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AUSTRALIAN NAVAL CLASSIFICATION MANUAL (VOLUME 2)

DIVISION 3: SHIP RULES

CHAPTER 01: INTEGRATED PLATFORM SURVIVABILITY

PART 1: ANC RULES

This document is issued for use by Defence and Defence Industry personnel and is effective forthwith.

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1 https://www.legislation.gov.au/Series/C1968A00063

2 https://www.legislation.gov.au/Series/C2004A04868

3 https://www.legislation.gov.au/Series/C2004A03712

4 http://drnet/AssociateSecretary/security/policy/Pages/dspf.aspx

AUSTRALIAN NAVAL CLASSIFICATION RULES

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[5] https://www.defence.gov.au/business-industry/industry-governance/australian-naval-classification-authority/australian-naval-classification-rules

AMENDMENTS

Proposals for amendments to the ANC Manual (Volume 2) may be sent to:

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Division 3: Ship Rules
Part 1: Rules

Chapter 01: Integrated Platform Survivability

Contents

Australian Naval Classification Rules

Rule 0. Goal

0.1 Ships exposed to extreme threat conditions shall be designed, constructed and maintained to achieve a level of survivability aligned with the OSI that optimises susceptibility, vulnerability and recoverability to maintain post damage capability for all defined threats in all foreseeable operating conditions.

Rule 1. General

Functional Objective

1.1 The purpose of this Rule is to outline the principles and framework of this chapter and its application.

Scope

1.2 The scope of this Chapter is to describe the Goals, Functional Objectives and Performance Requirements of the ship's ability to maintain a level of post damage capability and provide safe protection of embarked persons at sea, against all defined threats and damage scenarios in all foreseeable operating conditions.

1.3 The minimum survivability level is provided by SOLAS. However, this alone does not provide a sufficient level of survivability and may not be applicable to the context, for post damage capability and safe protection of embarked persons, for the majority of ship operations in peacetime, constabulary and combat operations.

1.4 Chapter 01 *Integrated Platform Survivability* provides additional requirements to all Chapters of the ANC Rules Division 3, as applicable by the Integrated Platform Survivability (IPS) level. Therefore, in order to meet Chapter 01 goals, the requirements of this chapter shall be met when designing and verifying other Division 3 Chapters, to the extent necessary to meet the OSI.

Application

1.5 The ship design shall meet the ship’s survivability in accordance with the OSI, to:

1.5.1 retain post damage capability for both combat and platform systems from defined threats

1.5.2 provide safe protection of embarked persons throughout a defined damage incident.

1.6 The survivability controls shall be designed for each area of the survivability domains as follows:

1.6.1 Susceptibility: The tactical and post detection capability shall be ensured by understanding the threat capabilities and applying susceptibility controls including:

1.6.1.1 signature reduction

1.6.1.2 threat detection

1.6.1.3 countermeasures.

Note: For threat detection, countermeasure systems, decoys, and their associated systems requirements,

refer to Chapter 13 *Combat Systems*.

1.6.2 Vulnerability: The post damage capability and safe protection of embarked persons shall be ensured by understanding the damage extent from the defined threats and applying vulnerability controls including:

1.6.2.1 zoning, separation and redundancy

1.6.2.2 shock hardening

1.6.2.3 blast hardening

1.6.2.4 ballistic protection.

1.6.3 Recoverability: The recovered capability shall be ensured by understanding the damage extent from the defined threats and applying recoverability controls including:

1.6.3.1 incident management

1.6.3.2 fire control

1.6.3.3 flood control

1.6.3.4 hazardous substance control

1.6.3.5 CBRN defence

1.6.3.6 preservation of life.

Note: For fire control requirements, refer to Chapter 06 *Fire Safety*.

Note: For hazardous substance control requirements, refer to Division 2 Chapter 01 *General Requirements* Rule 7 *Hazardous Areas*.

Note: For preservation of life requirements, refer to Chapter 07 *Escape, Evacuation and Rescue.*

Rule 2. Post Damage Capability

Functional Objective

2.1 In case of damage, the capability of Essential Safety Functions and other defined services shall be maintained and/or recovered to a defined level to meet the OSI.

2.2 Ships shall be designed against internal and external physical threats in non-combat and combat operating environment through its survivability capabilities to meet the OSI.

Performance Requirements

2.3 The defined threats, both non-combat and combat, both external and internal, the ship may encounter while meeting its OSI shall be identified and defined.

2.4 The post damage capability expected of the ship shall meet the OSI, if any of the defined threats are realised.

2.5 In all situations, sufficient systems shall be provided following a damage incident to support safe abandonment.

2.6 Post damage capability shall be provided to the extent required by the OSI to enable embarked persons to remain on board in the event of an incident.

Rule 3. Signature Reduction

Functional Objective

3.1 The ship shall be designed to reduce and maintain signatures to avoid detection by threats and their operators as specified in the OSI.

Note: The ship design may consider signatures that include, but are not limited to those caused by underwater radiated, noise, magnetic, electromagnetic, radar cross section, heat, airborne noise and visual.

Performance Requirements

3.2 The ship's signatures shall be designed to minimise the likelihood of detection from threat operators.

3.3 The ship's signatures shall be designed to minimise the likelihood of detection from defined combat threats.

3.4 The ship's signatures shall be designed to enable effective operation of countermeasures.

3.5 All signature reduction systems shall be designed, constructed and maintained to achieve overall effectiveness, as specified in the OSI.

Rule 4. Zoning, Separation and Redundancy

Functional Objective

4.1 The ship zoning shall be subdivided to reduce its vulnerability and maximise its recoverability from damage resulting from defined threats.

4.2 Ships critical systems and equipment shall have redundancy arranged to provide sufficient separation to enable ship zone autonomy to meet the OSI.

Performance Requirements

4.3 Sub-divided zones shall be aligned to watertight, fire, smoke, damage control, and citadel zones required by Chapter 03 *Buoyancy and Stability* and Chapter 06 *Fire Safety.*

4.4 The zoning, separation and redundancy of vital systems shall be arranged to meet the defined level of post damage capability required and protect embarked persons.

4.5 The ship's electrical distribution systems shall be designed to isolate electrical power in any damaged zone.

4.6 At each sub-division bulkhead and deck, the ship shall include through structure connectors or openings to enable recoverability in any damaged zone without compromising the water, fire and smoke tight integrity of the zone boundary.

4.7 The ship shall be designed and equipped to enable the formation of control boundaries.

4.8 The ship shall be fitted with a damage control state marking system in every ship zone.

Rule 5. Shock Hardening

Functional Objective

5.1 The ship and its equipment shall be shock hardened against defined threats to the extent

necessary to meet the OSI.

Performance Requirements

5.2 The severity of the shock loading to be used throughout the design and qualification process for the ship structure and its equipment shall be determined from the threats and stand-off assumptions in the OSI.

5.3 Shock and whipping loads on the hull's structure, appendages, and fittings are to be included in the hull structural design and calculations required by Chapter 02 *Structure.*

5.4 All equipment, systems and structure shall be shock qualified according to the post damage capability required by the OSI.

Rule 6. Blast Hardening

Functional Objective

6.1 The ship and its equipment shall be blast hardened against defined threats according to the OSI.

Performance Requirements

6.2 Ship shall be blast hardened to resist internal and/or external blasts, to the extent necessary to meet the OSI.

6.3 The position and design of equipment mountings on blast affected surfaces shall minimise the peak accelerations incurred during a defined blast.

6.4 Ship's structure and fittings shall be designed to withstand blast damage sufficient to retain the post damage capabilities and provide protection of embarked persons as required by the OSI.

Rule 7. Ballistic Protection

Functional Objective

7.1 The ship shall be fitted with ballistic protection systems to retain capability and safe protection of embarked persons against the defined ballistic threats to the extent necessary to meet the OSI.

Performance Requirements

7.2 Ballistic protection systems designed to defeat projectile and fragment ballistic threats shall provide the required level of ballistic protection as specified in the OSI.

7.3 Ballistic protection shall be provided to compartments and systems to the extent necessary to protect personnel and retain post damage capability as specified by the OSI.

7.4 The ballistic protection system shall be designed, constructed, and maintained to retain its qualified ballistic protection level in all foreseeable operating conditions.

Rule 8. Recoverability Systems

Functional Objective

8.1 The ship shall be designed, constructed and maintained to enable operation of recoverability

management systems in all foreseeable operating conditions.

8.2 The ship shall be arranged to enable resilient and effective control and recovery from damaging incidents to the extent necessary to meet the OSI and also be consistent with the NVO's recoverability doctrine or damage control philosophy.

Performance Requirements

8.3 On board information, documentation and decision making tools shall be provided for the conduct of all foreseeable vessel damage control and recovery activities.

8.4 The ship shall be fitted with the required equipment for the conduct of all foreseeable vessel damage control and recovery activities.

8.5 The ship shall be fitted with communication systems to establish and maintain the controlled conveyance of information and command directives between command positions as well as to and from the various recovery teams.

Note: See also Chapter 08 *Safety Communications* Rule 6 *Internal Communications*, Rule 7 *Main Broadcast and Emergency Alarm System* and Rule 8 *Portable Communications* for requirements for internal communications systems to support damage incident response and recovery.

8.6 The ship shall be fitted with marking systems that facilitate effective recoverability activities.

8.7 The ship shall be arranged to enable command, control and execution of recoverability activities.

Rule 9. Incident Information Systems

Functional Objective

9.1 The ship shall be designed, constructed and maintained to enable operation of incident information systems in all foreseeable operating conditions.

9.2 The ship shall be fitted with systems to collect, process, display, and record information to provide Command with a clear understanding of the state of the ship and ongoing incidents to the extent necessary to meet the OSI and also be consistent with the NVO's recoverability doctrine or damage control philosophy.

Performance Requirements

9.3 The ship shall be fitted with sensors and systems to collect, process and display data about equipment and system status, internal environmental conditions and material state.

9.4 The ship shall be fitted with systems to plot the progress of damage incidents and support decision making.

9.5 The ship shall be fitted with systems to retain and store data for both immediate recall for real-time assessment of an evolving incident as well as post-incident analysis and documentation.

Rule 10. Damage Isolation and Containment

Functional Objective

10.1 The ship shall be designed, constructed and maintained to provide the required performance of containment and isolation provisions.

10.2 The ship shall be arranged to prevent further loss of capability due to the spread of damage to unaffected areas and sections of the ship whilst also isolating potential sources of incident escalation, to the extent necessary to meet the OSI and also be consistent with the NVO's recoverability doctrine or damage control philosophy.

Performance Requirements

10.3 The ship shall enable boundaries to be set to support containment of damage, safeguard personnel and support operational objectives of the command team.

10.4 The ship shall be arranged to enable restriction and complete control of damage to prevent the further spread of damage to unaffected areas.

10.5 The ship shall be fitted with means of isolating areas of the ship to stop transfer of electricity, liquids, gases and potential sources of incident escalation.

Rule 11. Incident Response

Functional Objective

11.1 The ship shall be designed, constructed and maintained to enable execution of damage control, access, search and rescue using damage control systems and equipment.

11.2 The ship shall be arranged to limit or stop the further loss of capability within the damage zone through rapid action and resolution consistent with the NVO's recoverability doctrine or damage control philosophy.

Performance Requirements

11.3 The ship shall be fitted with systems and equipment to control and eliminate fire, smoke and hazardous gases, flood and hazardous liquids, and hazardous solids.

11.4 The ship shall be designed for unrestricted movement of personnel, equipment, and materials to facilitate effective damage control, unhindered access to damaged sections, and the preservation of structural integrity.

11.5 The ship shall be arranged to rapidly account for personnel or high value items and the means to rescue them from a place of high risk to a place of relative safety.

Rule 12. Damage Recovery

Functional Objective

12.1 The ship shall be designed, constructed and maintained to enable availability and operation of all recovery systems and equipment.

12.2 The ship shall be arranged to provide resilience in system operation and means of restoring partial or full capability to the extent necessary to meet the OSI, within specified timescales using on-board resources consistent with the NVO's recoverability doctrine or damage control philosophy.

Performance Requirements

12.3 The ship shall be fitted with Essential Safety Functions or Mission Critical Functions able to be operated in different operating modes.

12.4 The ship shall be fitted with Essential Safety Functions or Mission Critical Functions able to

override peacetime safety settings and auto shutdown protection features to ensure continued availability under high threat conditions, irrespective of the risk of permanent future damage.

12.5 The ship shall be fitted with distributed systems able to connect portable sections to enable routing around damage.

12.6 The ship shall be fitted with spare parts and equipment to repair systems and structure after battle damage.

12.7 The ship shall be fitted with systems and equipment to restore internal environmental conditions and decontaminate damaged areas from hazardous material.

Rule 13. Chemical, Biological, Radiological and Nuclear Defence

Functional Objective

13.1 The ship and its equipment shall be capable of surviving and operating in a CBRN environment and provide defence against CBRN threats to the extent necessary as specified in the OSI.

Performance Requirements

13.2 CBRN situational awareness shall be provided through an automatic detection system that can perform the following:

13.2.1 sense CBRN agents and contaminants both external and internal to the ship

13.2.2 monitor CBRN agents and contaminants residual levels following a CBRN incident

13.2.3 provide identification of the CBRN agent or contaminant.

13.3 The ships exposed surfaces and equipment shall be designed to prevent accumulation of contaminants and allow for ease of decontamination.

13.4 COLPRO shall be provided to enclose part of the ship to isolate all embarked persons from external CBRN threats while retaining a level of ship’s operating capability.

13.5 COLPRO shall include space to conduct self-aid for embarked persons contaminated by exposure to CBRN agents.

13.6 Measures shall be in place to prevent any potential CBRN threat from entering the citadel.

13.7 Cleansing Stations shall be provided for immediate decontamination of embarked persons at the entry point to the citadel.

13.8 The ship shall be designed with systems for the removal of CBRN agents and contamination.

13.9 The ship shall provide stowage internal and external of the ship's citadel for all relevant CBRN IPE and portable CBRN related equipment.

13.10 The ship shall be designed with consideration for operating equipment external to the citadel with CBRN IPE.

13.11 After being exposed to CBRN contaminants, the ship shall have the ability to undergo decontamination without the need for operator intervention.