacuate as effectively as practicable from the evacuation station of the damaged vessel into survival craft;
- 1.2.3 Supporting the life of evacuated persons, who may be in a survival craft, as long as reasonably practicable and commensurate with the anticipated time for rescue; and
- 1.2.4 Permitting the rescue of persons from the sea or from survival craft.

Application

- 1.3 The Naval Administration may define equivalent alternative standards, codes, rules or regulations in place of those referenced in this Chapter in accordance with the provisions of Chapter 0 Regulation 7.

Scope

- 1.4 The Naval Ship Code excludes training requirements. Chapter VII Escape, Evacuation and Rescue assumes all embarked persons have an appropriate level of competence for the operation of the installed systems. Part 3 contains some guidance on typical training requirements.

General Performance Requirements

- 1.5 Naval ships shall be adequately designed, constructed, equipped, maintained and provided with procedures for the Escape, Evacuation and Rescue of all embarked persons following all foreseeable emergency situations and damage conditions.

- 1.6 Escape, Evacuation and Rescue measures shall:
- 1.6.1 Be robust and have a minimum susceptibility to damage. Redundancy shall be provided to secure Escape, Evacuation and Rescue functionality from catastrophic failure unless the identified mode of failure is extremely improbable;
 - 1.6.2 Not be affected by the vessel's weapon and sensor systems;
 - 1.6.3 Present minimum risk of injury to the embarked persons during normal operations, maintenance and emergency situations;
 - 1.6.4 Not have a detrimental impact on other Escape, Evacuation and Rescue measures on board.
- 1.7 Unless directed otherwise by the Naval Administration, the provision of Escape, Evacuation and Rescue measures shall reflect:
- 1.7.1 The maritime environment: All exposed arrangements or equipment shall be designed and maintained to withstand the development of corrosion, shall be rot-proofed and shall be able to withstand sunlight (including ultra-violet), temperature, humidity, oil and fungal attack without degradation of performance;
 - 1.7.2 The intended area of operation: Escape, Evacuation and Rescue equipment and their stowages shall be designed, constructed and maintained for the maritime environment to be experienced in the declared areas of operation;
 - 1.7.3 The embarked persons: i.e. number and distribution of embarked persons, taking into account their physical characteristics, their knowledge of the vessel and its safety equipment;
 - 1.7.4 Foreseeable emergencies resulting in Escape, Evacuation and Rescue activities: as a minimum these would include list, trim, flooding, fire, smoke, hazardous vapours and obstruction of fixtures and fittings such as doors.

Note: For all references in this Chapter to SOLAS, the following applies: (1) where the IMO document uses the term "passenger", it should be read to mean "non-crew" as defined in Part 1 Definitions and Abbreviations of this document (2) where the IMO document refers to SOLAS II-1/42 or II-1/43, it should be read to mean Regulation 14 Power Supply to Escape, Evacuation and Rescue Systems.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 2 Escape, Evacuation and Rescue Measures

Functional Objective

- 2.1 Escape, Evacuation and Rescue measures shall be fit for purpose and are to enable the evacuation of the ship within an appropriate timeframe.

Performance Requirements

- 2.2 Escape, Evacuation and Rescue measures shall be proven to enable achievement of the necessary evacuation timings.
- 2.3 Escape, Evacuation and Rescue measures shall be tested in accordance with appropriate standards.
- 2.4 Novel Escape, Evacuation and Rescue measures shall be approved in accordance with an appropriate recognised process.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 3 **Escape and Evacuation Analysis and Demonstration**

Functional Objective

3.1 Escape and Evacuation Analysis and Escape and Evacuation Demonstration shall ensure that effectiveness of escape and evacuation measures are optimised.

Performance Requirements

3.2 An Escape and Evacuation Analysis shall:

3.2.1 Optimise the effectiveness of escape and evacuation measures, considering:

3.2.1.1 Normal seagoing conditions;

3.2.1.2 Damaged conditions defined in the Concept of Operations Statement.

3.2.2 Represent flows of persons during escape and evacuation as factually accurate as possible.

3.3 An Escape and Evacuation Demonstration shall:

3.3.1 Verify the accuracy of the Escape and Evacuation Analysis;

3.3.2 Enable the Naval Administration to identify unforeseen shortcomings of Escape and Evacuation measures;

3.3.3 Represent flows of persons during escape and evacuation as realistically as possible;

3.3.4 Not impose unacceptable risks to persons involved in the demonstration.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 4 **Inspection and Maintenance**

Functional Objective

4.1 Inspection and maintenance procedures shall ensure that any Escape, Evacuation and Rescue arrangement or equipment has an availability which is as high as reasonably practicable.

Performance Requirements

4.2 Escape, Evacuation and Rescue measures which are supplied in accordance with recognised standards shall be inspected and maintained as specified by those standards.

- 4.3 Maintenance and inspection activities shall be undertaken by suitably qualified personnel in accordance with approved procedures and the activities shall be recorded.
- 4.4 The periodicity of maintenance and inspection activities shall optimise the operational availability of Escape, Evacuation and Rescue measures.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 5 Availability of Escape, Evacuation and Rescue Measures

Functional Objective

- 5.1 Effective Escape, Evacuation and Rescue measures shall be available at all times whilst the ship is in-service.

Performance Requirements

- 5.2 Routine Escape, Evacuation and Rescue procedures shall:
- 5.2.1 Ensure that sufficient Escape, Evacuation and Rescue measures are available on board for the forthcoming operation, considering:
- 5.2.1.1 The embarked persons;
- 5.2.1.2 The areas of operation.
- 5.2.2 Ensure that any Escape, Evacuation and Rescue measures remain fully available during foreseeable operating conditions.
- 5.2.3 Ensure that crew are aware of their responsibilities and appropriately trained to discharge their duties;
- 5.2.4 Ensure that embarked persons have received basic Escape, Evacuation and Rescue training;
- 5.2.5 Ensure that prior to proceeding to sea all embarked persons are accounted for.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 6 Emergency Procedures

Functional Objective

- 6.1 Emergency procedures shall enable assigned crew members perform their assigned Escape, Evacuation and Rescue tasks effectively.

Performance Requirements

- 6.2 Escape, Evacuation and Rescue emergency procedures shall:
- 6.2.1 Cover all duties in the Escape, Evacuation and Rescue process;
 - 6.2.2 Be clear and unambiguous;
 - 6.2.3 Incorporate redundancy;
 - 6.2.4 Be up-to-date;
 - 6.2.5 Provide an effective EER plan which is supported by evidence;
 - 6.2.6 Provide a decision support system for emergency management.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 7 Not Used

Regulation 8 Provision of Operational Information

Functional Objective

- 8.1 On board documentation shall provide information for the conduct of effective Escape, Evacuation and Rescue activities.

Performance Requirements

- 8.2 On board information shall:
- 8.2.1 Cover information necessary for embarked persons to conduct Escape, Evacuation and Rescue related activities.
 - 8.2.2 Be clear and understandable.
 - 8.2.3 Be readily found and shall be available at locations where they might be needed.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 9 Escape, Evacuation and Rescue Equipment Stowages

Functional Objective

- 9.1 Escape, Evacuation and Rescue equipment stowages shall protect any on board Escape, Evacuation and Rescue equipment and ensure any on board Escape, Evacuation and Rescue equipment is readily available.

Performance Requirements

- 9.2 If applicable, the Escape, Evacuation and Rescue equipment stowages shall protect the stowed equipment as far as possible from:
- 9.2.1 External environmental factors such as wash, green water, sea state, icing or wind;
 - 9.2.2 Vessel's weapon or sensor systems and aircraft down wash or jet blast;
 - 9.2.3 Heat, fire, smoke or hazardous gasses.
- 9.3 Equipment stowages shall:
- 9.3.1 Enable stored equipment to be accessible and readily deployed;
 - 9.3.2 Be robust and have minimum susceptibility to damage;
 - 9.3.3 Be readily found and unambiguously recognised;
 - 9.3.4 Allow inspection of the stored equipment;
 - 9.3.5 Not have a detrimental effect on the stored equipment;
 - 9.3.6 Not have a detrimental impact on the ready deployment of any other stored equipment in case of an emergency;
 - 9.3.7 Be free from undue hazards, such as protrusions or obstructions which could cause injury or ensnare clothing, life-jackets or personal thermal protection suits.
 - 9.3.8 Be able to withstand vessels seakeeping accelerations.
- 9.4 Stowages of inflatable survival craft, personal thermal protection suits, life-jackets, life buoys and other external stored equipment shall enable the equipment to float free.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 10 General Emergency Alarm System

Functional Objective

- 10.1 A General Emergency Alarm System shall enable the notification of all embarked persons in a timely manner that an emergency situation exists.

Performance Requirements

- 10.2 The general emergency alarm shall:
- 10.2.1 Be clearly noticeable by all embarked persons;
 - 10.2.2 Be easily distinguishable and recognisable;
 - 10.2.3 Be continuously available;
 - 10.2.4 Be protected from hazards such as fire, vibration, electrical interference, flooding;
 - 10.2.5 Be provided such that any incident which may cause alarm failure shall be guarded against by system or equipment redundancy;
 - 10.2.6 Be operable from strategic Escape, Evacuation and Rescue positions.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 11 Main Broadcast System

Functional Objective

- 11.1 A main broadcast system shall enable verbal communication to embarked persons of an emergency incident and the actions to be taken.

Performance Requirements

- 11.2 Refer to the requirements of Chapter VIII: Regulation 7 Main Broadcast System.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 12 On board Two-Way Communication

Functional Objective

- 12.1 On board communication systems shall enable effective two-way communication between crew members to support Escape, Evacuation and Rescue activities.

Performance Requirements

- 12.2 Refer to the requirements of Chapter VIII: Regulation 6 Internal Communications and Regulation 8 Portable Communications.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 13 External Communication Equipment

Functional Objective

- 13.1 External communication equipment shall enable communication to other ships or to shore during emergencies.

Performance Requirements

- 13.2 Refer to the requirements of Chapter VIII, in particular Regulation 2 GMDSS Equipment and Regulation 9 Survival Craft Radio Equipment.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 14 Power Supply to Escape, Evacuation and Rescue Systems

Functional Objective

- 14.1 The power supply to Escape, Evacuation and Rescue systems shall provide all sufficient power necessary to conduct any (combination of) Escape, Evacuation and Rescue activities during an emergency.

Performance Requirements

- 14.2 Power supply to Escape, Evacuation and Rescue systems shall:
- 14.2.1 Have sufficient capacity to simultaneously operate any combination of Escape, Evacuation and Rescue equipment with any other essential consumers;
 - 14.2.2 Operate for a period as necessary to complete all Escape, Evacuation and Rescue activities;
 - 14.2.3 Be provided such that any incident which may cause power supply failure shall be guarded against by system or equipment redundancy, so that Escape, Evacuation and Rescue systems identified at Part 2, Regulation 14, Paragraph 14.2 will be powered continuously;
 - 14.2.4 Have minimised susceptibility to damage.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 15 Lighting During Escape, Evacuation and Rescue Emergencies

Functional Objective

- 15.1 Lighting systems shall provide sufficient illumination to conduct any Escape, Evacuation and Rescue activity during an emergency.

Performance Requirements

- 15.2 Escape, Evacuation and Rescue lighting systems shall:
- 15.2.1 Provide sufficient illumination to any location essential for any Escape, Evacuation and Rescue activity;
 - 15.2.2 Operate for a period as necessary to complete all Escape, Evacuation and Rescue activities;
 - 15.2.3 Be provided such that any incident which may cause lighting failure shall be guarded against by system or equipment redundancy;
 - 15.2.4 Have minimised susceptibility to damage.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 16 Escape Routes and Escape Exits

Functional Objective

- 16.1 Escape routes and escape exits shall enable the movement of embarked persons from any compartment within the ship to the muster stations (if provided) and evacuation stations as quickly and as safely as reasonably practicable.

Performance Requirements

- 16.2 Escape routes and escape exits shall:
- 16.2.1 Be provided from any compartment within the vessel and shall lead to the muster stations (if provided) or evacuation stations.
 - 16.2.2 Be as direct as reasonably practicable;
 - 16.2.3 Be as flexible as reasonably practicable to provide for the possibility that certain escape routes may not be available as a result of fire, flooding or other damage;
 - 16.2.4 Remain functional as long as reasonably practicable during fire, flooding, list and trim;
 - 16.2.5 Be arranged such that they do not contribute to the spread of fire, flood, smoke or other toxic gases to any muster, evacuation or launching station;
 - 16.2.6 Allow for safe and easy movement of embarked persons, taking into account:
 - 16.2.6.1 The anticipated number, physical characteristics and distribution of embarked persons, including the possibility that some injured personnel may be transported by stretchers;
 - 16.2.6.2 The size, location, function and risks of individual compartments on board;
 - 16.2.6.3 The clothing and personal protective equipment that may be worn or carried (e.g. fire fighting outfits, Emergency Escape Breathing Devices, life-jackets or personal thermal protection suits).

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 17 Fixtures and Fittings on Escape Routes

Functional Objective

17.1 Fixtures and fittings on escape routes shall facilitate the movement of embarked persons from any space within the ship to the evacuation station as quickly and as safely as reasonably practicable.

Performance Requirements

17.2 Fixtures and fittings shall:

17.2.1 Allow for safe and easy movement of embarked persons, taking into account:

17.2.1.1 The anticipated number, physical characteristics and distribution of embarked persons;

17.2.1.2 The size, location and function of individual compartments on board;

17.2.1.3 The clothing and personal protective equipment that may be worn or carried (e.g. fire fighting outfits, Emergency Escape Breathing Devices, life-jackets or personal thermal protection suits).

17.2.2 Offer a level of protection against fire hazards;

17.2.3 Be arranged such that they do not contribute to the spread of fire, flood, smoke or other toxic gases to the muster, evacuation or launching stations;

17.2.4 Be operable in case of normal operations and in case of anticipated level of list or trim for damaged conditions;

17.2.5 Be operational in case of electrical power failure;

17.2.6 Be readily identified.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 18 Way Finding System

Functional Objective

18.1 A way-finding system shall allow embarked persons to safely and effectively locate muster stations (if provided) and evacuation stations.

Performance Requirements

18.2 Way finding systems shall:

- 18.2.1 Enable embarked persons to locate escape routes, escape exits, muster stations (if provided) and evacuation stations;
 - 18.2.2 Be unambiguous and readily found;
 - 18.2.3 Be operational in case of unavailability of electrical power;
 - 18.2.4 Be provided taking into account:
 - 18.2.4.1 The anticipated distribution of embarked persons;
 - 18.2.4.2 The anticipated familiarity of embarked persons with the vessel.
 - 18.2.5 Lead from normally occupied compartments to the muster stations (if provided) and evacuation stations.
- 18.3 The arrangements of way finding systems shall as far as reasonably practicable take into account hazards such as fire, smoke and flood water.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 19 Muster Station

Functional Objective

19.1 Muster stations shall allow assembly of embarked persons in a position of relative safety.

Performance Requirements

19.2 Muster stations shall:

- 19.2.1 Be of sufficient size for the number of persons assigned to it and the anticipated actions undertaken prior to moving to the evacuation station;
- 19.2.2 Be readily accessed from normally occupied compartments and provide ease of escape to evacuation stations as far as practicable;
- 19.2.3 Reflect the number and anticipated distribution of embarked persons;
- 19.2.4 Have redundancy if any primary muster station is unavailable owing to the emergency;
- 19.2.5 Provide protection against hazard for persons within (e.g. fire, green water).

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 20 Emergency Escape Breathing Devices

Functional Objective

20.1 Emergency escape breathing devices shall provide embarked persons breathing and visual protection against a hazardous atmosphere while escaping to an area of relative safety.

Performance Requirements

20.2 Emergency escape breathing devices shall:

20.2.1 Provide breathing and visual protection against smoke and hazardous gases for any crew member;

20.2.2 Provide protection for the time necessary to escape to a safe haven;

20.2.3 Be clearly identifiable;

20.2.4 Be readily available;

20.2.5 Be provided and located considering:

20.2.5.1 The number and distribution of embarked persons;

20.2.5.2 Hazardous compartments;

20.2.5.3 Escape routes.

20.2.6 Be easy to don, without assistance;

20.2.7 Be easily apparent to operate;

20.2.8 Shall not hinder the person's movement during escape.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 21 Incapacitated Persons

Functional Objective

21.1 Embarked persons shall be able to move an injured/incapacitated person to a place of safety.

Performance Requirements

21.2 CASEVAC equipment shall:

21.2.1 Enable crew members to transport any incapacitated persons horizontally or vertically throughout the ship;

21.2.2 Be compatible for helicopter pick-up;

21.2.3 Be provided and located considering:

21.2.3.1 The number, distribution and anthropometrical characteristics of embarked persons;

21.2.3.2 The dimensions and escape routes of the ship.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 22 Launching and Embarkation Arrangements

Functional Objective

22.1 Launching and embarkation arrangements shall:

22.1.1 Enable the transfer of survival craft or rescue boats from stowed positions to the sea surface;

22.1.2 Enable persons to embark survival or rescue craft.

Performance Requirements

22.2 Launching and embarkation arrangements shall:

22.2.1 Enable evacuation as safely and swiftly as reasonably practicable;

22.2.2 Be always capable of safe and efficient operation under normal operating conditions and under the anticipated list or trim for damaged conditions;

22.2.3 Be easily and unambiguously used;

22.2.4 Be designed and surveyed according to the intended duty and have a minimum susceptibility to damage;

22.2.5 Not impose insurmountable dangers to the embarked persons during normal operations, training, maintenance and emergency situations;

22.2.6 Reflect the physical characteristics of the embarked persons;

22.2.7 Be provided with consideration for the possibility that certain launching arrangements may not be available as a result of loss due to fire, explosion, flooding, or other hazards;

22.2.8 Be protected from damage by wash, heavy seas, icing and wind, the vessel's weapon and sensor systems, fire, explosion and hazardous gasses;

22.2.9 Be free from hazards, such as protrusions or obstructions which could cause injury or ensnare clothing, life-jackets or personal thermal protection suits;

22.3 Launching stations shall:

22.3.1 Not be located above the approved launching height of the survival craft, rescue craft or launching equipment;

22.3.2 Be positioned so that survival and rescue craft can be launched clear of all obstructions under normal and abnormal conditions.

22.4 Launching equipment shall:

22.4.1 Be able to function without power supply;

22.4.2 Where capable of launching lifeboats, also be capable of their recovery.

22.4.3 Enable the timely launching and recovery of the rescue and survival craft.

22.5 Embarkation stations shall:

22.5.1 Be of sufficient size to accommodate the maximum number of persons anticipated to embark from each station.

22.6 Embarkation equipment shall:

22.6.1 Provide a safe means of transfer of persons into a survival craft;

22.6.2 Be aimed at dry shod embarkation;

22.6.3 Be suitable for the hull shape at the embarkation station and the height of the embarkation station above the waterline.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 23 Not Used

Regulation 24 Survival Craft

Functional Objective

24.1 Survival craft shall provide a place of relative safety away from the damaged ship following evacuation.

Performance Requirements

24.2 Survival craft shall:

24.2.1 Be provided taking into account the number of embarked persons;

24.2.2 Be able to manoeuvre away from the damaged vessel;

24.2.3 Protect embarked persons from risks of the damaged vessel;

24.2.4 Protect embarked persons against the natural environment;

24.2.5 Provide provisions and habitability during the anticipated rescue time;

- 24.2.6 Be designed for minimum motion sickness;
- 24.2.7 Allow the survival craft to be readily located under different environmental conditions (e.g. weather, sea state and darkness);
- 24.2.8 Be easily boarded from the water.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 25 Life-Jackets

Functional Objective

- 25.1 Life-jackets shall provide effective flotation assistance for persons over board.

Performance Requirements

- 25.2 A life-jacket shall:
 - 25.2.1 Turn unconscious drowning persons face-up thereby lifting the mouth above the water and protect the face from waves and sea-spray;
 - 25.2.2 Be provided to accommodate the full range of physical characteristics of embarked persons;
 - 25.2.3 Be sufficiently provided relating to the number of embarked persons;
 - 25.2.4 Be compatible with the personal thermal protection suits or other PPE that embarked persons may be wearing during evacuation;
 - 25.2.5 Allow the person over board to be readily located under different environmental conditions (e.g. weather, sea state and at all times of day or night).

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 26 Personal Thermal Protection Suits

Functional Objective

- 26.1 PPE shall help prevent the effect of severe environmental conditions

Performance Requirements

- 26.2 Personal thermal protection suits shall:
 - 26.2.1 Be designed to provide protection from the effect of severe environmental conditions (e.g. cold shock and hypothermia);

- 26.2.2 Maintain life support for the envisaged rescue time;
- 26.2.3 Accommodate the full range of physical characteristics of embarked persons;
- 26.2.4 Be unpacked and donned easily, swiftly and without assistance;
- 26.2.5 Not hinder the person wearing it to conduct evacuation and rescue activities;
- 26.2.6 Remain functional during the evacuation and rescue process;
- 26.2.7 Not hinder the person wearing it to don a life-jacket, if not combined in the thermal protection suit;
- 26.2.8 Not hinder the person wearing it to swim a short distance through the water and board a survival craft.
- 26.2.9 Be sufficiently provided relating to the number of embarked persons and stowed in accessible locations so that they can be retrieved quickly in the event of an emergency.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 27 Rescue Arrangements

Functional Objective

27.1 Rescue arrangements shall enable persons to be rescued from the sea, rescue units or survival craft.

Performance Requirements

27.2 Rescue arrangements shall:

27.2.1 Permit effective and rapid rescue of persons over board;

27.2.2 Minimise the risk levels imposed on the rescue crew;

27.2.3 Permit the mass rescue of persons from another vessel.

Note: See Chapter V Regulation 5 for the requirements for mass rescue

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

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PART 1 CHAPTER VIII COMMUNICATIONS

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Regulation 0 Goal

- 0.1 The communications equipment shall be designed, installed and maintained so that the ship, while at sea, is capable of:
- 0.1.1 Transmitting ship-to-shore distress alerts by at least two separate and independent means, each using a different radiocommunication service;
 - 0.1.2 Transmitting ship-to-air distress alerts;
 - 0.1.3 Receiving shore-to-ship distress alerts;
 - 0.1.4 Transmitting and receiving ship-to-ship distress alerts;
 - 0.1.5 Transmitting and receiving search and rescue coordinating communications;
 - 0.1.6 Transmitting and receiving on-scene communications;
 - 0.1.7 Transmitting and receiving signals for locating ships, aircraft, units or persons in distress, including persons lost overboard;
 - 0.1.8 Transmitting and receiving maritime safety information;
 - 0.1.9 Transmitting and receiving general radiocommunications to and from shore-based radio systems or networks;
 - 0.1.10 Transmitting and receiving bridge-bridge communications from the position where the ship is normally navigated; and
 - 0.1.11 Transmitting and receiving internal communications.

- 0.2 The communications equipment shall:
- 0.2.1 Provide high reliability and minimise the risk of mal-operation in all Foreseeable Operating Conditions, accidents and emergencies; and
 - 0.2.2 Maintain essential safety functions after a minimum of one single operational error and/or system/equipment fault.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 1 General

Functional Objective

- 1.1 The purpose of this Regulation is to outline the principles and framework of Chapter VIII Communications Systems and their applications.

Purpose

- 1.2 The ability to be deployed to any area of interest to the Navy defined in the Concept of Operations Statement shall be maintained and the communications fit and on-board personnel shall provide:
- 1.2.1 The capability to receive and transmit all information as required by the Global Maritime Distress and safety System (GMDSS) in all seastates and weather conditions.
 - 1.2.2 On-board safety communications including internal communications, main broadcast, portable and survival craft equipment;
 - 1.2.3 Qualified personnel certified to operate and, if required, maintain the GMDSS equipment to ITU Radio Regulations.

Note: The requirements of Chapter VI, Regulation 10 which relate to communications equipment shall be met.

Scope

- 1.3 The Naval Ship Code excludes training requirements. Chapter VIII Communications assumes all embarked persons have an appropriate level of competence for the operation of the installed systems. Part 3 contains some guidance on typical training requirements.

General Performance Requirements

- 1.4 The Concept of Operations Statement document is the Owner's vision of how the communications systems of the ship are to be operated and maintained throughout the life of the ship and is to be shared by the Naval Administration and, where appointed, its Recognised Organisation.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 2 GMDSS Equipment

Functional Objective

- 2.1 The ship shall be fitted with GMDSS communications equipment to enable communication with shore based communication and rescue authorities, in addition to vessels in the immediate vicinity, in the event of a marine distress.

Performance Requirements

- 2.2 The ship shall be fitted with GMDSS equipment to:
- 2.2.1 Transmit ship-to-shore distress alerts by at least two separate and independent means, each using a different radiocommunication service; one of these means shall be portable and one of these means shall be automatically activated;
 - 2.2.2 Receive shore-to-ship distress alerts;
 - 2.2.3 Transmit and receive ship-to-ship distress alerts;
 - 2.2.4 Transmit and receive search and rescue coordinating communications;
 - 2.2.5 Transmit and receive on-scene communications;
 - 2.2.6 Transmit and receive signals for locating ships, aircraft or units in distress;
 - 2.2.7 Transmit and receive maritime safety information;
 - 2.2.8 Transmit and receive general radiocommunications to and from shore-based radio systems or networks;
 - 2.2.9 Transmit and receive bridge-bridge communications from the position where the ship is normally navigated.
- 2.3 The GMDSS equipment to be fitted shall be determined by the ship's sea area of operation with reference to the Concept of Operations Statement.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 3 Availability of GMDSS Equipment

Functional Objective

- 3.1 GMDSS equipment shall be continuously available at sea.

Performance Requirements

- 3.2 The continuous availability of the GMDSS communications functions defined at Part 1, Regulation 2, Paragraph 2.2 shall be ensured by using such methods as duplication of equipment, or provision of maintenance facilities.

- 3.3 The number and diversity of methods used to ensure continuous availability of the GMDSS communications functions shall be determined by the ship's sea area of operation with reference to the Concept of Operations Statement.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 4 GMDSS Sources of Energy

Functional Objective

- 4.1 GMDSS equipment shall be provided with main, emergency and reserve sources of energy.

Performance Requirements

- 4.2 There shall be available at all times, while the ship is at sea, a supply of electrical energy sufficient to operate the radio installations and to charge any batteries used as part of a reserve source or sources of energy for the radio installations.
- 4.3 A reserve source or sources of energy shall be provided on every ship, to supply GMDSS radio installations, for the purpose of conducting distress and safety radiocommunications, in the event of failure of the ship's main and emergency sources of electrical power. The reserve source or sources of energy shall be capable of simultaneously operating the main and duplicated GMDSS equipment for a period of at least:
- 4.3.1 1 hour on ships provided with an emergency source of electrical power, if such source of power complies fully with all relevant provisions of Chapter IV, Regulation 9, including the supply of such power to the radio installations; and
- 4.3.2 6 hours on ships not provided with an emergency source of electrical power complying fully with all relevant provisions of Chapter IV, Regulation 9, including the supply of such power to the radio installations.
- 4.4 The reserve source or sources of energy shall be independent of the propelling power of the ship and the ship's electrical system.
- 4.5 The reserve source or sources of energy may be used to supply the emergency radio lighting.
- 4.6 If an uninterrupted input of information from the ship's navigational or other equipment to a radio installation required by this chapter is needed to ensure its proper performance, it shall be powered from the main, emergency and reserve sources of energy.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 5 Position Updates to GMDSS Equipment

Functional Objective

5.1 Electronic position information shall be available to the GMDSS equipment.

Performance Requirements

5.2 All GMDSS equipment carried on board a ship which is capable of automatically including the ship's position in the distress alert shall be automatically provided with this information from an internal or external navigation receiver, if either is installed.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 6 Internal Communications

Functional Objective

6.1 Internal communications equipment shall be provided to:

6.1.1 Enable safe operation of the ship;

6.1.2 Alert embarked persons of emergency or hazardous situations; and

6.1.3 Facilitate appropriate emergency response and recovery.

Performance Requirements

6.2 The main internal communications system shall provide effective two-way verbal communication between crew members.

6.3 A back-up internal communications system shall also be provided in the event that the main system is unavailable. The back-up system shall:

6.3.1 Be effective and continuously available;

6.3.2 Be protected from hazards such as fire, vibration, electrical interference and flooding;

6.3.3 Be independent of the ship's power supply;

6.3.4 Be operable from positions defined by the Naval Administration.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 7 Main Broadcast System

Functional Objective

- 7.1 A main broadcast system shall enable verbal communication to embarked persons of an emergency incident and the actions to be taken.

Performance Requirements

- 7.2 The main broadcast system shall:
- 7.2.1 Allow one-way verbal communication to embarked persons;
 - 7.2.2 Be clearly noticeable by all embarked persons;
 - 7.2.3 Be easily distinguishable and recognisable;
 - 7.2.4 Be continuously available;
 - 7.2.5 Be protected from hazards such as fire, vibration, electrical interference and flooding;
 - 7.2.6 Be provided such that any incident which may cause alarm failure shall be guarded against by system or equipment redundancy;
 - 7.2.7 Be operable from strategic Escape, Evacuation and Rescue positions and locations used for command and control.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 8 Portable Communications

Functional Objective

- 8.1 Portable communications systems shall enable effective two-way communication between crew members in situations not covered by the main broadcast nor internal communications systems.

Performance Requirements

- 8.2 Portable communications systems shall:
- 8.2.1 Allow clear and distinguishable two-way communication;
 - 8.2.2 Be suitably rated for the environment under which it will operate;
 - 8.2.3 Have sufficient system redundancy, as agreed by the Naval Administration.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 9 Survival Craft Radio Equipment

Functional Objective

- 9.1 External communication equipment shall be available to be used in survival craft shall enable communication to other vessels, aircraft or to shore during emergencies.

Performance Requirements

- 9.2 External communication equipment to be used in survival craft shall:
- 9.2.1 Be easy to operate including by those wearing fire fighting or other individual protective equipment;
 - 9.2.2 Incorporate redundancy;
 - 9.2.3 Be located at strategic Escape, Evacuation and Rescue positions as agreed with the Naval Administration;
 - 9.2.4 Be installed in such a way as to avoid harmful electromagnetic interference arising from, or being given to other equipment on board; and
 - 9.2.5 Not cause injuries to persons using the equipment.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 10 Sea-Air Radiocommunications

Functional Objective

- 10.1 A sea-to-air two-way radiocommunications system shall enable communication with overflying aircraft during emergencies.

Performance Requirements

- 10.2 Every ship shall be provided with means for two-way on-scene radiocommunications for search and rescue purposes using civil aeronautical VHF frequencies.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 11 Not Used

Regulation 12 Not Used

Regulation 13 Not Used

Regulation 14 Installation, Maintenance, Testing and Repairs

Functional Objective

- 14.1 The location and ship installation of safety communications equipment shall enable its operation, maintenance, testing and repair.

Performance Requirements

- 14.2 Every GMDSS radio installation shall;
- 14.2.1 Be so located that no harmful interference of mechanical, electrical or other origin affects its proper use, and so as to ensure electromagnetic compatibility and avoidance of harmful interaction with other equipment and systems;
 - 14.2.2 Be so located as to ensure the greatest possible degree of safety and operational availability;
 - 14.2.3 Be protected against harmful effects of water, extremes of temperature and other adverse environmental conditions;
 - 14.2.4 Be provided with reliable, permanently arranged electrical lighting, independent of the main and emergency sources of electrical power, for the adequate illumination of the radiocontrols for operating the radio installation; and
 - 14.2.5 Be clearly marked with the call sign, the ship station identity and other codes as applicable for the use of the radio installation.
- 14.3 Where applicable, all other safety communications systems shall meet the requirements of paragraphs 14.2.1 - 14.2.3.
- 14.4 Control of the VHF radiotelephone channels, required for navigational safety, shall be immediately available in the wheelhouse convenient to the conning position and, where necessary, facilities should be available to permit radiocommunications from the Bridge wings. Portable VHF equipment may be used to meet the latter requirement.
- 14.5 Where applicable, GMDSS and other safety communications equipment shall be so constructed and installed that it is readily accessible for inspection and on-board maintenance purposes.
- 14.6 Where required by the Naval Administration, GMDSS equipment shall be provided with facilities to inhibit transmission for EMCON/RADHAZ purposes.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 15 Operational Audit and Compliance Validation

Functional Objective

15.1 GMDSS equipment shall be surveyed at regular intervals.

Performance Requirements

15.2 The GMDSS equipment shall be surveyed annually in accordance with the requirements of Chapter I, Part B.

Note: Annual survey of GMDSS equipment is required for full SOLAS compliance.

15.3 The Naval Administration may require alternative arrangements for the periodicity of surveys.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

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PART 1 CHAPTER IX NAVIGATION

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Regulation 0 Goal

- 0.1 The ship shall be designed, constructed, installed and maintained so that, while at sea, it can:
- 0.1.1 Be independently navigated;
 - 0.1.2 Provide alerts of all navigation hazards, fixed or mobile;
 - 0.1.3 Measure and interpret environmental data; and
 - 0.1.4 Assist other ships, aircraft, units or persons in distress.
- 0.2 The ship shall be able to manoeuvre to minimise risk of grounding, collision and negative environmental impact;
- 0.3 The navigation systems shall be designed, constructed, operated and maintained to:
- 0.3.1 Provide high reliability and minimise the risk of mal-operation in all Foreseeable Operating Conditions, accidents and emergencies;
 - 0.3.2 Maintain uninterrupted essential safety functions after a minimum of one single operational error and/or system/equipment fault; and
 - 0.3.3 Maintain uninterrupted essential safety functions regardless of any sensor or processing demands or deficiencies from the ship's combat systems.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 1 General

Functional Objective

- 1.1 The purpose of this Regulation is to outline the principles and framework of Chapter IX Navigation and its application.

Purpose

- 1.2 The ability to be deployed to any area of interest to the Navy defined in the Concept of Operations Statement shall be maintained and the navigation equipment and sensors fit and on-board personnel shall provide:
- 1.2.1 The capability to conduct safe navigation as required by SOLAS, the COLREGS and, where applicable, the HSC Code.

Note: The requirements of Chapter IV and Chapter VI, Regulation 10 which relate to navigation equipment and systems shall be met.

- 1.2.2 On-board safety communications including internal communications, main broadcast, Bridge Navigation Watch Alarm System (if fitted) and portable communications equipment;
- 1.2.3 Qualified personnel certified to operate and, if required, maintain the NAVTEX equipment to ITU Radio Regulations.

Scope

- 1.3 The Naval Ship Code excludes training requirements. Chapter IX Navigation assumes all embarked persons have an appropriate level of competence for the operation of the installed systems. Part 3 contains some guidance on typical training requirements.

General Performance Requirements

- 1.4 The ship's Concept of Operations Statement document defines how the navigation systems of the ship are to be operated and maintained throughout the life of the ship and is to be shared by the Naval Administration and, where appointed, it's Recognised Organisation.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 2 Bridge Working Environment

Functional Objective

- 2.1 The Bridge shall provide a working environment which facilitates the sustained maintenance of an effective lookout and conduct of safe navigation.

Performance Requirements

- 2.2 The wheelhouse shall be provided with a Heating, Ventilation and Air Conditioning (HVAC) system, or equivalent, that maintains the ventilation, temperature and humidity of the wheelhouse and associated compartments within a comfortable range.

Note: The HVAC system shall also comply with Chapter IV Regulation 23 of the Code.

- 2.3 The Bridge, associated compartments, and systems installed on the Bridge, shall be provided with lighting and illumination systems that enable Bridge personnel to perform all Bridge tasks, including maintenance and chartwork, by day and night, ensuring that lighting systems required outside of the Bridge shall be designed such that they do not impair safe navigation.
- 2.4 The effects of direct and indirect glare are to be reduced to a minimum.

- 2.5 Where multiple consoles or workstations are to be installed in the Bridge they shall be of a common design.
- 2.6 The arrangement of workstations remote from the Bridge, but having the same functionality as those used by Bridge operators, shall be the same to prevent mal-operation.
- 2.7 Noise levels within the wheelhouse during good weather are to be sufficiently low as to enable operators carrying out navigation duties to concentrate for long periods of time and comfortably hold conversations with Bridge personnel for the sustained conduct of safe navigation.
- 2.8 A system shall be installed is to monitor Bridge activity and detect operator disability which could lead to marine accidents.
- 2.9 The ship's Bridge shall be arranged such that access to the workstations, movement around the Bridge and escape from the Bridge is unobstructed and hazard free.

Note: Access shall also comply with Chapter VII Regulation 16.

- 2.10 Safety equipment stored on the Bridge shall be readily accessible.
- 2.11 Facilities to promote the efficiency and alertness of the Bridge operators are to be provided on the Bridge or on the same deck adjacent to the Bridge.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 3 Bridge Workstations

Functional Objective

- 3.1 The design and arrangement of the workstations shall ensure that the operators are enabled to perform expeditious, continuous and effective information processing and decision making for maintaining a proper lookout and the conduct of safe navigation.

Performance Requirements

- 3.2 The design and arrangement of the workstations within the Bridge shall promote effective and safe Bridge Resource Management by facilitating the tasks to be performed by the operators in making full appraisal of the situation and in navigating the ship safely under all operational conditions.
- 3.3 The Bridge shall allow the OOW to have proper field of vision to maintain visual awareness for safe navigation and where appropriate the monitoring of:
 - 3.3.1 Boat launch;
 - 3.3.2 Swimmer of the watch (SOW) position;
 - 3.3.3 Flight deck operations;
 - 3.3.4 RAS.

- 3.4 The workstations shall enable the operators to have convenient and continuous access to essential information which is presented in a clear, unambiguous manner, using standard symbols and coding systems for controls and displays to allow for expeditious, continuous and effective information processing and decision making for the conduct of safe navigation and additional Bridge functions.
- 3.5 The workstations shall indicate the operational status of automated functions and integrated components, systems and/or sub-systems.
- 3.6 The design and arrangement of the workstations within the bridge shall prevent, or minimise, excessive or unnecessary work and any conditions or distractions on the Bridge which may cause fatigue or interfere with the vigilance of the operators and minimise the risk of human error and detect such error, if it occurs, through monitoring and alarm systems, in time for the operators to take appropriate action.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 4 Alternate Conning Position

Functional Objective

- 4.1 Where considered necessary, the ship shall have an alternate conning position that enables operators not situated on the Bridge to perform expeditious, continuous and effective information processing and decision making for maintaining a proper lookout and the conduct of safe navigation.

Performance Requirements

- 4.2 The alternate conning position shall enable operators to safely navigate the ship independent of the personnel on the Bridge
- 4.3 The alternate conning position shall allow the OOW to have proper field of vision to maintain visual awareness.
- 4.4 Navigation systems fitted at the alternate conning position shall be common with those used on the Bridge so as to avoid confusion and mal-operation.
- 4.5 The design and arrangement of the alternate conning position and its workstations shall facilitate the tasks to be performed by the operators in making full appraisal of the situation and in navigating the ship safely under all conditions while providing the same functionality as that available on the Bridge.
- 4.6 The alternate conning position and systems installed at that position shall be provided with lighting and illumination systems that enable personnel to perform route planning, route monitoring, monitoring, conning and communication functions, by day and night.
- 4.7 The effects of direct and indirect glare are to be reduced to a minimum.
- 4.8 Noise levels at the alternate conning position are to be sufficiently low as to enable operators carrying out navigation duties to concentrate for long periods of time and safely communicate between themselves, Bridge and with control stations.
- 4.9 Personnel safety equipment stored at the alternate conning position shall be readily accessible.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 5 Emergency Conning Position

Functional Objective

- 5.1 The ship shall be fitted with an emergency conning position that enables operators, without access to primary navigation functions, to identify a place of refuge and safely navigate the ship to that location.

Performance Requirements

- 5.2 The emergency conning position, without reliance on primary navigation functions, shall enable operators to navigate the ship to a place of refuge whilst maintaining limited lookout.
- 5.3 The design and arrangement of the emergency conning position shall:
- 5.3.1 Facilitate the tasks to be performed by the operators in making full appraisal of the situation and in navigating the ship safely under emergency conditions; and
- 5.3.2 Allow the OOW to have proper field of vision to maintain visual awareness.
- 5.4 The emergency conning position and systems installed at that position shall be provided with lighting and illumination systems that enable personnel to perform route planning, route monitoring, conning and internal communication functions, by day and night. Lighting systems shall be designed such that they do not impair safe navigation.
- 5.5 Noise levels at the emergency conning position are to be sufficiently low as to enable operators carrying out navigation duties to concentrate for long periods of time and safely communicate between themselves and with control stations.
- 5.6 The emergency conning position and access to and from the emergency conning position shall be so arranged as to enable personnel to move or stand safely in bad weather.
- 5.7 Personnel safety equipment stored at the emergency conning position shall be readily accessible.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 6 Navigation Safety - Geospatial, Temporal & Environmental Awareness

Functional Objective

- 6.1 The ship shall be provided with sufficient sensors and systems to continuously and accurately determine, display and record its present time, position, orientation and movement in relation to the Earth and the rate of change of the parameters measured to ensure safe, independent navigation.
- 6.2 The ship shall be provided with appropriate sensors and processing equipment to adequately measure, analyse, assess, display and record its physical environment for the conduct of safe navigation.

Performance Requirements

- 6.3 The ship shall be provided with sufficient sensors and systems to:
- 6.3.1 Ensure continuous monitoring of position, velocity and time;
 - 6.3.2 Generate a precise time reference continuously for intended voyage;
 - 6.3.3 Determine and input heading information and rates of turn;
 - 6.3.4 Correct heading and bearings to True at all times;
 - 6.3.5 Determine and input speed and distance travelled in the water;
 - 6.3.6 Determine and input depth of water;
 - 6.3.7 Establish and update the ship's position;
 - 6.3.8 Identify weather and sea conditions; and
 - 6.3.9 Measure, display, record and analyse, in real time, the ship's behaviour in the prevailing conditions of wind and sea.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 7 Operation & Control Systems

Functional Objective

- 7.1 A ship shall be provided with appropriate means to control propulsion and manoeuvring, navigation and other systems from the Bridge and the emergency conning position for the conduct of safe navigation, collision avoidance and operational evolutions.

Performance Requirements

- 7.2 The Commanding Officer or authorised delegate shall when conning the ship:
- 7.2.1 Have means to control the direction and speed of the ship;
 - 7.2.2 Control the means by which the ship displays its manoeuvring intentions or limitations;
 - 7.2.3 Be aware at all times of the ship's limitations.
- 7.3 Manoeuvring characteristics and information on the ship's current condition as it affects manoeuvring shall be available at all times when in-service.
- 7.4 The OOW shall control the means by which the ship displays its illuminated appearance;
- 7.5 The ship shall have means to communicate with other ships or aircraft by day and night.

- 7.6 The ship shall have means to alert others that the ship is in distress.
- 7.7 There shall be a means to communicate with those in charge of essential safety functions and with all embarked persons in the event of an emergency.
- 7.8 The OOW shall have means to communicate with control station operators.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 8 Resilience and Continuous Availability

Functional Objective

- 8.1 The ship shall be provided with sufficient means to assure that there is resilience and continuous availability in navigation related systems and equipment.

Performance Requirements

- 8.2 The ship's spaces, systems and equipment essential to the maintenance of a proper lookout and the conduct of safe navigation shall be so arranged as to ensure high reliability and minimise the risk of mal-operation.

Note: The measures to ensure continuous availability shall be appropriate to the size, operational role, area of operations and maximum speed of the ship.

- 8.3 Machinery, equipment and systems essential to safe navigation shall be so arranged that, as far as is reasonable and practical, they will continue to function correctly and/or be easy to restore in the event of a minimum of a single operational error and/or system/equipment fault.
- 8.4 Equipment necessary for the safety of navigation shall be capable of being accessed for the purpose of routine maintenance to keep it in efficient working order.
- 8.5 There shall be reversionary methods of controlling propulsion and manoeuvring systems from wheelhouse, alternate conning position (where required by the Concept of Operations Statement), machinery control position and manoeuvring equipment control stations.

Note: The system shall also comply with Chapter IV Regulation 13.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 9 Integrated Bridge

Functional Objective

- 9.1 Where required by the Naval Administration, an Integrated Bridge System (IBS), Integrated Navigation System (INS), or both Integrated Navigation Bridge System (INBS) shall present all relevant information necessary for the conduct of safe navigation, manoeuvring and collision avoidance to ensure that additional hazards are not introduced as a result of installing or operating the system.

Note: Unless otherwise noted or clear from the context of the requirement, the term 'INBS' used in the following paragraphs of this Regulation refers to both an IBS and INS.

Performance Requirements

- 9.2 The INBS shall be designed, constructed and able to be maintained so as to support the proper and safe integration of navigational functions and information required to maintain a proper lookout, sustain safe conduct of navigation and manoeuvre as required, in particular:
- 9.2.1 To allow the installation and use of an INBS instead of stand-alone navigational equipment onboard ships;
 - 9.2.2 To promote safe procedures for the integration process;
 - 9.2.3 To ensure its performance is at least equivalent to the performance required of the individual components and sub-systems by this Chapter;
 - 9.2.4 To alert operators of any degraded condition such that the OOW and pilot can understand the nature of the failure and its consequences.

Note: The system shall also comply with all other Regulations of this Chapter.

- 9.3 The INBS shall be installed so as to reduce to a minimum the risk of human error.
- 9.4 Navigation systems shall not be rationalised by sharing functions or by inter-switching.
- 9.5 INBS equipment utilising programmable electronic systems shall be robust, resilient to operator errors and able to continue functioning in extremis. The Naval Administration shall identify the degree of functionality that should remain in extreme circumstances.

Note: The system shall also comply with Chapter IV Regulation 15.

- 9.6 The INBS shall be so arranged that it is not dependent upon ship's combat systems being available and will allow rapid removal of tactical data for the purposes of safe navigation.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 10 Data Communication

Functional Objective

- 10.1 The ship shall be fitted with equipment and systems in order to receive, transmit, record and analyse data, in recognised formats, relevant to safe navigation.

Performance Requirements

- 10.2 The ship shall be fitted with a means for recording all navigation related data for a period of at least 12 hours such that the sensor presentations, internal and external voice communications, decision making process and the ship's movements might be adequately re-constructed if necessary.
- 10.3 The ship shall be provided with systems/equipment to support the regular reporting of its position and movement to the appropriate command, with due regard to the Naval Administration's requirement for protection of classified information.

- 10.4 Irrespective of size, the ship shall be capable of the automatic transmission and reception of specified navigation and safety-related information to and from appropriately equipped ships, aircraft and shore stations. The system shall:
- 10.4.1 Monitor and track ships;
 - 10.4.2 Be so arranged that information exchanged shall be available to both the Bridge, alternate conning position (where required by the Concept of Operations Statement) and the Operations Room.
- 10.5 Where required by the Concept of Operations Statement, the ship shall be capable of the automatic transmission and reception of specified navigation and safety-related information to and from appropriately equipped ships, aircraft and shore stations and able to process that data as part of naval operations. The system shall:
- 10.5.1 Be able to be controlled from the Operations Room, alternate conning position or the Bridge and may be interfaced with, or an integral element of, the Combat System provided that independent operation is possible;
 - 10.5.2 Be capable of providing (at the Commanding Officer's discretion) to similarly fitted ships, aircraft and shore stations the ship's identity, position, course, speed, navigational status and other safety related information;
 - 10.5.3 Receive automatically such information from AIS fitted ships;
 - 10.5.4 Monitor and track ships;
 - 10.5.5 Exchange data with shore-based facilities.
- 10.6 The ship shall be able to receive automatically maritime safety information on 518 kHz by means of narrow-band direct-printing telegraphy.
- 10.7 The ship shall be provided with sufficient communications facilities to be able to send and receive, by at least two separate and independent means, distress alerts, SAR co-ordination communications, maritime safety information, general radiocommunications and Bridge-to-Bridge communications.
- 10.8 The ship shall be provided with the necessary installations to be capable of participating in the exchange of maritime safety information with other ships and shore stations as established under the eNavigation programme.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 11 Collision Avoidance

Functional Objective

- 11.1 The ship shall be provided with sensors, systems and equipment to enable the crew to determine the risk of collision, signal the ship's condition and intentions and manoeuvre to avoid collisions in the prevailing circumstances and conditions.

Performance Requirements

- 11.2 The ship shall be able to exhibit by day and night, in all weathers, appropriate lights and shapes in order to indicate size, orientation, activity and limitations so as to facilitate the determination of risk of collision by other mariners.
- 11.3 The ship shall be able to generate, by day and night, in all weathers, sound signals, in order to indicate its size, orientation, activity and limitations so as to facilitate the determination of risk of collision by other mariners.
- 11.4 If the ship is equipped with external operational lighting for military purposes, it shall be possible to revert to ordinary navigation lights in a time sufficient to avoid a collision.
- 11.5 The ship by day and night, in all weathers, shall be able to detect the presence of nearby vessels, understand their intentions and take measures as required to avoid a collision.
- 11.6 The ship shall be able to track other vessels to determine risk of collision.
- 11.7 The ship shall always have sufficient power and a means of manoeuvring available to ensure proper control.

Note: The propulsion installation and manoeuvring equipment shall also comply with Chapter IV.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

PART 1 CHAPTER X DANGEROUS GOODS

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Regulation 0 Goal

Note: This Chapter primarily regulates the carriage and use of Class 1 articles and substances. The Chapter Scope (Regulation 1) also details how Class 2-9 articles and substances shall be addressed.

0.1 The ship arrangements for the carriage and use of dangerous goods shall:

0.1.1 Minimise the risk of an incident associated with the carriage of dangerous goods;

0.1.2 Manage the risk to the people, property and the environment including essential safety functions arising from incidents associated with the carriage and use of dangerous goods to an acceptable level;

Note: National and International regulations regarding Health and Safety shall apply to personnel involved with the carriage and use of dangerous goods in addition to the requirements of this Chapter.

0.1.3 Enable the safe movement, maintenance and preparation for use of dangerous goods.

Note: This Chapter seeks to control the risk of an incident arising from the carriage and use of dangerous goods and could be considered a component of an environmental protection policy.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 1 General

Functional Objective

1.1 The purpose of this Regulation is to outline the principles and framework of Chapter X that must be met if the role of the ship requires the carriage or use of dangerous goods.

Scope

1.2 Chapter X Dangerous Goods is written in a goal based format which specifies high level objectives to achieve a minimum level of safety. It also provides some Solutions which form the foundation for the selection of standards and development of practices and procedures.

1.3 Ship arrangements associated with dangerous goods shall be in accordance with the requirements of SOLAS and IMDG Code.

- 1.4 For Class 1 items where compliance with paragraph 1.3, in whole or part, is not compatible with the Concept of Operations Statement, the Owner shall comply with this Chapter by the implementation of:
- 1.4.1 Equivalent arrangements for aspects within the scope of SOLAS or IMDG Code; and/or
- 1.4.2 Additional arrangements for aspects outside the scope of SOLAS or IMDG Code.
- 1.5 For Class 2-9 items where compliance with paragraph 1.3, in whole or part, is not compatible with the Concept of Operations Statement, the Owner shall address the issues of stowage, personal protection and emergency procedures when dangerous goods are in use, and the subsequent stowage of opened dangerous goods, through a risk assessment.
- 1.6 The requirements of this Chapter apply directly to all spaces and systems in which dangerous goods are stowed, maintained, handled or used and to those adjacent spaces containing items that might produce an unacceptable risk of incident. The list of affected spaces and equipment shall be agreed with the Naval Administration.
- 1.7 Chapter IV contains the overarching requirements for Engineering Systems which apply to the carriage and use of Dangerous Goods (Class 1-9). Chapter X supplements Chapter IV by providing additional requirements applicable to Class 1 Dangerous Goods (Explosives).
- 1.8 Chapter VI contains the overarching requirements for Fire Safety which apply to the carriage and use of Dangerous Goods (Class 1-9). Chapter X supplements Chapter VI by providing additional requirements applicable to Class 1 Dangerous Goods (Explosives).
- 1.9 Chapter X does not apply to dangerous goods which are a permanent component of a ship's system except for Class 1 items stored within their launching mechanisms.
- 1.10 Once equipment containing dangerous goods is removed from its host system it is subject to the Regulations of this Chapter.
- 1.11 Where a ship loads and unloads dangerous goods to vehicles (boats, craft, vehicles and aircraft) the ship arrangements shall manage the safety of the dangerous goods until the loaded vehicle no longer places the ship at risk.
- 1.12 The Naval Ship Code excludes training requirements. Chapter X Dangerous Goods assumes all embarked persons have an appropriate level of competence for the operation of the installed systems. Part 3 contains some guidance on typical training requirements.

Application

- 1.13 This Chapter shall apply from the point at which dangerous goods directly contact or place at risk the receiving vessel (e.g. on the deck or attached to ship's lifting equipment) to the point at which they no longer put the vessel at risk (e.g. after consumption or transfer to another vessel or shore).
- 1.14 This Chapter applies to the carriage and use of dangerous goods during Foreseeable Operating Conditions. For extreme threat conditions, the Owner shall define the requirements in the Concept of Operations Statement and set the performance requirements for the safety of dangerous goods.

Note: Foreseeable Operating Conditions and extreme threat conditions are defined in Part 1 Definitions and Abbreviations.

- 1.15 Where the ship arrangements do not meet the requirements of the other chapters the implications for dangerous goods shall be identified and ship arrangements provided specific to the risk management of the dangerous goods.

General Performance Requirements

- 1.16 The Ship's Safety Management System shall include a section specific to the dangerous goods, whose scope at a minimum addresses all the elements of this Chapter and shall be independently assured. Design standards, acceptance criteria and verification of effective ship arrangements throughout the ship's life shall be derived from the Safety Management System.
- 1.17 Ship arrangements supporting the safe carriage and use of dangerous goods shall be clearly identified, operated and maintained commensurate with the importance of the risk they manage.
- 1.18 Dangerous goods shall be designated in accordance with the UN Recommendations on the Transport of Dangerous Goods – Model Regulations.
- 1.19 Dangerous goods shall not be embarked without appropriate documentation that identifies the dangerous goods' inherent safety and associated safety parameters.
- 1.20 Where, for extraordinary immediate operational reasons, the requirements of Chapter X are unable to be met, approval for the safe carriage, and use of dangerous goods and potentially dangerous goods shall meet the requirements of Chapter 0 Regulation 7.

Note: Potentially dangerous goods are items whose safety is not fully understood that may reasonably be suspected of being either a) hazardous in accordance with the *UN Recommendations on the Transport of Dangerous Goods – Model Regulations* or; b) may endanger embarked dangerous goods.

- 1.21 The ship, systems and equipment shall be approved in accordance with the agreed standards by the Naval Administration.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 2 Layout and Services

Functional Objective

- 2.1 Ship arrangements for the location within the ship, layout of spaces and the provision of supporting services shall maintain the inherent safety of the dangerous goods and manage incidents.

Performance Requirements

- 2.2 The size, shape and location of the dangerous goods stowage areas, maintenance facilities, embarkation and disembarkation routes and emergency procedures shall be designed taking into account the Concept of Operations Statement, the use of the dangerous goods and the risks associated with the dangerous goods as derived from the Safety Management System.
- 2.3 Spaces adjacent to dangerous goods stores and ship equipment (for both normal and fault conditions) shall be designed to manage the hazards they present to the dangerous goods.
- 2.4 Ship arrangements for temporary holding areas for dangerous goods shall manage the risk from and to the dangerous goods commensurate with the time at risk.
- 2.5 The ergonomics of the spaces in which dangerous goods are stored, prepared, maintained or used shall provide for the safe carriage and use, maintenance and inspection of dangerous goods and the dangerous goods stowage areas.

- 2.6 Ship arrangements shall mitigate the risk of a reaction occurring between dangerous goods.
- 2.7 Systems or equipment passing through or resident in spaces in which dangerous goods are stored or used shall not present an unacceptable risk to the dangerous goods or vice versa during normal operation or fault conditions.
- 2.8 Dangerous goods stowage areas shall be designed to collect any leakage of hazardous liquids and detect gases or vapours, that might emanate from dangerous goods or other items.
- 2.9 Ship arrangements shall be such that an incident associated with dangerous goods does not degrade essential escape, evacuation and rescue systems below an acceptable level due to an incident related to dangerous goods.
- 2.10 Incident control systems such as pressure relief systems and containment control shall not endanger the crew or third parties when operated.
- 2.11 Dangerous goods stowage areas shall provide emergency escape and evacuation arrangements for personnel. The scope of such arrangements shall be commensurate with the size of the vessel and the type of hazard presented by the dangerous goods.
- 2.12 The ship arrangements shall control the environment as required by the dangerous goods embarked.
- 2.13 Ship arrangements shall be demonstrated at build and through life to control the environment in accordance with the dangerous goods embarked.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 3 Structural Protection

Functional Objective

- 3.1 Ship arrangements shall provide appropriate structural integrity to support dangerous goods and their associated safety systems.

Performance Requirements

- 3.2 Structure which is a component of the ship's safety management system shall be designed, constructed and maintained to protect the ship from incidents occurring with dangerous goods.

Note: For foreseeable damage conditions structural requirements relating to fire incidents are in Chapter VI, regulation 2 and structural requirements relating to damage are in Chapter II, Regulation 3.

- 3.3 Ship structure shall withstand or be protected from loads (e.g. blast, heat, and shock) arising from the use of dangerous goods.
- 3.4 Ship structure shall support safety and consequence management systems.
- 3.5 Safety factors of structure associated with handling and operating equipment shall be appropriate for the hazard classification of the dangerous goods being used and the operation under consideration.
- 3.6 Temporary or portable ship structure, or fittings associated with the carriage and use of dangerous goods shall be designed, built, assembled and tested commensurate with the risk associated with the dangerous goods.

- 3.7 Structural fixing of items within dangerous goods stowage areas shall ensure items remain fixed in all foreseeable operating conditions and extreme conditions where required by the Naval Administration.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 4 Fire Protection

Functional Objective

- 4.1 Ship arrangements shall manage to an acceptable level, the risk of fire incidents initiated by dangerous goods or that threaten dangerous goods.

Note: This regulation applies whenever and wherever dangerous goods are present and are additional to the requirements of Chapter VI – which should be read in conjunction with Chapter X.

Performance Requirements

- 4.2 The fire management policy for dangerous goods for the vessel, including prevention, detection, containment, control and extinguishing of fires, shall be defined in the Concept of Operations Statement and be approved.

Note: This will include a definition of the number and severity of fire incidents the ship shall be expected to manage and verified for operation in the extreme threat conditions as defined in Part 1 Definitions and Abbreviations.

- 4.3 The fire detection, alarm and response system (e.g. fully automated or require manual activation) shall be appropriate to the ship Concept of Operations Statement.
- 4.4 Materials shall be selected to minimise the fire risk they present.
- 4.5 Drainage, flooding and fixed fire fighting systems for dangerous goods stowage areas shall be controllable from outside the space.
- 4.6 To prevent fire escalation, the fire protection system design, coverage, reaction times and rates of deployment shall be commensurate with the type of hazard presented by the dangerous goods.
- 4.7 Systems passing through dangerous goods stores shall be avoided where failure of the system presents a fire risk to the goods stored. Where this is not possible appropriate mitigation such as shielding or enhanced fire protection systems shall be provided.

Note: Systems refers to pipes, cables, vents etc.

- 4.8 Integrity and operational efficiency of fire protection systems for dangerous goods stores shall not be compromised by failure or maintenance of the ship systems or equipment that support the fire protection system.
- 4.9 Ventilation control shall ensure the effectiveness of the fire protection system provided for the protection of dangerous goods.
- 4.10 The operation of the fire protection system should be monitored at all times whilst dangerous goods are embarked and reported to the ship's staff when activated.
- 4.11 Reporting of the fire protection system of the dangerous goods stowage shall be to a continually manned space.

- 4.12 Arrangements for dangerous goods stowage areas shall limit transfer of heat from fires, machinery systems or other equipment or systems outside of the stowage areas to within safe levels.
- 4.13 Ship arrangements shall provide the rapid and direct distribution of appropriate fire suppressant or cooling media.
- 4.14 Dangerous goods shall not be embarked until the fire protection system is operable and verified.
- 4.15 Control points for fire fighting systems shall be provided and separated to reduce the probability of loss of system control.
- 4.16 Positions where dangerous goods are temporarily stowed, prepared or maintained shall be provided with fire detection, prevention and suppressant systems commensurate with the time at risk and the magnitude of the risk presented by the dangerous goods.
- 4.17 Dangerous goods stored on exposed decks shall be provided with fire protection systems suitable for the fire risk.
- 4.18 Ship arrangements shall facilitate the testing of fire systems to ensure their availability and reliability is maintained whilst the dangerous goods are present.
- 4.19 Ship arrangements for fire protection of dangerous goods shall consider failure modes and provide suitable mitigation measures.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 5 Electrical Fittings

Functional Objective

- 5.1 The ship arrangements shall protect dangerous goods from electrical conditions that could lead to an incident.

Performance Requirements

- 5.2 Electrical items shall be approved and certified safe for operation in dangerous good stowage areas or in the vicinity of dangerous goods or their associated safety systems.
- 5.3 The design of electrical items under normal, overload and fault conditions shall maintain the safety arrangements associated with the protection of dangerous goods.
- 5.4 Ship arrangements shall maintain the electromagnetic conditions within safe limits wherever and whenever dangerous goods are present.

Note: Authorised electrical items are recognised by the Naval Administration to be safe for operation through meeting or exceeding applicable standards associated with the dangerous goods embarked.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 6 Stowage and Handling

Functional Objective

- 6.1 Ship arrangements shall provide safe and secure stowage, handling, movement, re-location and transfer of dangerous goods.

Performance Requirements

- 6.2 Ship arrangements shall have secure restraint systems that maintain the integrity and safety of the dangerous goods.
- 6.3 All other items stored within dangerous goods stowage areas shall be assessed for compatibility with the dangerous goods and restrained such that they do not endanger the dangerous goods.
- 6.4 Where bulk or versatile stowage of dangerous goods is used, ship arrangements shall provide appropriate segregation, restraint and partitioning.
- 6.5 Dangerous goods stores on exposed decks shall be provided with adequate protection from environmental conditions and sited to control the risk from ship operations.
- 6.6 Stowage layouts shall be commensurate with the protection systems (e.g. adequate clearance to bulkheads and decks for boundary cooling from fire fighting systems).
- 6.7 The temperature of surfaces in the vicinity of dangerous goods shall be maintained at safe levels during normal and fault conditions.
- 6.8 Where dangerous goods safety is at risk from exposure to sea water, flood alarms shall be fitted and reported in a continually manned space, at sea and in harbour.
- 6.9 Ship arrangements shall incorporate embarked vehicles in which dangerous goods are stored for transfer.
- 6.10 The interface between safety arrangements for the ship and any system delivering dangerous goods to and from the ship shall be carefully managed and controlled commensurate with the risk posed.
- 6.11 Restraint systems and layout shall allow access to and removal of dangerous goods without detriment to the safety of other dangerous goods.
- 6.12 Movement, re-location or transfer shall be undertaken in accordance with a procedure to efficiently, with the minimum of delay or pausing in the process to limit the exposure of the ship to increased safety risk.
- 6.13 All dangerous goods transfer routes shall be defined and approved.
- 6.14 All handling equipment is to comply with approved standards and regulations for the areas in which they are to be used commensurate with the risks appropriate to the dangerous goods stored.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 7 Security

Functional Objective

- 7.1 Ship arrangements shall prevent malicious or unintended interference with the dangerous goods or their safety management system.

Performance Requirements

- 7.2 The permission of the Commanding Officer or a delegated responsible representative is required for the embarkation of any dangerous goods.
- 7.3 Ship arrangements shall prevent access to dangerous goods or associated safety management systems by unauthorised persons and be approved.

Note: Authorised persons are those approved by the Owner to have access to dangerous goods and have been assessed as competent or are appropriately supervised.

Note: Access includes physical presence, control of procedures, or freedom to affect the safe carriage and use of dangerous goods. This may apply when dangerous goods are not present.

- 7.4 The location, condition and quantity of all dangerous goods shall be known, logged and monitored at all times by the Commanding Officer or a delegated responsible representative and a system in place for reporting discrepancies.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 8 Incident Reporting

Functional Objective

- 8.1 Incidents involving dangerous goods or associated safety systems shall be reported, investigated and, where appropriate, ship arrangements amended to maintain or improve safety levels.

Performance Requirements

- 8.2 A management system shall exist to ensure that dangerous goods incidents are recognised and reported.
- 8.3 The Naval Administration shall make adequate and proportional arrangements for the investigation or review of each dangerous goods incident.
- 8.4 Appropriate measures shall be taken such that the intended acceptable safety levels are maintained or improved following a dangerous goods incident.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 9 Not Used

Regulation 10 Use of Dangerous Goods

Functional Objective

10.1 Ship Arrangements shall control the safety risk associated with use of dangerous goods.

Performance Requirements

10.2 All planned activities involving the use of dangerous goods shall be identified with a safe system of work defined for each activity

10.3 The ship arrangements shall provide for the safe disassembly and assembly of packaging.

10.4 Ship arrangements shall manage the safe preparation of dangerous goods.

10.5 Ship arrangements shall manage the safe activation of dangerous goods.

10.6 Ship Arrangements shall manage the risk due to the carriage of dangerous goods by offboard systems operating to and from the ship.

10.7 Ship Arrangements shall manage the risk due to carriage and use of dangerous goods by embarked persons.

10.8 Ship Arrangements shall manage the safety of tests, trials and experiments involving dangerous goods.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

Regulation 11 Emergency Procedures

Functional Objective

11.1 Ship Arrangements shall control the consequences associated with dangerous goods, arising from foreseeable emergency situations.

Performance Requirements

11.2 Emergency planning shall be conducted to identify and prioritise all foreseeable emergency situations.

11.3 Arrangements to control the consequences of emergency situations shall be put in place.

11.4 Emergency arrangements shall be implemented effectively.

11.5 Appropriate measures shall be taken to return all dangerous goods to a safe condition following an emergency.

[Solutions](#) for this Regulation are contained in Part 2.

[Justification & Guidance](#) for this Regulation are contained in Part 3.

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