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AUSTRALIAN NAVAL CLASSIFICATION AUTHORITY MANUAL (VOLUME 2)

DIVISION 3: SHIP RULES

CHAPTER 05: SEAMANSHIP SYSTEMS

PART 2: SOLUTIONS TO THE ANC RULES

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

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AUSTRALIAN NAVAL CLASSIFICATION RULES

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Division 3: Ship Rules
Part 2: Solutions to the ANC Rules

Chapter 05: Seamanship Systems

Contents

Solutions to the ANC Rules

Rule 0. Goal

0.1 Goal for this Chapter is contained in Part 1.

Rule 1. General

1.1 The Naval Vessel Operator (NVO) shall present and justify a solution for demonstrating compliance to Part 1 of the ANC Rules. All decisions that affect compliance with the requirements of this chapter shall be recorded at all stages from Concept to Disposal and these records shall be maintained throughout the life of the Naval Vessel.

Solutions

1.2 The rulesets of a single Classification Society shall be used for designing, constructing and maintaining the seamanship systems of Naval Vessels.

1.3 The Classification Society issuing the ruleset required by paragraph 1.2 shall be recognised as a Competent Organisation by the ANC Authority.

1.4 The requirements prescribed in Part 1 shall be met through the application of the appropriate class notations of the ship's Classification Society, supplemented by additional standards, or justified solutions where necessary to meet the Operating and Support Intent (OSI).

1.5 These seamanship systems shall be constructed and repaired under survey of the ship's Classification Society's surveyors and shall be certified with the relevant construction marks or symbols assigned by that society.

1.6 If requirements in this Chapter contradict the requirements in the ruleset of the Classification Society or defined regulations and standards, requirements in this Chapter take precedence or consult the ANC Authority.

1.7 All Rules, Regulations, Codes and Standards used shall be the latest versions as amended at the time of drafting the ANC Basis unless a specific version date is specified in the text.

Rule 2. Not Used

Rule 3. Provision of Operational Information

3.1 The NVO shall present and justify a solution for demonstrating compliance to Part 1 of the ANC Rules. In the presentation and justification of a solution, the following shall be considered.

Solutions

3.2 Robust operation, maintenance and inspection guidance to support seamanship systems shall be provided for the target operators and maintainers.

3.2.1 Guidance shall be derived in whole or in part from the technical documentation provided by the original equipment manufacturer.

3.2.2 Guidance shall be easily understood by an audience with a level of qualifications and experience expected of the target operators and maintainers, including the original equipment manufacturer's technical documentation.

3.3 Clearly defined precautions, limitations and equipment requirements for the safe operation of seamanship systems shall be provided to the operators, which include:

3.3.1 The impact of operations in extreme temperature climates and protection of crew from the environment, including the deleterious effects of over exposure to the sun and requirements for adequate hydration.

3.3.2 The effect of heavy weather and limits for normal operation, operations with enhanced life-preserving equipment and limits at which safe operation within defined zones of the upper deck is not possible.

3.3.3 The level of qualification and experience required by personnel for safe operation of the seamanship systems.

3.3.4 The provision of adequate numbers of suitable qualified and experienced operators for seamanship systems' operations.

3.3.5 The effect of ship motions and limits for normal operation, and limits at which safe operation of seamanship systems is not possible.

3.3.6 Where the upper deck is divided into zones of operation (for example forecastle), a clear definition of those zones and their associated requirements for safe operation.

Rule 4. Access to Upper Deck and Working on the Upper Deck

4.1 The NVO shall present and justify a solution for demonstrating compliance to Part 1 of the ANC Rules. In the presentation and justification of a solution, the following shall be considered.

Solutions

4.2 In determining the provision of access points to the upper deck the following shall be considered:

4.2.1 The impact of various degrees of list on the viability of access routes;

4.2.2 The impact of the environment (for example high sea states) on the viability of access routes;

4.2.3 The need for redundancy of access routes for all Foreseeable Operating Conditions.

4.3 Consideration shall be given to the additional risks imposed by the creation of penetrations in the ships structure (especially to a CBRN boundary) when determining the need to include additional access points.

4.4 Hatches and doors shall be provided with the means of being operated from both sides.

4.5 Analysis of the seamanship evolutions, equipment and storage locations shall be carried out to determine that the access routes are suitably sized.

4.6 Zones (including hazardous zones) on the upper deck shall be defined for each upper deck evolution. Controls, including procedures, shall be put in place to ensure safety of embarked persons and include:

4.6.1 Deck markings;

4.6.2 Signage;

4.6.3 Temporary guardrails;

4.6.4 Communications;

4.6.5 Lighting.

4.7 The risk to personnel presented by the momentum of a swinging hatch or door when exacerbated by the motion of the ship shall be considered and where necessary mitigated by arresting mechanisms.

4.8 Mechanically operated doors shall have a manual reversionary mode enabling opening and closing by hand.

4.9 The access routes for personnel required to perform Essential Safety Functions and, where applicable, Mission Critical Functions, shall be designed to:

4.9.1 allow for their expeditious transit to their designated operating position in all foreseeable circumstances in which that function may is required

4.9.2 provide redundancy of access routes for all positions from which an essential safety function or, where applicable, a Mission Critical Function, is required to be performed

4.9.3 provide access to seamanship equipment with an essential safety function or, where applicable, a Mission Critical Function.

4.10 Lighting for upper deck access and seamanship evolutions shall enable operators to safely transit and carry out their duties.

Note: See Chapter 04 *Engineering Systems* Rule 14 *Lighting* for the level of illumination requirements where provided for upper deck evolutions.

Note: See Chapter 04 *Engineering Systems* Rule 14 *Lighting* for the night vision requirements where provided for upper deck evolutions.

4.11 In designing the upper deck layout, the human elements of operation shall dictate an envelope of operation for each equipment or system which encompasses sufficient physical space for the personnel required and their associated movement during operation in all modes.

4.12 Arrangements and personal protective equipment (e.g. life lines and harnesses) shall be provided to prevent personnel being lost overboard or falling from height and shall be available to permit full exploitation of the envelope of seamanship operation of each equipment or system.

4.13 All arrangements and equipment required to meet para 4.12 shall be periodically load tested as appropriate.

4.14 Where access to the upper deck is provided for leisure activities, the suitability of individual zones of the upper deck (see para 4.8) shall be considered to facilitate safe access, for specific activities under the prevailing circumstances and conditions.

Rule 5. Embarkation and Disembarkation

5.1 The NVO shall present and justify a solution for demonstrating compliance to Part 1 of the ANC Rules. In the presentation and justification of a solution, the following shall be considered.

Solutions

5.2 Ships shall meet the requirements of SOLAS Chapter II-1, Regulation 3-9 *Means of Embarkation on and Disembarkation from Ship*, supplemented by the following.

Note: In recognition of the requirement for Naval ships to respond to changing instructions while in transit the means of embarkation or disembarkation shall be carried by the ship at all times, even when engaged on a planned voyage between designated ports where appropriate accommodation/embarkation ladders are provided.

5.3 The means of embarkation and disembarkation shall be constructed and installed in compliance with the *Guidelines for construction, installation, maintenance and inspection/survey of means of embarkation and disembarkation* (MSC.1/Circ.1331.). This shall include compliance with the standards:

5.3.1 ISO 5488 *Ships and marine technology — Accommodation ladders*

5.3.2 ISO 7061 *Ships and marine technology — Aluminium shore gangways for seagoing vessels*

5.3.3 ISO 7364 *Ships and marine technology — Deck machinery — Accommodation ladder winches*

5.4 The means of embarkation or disembarkation shall be sufficient to deliver safe embarkation or disembarkation whilst not alongside but not underway and at sea in all foreseeable conditions covered by the OSI.

Rule 6. Pilot Transfer Arrangements

6.1 The NVO shall present and justify a solution for demonstrating compliance to Part 1 of the ANC Rules. In the presentation and justification of a solution, the following shall be considered.

Solutions

6.2 Pilot transfer arrangements shall meet the requirements of SOLAS Chapter V Regulation 23, supplemented by the following.

6.3 All arrangements used for pilot transfer shall efficiently fulfil their purpose of enabling pilots to embark and disembark safely as required by paragraph 6.2, which includes:

6.3.1 The system shall comply with IMO Resolution A.1045(27) relating to pilot transfer.

6.3.2 All arrangements and equipment required to transfer pilots shall be maintained and periodically inspected in accordance with ISO 799 *Ships and marine technology – Pilot ladders*.

6.3.3 The pilot shall be escorted from the point of embarkation to and from the navigation bridge by a recognised safe route.

6.3.4 A pilot ladder shall be certified by the manufacturer as complying with SOLAS Chapter V Regulation 23 or ISO 799 *Ships and marine technology – Pilot ladders*.

6.3.5 Supporting essential safety equipment for use in the event of an accident during transfer shall be available on the side engaged in transfer.

6.3.6 The lighting shall be arranged such that adequate light is provided to support operations at the transfer point.

6.4 No single point of failure shall render communications between operators ineffective.

6.5 In addition to the lighting where the person embarks or disembarks (refer to Paragraph 6.2.6), lighting shall:

6.5.1 Be arranged without directing light into either the navigation bridge or the conning position of the transfer vessel.

6.5.2 Illuminate the route from the point of embarkation or disembarkation to the bridge to allow safe passage of the pilot through both internal and external sections. At night the transfer route shall be lit in such way it provides for safe passage while preserving the night vision of the pilot.

Rule 7. Not Used

Rule 8. Mooring

8.1 The NVO shall present and justify a solution for demonstrating compliance to Part 1 of the ANC Rules. In the presentation and justification of a solution, the following shall be considered.

Solutions

8.2 Mooring arrangements shall comply with SOLAS regulation II-1/3-8. This includes:

8.2.1 The mooring arrangement, equipment and fittings shall be designed, constructed and maintained to the mooring rules of the ship's Classification Society applicable to the area(s) of operation defined in the OSI, and shall be certified with the relevant character/construction symbols, or marks, assigned by that society.

8.2.2 For the design load of mooring points, account shall be taken of the structural strength of the area of the ship to which they are mounted as stated in IMO MSC/Circ.1175.

8.2.3 The consequential loads on all mooring points shall be adequate to withstand the maximum credible wind and current forces when moored in conditions defined within the OSI.

Note: Operations throughout all foreseeable conditions defined in the OSI encompasses the need to effectively moor the ship in extreme conditions and, where deemed necessary, the provision of additional mooring lines.

8.3 Mooring equipment shall be operable in accordance with seamanship practices described in a recognised code or manual including:

8.3.1 The United Kingdom Maritime and Coastguard Agency *Code of Safe Working Practices for Merchant Seamen* (COSWP)

8.3.2 United Kingdom Maritime and Coastguard Agency *Marine Guidance Note* (MGN 592 M+F) *Mooring, Towing or Hauling Equipment on All Vessels – Safe Installation and Safe Operation*

8.3.3 British Royal Navy Reference Book 67 (BR 67) – *The Admiralty Manual of Seamanship*.

8.4 Ships shall have sufficient space around mooring fittings for the lines to be handled and secured.

8.5 Mooring lines shall be of a material and manufacture which conforms to National or International Standard.

8.6 Selection of suitable mooring lines shall consider:

8.6.1 the behaviour of the material with regard to elongation, energy absorption, abrasion, friction, bending, fatigue (including compression and creep) and temperature

8.6.2 the conditions under which the line will be stored prior to and on completion of operations

8.6.3 that the mooring lines shall fail under load before the design load of the intended mooring point is exceeded

8.6.4 the overall strength and in particular to the behaviour of the material when approaching maximum load and under failure in order to minimise potential hazards to personnel in the vicinity of lines or equipment which fail under excessive load, balanced with the need for shock mitigation to prevent damage to the mooring system

8.6.5 In particular consideration is to be given to snap back zones with regard to the siting of personnel during mooring operations.

8.7 Mooring lines' stowage and handling arrangements shall be designed to protect the equipment from conditions in which degradation occurs.

8.8 A suitable regime for the inspection of all mooring lines and accompanying retirement criteria are to be detailed and adhered to, with an auditable record maintained.

8.9 Winches or windlasses shall be constructed to give warning of undue strains by stalling at below half the designed maximum safe working load of the weakest element in the system (e.g. bollard, fairlead, shackle, holding down bolt, etc.) and to afford further protection by walking-back at half the design load (e.g. breaking strength of the mooring rope, tow line or hawser whichever is applicable).

8.10 Pedestal roller fairleads, lead bollards and mooring bitts shall be designed to meet all foreseeable operational loads and conditions and:

8.10.1 sited, wherever practicable, such that only one line need be used on each item during normal mooring operations

8.10.2 where required by the OSI, take the design loads into account for the mooring of two or more ships abreast, and the need to double up mooring lines

8.10.3 where intended for use with high modulus mooring lines (such as high modulus polyethylene (HMPE)), consider the shock effects related to provision of shock mitigation components within the system.

8.11 Where bollards and other mooring attachments are not permanently available (for example where they are turned in to preserve fairness of form), then arrangement shall include manual

turn out functionality, whether normally operated under mechanical assistance or not. For example; a hydraulically operated system shall have a manual alternative mode such that a failure of the system does not render the mooring point inoperable.

8.12 The layout of the mooring decks shall be such that where mechanical means to work mooring lines (such as windlasses) have been provided the operating position for such equipment shall allow a clear and unobstructed view of the equipment. Consideration shall also be given to the safety of personnel in the event of a line or equipment failure when siting operating positions.

8.13 Safety warnings shall be provided to warn embarked persons of mooring line snap-back hazards for the entire mooring and upper decks, including:

8.13.1 Clear visible signage displayed to warn personnel of the potential hazard during mooring operations.

8.13.2 A bird's eye view of the mooring and upper decks shall be produced to identify areas of potential hazards.

8.13.3 Snap-back zones shall not be marked on deck.

Note: The entire mooring and upper decks within reach of a snap-back line is considered as a potential snap-back zone.

8.14 Where an enclosed mooring deck is used, remote visual monitoring equipment shall be installed allowing the observation of operations from the navigation bridge.

8.15 Where the OSI requires canal transits (such as Suez or Panama), mooring arrangements and equipment shall meet any special requirements imposed by the bodies controlling those water ways.

Rule 9. Anchoring

9.1 The NVO shall present and justify a solution for demonstrating compliance to Part 1 of the ANC Rules. In the presentation and justification of a solution, the following shall be considered.

Note: See Division 1 of the ANC Rules for the requirements of alternative solutions. Although this section is titled *Anchoring* a solution other than an anchor shall be accepted as being suitable provided it demonstrates an equivalent or superior level of performance to the traditional anchor methods discussed in the remainder of the solutions to this rule.

Solutions

9.2 The anchoring arrangement and equipment shall be designed, constructed and maintained to the anchoring rules of the ship's Classification Society applicable to the area(s) of operation defined in the OSI, and shall be certified with the relevant character/construction symbols, or marks, assigned by that society.

9.3 Anchoring equipment shall meet the requirements of IACS Recommendation No.10 *Anchoring, Mooring and Towing Equipment* where the OSI requires anchoring for ships in deep and unsheltered water or environmental conditions exceeding those covered by Classification Society rules (see paragraph 9.2).

9.4 Anchoring equipment shall be operable in accordance with seamanship practices described in British Royal Navy Reference Book 67 (BR 67) – *The Admiralty Manual of Seamanship* including:

9.4.1 anchor chain traditional cable shackle markings of the length deployed, independent of the ships power supplies.

Note: Additional methods of indicating the anchor cable length deployed may be provided which are dependent on ship's power supplies.

9.5 Provision shall be made for the controlled deployment and locking and slipping (abandonment) of the anchor shall be possible, in all environmental conditions and depths defined within the OSI, independent of the ship's power.

9.5.1 Where it is necessary to slip (abandon) an anchor and chain, a means shall be provided to visually mark the position of the abandoned anchor in order to alert other mariners to its presence as a fouling hazard and to aid subsequent recovery.

9.5.2 The bitter end of the chain cable shall be accessible to be released in an emergency from outside of the chain locker.

9.6 Where an enclosed anchor deck is used remote visual monitoring equipment shall be installed.

9.7 Where the OSI requires canal transits (such as Suez or Panama) anchoring arrangements and equipment shall meet any special requirements imposed by the bodies controlling those water ways.

9.8 Anchor system failure from exceeding the design limits should be achieved without damage to the structure of the ship. The system should therefore not fail at the bitter end but rather at the deployed end of the arrangement.

Rule 10. Towing

10.1 The NVO shall present and justify a solution for demonstrating compliance to Part 1 of the ANC Rules. In the presentation and justification of a solution, the following shall be considered.

Solutions

10.2 Towing arrangements shall comply with SOLAS regulation II-1/3-8. This includes:

10.2.1 The towing arrangement, equipment and fittings shall be designed, constructed and maintained to the towing rules of the ship's Classification Society applicable to the area(s) of operation defined in the OSI, and shall be certified with the relevant character/construction symbols, or marks, and associated class notation assigned by that society.

10.2.2 IMO MSC/Circ.1175 *Guidance on Shipboard Towing and Mooring Equipment.*

10.3 The emergency towing arrangements shall meet the requirements of SOLAS Chapter II-1 regulation 3-4. This includes:

10.3.1 IMO MSC.1/Circ.1255 *Guidelines for Owners/Operators on Preparing Emergency Towing Procedures*.

10.4 Towing equipment shall be operable in accordance with seamanship practices described in a recognised code or manual including:

10.4.1 BR 67 – *The Admiralty Manual of Seamanship*

10.4.2 The United Kingdom Maritime and Coastguard Agency *Code of Safe Working Practices for Merchant Seamen* (COSWP)

10.4.3 The United Kingdom Maritime and Coastguard Agency *Marine Guidance Note (MGN592 M+F) Mooring, Towing or Hauling Equipment on All Vessels – Safe Installation and Safe Operation*.

10.5 The scope of towing operations for which the ship is expected to perform, shall be as defined in the OSI. As a minimum provision shall be made for the ship to be taken in tow by another vessel using a line the ship has provided to the towing vessel for that purpose.

10.6 Consideration shall be given to the provision of a method of remote control which allows the towing line to be slipped without requiring personnel to be within the snap-back zone of any line under tension.

10.7 Towing lines' stowage and handling arrangements shall be designed to protect the equipment from conditions in which degradation occurs.

10.8 A suitable regime for the inspection of all towing lines and accompanying retirement criteria are to be detailed and adhered to, with an auditable record maintained.

10.8.1 Towing Lines are to be inspected once dried after each operation for signs of excessive stress or damage caused by salt crystallisation within the body of the line itself.

10.9 Consideration shall be given to the provision of a high integrity emergency towing line which is held specifically for emergency use in order to prevent any degradation which occurs through normal use.

10.10 Towing system design should take account of failure modes and ensure that the system fails in such a way the personnel required to operate the system were placed in positions which minimised the risk of injury.

10.11 The towing arrangement and system should be designed to fail in manner which:

10.11.1 minimises damage to the ship's structure

10.11.2 enables the tow to be quickly restored

10.11.3 minimises the impact of snapback

10.11.4 does not adversely affect the towing point

10.11.5 ensures the towing line fails under load before the design load of the intended towing point is exceeded.

10.12 Provision shall be made to terminate the towing operation in a manner which allows for:

10.12.1 the towing line's release while under strain

10.12.2 the safely re-establishment of the towing line if required

10.12.3 terminating the towing evolution with urgency by severing the tow cable itself in a manner which minimises the risk to embarked persons.

Rule 11. Replenishment at Sea (RAS)

11.1 The NVO shall present and justify a solution for demonstrating compliance to Part 1 of the ANC Rules. In the presentation and justification of a solution, the following shall be considered.

Solutions

11.2 Where the OSI requires the conduct of Replenishment at Sea (RAS) the ships arrangements shall meet the requirements of: ATP/MTP 16 *Replenishment at Sea,* supplemented by the following.

Note: ATP 16/MTP 16 *Replenishment at Sea* provides comprehensive guidance on procedures and arrangements for the transfer of personnel or stores while underway. Given that the compliance with ATP/MTP 16 will enhance interoperability with a range of nations any decision to depart from the requirements of that document shall be carefully considered.

11.3 Replenishment at sea arrangements shall be designed to meet the requirements of ANEP-89 – *Design Criteria for Replenishment Aspects of New Construction Naval Vessels* (STANAG 1310).

11.4 Hose couplings and end fittings for ship-to-ship operations shall meet the requirements of MIL-C-24356 *Couplings, segmented and split clamps re-attachable, 2-1/2-, 4-, 6-, and 7-inch, for refuelling at sea hose*.

11.5 Hoses shall meet the requirements of MIL-H-22240 *Lightweight buoyant type, smooth bore, petroleum-based fuels, and discharge-only water service rubber hoses*.

11.6 Where a capability to RAS by line transfer between ships is required by the OSI, the RAS system design shall consider the method of approach to be employed by the ships involved and any impact on the requirements placed upon the ships propulsion and steering systems given the interaction effects between hulls whilst underway.

11.7 The replenishment system shall be designed to transfer the scope of stores to or from the ship whilst underway in addition to the methods of transfer to be employed as defined in the OSI.

11.8 In the selection of RAS points consideration shall be given to the effects of pressure and suction between two vessels and their potential to cause dangerous interaction.

11.9 Replenishment at sea arrangements and equipment shall be designed not to place embarked persons at unnecessary risk of hazards including:

11.9.1 hazardous materials or liquids

11.9.2 moving parts

11.9.3 falling overboard

11.9.4 slips, trips or falls

11.9.5 manual handling

11.9.6 swinging or unrestrained loads

11.9.7 working at heights

11.9.8 concurrent operational activities.

Note: See Division 2 Chapter 01 *General Requirements* Rule 3 *System Safety* for the requirements relating to hazard identification and risk management.

11.10 In designing the layout of the deck around the replenishment at sea arrangements, sufficient physical space for the personnel engaged in the operation and their associated movement shall be provided for operations including:

11.10.1 transfer stations for rig and cargo handling

11.10.2 breakout and strikedown spaces

11.10.3 access routes between RAS stations and cargo stowage areas including use of mechanical handling equipment

11.10.4 support facilities for RAS equipment stowage.

11.11 Wherever feasible, highpoints shall be sliding to facilitate the handling, loading and unloading of rigs at deck level.

11.12 Support line winches shall incorporate constant tension control or anti-slack device to minimise slack line.

Rule 12. Boat Operations

12.1 The NVO shall present and justify a solution for demonstrating compliance to Part 1 of the ANC Rules. In the presentation and justification of a solution, the following shall be considered.

Solutions

12.2 Boats' launching and recovery equipment shall:

12.2.1 where the OSI requires the conduct of boat launch and recovery while alongside, be arranged so at least one boat can always be launched and recovered while the ship is alongside

12.2.2 launch and recover ship's boats, where necessary utilising painters, with the ship making way at the speeds and environmental conditions defined within the OSI

12.2.3 for lifting appliances that routinely launch sea boats/work boats/tender boats in addition to rescue boats and survival craft, lifting appliances shall be designed, constructed and maintained to:

12.2.3.1 the sea boats/work boats/tender boats launching appliance rules and standards of the ship's Classification Society as required in Rule 15 *Lifting and Hoisting Appliances*

12.2.3.2 take account of the higher frequency of operation (and consequent duty cycles) of sea boat/work boat/tender boat launching appliances compared to the design life of standard rescue boat launching appliances and their components.

12.2.4 where boat launching arrangements are located behind moveable screens (due to factors such as protection or to reduce ship radar cross section), include manual screen movement functionality, under the dead ship condition.

12.3 The position of the operator and the equipment, such as cranes and davits, shall be such that the controller has a line of sight on the operator and the equipment during the launch and recovery of the boat and personnel at all times.

12.4 In designing the layout of the deck around the boat launch position the requirement for sufficient physical space for the personnel engaged in the operation and their associated movement shall be provided for in all modes of operation and maintenance.

12.5 No single point of failure shall render communications between operators ineffective.

12.6 The means of transferring persons and equipment in and out of boats shall not place those persons at risk of conventional hazards including:

12.6.1 falling overboard

12.6.2 slips, trips or falls

12.6.3 manual handling risks.

12.7 Where equipment is to be transferred in and out of boats the method of transfer shall be suitable for the size and weight of the equipment and take due account of the risk of persons engaged in manually handling.

Rule 13. Not Used

Rule 14. Diving Operations

14.1 The NVO shall present and justify a solution for demonstrating compliance to Part 1 of the ANC Rules. In the presentation and justification of a solution, the following shall be considered.

Solutions

14.2 The ship shall be provided with diving arrangements and equipment to meet the scope and nature of diving operations for which it is authorised to conduct as defined in the OSI, including any requirements for:

14.2.1 dive profile (depth and duration of underwater diving operations)

14.2.2 interoperability

Note: Diving practices for NATO interoperability are described in NATO ADivP-01 *Allied Guide to Diving Operations* (STANAG 1372).

14.2.3 quantity (including contingency supplies) of breathing gases

14.2.4 composition of breathing gases

14.2.5 on site operational recompression chamber

14.2.6 diver orientation system

14.2.7 divers' portable equipment requiring support facilities

14.2.8 divers' hygiene and decontamination facilities.

14.3 Diving equipment and support systems shall be designed, constructed and maintained to meet the requirements of AS/NZS 2299.1 *Occupational diving operations*, Part 1: *Standard*

operational practice with schedule of modifications in the WHS 122 *Defence High Risk Diving Work Standard*, which includes the provision of:

14.3.1 First aid and medical equipment; and first response facilities commensurate with the diving operation shall be provided to the ship, including the following:

14.3.1.1 oxygen resuscitation equipment

Note: See Chapter 15 *Health Facilities*, Rule 3 *Casualty first response facilities* for general first aid capability.

14.3.1.2 an on-site operational recompression chamber if required by the OSI.

14.3.2 breathing gases provided for diving purposes including the following characteristics:

14.3.2.1 composition for the required dive profiles

14.3.2.2 quality

14.3.2.3 arrangements for primary and secondary breathing gas supplies

14.3.2.4 quantity of emergency breathing gases for the required dive profiles.

14.3.3 testing equipment (such as detector tube air test kit) for the assessment of the purity of breathing gases, including the presence of oil

14.3.4 surface supplied breathing apparatus (SSBA) and self-contained underwater breathing apparatus (SCUBA)

14.3.5 diving breathing gas compressors.

14.4 SSBA and SCUBA equipment and associated breathing gases shall meet the requirements of a recognised standard where the dive profile requires diving depths exceeding those covered by AS/NZS 2299.1 (see paragraph 14.3).

14.5 All pressure gauges for regulators used directly in compressed breathing gas cylinder valves shall meet the requirements of AS 4706 *Pressure gauges for regulators used with compressed gas cylinders*.

14.6 The diving system shall meet the requirements of MSC.548(107) *International Code for Safety for Diving Operations*, for the following:

14.6.1 Systems to ensure safe deployment and recovery of the divers shall be provided, including:

14.6.1.1 Diving access shall be provided, where possible, by ladder up to 2 m from the water surface or by stairs up to 4 m from the water surface.

14.6.1.2 Where diving access is not provided to meet paragraph 14.6.1.1, a diving Launch and Recovery System (LARS) shall be provided.

14.6.1.3 Systems shall be provided for the recovery of incapacitated divers in an emergency with consideration given to Chapter *07 Escape, Evacuation and Rescue* Rule 27 *Rescue Arrangements* if the rescue equipment is to serve dual purposes.

14.6.2 For diving systems storage facilities, in accordance with MSC.548(107), Section 3.5 *Placement and configuration of diving system on diving platform*.

14.7 The diving system shall provide breathing gases, at the required quantity required in the OSI.

14.8 The diving arrangement, equipment and fittings shall be designed to ensure the risks associated with the following are eliminated or minimised:

14.8.1 propulsion

14.8.2 rudders

14.8.3 stabilisers

14.8.4 underwater inlets and outlets

14.8.5 waste water discharges

14.8.6 cathodic protection

14.8.7 underwater acoustic emissions (including sonar)

14.8.8 anchoring.

14.9 Ship equipment posing risks to diving operations (including but not limited to those listed in 14.8.1 to 14.8.7), shall be controllable in accordance with practices described in NATO ADivP-01 *Allied Guide to Diving Operations* (STANAG 1372), including immobilisation and transmission control.

14.10 Where the OSI requires a diver orientation system to be fitted to the hull, the underwater hull and fittings shall be permanently and clearly marked externally (including tank boundaries).

14.11 Designated diving equipment facilities shall be provided and include the following:

14.11.1 secure fastening by straps, hooks, or fasteners to stow diving equipment in place, in all foreseeable operating conditions

14.11.2 drying racks and hangers for diving equipment as defined in the OSI

14.11.3 a designated area, tools, and equipment for pre- and post-dive inspections, routine cleaning, and maintenance

14.11.4 ventilation in accordance with Chapter 4 *Engineering Systems*, Rule 19 *Heating, Ventilation and Air Conditioning (HVAC)*

14.11.5 fresh water rinsing facilities to remove salt, sand, and other debris

14.11.6 shading in covered storage areas, or indoors.

14.12 Designated diving hygiene and decontamination facilities shall be provided as defined in the OSI and include the following:

14.12.1 Where diving occurs in contaminated environments, decontamination facilities for divers, dive attendants and all exposed equipment.

14.12.2 Sanitary facilities for diving operations shall comply with the Chapter 12 *Habitability* Rule 6 *Hygiene requirements*.

Rule 15. Lifting and Hoisting Appliances

15.1 The NVO shall present and justify a solution for demonstrating compliance to Part 1 of the ANC Rules. In the presentation and justification of a solution, the following shall be considered.

Solutions

15.2 The lifting appliances shall be designed, constructed and maintained to the lifting appliance rules of the ship's Classification Society applicable to the area(s) of operation defined in the OSI, and shall be certified with the relevant character/construction symbols, or marks and associated class notation assigned by that society. This includes:

15.2.1 Lifting appliances shall be designed with:

15.2.1.1 Fail safe functionality for its limit switches (such as those provided for the restriction of lifting appliance movement or the prevention of overloading).

15.2.1.2 Provision for the controlled means to raise, lower and traverse loads in all modes of operation.

15.2.1.3 Additional safety factors and devices, where the appliance may be used for handling personnel (including lifting and transfer).

15.2.1.4 Provisions in the event of motive power failure to:

a. ensure the load remains in position

b. afterwards, the means to safely move the load to a pre-determined location.

15.2.2 Lifting appliances shall be load tested and thoroughly examined before being taken into use for the first time and after repairs, modifications or alterations of major character.

15.2.3 Lifting appliances and loose gear shall be subject to a planned maintenance system including the routine through life conduct of:

15.2.3.1 load testing of lifting appliances

15.2.3.2 thorough examinations of lifting appliances and loose gear

15.2.3.3 operational testing, inspection and maintenance of lifting appliances and loose gear.

15.3 The ship shall be provided with documentation for each lifting appliance covering all of the following:

15.3.1 a rigging plan

15.3.2 drawings of the lifting appliance

15.3.3 operational instructions for assembling and using the lifting appliances meeting the requirements of Rule 3 *Provision of Operational Information*

15.3.4 maintenance instructions for the lifting appliances covering the planned maintenance system requirements of 15.2.3.

15.4 Lifting arrangements and equipment shall be designed not to place embarked persons at unnecessary risk of hazards including:

15.4.1 lighting for lifting appliance access and operations to enable operators to safely carry out their duties

15.4.2 falling overboard

15.4.3 slips, trips or falls

15.4.4 manual handling risks

Note: See Division 2 Chapter 01 *General Requirements* Rule 3 *System Safety* for the requirements relating to hazard identification and risk management.

15.5 Lifting appliances and loose gear shall be permanently and clearly marked with all the following:

15.5.1 Working Load Limit (WLL) or Safe Working Load (SWL)

15.5.2 the maximum test load

15.5.3 a distinguishing identification mark

15.5.3.1 an article of loose gear may be identified using a batch mark or number, if that mark is verified by a test.

Note: Where marking the lifting appliance is not possible, an alternative adjacent location may be acceptable to the ANC Authority.

15.6 The layout of lifting appliances shall be such that the operating position shall allow a clear and unobstructed view of the load.

15.7 Where more than one operating position is provided for a lifting appliance:

15.7.1 It shall not be possible for more than one operating position to control the same operation simultaneously.

15.7.2 All related operating positions shall provide a clear and unambiguous indication of their status as primary (i.e. in control) or secondary/additional (i.e. passive).

15.7.3 The means of transfer of control from one operating position to another shall minimise the opportunity for, and reduce the consequence of, human error.

15.7.4 Transfer of control from one operating position to another shall be indicated with clear and unambiguous visual and audible indications on all related operating positions.

15.7.5 Transfer of control from one operating position to another shall not affect the equipment and systems being controlled.