Contents

RULES FOR NAVIGATION BRIDGE SYSTEMS 2
Chapter 1 GENERAL 2
1.1 General 2
Chapter 2 SURVEYS OF NAVIGATION BRIDGE SYSTEMS 4
2.1 General 4
2.2 Registration Surveys 5
2.3 Registration Maintenance Surveys 6
Chapter 3 BRIDGE LAYOUTS AND BRIDGE WORKING ENVIRONMENTS 8
3.1 General 8
3.2 Bridge Working Environment 8
Chapter 4 NAVIGATIONAL EQUIPMENT 10
4.1 General 10
4.2 Navigational Equipment 10
Chapter 5 ACCIDENT PREVENTION SYSTEMS 12
5.1 General 12
5.2 Accident Prevention Systems 12
Chapter 6 BRIDGE WORK ASSIST SYSTEMS 14
6.1 General 14
6.2 Bridge Work Assist Systems 14

RULES FOR NAVIGATION BRIDGE SYSTEMS

Chapter 1 GENERAL

1.1 General

1.1.1 Scope

The Rules for Navigation Bridge Systems (hereinafter referred to as "the Rules") apply to bridge layouts and bridge working environments, navigational equipment and accident prevention systems (hereinafter referred to as "navigation bridge systems") of ships classified by the NIPPON KAIJI KYOKAI (hereinafter referred to as "the Society") and intended to be registered under **Chapter 3 of the Regulations for the Classification and Registry of Ships**.

1.1.2 Equivalency

Navigation bridge systems which do not fully comply with the requirements of the Rules may be accepted provided that they are deemed by the Society to be equivalent to those specified in the Rules.

1.1.3 Navigation Bridge Systems with Novel Design Features

In the case of navigation bridge systems with novel design features, the Society may apply the requirements of the Rules so far as practicable as well as any other requirements which are considered appropriate by the Society.

1.1.4 Modification of Requirements*

In cases where considered appropriate, the Society may modify parts of any requirements specified in the Rules in consideration of the national requirements of ship flag states, ship type and intended service areas of ships.

1.1.5 Definitions

The terms **BRS**-ship, **BRS1**-ship and **BRS1A**-ship which appear in the Rules are defined as follows:

(1) **BRS**-ships are those ships in which bridge layouts, bridge working environments and navigational equipment comply with those requirements given in **Chapters 3** and **4**.

(2) **BRS1**-ships are those **BRS**-ships in which accident prevention systems comply with the requirements given in **Chapter 5**.

(3) **BRS1A**-ships are those ships in which bridge layouts and bridge working environment, navigational equipment, accident prevention systems and bridge work assist systems comply with the requirements given in **Chapters 3** to **6**.

1.1.6 Installations Characters

1 Character "**BRS**" is given in the Register for those navigation bridge systems of **BRS**-ships.

2 Character "**BRS1**" is given in the Register for those navigation bridge systems of **BRS1**-ships.

3 Character "**BRS1A**" is given in the Register for those navigation bridge systems of **BRS1A**-ships.

1.1.7 Terminology

Terms used in the Rules are defined as follows:

(1) "Back-up navigator" is any individual, generally an officer, who has been designated by the ship master to be on call if assistance is needed on the bridge.

(2) "Bridge" is an area from which the navigation and control of the ship is exercised, including wheelhouses and bridge wings

(3) "Bridge wings" are parts of the bridge on both sides of ship wheelhouses which extend to ship sides.

(4) "Conning position" is a place on the bridge with a commanding view and which is used by navigators when commanding, manoeuvring and controlling ships.

(5) "Main conning position" is a conning position which is mainly used by navigators.

(6) "Field of vision" is an angular size of a scene that can be observed from position on ship bridges.

(7) "Navigator" is a person navigating, operating bridge equipment and manoeuvring ships.

(8) "Wheelhouse" is an enclosed area of the bridge.

(9) "Workstation" is a position at which one or several tasks constituting a particular activity are carried out.

(10) “Centralized bridge workstation” is a workstation where any navigational equipment needed for navigation and maneuvering are centrally arranged, including main conning positions.

(11) “Ocean areas” are areas in which the freedom of course setting in any direction for a distance equivalent to at least a period of 30 *minutes* sailing in which navigating speed is not restricted.

Chapter 2 SURVEYS OF NAVIGATION BRIDGE SYSTEMS

2.1 General

2.1.1 Kinds of Surveys

Navigation bridge systems registered or intended to be registered are to be subjected to the following surveys:

(1) Surveys for registration of navigation bridge systems (hereinafter referred to as "Registration Surveys")

(2) Surveys for maintaining registration of navigation bridge systems (hereinafter referred to as "Registration Maintenance Surveys"), which are:

(a) Special Surveys

(b) Annual Surveys

(c) Occasional Surveys

(d) Unscheduled Surveys

2.1.2 Time of Registration Surveys and Intervals of Registration Maintenance Surveys*

1 Registration Surveys are to be carried out at the time application for registration is made.

2 Registration Maintenance Surveys are to be carried out at the following intervals:

(1) Special Surveys are to be carried out at those intervals specified in **1.1.3-1(3), Part B of the Rules for the Survey and Construction of Steel Ships**.

(2) Annual Surveys are to be carried out at those intervals specified in **1.1.3-1(1), Part B of the Rules for the Survey and Construction of Steel Ships**.

(3) Notwithstanding **(1)** and **(2)** above, Occasional Surveys are to be carried out independently of Special Surveys and Annual Surveys in cases. To implement the survey, in lieu of the traditional ordinary surveys where a surveyor is in attendance, the Society may approve survey methods which it considers to be appropriate.

(a) Any main parts of systems have been damaged, repaired or renewed,

(b) Any systems are modified or altered, or

(c) Any time considered necessary by the Society.

(4) The classed ships may be subject to Unscheduled Surveys when the confirmation of the status of systems by survey is deemed necessary in cases where the Society considers the systems to be subject to **1.4-3 of the Conditions of Service for Classification of Ships and Registration of Installations**.

2.1.3 Special Surveys and Annual Surveys Carried Out in Advance, etc.

1 Surveys carried out in advance

The requirements for Special Surveys and Annual Surveys carried out in advance are to be in accordance with those provisions specified in **1.1.4, Part B of the Rules for the Survey and Construction of Steel Ships**.

2 Postponement of Special Surveys

The requirements for the postponement of Special Surveys are to be in accordance with those provisions specified in **1.1.5-1(1)** or **1.1.5-1(2), Part B of the Rules for the Survey and Construction of Steel Ships**.

2.1.4 Preparation for Surveys

1 All such preparations required for surveys to be carried out as well as any preparations which may be required by Surveyors as necessary in accordance with the requirements given in the Rules are to be made by survey applicants. Such preparations are to include necessary facilities and necessary records for survey execution. Any inspection, measuring and test equipment, which Surveyors rely on to make decisions affecting classification are to be individually identified and calibrated to standards deemed appropriate by the Society. However, Surveyors may accept simple measuring equipment (*e.g.* rulers, measuring tapes, weld gauges, micrometers) without individual identification or confirmation of calibration, provided that they are of standard commercial design, properly maintained and periodically compared with other similar equipment or test pieces. Surveyors may also accept equipment fitted on board ship and used in the examination of shipboard equipment (*e.g.* pressure, temperature or rpm gauges and meters) based either on calibration records or comparison of readings with multiple instruments.

2 Survey applicants are to arrange supervisors who are well conversant with those survey items intended for survey preparation in order to provide any necessary assistance to Surveyors according to their requests during surveys.

3 Surveys may be suspended in cases where the necessary preparations have not been made, any appropriate supervisor mentioned in the **-2** above is not present, or Surveyors consider that safety for survey execution is not ensured.

2.1.5 Recommendations

In cases where repairs are deemed necessary as a result of a survey, Surveyors will inform owners or their representatives of their recommendations. Upon notification, repairs are to be made to the satisfaction of the Surveyor.

2.1.6 Laid-up Ships

1 Laid-up ships are not subject to Registration Maintenance Surveys. However, Occasional Surveys may be carried out at the request of owners.

2 When laid-up ships are about to be re-entering service, the following surveys and surveys for specific matters which have been postponed due to being laid-up, if any, are to be carried out.

(1) If the due dates for Registration Maintenance Surveys have not transpired while the ship was laid-up, then an equivalent to the Annual Surveys specified in **2.3.2** is to be carried out.

(2) If the due dates for Registration Maintenance Surveys have transpired while the ship was laid-up, then these Registration Maintenance Surveys are, in principle, to be carried out. However, in cases where Special Surveys and Annual Surveys are due, only the Special Surveys may be carried out.

2.2 Registration Surveys

2.2.1 Submission of Plans and Documents

1 In the case of navigation bridge systems of **BRS**-ships, the plans and documents specified in **(1)** to **(5)** are to be submitted to the Society for approval.

(1) General arrangements of bridges (showing main conning positions, other conning positions, workstations, locations of control consoles and panels, and passage ways)

(2) Particulars of the navigational equipment specified in **4.2.2**

(3) Electrical wiring diagrams for the navigational equipment specified in **4.2**

(4) Schemes of on board tests and sea trials including methods of tests and test facilities provided

(5) Other drawings and data deemed necessary by the Society

2 In the case of navigation bridge systems of **BRS1**-ships, the plans and documents specified in **(1)** to **(3)** are to be submitted to the Society for approval.

(1) The drawings and data specified in **-1** above

(2) Particulars of those accident prevention systems specified in **5.2**

(3) Electrical wiring diagrams for those accident prevention systems specified in **5.2**

3 In the case of navigation bridge systems of **BRS1A**-ships, the plans and documents specified in **(1)** to **(4)** are to be submitted to the Society for approval.

(1) The drawings and data specified in **-2** above

(2) Particulars of those bridge work assist systems specified in **6.2**

(3) Electrical wiring diagrams for those bridge work assist systems specified in **6.2**

(4) Detail arrangements of those centralized bridge workstations specified in **6.1.3** (dimensions of control consoles, panel arrangements, etc., are to be shown)

4 The plans and documents specified in **-1** to **-3** above are to be submitted the Society in accordance with **(1)** to **(3)** below.

(1) Where the submission of plans and documents by paper, 2 sets for the Society and necessary sets for returning to the applicant are to be submitted.

(2) Where the submission of plans and documents electrically, the plans and documents are to be submitted using the systems prepared by the Society.

(3) Where the submission of plans and documents by means other than **(1)** and **(2)** above, the plans and documents are to be submitted by the means deemed appropriate by the Society.

2.2.2 Shop Tests*

All equipment listed in **(1)** to **(13)** below is to be approved by the Society. However, any equipment approved by the Government for the State whose flag the ship is entitled to fly, other Contracting Governments of the International Convention for The Safety of Life at Sea or any parties approved by the Governments mentioned above may be exempted from these requirements provided that it is deemed appropriate by the Society.

(1) Automatic radar plotting aids (ARPA)
(2) Electronic position-fixing systems
(3) Radars
(4) Gyro compass systems
(5) Heading control systems (HCS)
(6) Speed and distance measuring equipment
(7) Echo sounding devices
(8) Maritime safety information receivers
(9) VHF radio telephone installations
(10) Bridge navigational watch alarm systems (BNWAS)
(11) Electronic chart display and information systems (ECDIS)
(12) Track control systems (TCS)
(13) Any other equipment deemed necessary by the Society

2.2.3 Tests after Installation On Board*

Bridge layouts and bridge working environments, navigational equipment, and accident prevention systems, after installation on board, are to be verified, in accordance with those schemes of on board tests approved by the Society, as being constructed, installed and functioning properly under working conditions. Part of this verification may be carried out during sea trials.

2.2.4 Sea Trials*

Bridge layouts and bridge working environments, navigational equipment, and accident prevention systems are to be verified, in accordance with those schemes of sea trials approved by the Society, as being constructed, installed and functioning properly.

2.3 Registration Maintenance Surveys

2.3.1 Special Surveys*

1 During Special Surveys of navigation bridge systems of **BRS**-ships, the following tests and examinations are to be carried out:

(1) General examination of systems
(2) Function tests of the navigational equipment specified in 4.2.2(1) to **(5)**, **(7)** to **(11)** and **(13)** to **(16)**
(3) Verification of the capability of navigational equipment to be reinstated after a 45 *second* interruption of electrical power supplies

2 During Special Surveys of navigation bridge systems of **BRS1**-ships, the following tests and examinations are to be carried out:

(1) Those tests and examinations specified in **-1** above
(2) Function tests of accident prevention systems specified in 5.2
(3) Verification of the capability of accident prevention systems to be reinstated after a 45 *second* interruption of electrical power supplies

3 During Special Survey of navigation bridge systems of **BRS1A**-ships, the following tests and examinations are to be carried out:

(1) Those tests and examination specified in **-2** above
(2) Function tests of bridge work assist systems specified in 6.2
(3) Verification of the capability of bridge work assist systems to be reinstated after a 45 *second* interruption of electrical power supplies

2.3.2 Annual Surveys*

1 During Annul Surveys of navigation bridge systems of **BRS**-ships, the following tests and examinations are to be carried out:

(1) General examination of the systems

(2) Function tests of the following equipment:

(a) Automatic radar plotting aids (ARPA)

(b) Electronic position-fixing systems

(c) Radars

(d) VHF radio telephone installations

(e) Internal communication systems

(f) Any other equipment deemed necessary by the Society

2 During Annual Surveys of navigation bridge systems of **BRS1**-ships, the following tests and examinations are to be carried out:

(1) The tests and examination specified in **-1** above

(2) Function tests of the following equipment

(a) Bridge navigational watch alarm systems (BNWAS)

(b) Alarm and warning transfer systems

3 During Annual Surveys of navigation bridge systems of **BRS1A**-ships, the following tests and examinations are to be carried out:

(1) Those tests and examinations specified in **-2** above

(2) Function tests of the following equipment:

(a) Bridge information systems

(b) Electronic chart display and information systems (ECDIS)

(c) Track control systems (TCS)

2.3.3 Unscheduled Surveys

At Unscheduled Surveys, investigations, examinations or tests are to be made to the satisfaction of the Surveyor with respect to the matters concerned.

Chapter 3 BRIDGE LAYOUTS AND BRIDGE WORKING ENVIRONMENTS

3.1 General

3.1.1 Scope

The requirements in this Chapter apply to bridge layouts and bridge working environments for **BRS**-ships, **BRS1**-ships and **BRS1A**-ships.

3.1.2 General

1 All bridge configurations, arrangements of consoles, equipment locations and bridge working environments are to enable navigators to perform navigational duties and other functions allocated to bridges as well as to maintain proper lookouts from workstations on bridges.

2 Navigating and manoeuvring workstations are to be arranged so as to enable efficient operation under normal operating conditions. All relevant instrumentation and controls are to be easily visible, audible and accessible from such workstations.

3 For the purpose of performing duties related navigation and manoeuvring, fields of vision from navigating and manoeuvring workstations and conning positions are to be such as to enable observation of all objects which may affect ship safety.

4 Navigators are, as far as practicable, to be able to closely approach at least one bridge front window in order to watch those areas immediately in front of bridge superstructures from wheelhouses.

5 Bridges are, as far as practicable, to be placed above all other decked structures, not including funnels, which are on or above freeboard decks.

6 Regardless of ship length, navigation bridge visibility of ships is to be in accordance with **Part W of the Rules for the Survey and Construction of Steel Ships**.

3.2 Bridge Working Environment

3.2.1 General

1 Throughout the various stages of ship design, care is to be taken to ensure good working environments for bridge personnel.

2 All ceilings and walls inside wheelhouses are to be designed not to interfere with any reading of instrument indicators.

3 Toilet facilities are to be provided on or adjacent to bridges.

3.2.2 Vibrations*

Vibration levels on bridges are not to be uncomfortable for bridge personnel.

3.2.3 Noise*

Noise levels on bridges are not to interfere with any verbal communication, mask audible alarms or be uncomfortable for bridge personnel.

3.2.4 External Sound Signals

External sound signals, such as fog signals, that are audible on bridge wings are also to be audible inside wheelhouses.

3.2.5 Lighting

1 All lighting required on bridges is to be designed so as not to impair the night vision of navigators.

2 Any lighting used in areas and at items of equipment requiring illumination whilst ships are navigating is to be such that night vision adaptation is not impaired, e.g. red lighting. Such lighting is to be arranged so that it cannot be mistaken for navigation lights by other ships. It is to be noted that red lighting is not to be fitted over chart tables so that any possible confusion in colour discrimination is avoided.

3.2.6 Air Conditioning Systems

Wheelhouse spaces are to be provided with air conditioning systems. System controls are to be readily available to navigators.

3.2.7 Bridge Personnel Safety*

1 There are to be no sharp edges or protuberances which could cause injury to bridge personnel on the surfaces of any equipment and instruments installed on bridges.

2 Sufficient hand-rails or equivalent thereto are to be fitted inside of wheelhouses or around all equipment in wheelhouses for safety times of bad weather.

3 Adequate means are to be made for anti-slip bridge floors in both dry and wet conditions.

4 Doors to bridge wings are to be easy to open and close. Means are to be provided to hold the doors open at any position.

5 In cases where provisions for navigator seating are made in wheelhouses, means for securing such seating are to be provided with regard given to storm conditions.

Chapter 4 NAVIGATIONAL EQUIPMENT

4.1 General

4.1.1 Scope

The requirements given in this Chapter apply to the navigational equipment for **BRS**-ships, **BRS1**-ships and **BRS1A**-ships.

4.1.2 General

1 Navigational equipment is to be capable of continuous operation under the various sea conditions, vibration, humidity as well as any temperature and electromagnetic interference likely to be experienced by ships in which such equipment is installed.

2 In cases where computerized equipment is interconnected through computer networks, failure of such networks is not to prevent any individual equipment from performing their individual functions.

4.1.3 Electrical Power Supply*

1 Local distribution boards for all items of electrically operated navigational equipment are to be arranged in wheelhouses. These boards are to be supplied by two exclusive circuits, one fed from main sources of electrical power and one fed from emergency sources of electrical power; and, these circuits are to be separated as far apart as is practicable throughout their entire length. Items of navigational equipment are to be individually connected to distribution boards. These boards may also be used for those accident prevention systems specified in **Chapter 5**.

2 Power supplies to distribution boards are to be arranged with automatic changeover facilities between the two sources.

3 Any failures of main electrical power supplies to distribution boards are to initiate audible and visual alarms at such distribution boards.

4 Following any loss of electrical power which has lasted for a period of 45 *seconds* or less, all primary functions of navigational equipment are to be capable of being reinstated.

4.2 Navigational Equipment

4.2.1 General*

1 The instrumentation and controls at navigating and manoeuvring workstations are to be arranged to enable the navigator to easily do the following:

(1) Determine and plot ship position, course, track and speed

(2) Analyse traffic situations

(3) Decide on collision avoidance manoeuvres

(4) Alter course

(5) Change speed

(6) Effect internal communication and external communication using VHF radio telephone installations related to navigation and manoeuvring

(7) Give sound signals

(8) Hear sound signals

(9) Monitor navigational data such as course, speed, track, propeller revolutions (pitch), rudder angle, depth of water

(10) Record navigational data.

2 Navigational equipment is to be arranged to avoid any inadvertent operation.

3 Navigational equipment is to be designed to permit easy and correct reading by day and by night.

4 Each navigational equipment is to be placed with its face normal to the line of sight of navigators, or to mean values if the line of sight of navigators vary according to angle.

5 Navigational equipment is to be designed and fitted to minimize any glare and reflections or from being obscured by strong light.

4.2.2 Navigational Equipment*

All of the navigational equipment listed in **(1)** to **(17)** below is to be provided on bridges:

(1) Automatic radar plotting aids (ARPA) separate from or combined with any of the radar required by **(3)** and which comply with performance standards deemed appropriate by the Society.

(2) Electronic position-fixing systems appropriate for the intended service areas

(3) Two independent radars. One of them is to operate within *X-band*.

(4) Gyro compass repeaters and calibration facilities

(5) Heading control systems (HCS) which comply with performance standards deemed appropriate by the Society.

(6) Speed and distance measuring equipment

(7) Echo sounding devices

(8) Control devices of wheelhouse air conditioning systems

(9) NAVTEX receivers and EGC receivers depending upon the intended service areas

(10) Control switches and indicators of signaling lights such as navigation lights

(11) Steering pump selectors/control switches

(12) Whistle control systems

(13) Window wipes and wash control devices

(14) Control devices for the lighting of main workstation consoles

(15) Internal communication systems which comply with the following:

(a) Navigators are at all times to have access to facilities enabling two way communication with another qualified officer even in the event of any failure of main electrical power supplies.

(b) The bridge is to have priority over the use of communication systems.

(16) VHF radio telephone installations which are immediately available at conning positions.

(17) Main propulsion machinery remote control systems which comply with the Rules for Automatic and Remote Control Systems

4.2.3 Illumination and Individual Lighting of Equipment

1 The indicator lights and illumination of all equipment are to be designed and fitted to avoid any unnecessary glare or reflections or for the equipment being obscured by strong light.

2 To avoid any unnecessary light sources in the front areas of bridges, only equipment necessary for safe navigation and manoeuvring of ships is to be located in such areas.

3 Warning and alarm indicators are to be designed to not light up during normal conditions or in safe situations. Means are to be provided to test all lamps.

4 All illumination and lighting of equipment are to be adjustable down to zero, except in the case of lighting for warning and alarm indicators and control of any dimmers which are to remain readable.

5 Each equipment is to be fitted with means for individual light adjustment. In addition, groups of equipment normally working together may be equipped with common means for light adjustment.

Chapter 5 ACCIDENT PREVENTION SYSTEMS

5.1 General

5.1.1 Scope

The requirements given in this Chapter apply to those systems designed to prevent any accidents caused by navigator unfitness (hereinafter referred to as "accident prevention systems") for all ships intended for one-man bridge operations in ocean areas under normal operating conditions.

5.1.2 General

1 Accident prevention systems are to be capable of continuous operation under various sea conditions, vibration, humidity as well as any temperature and electromagnetic interference likely to be experienced by ships in which such systems are installed.

2 In cases where computerized equipment is interconnected through computer networks, failure of such networks is not to prevent any individual equipment from performing their individual functions.

5.1.3 External Sound Signals

To enable navigators inside wheelhouses to hear external sound signals such as fog signals that are audible on bridge wings in cases where the doors leading to such bridge wings are closed, transmitting devices are to be provided to reproduce such signals inside wheelhouses.

5.1.4 Navigational Equipment*

1 The navigational equipment specified in 4.2.2 is to give alarms in the following cases:

(1) Ships approach way-points.

(2) Ship positions are deviated from planned routes.

(3) Water depth beneath ships is less than any predetermined values.

2 Those systems or controls mentioned under 4.2.2(1), **(5)** and **(11)** to **(17)** are to be arranged so that navigators have easy access to them and allow navigators to maintain proper lookouts from bridges while using them.

3 Those systems or controls mentioned under 4.2.2(1), **(5)** and **(11)** to **(17)** are to be fitted so that they are within the reach when navigators are either seated or standing at any navigating and manoeuvring workstations.

5.1.5 Electrical Power Supply*

1 Local distribution boards for all items of electrically operated accident prevention systems are to be arranged in wheelhouses. These boards are to be supplied by two exclusive circuits, one fed from main sources of electrical power and one fed from emergency sources of electrical power; and, these circuits are to be separated as far as practicable throughout their entire length. Items of accident prevention systems are to be individually connected to distribution boards. These boards may also be used for the navigational equipment specified in Chapter 4.

2 Power supplies to distribution boards are to be arranged with automatic changeover facilities between the two sources.

3 Any failures of main electrical power supplies to distribution boards are to initiate audible and visual alarms at such distribution boards.

4 Following any loss of electrical power which has lasted for a period 45 *seconds* or less all, primary functions of accident prevention systems are to be capable of being reinstated.

5.2 Accident Prevention Systems

5.2.1 General

1 Indicator lamps are to be provided in shipmaster rooms which indicate whether those bridge navigational watch alarm systems specified in 5.2.2 and those alarm and warning transfer systems specified in 5.2.3 are functioning properly.

2 Audible and visual alarms for any malfunctions of those bridge navigational watch alarm systems specified in 5.2.2 and those alarm and warning transfer systems specified in 5.2.3 are to be provided on bridges and in shipmaster rooms.

5.2.2 Bridge Navigational Watch Alarm Systems (BNWAS)*

Bridge navigational watch alarm systems which comply with performance standards deemed appropriate by the Society are to be provided.

5.2.3 Alarm and Warning Transfer System

Alarm and warning transfer systems which comply with the following are to be provided:

(1) Acknowledgement of alarms and warnings that require navigator response is to only be possible from bridges.

(2) Any alarms and warnings that require navigator response are to be automatically transferred to shipmasters, to selected back-up navigators and to public rooms if not acknowledged on bridges within a period of 30 *seconds*.

(3) Alarm and warning transfers are to be operated through fixed installations.

(4) Provisions which initiate call-alarms clearly audible in those spaces specified in **(2)** above are to be provided on bridges for operation by navigators. Those fixed installations required under **(3)** above may be designated for such a purpose.

Chapter 6 BRIDGE WORK ASSIST SYSTEMS

6.1 General

6.1.1 Scope

The requirements given in this chapter apply to those systems designed to assist navigators for one-man bridge operations under normal operating conditions (hereinafter referred to as "bridge work assist systems").

6.1.2 General

1 Bridge work assist systems are to be capable of continuous operation under various sea conditions, vibration, humidity as well as any temperature and electro-magnetic interference likely to be experienced by ships in which such systems are installed.

2 In cases where computerized equipment is interconnected through computer networks, failure of such networks are not to prevent individual functions.

6.1.3 Centralized Bridge Workstation

1 Centralized bridge workstations are to be arranged to enable navigators to perform those navigating and maneuvering operations specified in **4.2.1-1** and also for two or more navigators to perform the same operations together.

2 Those systems or controls mentioned under **4.2.2(1)**, **(5)**, **(11)** to **(17)**, **6.2.2** and **6.2.3** are to be centrally arranged in order to enable navigators to easily operate them at centralized bridge workstations.

6.1.4 Electrical Power Supply*

1 Local distribution boards for all items of electrically operated bridge working assist systems are to be arranged in wheelhouses. These boards are to be supplied by two exclusive circuits, one fed from main sources of electrical power and one fed from emergency sources of electrical power; and, these circuits are to be separated as far apart as practicable throughout their entire length. Items of bridge working assist systems are to be individually connected to distribution boards. These boards may also be used for the navigational equipment and those accident prevention systems specified in **Chapter 4** and **5**.

2 Power supplies to distribution boards are to be arranged with automatic changeover facilities between the two sources.

3 Any failures of main electrical power supplies to distribution boards are to initiate audible and visual alarms at such distribution boards.

4 Following any loss of electrical power which has lasted for a period of 45 *seconds* or less, all primary functions of bridge work assist systems are to be capable of being reinstated.

6.2 Bridge Work Assist Systems

6.2.1 General*

1 Audible and visual alarms for any malfunction of those bridge information systems specified in **6.2.2**, those ECDISs specified in **6.2.3** and those TCSs specified in **6.2.4** are to be provided on bridges and in shipmaster rooms.

2 Electronic charts deemed appropriate by the Society are to be used for the ECDIS.

6.2.2 Bridge Information Systems*

Bridge information systems which comply with the followings are to be provided:

(1) At the very least, the following information, **(a)** to **(l)**, is to be capable of being displayed for easy viewing from centralized bridge workstations.

- (a) Actual and planned course
- (b) Rudder angle as well as rudder order value or direction
- (c) Ship speed (against water)
- (d) Main engine revolutions and direction (in the case of Controllable Pitch Propellers, main engine revolutions and propeller pitch angles)
- (e) Ship position (longitude and latitude)
- (f) Depth of water

(g) Wind direction (relative direction)

(h) Wind speed (relative speed)

(i) Rate of turn (50,000 *GT* or more)

(j) Side thruster pitch angle or motor amperes as well as thrust direction (if any)

(k) Onboard time

(l) Distance to way-point and estimated time of arrival

(2) In order to display any information which depends on navigation areas, at the very least all change-overs between harbor, ocean and all other modes (if any) are to be arranged on bridge information systems at all times. In addition, any essential information is to be capable of being displayed at any time for each mode.

(3) The following are to be capable of being displayed at any time for those harbor and ocean modes specified in **(2)** above:

(a) Harbour mode

Information given in **(1)(a)** to **(k)** above

(b) Ocean mode

Information given in **(1)(a)** to **(e)**, **(g)**, **(h)**, **(k)** and **(l)** above

(4) Acknowledgement of any alarms and warnings which requires navigator response is to be possible by such systems.

(5) Any other functions deemed necessary by the Society are to be provided.

6.2.3 Electronic Chart Display and Information System (ECDIS)*

Electronic chart display and information systems which comply with performance standards deemed appropriate by the Society are to be provided.

6.2.4 Track Control Systems (TCS)*

Track control systems which comply with performance standards deemed appropriate by the Society are to be provided.

Contents

GUIDANCE FOR NAVIGATION BRIDGE SYSTEMS 2
Chapter 1 GENERAL 2
1.1 General 2
Chapter 2 SURVEYS OF NAVIGATION BRIDGE SYSTEMS 3
2.1 General 3
2.2 Registration Surveys 3
2.3 Registration Maintenance Surveys 5
Chapter 3 BRIDGE LAYOUTS AND BRIDGE WORKING ENVIRONMENTS 6
3.2 Bridge Working Environments 6
Chapter 4 NAVIGATIONAL EQUIPMENT 7
4.1 General 7
4.2 Navigational Equipment 7
Chapter 5 ACCIDENT PREVENTION SYSTEMS 8
5.1 General 8
5.2 Accident Prevention Systems 8
Chapter 6 BRIDGE WORK ASSIST SYSTEMS 9
6.1 General 9
6.2 Bridge Work Assist Systems 9

GUIDANCE FOR NAVIGATION BRIDGE SYSTEMS

Chapter 1 GENERAL

1.1 General

1.1.4 Modification of Requirements

"In cases where considered appropriate" specified in **1.1.4 of the Rules** means those cases where examinations are carried out in accordance with measures specially approved by the Society. However, this regulation is not to be applied to surveys required by international regulations or the requirements of flag states.

Chapter 2 SURVEYS OF NAVIGATION BRIDGE SYSTEMS

2.1 General

2.1.2 Survey Intervals

The wording "the Society may approve the survey methods which it considers to be appropriate." in **2.1.2-2(3) of the Rules** means survey methods which the Society considers to be able to obtain information equivalent to that obtained through traditional ordinary surveys where a surveyor is in attendance.

2.2 Registration Surveys

2.2.2 Shop Tests

1 To implement surveys of shop tests, in lieu of traditional ordinary surveys where the Surveyor is in attendance, the Society may approve other survey methods which it considers to be able to obtain information equivalent to that obtained through traditional ordinary surveys.

2 The "Electronic position-fixing systems" mentioned in **2.2.2(2) of the Rules** include GNSS receivers, LORAN receivers, etc.

2.2.3 Tests after Installation On Board

The following are to be verified during any tests after installation on board.

(1) Bridge layouts and bridge working environments

Bridge layouts and bridge working environments are adequate enough to allow navigators to perform navigational duties and other functions allocated to bridges as well as to maintain proper lookouts from workstations on bridges.

(2) Navigational equipment

(a) Gyro compass repeaters

All Repeater compasses are installed parallel with the centre lines of ships.

(b) Echo sounding systems

Measuring errors are within permissible ranges.

(c) Steering pump selectors/control switches

Steering pumps can be smoothly changed from one to another.

(d) Electrical power supplies

i) In cases where main sources of electrical power to local distribution boards for navigational equipment are off, audible and visual alarms are initiated, and electrical power supplies to such boards are automatically switched over to emergency sources.

ii) All primary functions of navigational equipment can be reinstated after any 45 *seconds* interruption of electrical power supplies.

(3) Accident prevention systems (**BRS1**-ships and **BRS1A**-ships)

(a) Bridge navigational watch alarm systems

Audible and visual alarms are initiated in cases where setting verification periods elapse. Such alarms can be audible at any areas on bridges.

(b) Alarm and warning transfer systems

Alarm and warning transfer systems automatically transfer any alarms and warnings which require navigator response and which are not confirmed on bridges within a period of 30 *seconds* to shipmasters, to selected back-up navigators and to public rooms. Alarms of bridge navigational watch alarm systems are also transferred.

(c) System monitors

i) Indicator lamps in shipmaster rooms are to show whether bridge navigational watch alarm systems, and alarm and warning transfer systems are functioning properly.

ii) Audible and visual alarms are initiated on bridges and in shipmaster rooms in cases where bridge navigational watch

alarm systems as well as any alarm and warning transfer systems are malfunctioning.

(d) Electrical power supplies

i) In cases where main sources of electrical power to local distribution boards for accident prevention systems are off, audible and visual alarms are given as well as electrical power supplies to such boards are automatically switched over to emergency sources.

ii) All primary functions of the accident prevention systems can be reinstated after any 45 *seconds* interruption of electrical power supplies.

(4) Bridge work assist systems

(a) Bridge information systems

Those information displays and alarm systems deemed necessary for navigation and maneuvering are functioning properly.

(b) ECDIS

Charts, ship positions, planned routes, radars and ARPA information are added to such displays.

(c) System monitor

Audible and visual alarms for any malfunctions of bridge information systems, ECDISs and track control systems are given.

(d) Electrical power supplies

i) In cases where main sources of electrical power to local distribution boards for bridge work assist systems are off, audible and visual alarms are given, and electrical power supplies to such boards are automatically switched over to emergency sources.

ii) All primary functions of bridge work assist systems can be reinstated after any 45 *seconds* interruption of electrical power supplies.

2.2.4 Sea Trials

The following are to be verified during sea trials:

(1) Bridge layouts and bridge working environments

(a) Bridge layouts and bridge working environments are to be adequate enough to allow navigators to perform navigational duties and other functions allocated to bridges as well as to maintain proper lookouts from workstations on bridges under all navigating conditions day or night.

(b) Vibration levels and noise levels satisfy those requirements given in **3.2.2** and **3.2.3 of the Rules**.

(2) Navigational equipment

Among those tests required by **2.2.4 of the Rules** for navigational equipment, verification of those pre-warnings required by **5.1.4-1 of the Rules** (for **BRS1**-ships and **BRS1A**-ships only) and the following are to be included.

(a) Automatic radar plotting aids (ARPA)

i) Targets are acquired and course and speed information for these acquired targets is displayed by both true and relative vectors.

ii) Bearings and ranges of these acquired targets are displayed.

iii) CPAs and TCPAs are displayed.

iv) Audible and visual alarms are initiated in cases where any acquired targets closes to ranges or transits zones chosen by navigators.

(b) Radars

i) Bearings and ranges of at least two objects (one of them is to be an object on shore) which appear forward of beams are displayed.

ii) Measuring errors of any installed radars are not greater than those errors which such radars originally have.

(c) Heading control systems (HCS)

i) Heading directions of ships are automatically maintained at preset courses.

ii) Audible and visual alarms are initiated in cases where rudders reach preset angle limits.

iii) Audible and visual alarms are initiated in cases where heading directions of ships deviate and exceed preset amounts of course deviation.

(d) Speed and distance measuring equipment

i) Speeds and distances are indicated during speed trials. Indicated speeds are to be compared with speed trial results.

ii) Speeds and distances are indicated in cases where ships are manoeuvring slowly, for example, during stopping tests.

(e) Echo sounding devices

The water depth is recorded while ships are manoeuvring.

(f) Whistle control systems

Fog signals are properly generated.

(g) Internal communication systems

i) Internal communication systems function properly in the event of any main electrical power failures.

ii) The bridge has priority over the use of communication systems.

(3) Accident prevention systems (**BRS1**-ships and **BRS1A**-ships)

In accordance with **2.2.3(3)(a)** and **(b)**.

(4) Bridge work assist systems (**BRS1A**-ships)

(a) In accordance with **2.2.3(4)(a)** and **(b)**.

(b) Track control systems

i) Auto tracking systems perform automatic steering of ships along planned routes.

ii) In the case of track control by a sequence of waypoints, an alarm is to be given at the wheel-over line.

iii) If the actual course change alarm is not confirmed by the officer of the watch within 30 *seconds* of wheel-over, a back-up navigator alarms are given.

iv) Change-overs to manual steering modes are possible.

2.3 Registration Maintenance Surveys

2.3.1 Special Surveys

1 Function test methods and navigational equipment verification are in accordance with **2.2.3(2)(d)** and **2.2.4(2)**. However, automatic radar plotting aids (ARPA) function tests may be carried out by simulation.

2 In the case of **BRS1**-ships, function test methods and accident prevention system verifications are in accordance with **2.2.3(3)**.

3 In the cases of **BRS1A**-ships, function test methods and bridge work assist system verifications are in accordance with **2.2.3(4)**.

2.3.2 Annual Surveys

1 Verification test methods for navigational equipment are accordance with **2.2.4(2)**. However, automatic radar plotting aids (ARPA) verifications may be carried out by simulation.

2 In the case of **BRS1**-ships, function test methods and accident prevention system verifications are in accordance with **2.2.3(3)(a)** to **(c)**.

3 In the case of **BRS1A**-ships, function test methods and bridge work assist system verifications are in accordance with **2.2.3(4)(a)** to **(c)**.

Chapter 3 BRIDGE LAYOUTS AND BRIDGE WORKING ENVIRONMENTS

3.2 Bridge Working Environments

3.2.2 Vibrations

Permissible vibration levels use *ISO Guideline* 6954-1984(E) as a standard.

3.2.3 Noise

Permissible noise levels use **Annex 2.3.1-2 "PROCEDURES FOR ON BOARD NOISE MEASUREMENTS", Part B of the Rules for the Survey and Construction of Steel Ships** as a standard.

3.2.7 Bridge Personnel Safety

Doors to bridge wings may be held at least one mid position in cases where any person is to be able to pass by at that door position.

Chapter 4 NAVIGATIONAL EQUIPMENT

4.1 General

4.1.3 Electrical Power Supply

The requirements given in **4.1.3 of the Rules** may not apply to the following ships:

(1) Ships with class notations of "*Coasting Service*", "*Smooth Water Service*", "*Harbour Service*" or equivalent thereto.

(2) Ships with gross tonnages less than 500*tons*.

4.2 Navigational Equipment

4.2.1 General

Any navigational equipment whose inadvertent operation leads to serious situations, for example start/stop switches of steering gear, may require further means of protection to prevent any such misoperation from occurring.

4.2.2 Navigational Equipment

1 The wording "performance standards deemed appropriate by the Society" specified in **4.2.2(1) of the Rules** means those performance standards specified in *IMO Resolution A.*823.

2 The wording "performance standards deemed appropriate by the Society" specified in **4.2.2(5) of the Rules** means those performance standards specified in *IMO Resolution MSC.*64(67) *ANNEX* 3.

3 Those whistle control systems required by **4.2.2(12) of the Rules** are to generate fog signals and to initiate whistles manually.

4 Automatic exchange telephone systems may be used as those internal communication means required by **4.2.2(15) of the Rules**.

Chapter 5 ACCIDENT PREVENTION SYSTEMS

5.1 General

5.1.4 Navigational Equipment

Those alarm systems specified in **5.1.4-1 of the Rules** may be activated by any of the other navigational equipment specified in **4.2.2 of the Rules**.

5.1.5 Electrical Power Supply

The requirements of **5.1.5 of the Rules** may not apply to the following ships:

(1) Ships with class notations of "*Coasting Service*", "*Smooth Water Service*", "*Harbour Service*" or equivalent thereto.

(2) Ships with gross tonnages less than 500 *tons*.

5.2 Accident Prevention Systems

5.2.2 Bridge Navigational Watch Alarm Systems (BNWAS)

The wording "performance standards deemed appropriate by the Society" specified in **5.2.2 of the Rules** means those performance standards specified in *IMO Resolution MSC.*128(75).

Chapter 6 BRIDGE WORK ASSIST SYSTEMS

6.1 General

6.1.4 Electrical Power Supply

The requirements given in **6.1.4 of the Rules** may not apply to the following ships:

(1) Ships with class notations of "*Coasting Service*", "*Smooth Water Service*", "*Harbour Service*" or equivalent thereto.

(2) Ships with gross tonnages less than 500 *tons*.

6.2 Bridge Work Assist Systems

6.2.1 General

The wording "electronic charts deemed appropriate by the Society" means Electronic Navigation Chart (ENC). In cases where ships navigate in areas in which ENC are not issued, other electronic charts may be used under the same conditions related to the use of paper charts.

6.2.2 Bridge Information Systems

In order to avoid any lapses, misunderstanding etc., all information on bridge information system displays are to be grouped into subdivisions. The size of all characters used on such displays is to be in accordance with *ISO* 8468.

6.2.3 Electronic Chart Display and Information Systems (ECDIS)

The wording "performance standards deemed appropriate by the Society" specified in **6.2.3 of the Rules** means those performance standards specified in *IMO Resolution MSC.*232(82).

6.2.4 Track Control Systems (TCS)

The wording "performance standards deemed appropriate by the Society" specified in **6.2.4 of the Rules** means those performance standards specified in *IMO Resolution MSC.* 74(69) *ANNEX* 2.