Guide for

Bridge Design and Navigational Equipment/ Systems

September 2021

GUIDE FOR

BRIDGE DESIGN AND NAVIGATIONAL EQUIPMENT/ SYSTEMS SEPTEMBER 2021

American Bureau of Shipping
Incorporated by Act of Legislature of
the State of New York 1862

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Foreword *(1 September 2021)*

This Guide supersedes the May 2019 revision of the Guide which was originally published in 2018.

The requirements for the functionality of the bridge design and layout, and the navigational equipment/systems laid down in this Guide are intended to improve and optimize the work environment within the bridge area and enhance the navigational capabilities, and safety of vessels. The requirements for vessels fitted with an integrated bridge system for navigational purpose is also included in this Guide.

The notations **NBL**, **NBLES**, **NBLES+** and **NIBS** are introduced to replace the previous **OMBO** notation and to define the expanded scope of the subject Guide.

The October 2020 edition included addition of the new **NBLES (COS)** Notation and requirements pertaining to this Notation. It is an optional notation assigned to vessels that typically operate in coastal and narrow waters provided they meet enhanced requirements provided in the new Section 4 of the Guide.

The September 2021 edition replaces the requirements for surveys after construction with references to Section 7-9-13 of the ABS *Rules for Survey After Construction (Part 7)*.

This Guide becomes effective on the first day of the month of publication.

Users are advised to check periodically on the ABS website www.eagle.org to verify that this version of this Guide is the most current.

We welcome your feedback. Comments or suggestions can be sent electronically by email to rsd@eagle.org.

GUIDE FOR

BRIDGE DESIGN AND NAVIGATIONAL EQUIPMENT/ SYSTEMS

CONTENTS

SECTION 1
General

1 Application and Design Basis *(1 October 2020)*

1.1 Application *(1 October 2020)*

This Guide applies to vessels possessing valid SOLAS certificates, and having a bridge so designed and equipped as to enhance the safety and efficiency of navigation. When a vessel is designed, built and surveyed in accordance with this Guide, and found satisfactory, a classification notation as specified in 1/5 will be granted. Application of the requirements of this Guide is optional.

1.3 Design Basis *(1 October 2020)*

The design and layout of navigational equipment is to be based on sound ergonomic principles. The ABS *Guidance Notes on Ergonomic Design of Navigation Bridges* may be used as a supplement.

3 Operational Assumptions

The requirements contained in this Guide are based on the following assumptions:

3.1 Operation Manual *(1 October 2020)*

Plans for emergencies and the conditions under which the vessel is intended to operate are to be clearly defined in an operation manual acceptable to the flag Administration. The manual is to clearly state the bridge crew composition required under any set of circumstances.

3.2 Crew Training and Certification Requirements *(1 October 2020)*

The composition and qualifications of the crew remains the responsibility of the flag Administrations. The requirements of the International Conventions on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) and other applicable statutory regulations are to be complied with.

5 Optional Notations *(1 October 2020)*

Upon request, the following optional notations are offered for vessels where the navigational bridge design, design and arrangement of navigational equipment and bridge operational procedures are developed based on accepted IMO Resolutions to aid in improving their level of safety and ro reduce the risk of grounding, collision and weather damage, according to the level of compliance.

5.1 Notation NBL (Navigational Bridge Layout) *(1 October 2020)*

A vessel having its navigational equipment designed and constructed based on sound ergonomic principles and its navigational bridge equipped in compliance with the requirements in Section 1, as applicable, and Section 2 of this Guide, and which has been constructed and installed under ABS survey, will be assigned the Notation **NBL**.

5.2 Notation NBLES and NBLES+ (Navigational Bridge Layout and Equipment/systems) *(1 October 2020)*

A vessel having its navigational bridge equipped per the requirements specified in Sections 1 through 3 & 3/27 TABLE 1 of this Guide and which has been constructed and installed under ABS survey, will be assigned the Notation **NBLES.**

A vessel having met the requirements for NBLES notation which is also equipped with additional equipment on bridge wings as specified in 3/27 TABLE 2 of this Guide and which has been constructed and installed under ABS survey, will be assigned the Notation **NBLES+**.

5.3 Notation NBLES (COS) (Navigational Bridge Layout and Equipment/Systems for Coastal and Offshore Service) *(1 October 2020)*

A vessel having its navigational bridge equipped according to Sections 1 through 4 of this Guide and which has been constructed and installed under ABS survey, will be assigned the Notation **NBLES (COS)**.

5.4 Notation NIBS (Navigational Integrated Bridge System) *(1 October 2020)*

A vessel fitted with an integrated bridge system (IBS) for navigational purpose in compliance with the IMO document SN.1/Circ.288, "Guidelines for Bridge Equipment and Systems, Their Arrangement and Integration (BES)", and is found to comply with Sections 1 through 3 and Section 5 of this Guide, and which has been constructed and installed under ABS survey, will be assigned the Notation **NIBS**.

7 Regulations *(1 October 2020)*

For the purpose of this Guide, the International Regulations for Preventing Collisions at Sea, and all other relevant regulations relating to radio and safety of navigation required by Chapters IV and V of 1974 SOLAS, as amended, are to be complied with. Valid statutory certificates issued by the pertinent flag Administration are to be maintained onboard the vessel and made available to the Surveyor upon request.

9 Flag Administration and National Authorities *(1 October 2020)*

Vessel owners or other interested parties are encouraged to consult the flag Administration and relevant National Authorities concerning required manning levels on the bridge and any additional requirements which may be imposed by them.

11 Definitions *(1 October 2020)*

The following terms are used in this Guide:

Acquisition - The selection of those target vessels requiring a tracking procedure and the initiation of their tracking.

Alarm - A visual and audible signal indicating an abnormal condition.

ARPA - Automatic Radar Plotting Aid.

Back-up Navigator - Any individual, generally an officer, designated by the vessel master to be on call if assistance is needed on the navigation bridge.

BNWAS - Bridge Navigational Watch Alarm System

Bridge - That area from which the navigation and control of the vessel is exercised, including the wheelhouse and bridge wings.

Bridge Wings - The parts of the bridge extending from both sides of the wheelhouse from which the ship's sides are visible. Ship docking is normally conducted from workstations on the bridge wings.

Bridge Wing Workstation - Workstation from which the vessel can be maneuvered, and operated during unmooring and mooring, lock passage, taking or dropping the pilot, etc.

Closest Point of Approach (CPA) - The shortest target vessel-own vessel calculated distance that will occur if there is no change in course and speed data.

Catwalk - Extension of a deck that is wide enough to allow the passage of a man.

Chart Area - Part of the wheelhouse situated and equipped for the performance of voyage planning and plotting activities.

Commanding View - View without obstructions which would interfere with the ability to perform immediate navigation tasks.

Conning Position - Place on the bridge with a commanding view and which is used by navigators and pilots, when monitoring, maneuvering and controlling a vessel.

Course – The direction in which a vessel is steered or intended to be steered, expressed as an angular distance from North over the water.

Cross Track Alarm – Comparison of the vessel's position with the track (control error).

Display - Means by which a device presents visual information to the navigator, including conventional instrumentation

Electronic Chart Display and Information System (ECDIS) - A system which displays hydrographic information and the vessel's position along a pre-planned route.

Ergonomics - The study and design of working environments and their components, work practices, and work procedures for the benefit of the worker's productivity, health, comfort, and safety. Application of the human factor in the analysis and design of equipment and working environment

Field of Vision (FOV) - Angular size of a scene that can be observed from a given position.

GLONASS - Global Orbiting Navigating Satellite Systems.

GMDSS - Global Maritime Distress and Safety System.

Heading – The horizontal direction in which the longitudinal axis of a ship actually points or heads at any instant, expressed in angular units from a referenced direction.

Heading Monitor – Comparison of the heading source in use with a second independent heading sensor.

Helmsman - Person who steers the vessel.

Integrated Bridge System (IBS) - A combination of interconnected systems allowing centralized access to sensor information or command/control from workstations, with the aim of increasing safe and efficient vessel's management. For the purpose of this Guide, the integrated bridge system pertains only to aspects dealing with navigational, monitoring/alarming and communication functions as covered in this Guide.

Lookout - Activity carried out by sight and hearing as well as by all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and of the risk of collision. Also, the person performing these tasks.

Main Workstation - See "navigation and traffic surveillance/maneuvering workstation".

Manual Steering Workstation - Workstation from which the vessel can be steered by a helmsman.

Monitoring - Act of constantly checking the status of equipment and environment.

Monitoring Workstation - Workstation from where equipment and environment can be checked constantly; when several persons are working on the bridge it serves for relieving the navigator at the navigation and traffic surveillance/maneuvering workstation and/or for carrying out advisory functions by the master or pilot.

Navigation - All tasks relevant for deciding, executing and maintaining course and speed in relation to waters and traffic.

Navigator - Person navigating, operating bridge equipment and maneuvering the vessel.

Navigation and Traffic Surveillance/maneuvering Workstation - Main workstation at which the vessel's course, speed and position in relation to the waters and traffic can be controlled and monitored, and where communication relevant to navigation can be performed. It is generally conceived for working in seated or standing position with optimum visibility and with an integrated presentation of information and operating equipment. It is to be possible from this location, in particular when a fast action is required.

NAVTEX - A narrow-band direct printing telegraph providing navigational and meteorological warnings and urgent information to vessels.

Normal Sailing Conditions - A condition wherein systems and equipment related to navigation operate within design limits, and environmental conditions such as weather and traffic do not cause excessive workload to the officer of the watch.

Off Heading Alarm – An alarm that monitors the comparison of heading and preset heading (control error).

Officer of the Watch - The person responsible for safe navigating, operation of bridge equipment and maneuvering of the vessel.

Operating/Technical Manual – Manuals or operational instructions for equipment/systems installed on the bridge for the use of bridge personnel.

Position Monitor – Comparison of the position source in use with a second independent position sensor or source.

Primary Bridge Navigational Equipment/Systems - For the purpose of this Guide, equipment/ systems essential for the performance of primary bridge navigational functions such as gyro compass, radar, position-fixing system and electronic chart system.

Public Rooms - Those accommodations areas used for halls, dining rooms, lounges and similar permanently enclosed spaces. For the purpose of this Guide, the library, gymnasium, vessel's office and conference rooms need not be considered.

Radar Plotting - The process of target detection, tracking calculation, calculation of relative and true motion, course, speed and display of information.

Route Planning Workstation - Workstation at which vessel's operations are planned (i.e., route planning, deck log, etc.) and where determining and documenting all vessel's operation takes place.

Sea-going Vessel - Any vessel navigating on the high seas, i.e. areas along coasts and from coast to coast.

TCPA - Time to Closest Point of Approach.

Track – The intended or desired direction of travel of a vessel.

Tracking - The process of observing the sequential changes in the position of a target, to establish its motion.

Way-point - Any of the various intermediate points on a route.

Wheelhouse - The enclosed area of the bridge.

Workstation - The position at which one, or several tasks constituting a particular activity are carried out.

13 Plans and Data to be Submitted *(1 October 2020)*

Relevant plans and data are to be submitted for approval and/or information as follows. Plans should generally be submitted electronically to ABS. However, hard copies will also be accepted.

13.1 Applicable to NBL, NBLES, NBLES+, NBLES (COS) and NIBS Notations *(1 October 2020)*

i) Arrangements of windows, including dimensions and angles of inclination, dimensions of frames, height above deck surface of upper and lower edges, type of glass, and details of clear view arrangements (wipers, fresh water wash systems, de-icing/ de-misting systems, and sunscreens).

ii) Fields of vision from the bridge workstations, including any blind sectors caused by obstructions outside of the wheelhouse.

iii) Location and arrangement of workstations, including dimensions of consoles, layout of instrumentation and controls, handrails, and seating.

iv) Clearances between floor and ceiling, or between floor and the underside of ceiling mounted instruments, throughout the wheelhouse.

v) Arrangements for the general illumination of the bridge and the individual illumination of workstation instruments and controls.

vi) Details of wheelhouse ventilation and heating systems.

vii) Details of internal communication systems operable from the bridge.

viii) Arrangements/details of exterior catwalk in front of bridge windows.

ix) Details of non-slip flooring. See 2/5.6.5.

x) Details of wheelhouse doors, including hold-back arrangements. See 2/5.6.8.

xi) Location of toilet. See 2/5.6.7.

xii) Arrangements for drainage of bridge decks. See 2/5.6.6.

xiii) Arrangements/details of the measures to minimize hazards to personnel. See 2/5.6.10.

13.2 Applicable to NBLES, NBLES+, NBLES (COS) and NIBS Notations *(1 October 2020)*

13.2.1 List of Equipment *(1 October 2020)*

A list of navigational equipment. This is to include the manufacturer's name and model number for each item, along with copies of relevant type approval certificates.

13.2.2 Alarms and Display *(1 October 2020)*

A complete operational description of the relevant monitoring systems including a list of alarms and displays. This may be accomplished by means of simplified block diagrams of navigation equipment, internal communications systems and watch monitoring and alarm transfer systems, and central alarm panel (where provided) including a list of alarms.

13.2.3 One Line Diagram *(1 October 2020)*

A simplified one-line diagram of the relevant systems described in 3/13 through 3/19. This is to include power supplies to the bridge equipment, circuit protection ratings and settings, cable sizes, rating of connected loads, detailed description and interactions.

13.2.4 Operation Manuals *(1 October 2020)*

Operation/technical manuals for the installed navigational equipment/systems. A single copy only is to be submitted for information. See 3/23.

13.2.5 Sea Trial-Test Plan *(1 October 2020)*

Sea trial test schedule. One copy only is to be submitted. See 3/25.

13.3 Applicable to NBLES (COS) Notation *(1 October 2020)*

The following are to be provided:

i) Documentation denoting vertical and horizontal field of visions from bridge and bridge workstations.

ii) Documentation from the navigational equipment suppliers related to the compliance of the Human Machine Interface (HMI) requirements contained in 4/9.4 of this Guide.

iii) FMEA or an equivalent and acceptable national/international standard for bridge operation during maneuvering the vessel is to be carried out and the report to be submitted for consideration. A failure mode effect analysis (FMEA) showing how a single failure of an equipment or system will impact the bridge operation during maneuvering or transit. IEC standard 60812 may be used as reference document for conductance of the FMEA.

iv) Maneuvering data booklet including the results of all maneuvering trials, identifying the mode of equipment and applied corrections

13.4 Applicable to NIBS Notation

13.4.1 Workstation Details *(1 October 2020)*

Details and arrangements of the workstations and systems as described in Section 5.

13.4.2 Program for Sea Trails *(1 October 2020)*

In addition to 13.2.5, the sea trial program is to include test details of the electronic chart display and information systems (ECDIS) and integrated bridge system (IBS).

SECTION 2

Requirements for Notation NBL (Navigation Bridge Layout)

1 General *(1 October 2020)*

Vessels complying with Sections 1 and 2 of this Guide, will be assigned the Notation **NBL** (Navigation Bridge Layout).

3 Equipment Design and Construction *(1 October 2020)*

Following requirements are applicable to navigational equipment required in this Guide:

3.1 General *(December 2003)*

The design of navigational equipment is to be based on sound ergonomic principles in accordance with the ABS *Guidance Notes on Ergonomic Design of Navigation Bridges*, as applicable. Its construction is to be of robust, durable and flame retardant material incorporating the required degree of enclosure protection (i.e., IP 20 for bridge installation and IP 56 for open deck installation). The requirements in 3/3 are applicable to navigational related equipment required in this Guide.

3.2 Fault Isolation

Circuits are to be designed to permit the isolation of a fault while maintaining functionality of the remaining circuits or sub-components (i.e., using printed circuit cards, or modules, etc.) and are to allow the easy and safe replacement of the faulted portion of the circuit.

3.3 Replacement of Components

Replaceable components are to be designed and arranged so that it will not be possible to connect them incorrectly or use incorrect replacements.

3.4 Self-support *(1 October 2020)*

Workstations, panels, cabinets, etc., are to be secured to a solid foundation with sides and back suitably protected. They are to be self-supported or be braced to the bulkhead or the ceiling. If braced to the bulkhead or the ceiling, means of bracing is to be flexible to allow deflection of the deck without buckling the assembly structure.

3.5 Configuration of Devices *(1 October 2020)*

Alarms, displays and control devices are to be arranged in a functional and logical manner to allow the operator an easy and clear means of identification of each of the components or systems included therein. Grouping of like system alarms, displays, and devices, and the use of labels and color schemes are some of the methods to achieve this goal. Precautions are to be taken to prevent the inadvertent operation of controls that may lead to critical situations, i.e., care in the identification and location of switches, activation controls, and handles, the use of recessed or covered switches and controls, and arrangement for sequential operation.

3.6 Instruments and Controls

Instruments and controls are to be designed to permit easy and correct reading by day and night and so fitted as to minimize glare or reflection or being obscured by strong light. The following is applicable:

3.6.1 Digital Readout

Digital readout is not to be used where the reading changes rapidly so as to preclude the operator from reading its changing value (i.e., numbers change is effected by snap action rather than by continuous movement).

3.6.2 Circular Scale

For an index moving relative to a circular scale, the index is to move clockwise (or the scale is to move counterclockwise) for increasing readings.

3.6.3 Linear Scale

For an index moving relative to a linear scale, the index is to be horizontal or vertical and the pointer is to move to the right or upwards for increasing readings. Deviation from this norm will be considered for special applications such as for water depth measurements.

3.6.4 Distinction

Controls or combined controls/indicators are to be visually and tactually distinguishable from elements that only indicate (i.e., rectangular buttons may be used for control elements and round lights for indicator elements).

3.6.5 Mechanical Control *(1 October 2020)*

The shape of mechanical controls is to assist in indicating the mode of operation of the control. Rotary finite-position controls (e.g., stepped switches) are to have toggles or levers, whereas rotary continuous-position controls (rheostats) are to have knobs or wheels except the steering control.

3.6.6 Light Contrast

Instruments providing information are to be presented on background of high contrast, emitting as little light as possible by night. They are to be designed to show a light text on a dark non-reflecting background at night.

3.6.7 Illumination and Lighting *(1 October 2020)*

All instruments and controls are to be provided with means of illumination. Such illumination is to be adjustable to zero, except for the illumination of alarms and dimmer controls. Such items are to remain visible at all times.

For the illumination of displays and alarms, red light (wavelength 620 nm or higher) is to be used.

5 Bridge Arrangement and Working Environment

5.1 Fields of Vision

5.1.1 General

Requirements found in Section 3-6-1, “Visibility” of the *Marine Vessel Rules* are to be complied with.

5.2 Control of Vessel

5.2.1 General

The relevant workstations are to be designed and positioned so that navigational and traffic surveillance/ maneuvering, docking and other tasks may be performed by the officer of the watch in cooperation with other persons manning individual workstations.

Workstations used for navigating and traffic surveillance/maneuvering, manual steering, voyage planning and communication are not to cover a working area with an axis longer than 15 m (49 ft 3 in.).

Further, where workstations are widely separated, talkback facilities are to be provided so that unhampered communications between workstations can be achieved under all operating conditions.

5.2.2 Conning Position *(1 October 2020)*

An adequate conning position is to be provided in close proximity to the forward center window and is to be arranged so as to enable the navigator(s) to view the area immediately in front of the bridge superstructure and observe all relevant information required to maintain a safe course and speed of the vessel in narrow waters, harbor areas and during final passages without interfering with the tasks of the bridge personnel. The rudder, propeller, thrust, pitch and operational mode indicators, or other means to determine and display rudder angle, propeller revolutions, direction of thrust and, if applicable, the force and direction of lateral thrust and the pitch and operational mode, are all to be readable from the conning position(s)

However, if the view in the center-line is obstructed by large masts, cranes, etc., two additional conning positions giving a clear view ahead are to be provided, one on the port side and one on the starboard side of the center-line, no more than 5 m (16 ft 5 in.) apart from each other.

5.2.3 Navigation and Traffic Surveillance/Maneuvering Workstation *(1 October 2020)*

The navigation and traffic surveillance/maneuvering workstation is to be arranged so as to enable the officer of the watch to carry out the required tasks and to provide him with all necessary information so that he can carry out his functions from a seated or standing working position but without being restricted to a specific location. In addition, this workstation is to be designed, arranged and located within an area having sufficient space for not less than two operators, but which would allow the workstation to be operated efficiently by one operator.

5.2.4 Route Planning Workstation

The route planning workstation is to enable the navigator to plan the intended voyage without interfering with the actual navigation or maneuvering of the vessel.

5.2.5 Monitoring Workstation

From the monitoring workstation, it is to be possible to see and hear the persons at the navigation and traffic surveillance/maneuvering workstation and steering workstations.

5.2.6 Manual Steering Workstation *(1 October 2020)*

The workstation for manual steering is preferably to be located on the vessel's centerline. If the workstation for manual steering is located off the centerline, special steering references are to be provided (e.g., sighting marks forward). If the view ahead is obstructed by large masts, cranes, etc., the steering workstation is to be located a distance to starboard of the centerline, sufficient to obtain a clear view ahead.

5.2.7 Docking Workstations *(1 October 2020)*

The workstations for vessel docking are to enable the navigator, together with a pilot, to observe all relevant external and internal operations which will affect the safe docking of the vessel. Talkback facilities are to be provided between the docking workstations and the wheelhouse when the distance from the wing extremity to the wheelhouse centerline is greater than 10 m (32 ft 10 in.).

5.3 Routes and Working Clearances

5.3.1 Across Wheelhouse *(1 October 2020)*

A clear route across the wheelhouse from bridge wing to bridge wing is to be provided and its width is to be at least 1.2 m (3 ft 11 in.). However, the width may be reduced to not less than 700 mm at any single point of obstruction subject to the following:

i) There is to be clear visibility for individuals on either side of the obstruction to see each other as they approach the area of reduced width,

ii) the length of the obstruction along the passageway is not to exceed 1 m (39.4 inches),

iii) there is sufficient room on either side of the obstruction to allow one individual to step aside and allow another individual to pass through [i.e., at least 1.2 m (3 ft 11 in.)],

iv) the above actions will not interfere with any crew member at a station required to be continuously manned,

v) the attending Surveyor is satisfied that two individuals traveling in opposite directions can pass through the area of reduced width with only a very brief pause by one of the two.

5.3.2 From Lower Decks

There are to be no obstructions between the points of entry to the bridge wings and wheelhouse from lower decks and the clear route required in 2/5.3.1.

5.3.3 Between Workstations

The distance between adjacent workstations is to be sufficient to allow unobstructed passage. To this end, the free passageway is to be at least 0.7 m (2 ft 4 in.) in width. The workstation operating area is to be part of the workstation and not of the passageway.

5.3.4 Front Passage

The distance from the front bulkhead, or from any workstation and installations placed against the front bulkhead, to any workstation or installations placed away from the bridge front is to be sufficient for two persons to pass each other. This distance is preferably to be 1 m (3 ft 3 in.) but in no case less than 0.8 m (2 ft 7 in.).

5.4 Clear Height

The clear ceiling height in the wheelhouse is to be designed with regard to the installation of overhead panels and instruments. To this end, the clear height between the bridge deck surface covering and the underside of the deck head beams is to be at least 2.25 m (7 ft 5 in.). The lower edge of deckhead mounted equipment is to be at least 2.1 m (6 ft 11 in.) above the deck in open areas, passageways and at standing workstations.

5.5 Workstations

5.5.1 General *(1 October 2020)*

Instruments providing visual information to more than one person on duty are to be located for easy viewing by all users concurrently, or if this is not possible, the instruments are to be duplicated. Instruments displaying information to more than one workstation may be located above the front windows if dimensions allow; such instruments are those denoting the vessel's heading, wind, water depth, speed, rate of turn, rudder angle, propeller revolutions (r/min), propeller pitch and time. Configuration and dimensions as outlined in 2/5.5.2 and 2/5.5.3 do not apply to radar consoles.

5.5.2 Configuration

In general, workstations are to be divided into two parts if possible:

i) *Vertical Part:* Instruments dealing with information/presentation of data are to be placed in the vertical part.

ii) *Horizontal Part*: Controls of the relevant equipment are to be placed in the horizontal part.

5.5.3 Dimensions *(1 October 2020)*

i) *Height*: The height of workstations is not to interfere with the navigating bridge window's view requirements found in 3-6-1/1.3.4 and 3-6-1/1.3.5 of the *Marine Vessel Rules:*

ii) *Width:* Based on sound ergonomic principles, the width of workstations designed for single person operation is not to exceed 1.6 m (5 ft 3 in.).

iii) *Chart Table:* The chart table is to be large enough to accommodate all chart sizes normally used internationally for marine traffic. The dimensions of the chart table are to be as follows: width, not less than 1.2 m (3 ft 11 in.); depth, not less than 0.85 m (2 ft 9 in.); height, not less than 0.9 m (2 ft 11 in.) and not more than 1 m (3 ft 3 in.). Additionally, the chart table is to be provided with 10 mm (3/8 in.) openings in front and back of the table to accommodate charts which are larger than the table.

5.5.4 Instruments and Controls

i) *General:* Instruments and controls are to be grouped according to their main functions; these are: navigating and traffic surveillance/maneuvering, and communication.

ii) *Line of Sight*: Each instrument and control is to be placed with its face normal to the navigator's line of sight, or to the mean value if the navigator's line of sight varies through an angle.

iii) *Glare*: To avoid glare, all instruments and controls are to be positioned relative to the operator considering the surrounding light sources.

iv) *Transparent Covers*: Transparent covers fitted over instrument(s) are to minimize reflections.

v) *Symbols/labels*: The purpose of each control is to be clearly illustrated by symbols where standard symbols have been internationally adopted or indicated by a label in English.

5.6 Other Considerations

5.6.1 Lighting and Illumination *(1 October 2020)*

i) *General*: A satisfactory level of lighting is to be provided to enable personnel to complete required bridge tasks at sea and port in both daytime and night. To this end, individual task areas are to have a greater luminance than the general lighting level.

ii) *Lighting in Dark Hours*: Relevant equipment fitted on the bridge is to be able to be discerned during hours of darkness. This is to be achieved via internally or externally located lighting. Red light is to be used to maintain dark adaptation whenever possible in areas or on items of equipment, other than the chart table, requiring illumination in the operational mode (see also 2/3.6.7). This is to include instruments and controls on the bridge wings.

Additionally, in order to prevent red lights in the wheelhouse from being mistaken for navigation lights by another vessel, indirect low level red lighting is to be fitted at deck level, especially for internal doors and staircases.

5.6.2 Heating Ventilating and Air Conditioning (HVAC) System

An adequate HVAC system is to be provided in order to maintain the temperature of the wheelhouse within the range of 14°C (57°F) to 30°C (86°F).

5.6.3 Sound Signals *(1 October 2020)*

Fixed sound signals are to be placed as high as practicable and if possible, forward of the bridge. External sound signals from vessels and fog signals that are audible on open deck, are to be also audible inside the wheelhouse; to this end, a sound reception system (of a recommended

frequency range of 70 to 700 Hz) is to be provided to reproduce such signals inside the wheelhouse (the opening of doors or windows is generally not to be accepted as an equivalent solution).

5.6.4 Noise Levels *(1 October 2020)*

i) The noise level on the bridge is not to interfere with verbal communication, mask audible alarms or be uncomfortable to the bridge personnel. In this respect, the ambient noise level on the bridge in calm weather is not to exceed 65 dB(A).

ii) The noise of ventilation fans, engine intake fans and other noise sources are to be dampened from the bridge operational area by suitable siting of the fans and associated housing.

5.6.5 Surfaces *(1 October 2020)*

i) *Glare-free*: All prepared surfaces are to be glare-free.

ii) *Non-slip*: The flooring throughout the bridge is to be provided with non-slip surfaces, effective in both wet and dry conditions.

5.6.6 Drainage

Bridge decks outside, including the wings, are to be provided with means for drainage.

5.6.7 Toilet Facilities

Toilet facilities are to be provided on or adjacent to the bridge, on the same level.

5.6.8 Doors

Doors to the bridge wings are to be capable of being operated with one hand. Means are to be provided to hold the doors open.

5.6.9 Refreshment Facilities

Refreshment facilities and other amenities provided for the bridge personnel are to include means for preventing damage to bridge equipment and injury to personnel resulting from the use of such facilities and amenities.

5.6.10 Safety of Personnel *(1 October 2020)*

i) *Sharp Edges and Protuberances*: There are to be no sharp edges or protuberances which could cause injury to personnel.

ii) *Handrails or Grab Rails:* Sufficient handrails or grab rails are to be fitted to enable personnel to move or stand safely in bad weather.

iii) *Seat Securing*: Where provisions for seating is made in the wheelhouse, means for securing same are to be provided, having regard to storm conditions.

7 Tests and Sea Trials *(1 October 2020)*

During sea trials, navigational equipment and systems are to be tested to the satisfaction of the attending Surveyor in accordance with a test program.

SECTION 3

Requirements for Notation NBLES (Navigational Bridge Layout and Equipment/Systems) and Notation NBLES+

1 General *(1 October 2020)*

Vessels complying with Sections 1 through 3 of this Guide, will be assigned the notation **NBLES** (Navigational Bridge Layout and Equipment/systems) or notation **NBLES+**. Equipment required for **NBLES** is listed in 3/27 TABLE 1 (found at end of Section 3) and for **NBLES+** is listed in 3/27 TABLE 1 & 3/27 TABLE 2.

3 Documentation, Type Approval and Performance Standards of Navigational Equipment

3.1 Documentation

The manufacturer or assembler of the relevant navigational equipment required in this Guide is to provide documented evidence indicating that the equipment meets the criteria specified in 3/3.2 and 3/3.3.

3.2 Type-approved Equipment *(1 October 2020)*

Navigational equipment is to be type approved to the satisfaction of the Administration in conformity with appropriate performance standards specified in respective IMO Resolutions and Circulars.

3.3 IMO's Performance Standards *(1 October 2020)*

In general, relevant navigational equipment is to comply with IMO Res. A.694(17), "General requirements for shipborne radio equipment forming part of the global maritime distress and safety system (GMDSS) and for electronic navigational aids", and those found in 3/13 and Section 5.

For ready reference, see also compilation of these performance standards in IMO Pub. 978-88.04.E (1988), "Performance Standards for Navigational Equipment". See also Appendix A1 for a list of IMO Resolutions referenced in this Guide.

5 Manual Mode of Operation *(1 October 2020)*

Navigational systems intended for automatic operation are to be fitted with manual mode provision to enable the officer of the watch to take the appropriate action in the event of failure of the automatic system. For automatic systems for which this is not possible, an alternative system is to be provided as per 3/13.

7 Alarm Systems

7.1 Characteristics

Alarm systems are to be of the self-monitoring type and designed so that a fault in the alarm system is to cause it to fail to the alarmed condition. Additionally, they are not to react to normal transient conditions or spurious signals. Alarms are to be both audible and visual and are to flash when first activated.

7.2 Audible Alarm Circuits

A fault in the visual alarm circuits is not to affect the operation of the audible alarm circuits.

7.3 Acknowledgment

Alarms are to be acknowledged by manually changing the flashing display of the incoming alarm to a steady display and by silencing the audible signal; the steady state light display is to remain activated until the fault condition is rectified. Alarming of other faults that may occur during the acknowledgment process is not to be suppressed by such action and is to be alarmed and displayed accordingly.

7.4 Disconnection and Resumption of Functions

Alarm circuits may be temporarily disabled for maintenance purposes or during initial start-up of machinery provided that such action is clearly indicated to the officer of the watch. However, such alarm is to be automatically re-activated after a preset time period has elapsed.

7.5 Built-in Testing

Alarm systems are to be provided with effective means for testing all audible and visual alarms and indicating lamps without disrupting the normal equipment or system operation.

9 Computerized Equipment

Where computerized equipment are interconnected through a computer network, failure of the network is not to prevent individual equipment from performing their individual functions.

11 Power Supply

11.1 Sources *(1 October 2020)*

Electrically operated systems and equipment covered in Sections 3 and 5 of this Guide are to be connected to distribution panels placed in an accessible position on, or adjacent to but at the same level of the bridge; each item of equipment is to be individually connected to its distribution panel. These panels are to be supplied by two exclusive circuits, one fed from the main source of electrical power and one fed from an emergency source of power. The power supplies to the distribution panels are to be arranged with automatic changeover facilities between the two sources.

11.2 Emergency Service *(1 October 2020)*

The vessel's emergency source of power is to be of sufficient capacity to supply the navigational related loads required in this Guide, in addition to other electrical loads as required in 4-8-2/5.5 of *Marine Vessel Rules.*

11.3 Loss of Power

Following a loss of power which has lasted for 45 seconds or less, navigational equipment/systems essential for the performance of primary bridge navigational functions (those are: gyro compass, radar, position-fixing system and electronic chart system) are to be automatically reinstated to their pre-power-loss configuration upon recovery from blackout, and all others are to be readily reinstated within five minutes, with minimum operator intervention, by virtue of the emergency source of power and, where necessary, by an uninterruptible power source.

Loss of power to the distribution panels is to activate an alarm.

13 Navigational Systems

In general, navigational equipment/systems installed onboard vessels are to be so arranged that failure of one piece of navigational equipment will not reduce the vessel's ability to perform the functions specified in 3/13.1 through 3/13.9.

13.1 Heading Information System *(December 2003)*

The vessel is to be provided with continuous heading information at the appropriate workstations and at the main steering position. To this end, a magnetic compass and a gyro compass having the capability to determine the vessel's heading in relation to the geographic (true) North are to be provided. The magnetic compass and the gyro compass are to comply with IMO's Res. A.382(X), "Performance Standard for Magnetic Compass" and IMO's Res. A.424(XI), "Performance Standard for Gyro Compass", respectively. In addition, a pelorus or compass bearing repeater, or other means to take bearings over an arc of the horizon of 360 degrees, and a gyro compass heading repeater is to be provided. The following is to be complied with:

13.1.1

In order to ensure the availability of heading information the vessel is to be fitted with an independent gyro compass

13.1.2

Means for taking optical bearings is to be made available onboard the vessel.

13.1.3

Means are to be provided for correction of errors induced by speed and latitude.

13.1.4

When the position of the vessel cannot be received, the heading of the vessel is to be maintained and such condition is to be alarmed.

13.2 Steering System

Means for manual and automatic steering of the vessel are to be provided. The steering system is to comply with the following:

13.2.1

(December 2003) The automatic pilot with an on/off indicator is to comply with IMO Res. A.342(IX), as amended by Annex 3 to MSC.64(67) "Performance Standard for Automatic Pilots".

13.2.2 *(1 October 2020)*

The automatic pilot equipment is to be monitored by an off-heading alarm, which is to activate, when the actual heading deviates from a pre-set heading beyond a preset limit, in the wheelhouse. This alarm is to be derived from a system independent from the automatic steering system. The off-heading alarm is not to be released when setting a new course reference.

The off-heading alarm may receive input from the gyrocompass, provided the compass is independent of the automatic steering gear. The magnetic compass may be used as a signal input, provided that same is used as a back-up to the gyro compass.

A heading control system is to work together with a track control system, adjusting its heading for drift. The heading control system is to comply with IMO Res. MSC.64(67), Annex 3 "Recommendation on Performance Standards for Heading Control Systems" and the track control

system is to comply with IMO Res. MSC.74(69), Annex 2 “Recommendation on Performance Standards for Track Control Systems”.

13.2.3

An overriding control device is to be provided at the navigation and traffic surveillance/ maneuvering workstation. The override control is to enable instant take-over from the autopilot as well as from the manual steering station.

13.2.4

For vessels of 50,000 GT and above, a rate of turn indicator is to be provided. The rate-of-turn indicator is to comply with IMO Res. A.526(13), “Performance Standards for Rate-of-Turn Indicators”.

13.2.5

For vessels of 50,000 GT and above, a track controller, or other means to automatically perform turns with a preset radius or rate of turn is to be provided.

13.3 Speed Measuring System *(1 October 2020)*

The vessel is to be fitted with the means for measuring speed and distance through the water. Vessels above 50,000 GT are also to be capable of measuring speed in the forward, and athwartship directions. The speed log is to comply with IMO Res. MSC.96 (72), Annex 14 "Performance Standards for Devices to Indicate Speed and Distance" as amended by IMO Res. 334(90), "Adoption of Amendments to Performance Standards for Devices to Indicate Speed and Distance".

13.4 Depth Measuring System *(December 2003)*

The vessel is to be fitted with an echo sounder or equivalent for measuring the water depth under the keel. An alarm is to be initiated when the water depth beneath the vessel is less than the predetermined value. The echo sounder is to comply with IMO Res. MSC.74(69), Annex 4 "Performance Standards for Echo-Sounding Equipment".

13.5 Radar System

A 9 GHz radar or other means is to be provided in order to determine and display the range and bearing of search and rescue transponders and of other surface craft, obstructions, buoys, shorelines and navigational marks to assist in navigation and in collision avoidance. The radar installation is to comply with IMO Res. A.477(XII) as amended by Annex 4 to MSC.64(67), "Performance Standards for Navigational Radar Equipment" and the following:

13.5.1 *(1 October 2020)*

If the vessel’s minimum reflective cross section area is less than 100 m^2, a radar reflector or other means is to be provided so that the vessel can be detected by another vessel navigating by radar. The radar reflector is to comply with IMO Res. 164(78) “Revised Performance Standard for Radar Reflectors”.

13.5.2

For vessels 3,000 GT and above, a second radar, independent of the 9 GHz radar, is to be provided. Additionally, a change-over switch between these radar together with the means to bypass the switch is to be provided.

13.6 Automatic Traffic Surveillance System *(1 October 2020)*

The vessel is to be fitted with an automatic traffic surveillance system to plot automatically the range and bearing of other vessel's ability to determine collision risk. This traffic surveillance system is to comply with IMO Res. A.823(19), "Performance Standards for Automatic Radar Plotting Aids (ARPA)". The

ARPA function may be independent or built into the radar equipment. The following is also to be complied with:

13.6.1

The system is to be based on the assumption that all floating objects may come into a collision course with own vessel if the object's course is changed by 45° with its speed maintained. An alarm is to be given to the navigator at a time which is to be adjustable in the range of 6 to 30 minutes, having regard to the danger, time to closest point of approach (TCPA). The system as a whole is to feature the following capability:

a) true motion and relative motion modes,

b) daylight-visible display,

c) guard zone system, featuring adjustable parameters, notably alarm set for CPA and TCPA,

d) simulator function showing the likely effects of a course or speed change in relation to tracked targets and

e) incorporated self-checking properties.

13.6.2

For vessels 3,000 GT and above, automatic acquisition and tracking of 20 radar targets and means to simulate a trial maneuver is to be provided. Additionally, a heading or track controller or other means to automatically control and keep to a heading and/or track is to be provided.

13.6.3

For vessels 10,000 GT and above, means to automatically control and keep the vessel in a straight track is to be provided.

13.7 Position Fixing System *(1 October 2020)*

The vessel is to be fitted with at least two types of automatic position fixing systems for the waters she is to navigate. These systems are to be capable of automatically and continually determining and displaying the vessel's position. One of the systems is to be GPS or equivalent, and the other a Decca, LORAN-C, GLONASS, or other means. The positioning equipment/system is to comply with IMO Res. A.819(19), "Performance Standards for Shipborne Global positioning System (GPS) Receiver Equipment" and the following:

13.7.1

Means for manually inputting required data in case of sensor failure, and the means to indicate the system's mode of operation i.e., manual or automatic, are to be provided.

13.7.2

A means to self-test the major functions of the system is to be provided.

13.7.3 *(1 October 2020)*

Decca receivers are to comply with IMO Res. A.816(19), "Performance Standard for Shipborne Decca Navigator Receivers"; Loran-C receivers are to comply with IMO Res. A.818(19), "Performance Standard for Shipborne Loran-C and Chayka Receivers"; GLONASS receivers are to comply with IMO Res. MSC. 113(73), Annex 26 "Performance Standard for Shipborne GLONASS Receiver Equipment".

13.8 Bridge Navaigational Watch Alarm System (BNWAS) *(1 October 2020)*

Means to monitor the alertness of the officer of the watch and alarm other bridge personnel if disability occurs is to be provided. The BNWASs are to comply with IMO Res, 128(75) , "Performance Standards for a Bridge Navigational Alarm System (BNWAS). Additionally, conditions of danger to navigation

caused by traffic or improper course-keeping in relation to planned route are to be monitored and such adverse conditions are to be alarmed at the bridge and at the locations specified herein.

13.8.1 Officer of the Watch Alertness-check System

a) ***General*** : A system is to be provided to monitor the alertness of the officer of the watch present on the bridge. This system is not to cause undue interference with the performance of bridge functions and it is to be designed and arranged that it cannot be operated in a unauthorized manner (i.e. bypassed). The system is to be connected to the alarm transfer system described in 3/13.8.2.

b) ***Periodic Verification*** *(December 2003)*: The system used for periodic verification of the watch alertness system is to be adjustable up to 12 minute intervals, and it is to be arranged so that only the vessel's master has access for enabling and disabling it (i.e., removing the fuses or keeping the acknowledgment button permanently depressed) and for setting the appropriate intervals for a periodic verification.

c) ***Acknowledgment of Alertness-check Alarm*** : The system is to provide for the acknowledgment by the officer of the watch at the navigation and traffic surveillance/ maneuvering workstation and at the monitoring workstation.

d) ***System Failure Alarm:*** An alarm is to operate on the bridge and at the spaces described in 3/13.8.2.b, in the event of a failure of the alertness-check alarm system.

13.8.2 Alarm Transfer System *(1 May 2018)*

a) ***General*** *(December 2003)*: A fixed alarm transfer system is to be provided and connected to all vessel navigating officers' cabins and public rooms.

b) ***Transfer of Alarms*** *(December 2003)*: Alarms per the "Remark" column of item B17, a through h, in 3/27 TABLE 1 are to be automatically transferred to the master's cabin if not acknowledged at the bridge within 30 seconds. Additionally, a selector switch is to be provided in the event the master deems it necessary to also transfer the aforementioned alarms to the selected back-up navigator's cabins and public rooms.

c) ***Back-up Navigator Call-alarm*** : Provisions are to be made at the bridge to activate the back-up navigator call-alarm. This alarm is to be audible in all the spaces described in 3/13.8.2.b. The fixed installation required under 3/13.8.2.a may serve this purpose.

d) ***Portable Communication Device*** : A wireless portable device allowing two-way communication with the officer of the watch is to be provided for use by the back-up navigator when attending locations not connected to the fixed installation.

13.9 Route Planning *(1 October 2020)*

The vessel is to carry official charts sufficient to enable route planning and monitoring for the intended voyage.

An Electronic Chart Display and Information System (ECDIS) is also accepted as meeting the chart carriage requirement. The ECDIS is to comply with IMO Res. MSC.232(82), "Adoption of the Revised Performance Standards for Electronic Chart Display and Information Systems(ECDIS)". Ships engaged on international voyages are to comply with carriage requirements for ECDIS as specified in SOLAS V/19 Para 2.10.

However, where the charting function is partially or fully effected via electronic charts, a back-up means is to be provided. In addition, an alarm is to be given in case of deviation from the planned route, which is to be adjustable having regard to the time to danger of grounding.

13.10 Vessel's Automatic Identification System *(December 2003)*

A vessel's automatic identification system (AIS) is to be fitted onboard the vessel to provide automatically to appropriately fitted shore stations, other vessels and aircraft, needed navigational related information such as vessel's identity, type, position, course, speed, navigational status, etc., and other safety related information, and to automatically receive such information from similarly fitted vessels and to monitor and track vessels and to exchange data with shore based facilities. The automatic identification system (AIS) is to comply with IMO Res. MSC.74(69), Annex 3 "Recommendation on Performance Standards for an Universal Shipborne Automatic Identification System".

15 Propulsion Engine/thruster Controls

Means for controlling the propulsion engines/thrusters are to be provided at the wheelhouse and same is to be at least in compliance with Section 4-9-2 of the *Marine Vessel Rules*.

17 Automatic Telephone System *(December 2003)*

The vessel is to be fitted with an automatic telephone system, which is to comply with the following. In addition, a telephone system that can operate independently of the power supply from the vessel's main or emergency system is to be installed.

17.1

The system is to enable two-way communication between all relevant workstations on the bridge and:

- Navigating officer's cabins and public rooms
- Radio room (when located outside the bridge area)
- Steering gear room
- If provided, emergency steering position
- Propulsion-machinery room

17.2

The automatic telephone network is to be designed to carry at least 2 simultaneous calls.

17.3

Telephones on the bridge and propulsion machinery control room are to have priority function over any other extension. A list of all relevant telephone extensions is to be permanently posted and clearly displayed adjacent to each telephone.

19 Nautical Radiocommunication System

The vessel is to be fitted with means for nautical radiocommunication with other vessels as well as means for communication with tugboats and mooring stations aboard and ashore.

21 Workstations - Required Equipment

As a minimum, in addition to alarms/indicators invoked in the various IMO Resolutions referenced in this Guide, the equipment listed in 3/27 TABLE 1 is to be fitted at the various workstations to enable the officer of the watch and other operators to carry out the required tasks.

23 Operation/Technical Manual *(1 October 2020)*

An operation/technical manual which is consistent with the information and criteria upon which the notations **NBLES** and **NBLES+** are based is to be placed onboard the vessel for the guidance of the operating personnel. The operation/technical manual is to give clear guidance to the vessel's personnel

about the vessel's capability, limitation and procedures to follow when navigating the vessel with the required manning on the bridge. The operating/technicalmanual is to include the following, as a minimum.

23.1 *(1 October 2020)*

Vessel’s name and Vessel ID number.

23.2

Simplified diagrams of the systems described in 3/11 through 3/19.

23.3

Vessel’s navigating and maneuvering capabilities (i.e., particulars of propulsion machinery and steering system, vessel’s speed, vessel’s stopping ability, vessel’s turning ability, etc.).

23.4

Navigational procedures including transfer of alarms to the back-up navigator, and details of the routines, duties and responsibilities of each of the relevant personnel associated with the bridge operation of the vessel.

23.5

Periodical testing procedures for relevant navigational equipment/systems.

The operating/technical manual is to be submitted to ABS for reviewsolely to ensure the presence of the above information which is to be consistent with the vessel's design information and navigational capabilities. The operation of the vessel is not a condition of the assigned class notations.

Any modifications made to the approved bridge layout, field of views and navigational equipment/systems are to be approved by ABS. The operating/technical manual is to be updated accordingly, and submitted to ABS for review.

25 Tests and Sea Trials

During sea trials, navigational equipment and systems are to be tested to the satisfaction of the attending Surveyor in accordance with a test program. The test program is to include the following test details:

25.1 Applicable to All Relevant Navigational Equipment

25.1.1

Prior to testing, all relevant navigational equipment/systems are to be satisfactorily checked, calibrated and operated by the representative of the manufacturer or the equipment supplier who is to issue an affidavit to such effect for the review of the attending Surveyor.

25.1.2

Automatic resumption of primary bridge navigational equipment/systems functions are to be demonstrated following a blackout simulation of a period of 45 seconds. Similarly, resumption of all other relevant non-primary bridge navigational equipment/systems functions are to be satisfactorily effected following a blackout simulation period of five minutes. See 3/11.3.

25.2 Specific Equipment or System *(1 October 2020)*

Test details for the following equipment or systems:

a) Course information system.

b) Automatic steering system.

c) Speed measuring system.

d) Depth measuring system.

e) Radar system.

f) Automatic traffic surveillance system

g) Position-fixing system.

h) Bridge Navigational Watch Alarm System.

i) Route planning system.

j) Vessel's automatic identification system.

k) Automatic Telephone System.

l) Sound reception in bridge, if fitted.

m) Radiocommunication system.

27 Survey After Construction *(1 September 2021)*

See 7-9-13/1 of the ABS *Rules for Survey After Construction (Part 7)*.

TABLE 1
Navigational Equipment for NBLES Notation *(1 October 2020)*

Workstation for	*Main functions to be performed*	*Item*	*Equipment*	*Remarks*
Navigation and Traffic Surveillance/ maneuvering *[See Note 1]*	• Observation of all vessels and objects • Recognizing dangerous situations • Deciding on collision avoidance actions • Checking vessel's own signal • Checking own course and speed • Keeping and/or changing own course and speed (track keeping) • Checking own position • Handling own internal communication on board • Handling communication vessel/ vessel, and vessel/ shore (VHF) • Releasing alarms • Perception of group alarms with aids for decision-making • Observation of weather and seaway • Acknowledging watch check-alertness alarm • Keeping deck log (a dictaphone may be used) • Sounding signals	**A1**	Gyro compass heading indicator	*(December 2003)* For **NIBS** notation, two independent gyro compasses are to be provided on the bridge (See 5/13.1). See note 2.
		A2	Magnetic compass heading indicator	
		A3	Course reminder (set course) indicator	
		A4	Rudder pump selector switch	
		A5	Steering mode selector switch	
		A6	Steering position indicator	
		A7	Rudder angle indicator	
		A8	Pitch indicator	For controllable-pitch propeller
		A9	Rate-of-turn indicator and controller	For vessels 50,000 GT or greater. See 3/13.2.4 and 3/13.2.5
		A10	Speed and distance indicator	For **NIBS** notation, the speed measuring system is to be independent of the position-fixing systems. See 5/13.2
		A11	Depth water indicators with adjustment controls	See also 3/13.4
		A12	9 GHz radar	For vessels 3,000 GT and above, an additional independent radar together with a change-over switch is to be provided. See 3/13.5.2
		A13	Automatic traffic surveillance system including ARPA	See 3/13.6. For **NIBS** notation, see 5/13.3
		A14	Position fixing equipment/ system including automatic visual position indicator	Two types of receivers are to be provided. One of the systems is to be GPS or equivalent, and the other: Decca, Loran-C, GLONASS, or other means. See 3/13.7
		A15	Officer of the watch check-alertness acknowledgment device	

Workstation for	*Main functions to be performed*	*Item*	*Equipment*	*Remarks*
		A16	Back-up navigator call alarm device	Two-way communication wireless portable device to be provided. See 3/13.8.2.b
		A17	Facilities for use of navigation charts	This may be separated from the navigation and traffic surveillance/maneuvering workstation. See also 3/13.10
		A18	Vessel's automatic identification system	
		A19	Propulsion engines/ thrusters controls including emergency stops.	Compliance with 4-9-2 of the *Marine Vessel Rules* is to be met
		A20	Propulsion engine revolution	If reduction geared engine
		A21	Propeller revolutions indicator	
		A22	Wind direction and velocity indicator	
		A23	Air and water temperature indicator	
		A24	Automatic telephone system	See 3/17
		A25	Radiocommunication equipment	See 3/19
		A26	NAVTEX automatic receiver and recorder	For navigational and meteorological warning purpose. To comply with IMO Res. A.617(15) - "Implementation of the Navtex System as a Component of the Worldwide Navigational Warning Service"
		A27	Signal transmitter for: • whistle • automatic device for fog signal • general alarm • Morse signaling light	
		A28	Search light controls	*(1 May 2018)* e.g., searchlight on/off switch
		A29	Controls for windscreen wiper, washer, heater	
		A30	Night vision equipment	

Workstation for	*Main functions to be performed*	*Item*	*Equipment*	*Remarks*
		A31	Sound reception system	*(December 2003)* If required, see 2/5.6.3
		A32	Workstation lighting control device	
		A33	HVAC controls	
		A34	Clock	
		A35	Group alarms and reset controls	*(December 2003)* See also item B17 of this Table

Workstation for	*Main functions to be performed*	*Item*	*Equipment*	*Remarks*
Monitoring *[See Note 1]*	• Observation of all vessels and objects • Recognizing dangerous situations • Handling own internal communication on board • Handling communication vessel/ vessel, and vessel/ shore • Perception of group alarms with aids for decision-making • Releasing alarms • Observation of weather and seaway • Acknowledging watch check-alertness alarm • Keeping deck log • When workstation is occupied by an additional navigator, provides assistance to navigator at the navigation and traffic surveillance/ maneuvering workstation • When workstation is occupied by a pilot, advises to vessel's command.	**B1**	Gyro compass heading indicator	*(December 2003)* For **NIBS** notation, two independent gyro compasses are to be provided on the bridge (See 5/13.1). See note 2.
		B2	Rudder angle indicator	
		B3	Pitch indicator	For controllable-pitch propeller
		B4	Rate-of-turn indicator	For vessels 50,000 GT or greater. See 3/13.2.4 and 3/13.2.5
		B5	Speed and distance indicator	For **NIBS** notation, the speed measuring system is to be independent of the position-fixing systems. See 3/13.2
		B6	Depth water indicators	See also 3/13.4
		B7	Radar	For vessels 3,000 GT and above, an additional independent radar together with a change-over switch is to be provided. See 3/13.5.2
		B8	Officer of the watch check-alertness acknowledgment device	
		B9	Propulsion engines/ thrusters emergency stops	
		B10	Propeller revolutions indicator	
		B11	Automatic telephone system	See 3/17
		B12	Radiocommunication equipment	See 3/19
		B13	Signal transmitter for whistle	
		B14	Controls for windscreen wiper, washer, heater	
		B15	Workstation lighting control device	
		B16	Clock	

Workstation for	*Main functions to be performed*	*Item*	*Equipment*	*Remarks*
		B17	Required alarms and reset controls	*(December 2003)* In addition to the alarms/indicators which may be required by the various IMO Resolutions referenced in this Guide and pertinent flag Administration, the following conditions are to be alarmed at the monitoring workstation *a)* Off-heading *b)* Off-track *c)* Planned route deviation *d)* Pre-warning of approach-waypoint , and closest point of approach *e)* Off-preset water depth *f)* Gyro compass failure *g)* Failure of alarms prescribed in 3/13.8.1 *h)* Failure of power supply to distribution panel serving relevant equipment *(Alarming of the above conditions at the monitoring workstation is not a substitute for alarming at the required relevant workstations)*

Workstation for	*Main functions to be performed*	*Item*	*Equipment*	*Remarks*
Manual steering (Helmsman's) *[See Note 1]*	• Steering vessel according to rudder angle orders • Steering vessel according to course instruction • Steering vessel following landmark/ sea marks • Acknowledging watch check-alertness alarm	**C1**	Gyro compass heading indicator (repeater)	*(December 2003)* For **NIBS** notation, two independent gyro compasses are to be provided on the bridge (See 5/13.1). See note 2.
		C2	Magnetic compass heading indicator	
		C3	Course reminder (set course) indicator	
		C4	Manual steering with override and selector control switches including steering wheel/steering lever	
		C5	Rudder angle indicator	
		C6	Rate-of-turn indicator	For vessels 50,000 GT or greater
		C7	Watch check-alertness acknowledgment device	
		C8	Automatic telephone system	See 3/17
		C9	Controls for windscreen wiper, washer, heater	

Notes:

1 *As the navigation and traffic surveillance/maneuvering, monitoring and manual steering workstations are functionally interrelated and usually installed in close proximity from each other, considerations will be given to the omission of duplicate required equipment at each of the aforementioned workstations.*

2 *(December 2003) Master gyrocompass may be located in the electrical/instrumentation room and the gyrocompass repeaters on the bridge to meet this requirement.*

TABLE 2
Additional Navigational Equipment for NBLES+ Notation *(1 October 2020)*

Workstation for	*Main functions to be performed*	*Item*	*Equipment*	*Remarks*
Docking (Bridge wings)	• Giving instructions, performing and controlling change of course • Giving instructions, performing and controlling change of speed • Giving instructions, performing and controlling change of thruster • Handling communication with maneuvering stations • Handling communication with tugs, pilot boat • Watching water surface along vessel's side • Releasing signals • Acknowledging watch check-alertness alarm	**D1**	Gyro compass heading indicator	*(December 2003)* For **NIBS** notation, two independent gyro compasses are to be provided on the bridge (See 5/13.1). See note 1.
		D2	Steering position selector switch	
		D3	Rudder controls	
		D4	Rudder angle indicator	
		D5	Pitch indicator	For controllable-pitch propeller
		D6	Rate-of-turn indicator	For vessels 50,000 GT or greater
		D7	Propulsion engines/ thrusters controls.	
		D8	Propulsion engine revolution	If reduction geared engine
		D9	Propeller revolutions indicator	
		D10	Lateral thrust and lateral movement of vessel, indicator	If thrusters are fitted
		D11	Longitudinal movement of vessel, indicator	
		D12	Wind direction and velocity indicator	
		D13	Depth water indicators	See also 3/13.4
		D14	Officer of the watch check-alertness acknowledgment device	
		D15	Whistle controls	
		D16	Search light and Morse lamp controls	
		D17	Automatic telephone system	See 3/17
		D18	Radio communication equipment	See 3/19
		D19	Workstation lighting control device	

Note:

1 *(December 2003) Master gyrocompass may be located in the electrical/instrumentation room and the gyrocompass repeaters on the bridge to meet this requirement.*

SECTION 4

Requirements for Notation NBLES (COS) (Navigational Bridge Layout and Equipment/Systems for Coastal and Offshore Services) *(1 October 2020)*

1 General

Vessel complying with the Sections 1 through 4 of this Guide, will be assigned the **Notation NBLES (COS)** (Navigational Bridge Layout and Equipment/Systems for Coastal and Offshore Services).

1.1 Objective

This notation improves and optimizes the work environment within the bridge area to assist the bridge Officer of the Watch (OOW)/ Navigator/ Captain/ Pilot to more easily navigate the vessel in coastal and restricted waters reducing the chances of potential risk of collision, grounding or weather damage.

3 Plans and Data to be submitted

Plans and data as per Sections 1/13.1, 1/13.2 and 1/13.3 are to be submitted for approval and/or information as appropriate.

3.1 Documentation and Standards for Navigational Equipment

The manufacturer or assembler of the relevant navigational equipment is to provide documented evidence indicating that the equipment meets the criteria specified in 3/3.2 and 3/3.3 of this Guide.

5 Navigation Bridge Design and Layout

This subsection outlines various requirements for the navigation bridge and wheelhouse design, including field of vision, blind sectors, bridge windows, bridge configurations, wheelhouse arrangement, workstation configuration and location of equipment within workstations.

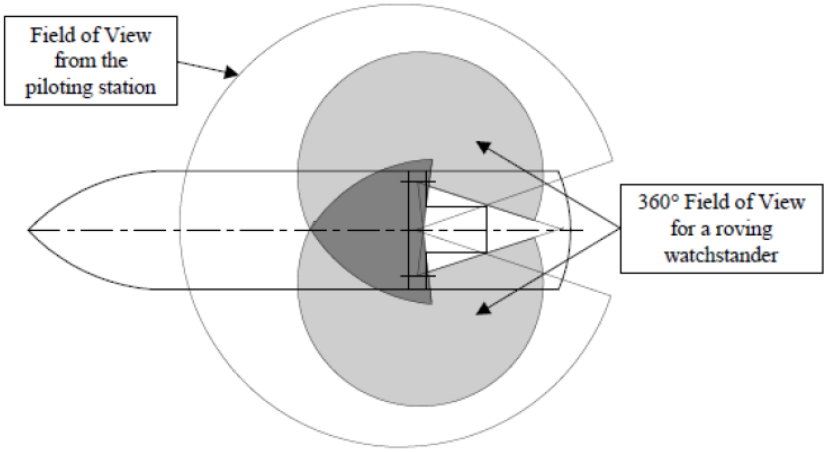
5.1 Visibility from Bridge

These requirements apply to ships where visibility procedures are to be established as prescribed in the Convention on the International Regulations for Preventing Collisions at Sea, as amended (1972, Rules 5, 6, 7 and 8) with respect to maintaining safe speed, posting of lookouts and watches and use of sound signals and collision avoidance using radar and plotting devices.

5.1.1 Field of View Around Vessel

It is to be possible to observe all objects necessary for navigation, such as ships and lighthouses, in any direction from inside the bridge. There is to be a 360° field of view for an observer moving within the bridge. See Figure 1, “Field of View Around Vessel.”

FIGURE 1
Field of View Around Vessel



If the ship is unable to satisfy the requirements of a 360° field of view around the vessel for an observer moving within the wheelhouse an alternative equivalent means may be acceptable such as cameras covering any obstructed views or blind sectors. Alternatively, other technologies such as sensors may also be considered provided they are shown to be equally effective.

5.1.2 Navigating and Maneuvering Workstation Field of View – Vertical View

Above the horizontal plane, a vertical angle of view of not less than 5° above a horizontal line, extending from height of eye of 1800 mm (71 inches) in forward direction, is to be provided irrespective of any special equipment, helicopter decks or other obstructions outside of the wheelhouse.

Below the horizontal plane, any elevated structure/equipment or cargo obstructing the sea surface close to the ship in excess of 1000m within the 180º sector forward of the athwart ship is to be considered as a blind sector and necessary calculations are to be conducted (height of eye of 1800 mm).

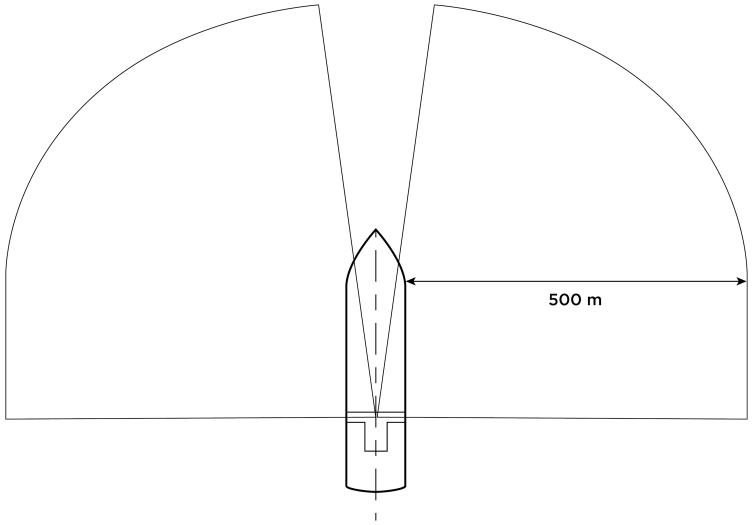
Note: If a height of eye of 1800 mm (71 inches) is unreasonable and impractical, it may be reduced, but not to less than 1600 mm (63 inches).

5.1.3 Navigating and Maneuvering Workstation Field of View – Obstruction of Sea Surface

While standing at the workstation in the conning position during navigation and maneuvering of the vessel, a person is to be able to observe all objects, the shoreline and water surface to a distance at least 500 m from the hull within the sectors from 10º on either side of the bow to 90° on both sides, under all conditions of draught, trim and with deck cargo (Figure 2).

If the ship is unable to satisfy the above requirements, an alternative means may be acceptable such as camera covering any obstructed views or blind sectors.

FIGURE 2



5.1.4 Navigating and Maneuvering Workstation Field of View – Horizontal View Astern

Leading lights and markers are to be provided for visual reference at the stern of the ship while navigating and maneuvering from the workstation to help to avoid grounding and provides a view the sea surface in close vicinity of the vessel stern. A horizontal field of vision of the vessel stern is to extend over an arc from right astern to at least 5º on each side. No blind sectors are to occur within this 10º field of vision sector.

5.1.5 Navigating and Maneuvering Workstation Field of View – Vertical View Astern

The lower edge of the navigation bridge aft windows is to be kept as close to the bridge deck as practical so the vertical view through the window from the workstation during navigating and maneuvering enables a view of the sea surface in all conditions at a distance not more than 2000 m abaft the stern.

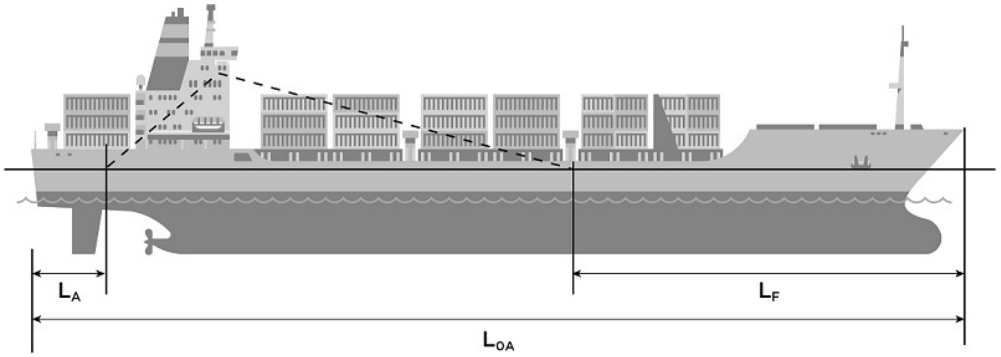
The upper edge of the navigation bridge aft windows is to be kept as close to the overhead deck as practical, and the upper edge of the window(s) is not to be less than 2000 mm above bridge deck surface.

The maximum height from deck to the lower edge of the window(s) is to be 1000 mm or at the least the lower part of the window is to allow a clear view of the sea surfaces aft of the vessel while viewing from the navigating and maneuvering workstation. Only the superstructure or deck may be concealed when viewed from normal operating position at this workstation.

5.1.6 Navigating and Maneuvering Workstation Field of View – Vertical View from the Docking Workstation

During vessel maneuvering, while standing at a docking workstation (e.g. console from the bridge wing), the navigator is to be capable to observe the parallel ship's side, both forward and aft of the vessel (Height of Eye 1600 mm). The total length of the visibility of the ship's side is to be not less than L/2 of the vessel. See Figure 3.

FIGURE 3

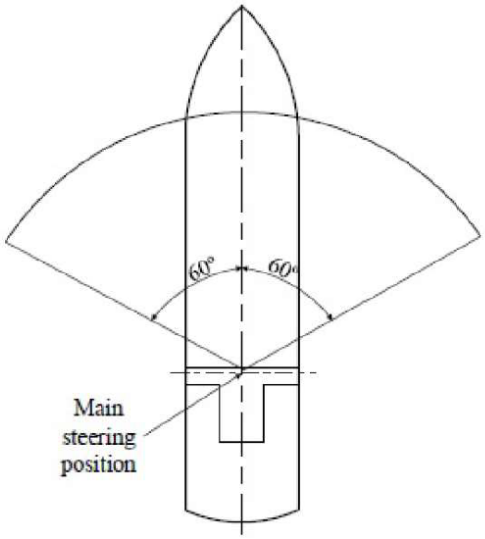


5.1.7 Navigating and Maneuvering Workstation Field of View – Main Steering Position

From the main steering position (i.e., workstation for manual steering) the horizontal field of view is to extend over an arc from direct forward to at least 60° on each side of the vessel. See Figure 4.

The helmsman is to be able to observe the vertical steering references in the fore ship while maneuvering the vessel from the main working position.

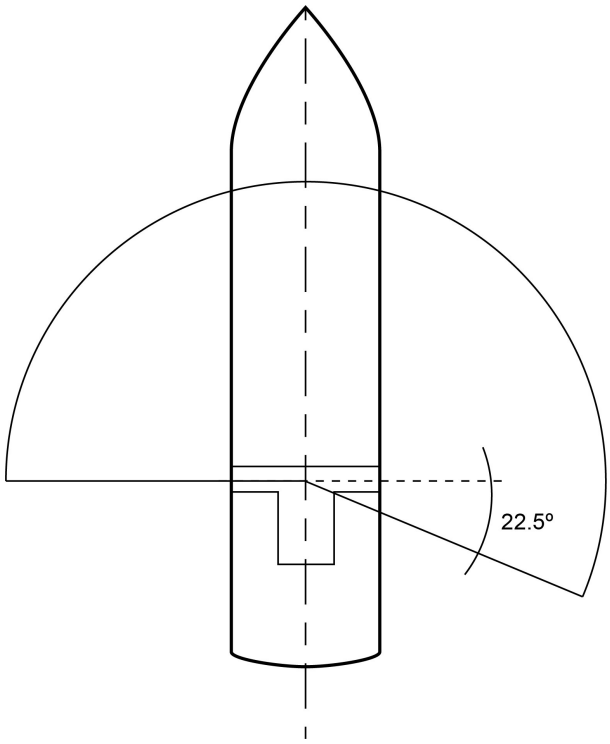
FIGURE 4



5.1.8 Navigating and Maneuvering Workstation Field of View – GDMSS and Additional Functions

Workstations used for carrying out various functions such as safety monitoring, GMDSS (Global Maritime Distress and Safety System) and other bridge functions e.g. chart table/voyage planning, communication etc. are to have horizontal field of vision extending a 90° arc on port bow covering through forward to 22.5° abaft the starboard beam (Figure 5).

FIGURE 5



5.1.9 Navigating and Maneuvering Workstation Field of View – Blind Sectors

5.1.9(a) If needed, the blind sectors from the front bulkhead and bridge wings bulwark are to be reduced to maintain the required field of vision while monitoring, navigating and maneuvering the vessel from different workstations.

5.1.9(b) The obstruction of the view of the sea surface from the GMDSS (Global Maritime Distress and Safety System) workstations and additional bridge functions caused by each individual blind sector are not to exceed 10°.

5.2 Bridge Windows

Following are the detailed design requirements for the bridge windows in addition to those given in 2/5.1.1 of the Guide.

5.2.1 Height of Lower Edge of Front Windows

The height of the lower edge of the front windows is to allow a forward view over the bow, from which a person seated at the workstations to monitor, navigate, and maneuver by maintaining the line of sight. In no case, the lower window edge is to present an obstruction from the forward to 90º on each side view. The height of the lower edge of front windows above the deck are to be kept as low as possible and it is to be kept not more than 1000 mm (39 inches) above the deck.

For arrangements where the navigator is normally positioned further back from the bridge-front bulkhead, the same eye height is to be used to determine the height of the lower edge of the front windows.

5.2.2 Breadth of the Windows

The width of the bridge windows is to be kept as wide as practicable to maintain an unimpeded view at all times. A minimum width of 1200 mm (47 inches) within the field of vision is to be maintained from the workstations.

In exception, the width of a window may be less than 1200 mm (47 inches) only where necessary to avoid obstructions from the field of vision of workstations caused by the divisions/stiffeners of windows.

5.2.3 Windows of Enclosed Bridge Wings

A ship with enclosed bridge wings may be provided either

- Vertical side windows where one side window can be opened to view the ship's side at the water surface level provided there is no other window providing a downward view in the deck or
- Inclined side windows where the bridge wing deck does not extend to the full width of the ship.

Alternative solution may be accepted upon special consideration by ABS, including installation of camera systems (with a backup system) covering an adequate area.

5.2.4 Window Framing

Divisions/frames between windows are to be kept to a minimum. No frames, including the centerline, are to be installed immediately forward of any workstation. The frames between front windows are not to exceed 150 mm (6 inches) in width. If stiffeners between windows are to be covered, coverings are not to cause further obstructions of the field of view from any position inside the wheelhouse. If stiffeners are used, frames are not to exceed 100 mm (4 inches) in width and 120 mm (4.7 inches) in depth. Horizontally sliding windows are not to be used.

5.2.5 Windows with Clear View Arrangements

At all times, regardless of the weather conditions, all front windows in the navigation bridge are to be provided with a clear view to maintain a clear field of vision for monitoring, navigating, and maneuvering the ship. The following systems or components or equivalent are to be provided:

i) Sunscreens with minimum color distortion; sunscreens are to be readily removable and not permanently installed.

ii) Heavy-duty wipers, preferably provided with an interval function, and freshwater wash systems. Wipers are to be capable of operating independently of each other.

iii) De-icing and de-misting systems on all applicable windows.

iv) A fixed catwalk with guardrails fitted in front of bridge windows for manual cleaning of windows in the event of failure of the above systems.

v) Where heated glass panels are installed in bridge windows, they are to be in accordance with ISO 3434.

5.2.6 Enclosed Bridge Wing Windows with Clear View arrangements

Heavy-duty wipers with freshwater wash systems are to be provided in the front and rear windows to maintain a clear field of vision from the workstations during navigation, maneuvering and docking.

Similar wipers may be installed on the side windows (fixed type) located at the bridge wings. All wipers are to be capable of operating independently of each other.

5.3 Bridge Design and Configuration

5.3.1 Bridge Wing

i) The height of the bridge wing bulwark is not to exceed 1000 mm to reduce the blind sectors for a clear field of vision from the workstations. A handrail of not less than 1200 mm height is to be fitted on top of the bulwark where the opening between bulwark and handrail is not less than 120 mm.

ii) Where wind deflectors are fitted at the front side of bridge wing, the length of the deflector is not to obstruct an arc of more than 10º as seen from the operating position of workstations.

5.3.2 Clear Heights of Ceiling and Entrances

i) The bridge ceiling clearance height between the bridge deck surface covering and the underside of the deck head beams is to be at least 2.25 m (7 ft 5 in.). The lower edge of deckhead mounted equipment is to be at least 2.1 m (6 ft 11 in.) above the deck in open areas, passageways and at standing workstations.

ii) The height of entrances and doors to the wheelhouse from adjacent passageways is not to be less than 2.0 m (6 ft 7 in.).

5.3.3 Doors and Other Accesses

i) All wheelhouse doors are to be operable with one hand. Bridge wing doors are not to be self-closing. Means are to be provided to hold the bridge wing doors open.

ii) Vessel having enclosed bridge wings are required to have at least one direct access route from the adjacent bridge deck area.

iii) Convenient access from the bridge deck to the compass deck is to be provided from the vicinity of the wheelhouse.

5.3.4 Visibility of Area in Front of Bridge

The navigator is to be able to view the area immediately in front of the bridge superstructure from the wheelhouse. There is to be a close approach access to at least one front window. If this requirement is met by combining “an adequate conning position” (see 2/5.2.2), a second close approach access, besides the access to the position described above, is to be provided, or the width of the total access is to be sufficient to accommodate two persons.

This defined position is not to affect the view of the helmsman to right ahead, as the helm is normally positioned on the centerline.

5.4 Bridge Arrangements and Workstation Configurations

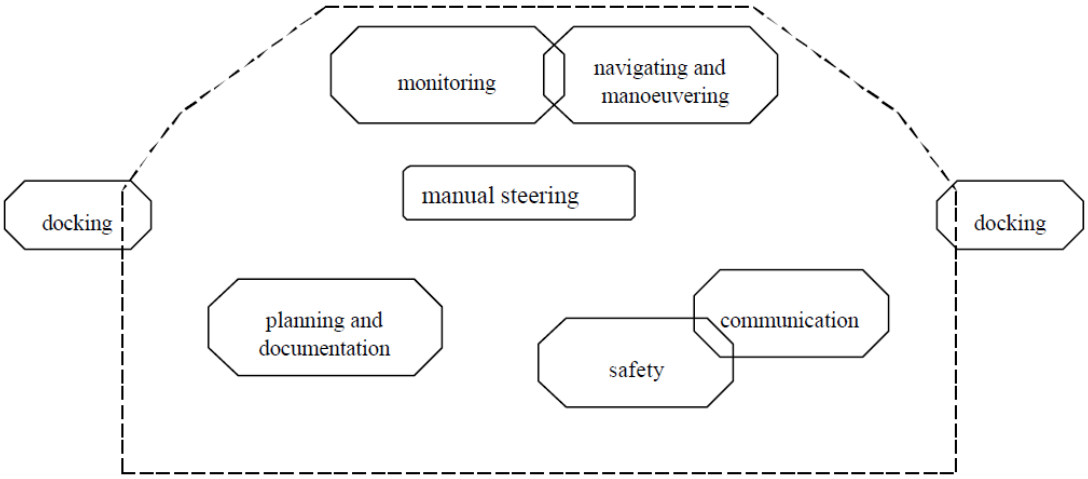
5.4.1 GENERAL

i) The design of navigational equipment is to be based on sound ergonomic principles. Construction is to be of robust, durable, and flame-retardant material incorporating the required degree of enclosure protection (IP 20 for installation inside the wheelhouse and IP 56 for open deck installation). Replaceable components for navigational equipment are to be designed and arranged so that it will not be possible to connect them incorrectly or install incorrect replacements.

ii) Alarms, displays and control devices are to be arranged in a functional and logical manner to allow the operator an easy and clear means of identification of each of the components or systems included therein. The color schemes of system alarms, displays, and devices are to be in accordance with international standards. Precautions are to be taken to prevent the inadvertent operation of controls that may lead to critical situations. Care is to be taken in the identification and location of switches, activation controls, and handles, the use of recessed or covered switches and controls, and arrangement for sequential operation.

iii) The layout of the bridge, including location and layout of the individual workstations is to be such that the field of view required for each function is available from the workstation. Figure 6, “Typical Bridge Arrangement " presents a typical bridge layout.

FIGURE 6
Typical Bridge Arrangement



5.4.2 General Requirements for Workstations

General requirements for workstations are provided in 2/5.2.1 of this Guide.

Workstations for voyage planning and/or safety may be eliminated on a case by case basis upon special consideration by ABS.

Alternative systems may be accepted on special purpose Vessel in lieu of the manual steering workstation where exceptional means of steering (e.g. multiple azipods or azimuthing thrusters) require a specific expertise for operation. The following requirements are to be complied with:

i) A manual steering device is to be provided at the navigation and maneuvering workstation and at least one other workstation

ii) The above steering devices are to be independent at two workstations and be able to be operated by personnel other than the bridge officer without interfering with other navigational equipment.

The design and details of the manual steering system arer to be submitted to ABS for approval.

5.4.3 Workstations with Additional Functions

5.4.3(a) The workstations for additional functions may be installed on the bridge provided the functionality of these additional workstations does not interfere with the primary bridge functions e.g. navigating, maneuvering, monitoring, manual steering, voyage planning, and communication. The workstations for additional functions may include:

i) dynamic positioning

ii) monitoring and control of machinery

iii) extended communication functions

iv) monitoring and control of ballasting and cargo operations

v) monitoring and control of hull openings

vi) monitoring and control of domestic systems

5.4.3(b) The dimensions of the workstations for additional functionality are not to obstruct the required field of visions of the sea surface from the workstations for monitoring, navigating, and maneuvering for safe operation of the vessel.

5.4.3(c) The primary function of the navigation bridge is to navigate, monitor, maneuver, communicate and provide other functions essential for the safe operation of the ship. Other workstations such as those for machinery, cargo operation, or hull opening are to be considered as effective and supportive integrated bridge resource management.

5.4.3(d) The requirements mentioned in above (b) and (c) may be exempted from any specific type of vessel e.g. a dynamic positioned vessel which has a dedicated workstation in the wheelhouse for an industrial mission. Such vessels may have a congested bridge and cannot meet the requirements of distance, visibility etc. Alternative designs may be considered for special types of vessel on a case by case basis upon submission to ABS.

5.4.4 Passageways in the Bridge Wings

The following requirements are in addition to those given in 2/5.3.1, 2/5.3.3 and 2/5.3.4 of the Guide:

The distance between bulwarks, bulkheads and consoles in the bridge wings are to be as small as possible but it is to be wide enough for one person to pass the console comfortably. The passageway width is preferably to be at least 600 mm.

Note: The Panama Canal Commission (ACP) requires a minimum of 1 m clearance between any consoles and adjacent bulkheads/bulwarks. ACP has the authority to provide any relaxation upon request.

5.4.5 Workstation Configuration

a) The console is to be designed so that from the normal working position, the total required left-to-right viewing angle is not to exceed 190°. This angle is to be reduced whenever possible through appropriate control-display layout.

b) The requirements of IMO Resolution A.694(17), General requirements for shipborne radio equipment forming part of the GMDSS and for electronic navigational aids is to be applied to design such equipment.

c) The workstation in the bridge from where the navigator is to maneuver the vessel through water traffic by monitoring, navigating, and communicating based on the displayed course, speed, and position of the vessel, is required to be located with optimum surrounding visibility whether the navigator is in a seated or standing position. All integrated information related to navigation, propulsion and other machinery systems is to be displayed and readily available at or near this location. In all situations, the navigator is to be able to maneuver and control the vessel easily from this workstation.

d) The upper leg room of the console is to have a minimum of 450 mm (18 inches) in depth and the lower leg room a minimum of 600 mm (25 inches) in depth. Alternatively, the different dimensions of minimum depth requirements may be accepted in case by case basis based on the acceptable justifications and supporting documentation.

e) The top of the consoles of workstation for navigating, monitoring, and maneuvering is not to exceed a height of 1300 mm (51 inches) and in no case the height of the workstations is not to interfere with the navigating bridge window's view requirements as given in above paragraphs 5-2-1 and 5-2-2.

f) The top of the consoles of workstations other than navigating, monitoring, and maneuvering which are intended to be operated by the bridge navigating officers is not to exceed 1300 mm. If any of these workstations impede the horizontal field of vision of the navigating, monitoring, and maneuvering workstation then the console height is not to exceed 1200 mm.

g) Chairs at workstations designed for a sitting position are to be adjustable in height and capable of being arrested on the floor, and capable of rotating with the footrest being arrested. Chairs are to be capable of being moved out of the operating area, if needed.

5.5 Provision of Maneuvering Information Display

The vessel's maneuvering characteristics and relevant information are to be tested, recorded, and displayed as per the Resolution A.601 (15) adopted on 19 November 1987, Provision and Display of Maneuvering Information on board ships.

7 Bridge Equipment

The **NBLES (COS)** notation necessitates the equipment as listed in 3/27 TABLE 1 and 3/27 TABLE 2. Some equipment needs to carry out additional functions and are required to comply with additional requirements. These requirements are provided below:

7.1 General

Basic Bridge Equipment

i) Computerized Equipment

ii) Power Supply

iii) Navigational System

- Propulsion Fixing System
- Bridge Navigational Watch Alarm System
- Route Planning
- Vessel's Automatic Identification System
- Propulsion Engine/Thruster Controls
- Automatic Telephone System
- Nautical Radio Communication

iv) Weather Information System

- Sound Reception System
- Public Address System

7.2 Requirements

The design and installation of the bridge equipment is to meet the following additional requirements:

7.2.1 Computerized Equipment

For installed automation systems and related computerized equipment, the vessel is to comply with 3/9 of this Guide and Section 4-9-3 of the *Marine Vessel Rules*. The principal consideration in every case is that the crew has the systems, facilities, or functions necessary to satisfy ship navigation or piloting safety requirements, with fallback capabilities for the possible cases in which primary automation functions fail. In addition, the following requirements are applicable:

- Automated systems' False Alarm Rate (FAR) is to be kept as low as reasonably possible. Checks are to be performed for validity of the interface and input data, and for user clarity for safety, even in the presence of false alarms, and documented with the system.
- Network connections and remote access to primary essential systems are to comply with the vessel's Cybersecurity Risk Management System, if implemented, or in the ship's Safety Management System (SMS). Refer to ABS CyberSafety Volume 2, and to the cybersecurity

considerations for the ship's SMS, in accordance with IMO Resolution MSC.428(98) and IMO MSC-FAL.1/Circ.3.

- Software development life cycle is to be in compliance with 4-9-3/9 of *Marine Vessel Rules* and ABS Cyber Security Volume 8 (*Guide for Integrated Software Quality Management*) for internally developed, safety-critical software. A failure modes and effects (FMEA) is recommended for these systems, though not strictly necessary, to inform cybersecurity-related safety procedures in the SMS.
- Software maintenance and updates are to be in compliance with Management of Change (MoC) procedures in a Software Development Life Cycle (SDLC). See 4-9-3/9 of the *Marine Vessel Rules* and the ABS CyberSecurity Volume 8 for examples and applicability.

7.2.2 Power Supply

The vessel is to be fitted with means for electrical power supply as per the requirements listed in 3/11 of this Guide along with the following:

- Essential equipment such as radar, ECDIS installed at workstation for navigating and maneuvering, GPS, Conning display, Bridge alert management system, Watch monitoring system, Speed log etc. are to be provided with a transitional source of power such as a UPS or battery to provide a minimum of 10 minutes of power. Any UPSs supplying power to bridge equipment are to be capable to bypass automatically.
- A minimum of one telephone system is to be supplied by a transitional emergency power source capable of operating for a minimum of 30 minutes. Alternatively, a sound power telephone system or portable self-contained two-way voice communication device is acceptable.

7.2.3 Navigational System

In general, navigational equipment/systems installed onboard Vessel are to be so arranged that failure of one piece of navigational equipment will not reduce the vessel's ability to perform the functions specified in 3/13, 3/27 TABLE 1, 3/27 TABLE 2 and 5/13 of this Guide along with following requirements:

- The vessel is to be provided two ECDIS (Electronic Chart Display and Information System) and both are to be separate and independent from each other. Both ECDIS are to have separate power source and network i.e. fully separate interfaces to be provided. An interconnection between both ECDIS is to be provided to exchange data and also to be interfaced to the radar systems. Radar installations are to have a bi-directional interface so that voyage plan can be transferred to and displayed on the radar screens. Also, the voyage planning terminal in to be interfaced with the ECDIS.
- The vessel is to be equipped with a centralized bridge workstation that complies with 5/5 of this Guide.
- Navigation system is to be equipped with a communication system in compliance with MSC Res.302 (87) adopted on 17 May 2010, Performance Standards for Bridge Alert Management.
- The vessel is to be equipped with a conning information display in compliance with the 5/11 of this Guide.
- Job aids and trainings are to be provided of navigational systems equipment which include grounding avoidance system courses.

7.2.3(a) Heading Control and Information System

For a heading control and information system, the vessel is to be in compliance with 3/13.1 and 3/13.2.2 along with the following:

- The vessel is to be equipped with one additional gyro compass (2 total)
- A gyro repeater is to be provided at all steering control positions

- Continuous heading information is to be provided to repeaters, radar systems, heading control and track control systems.
- ECDIS Failure of the selected compass system is to automatically trigger the backup system without disruption to rudder control
- Heading is to be maintained if one compass fails. The two compass systems are to be arranged for continuous performance with a minimum of one autonomous compass.

7.2.3(b) Steering System

The vessel is to have means for manual and automatic steering and to comply with 3/13.2 and 3/13.5 of this Guide and 4-3-4/13 of the *Marine Vessel Rules* along with the following additional requirements:

- Rate of turn indicators and rudder angle indicators are required and is to be in accordance with the turning ability of the vessel while proceeding at normal seagoing speeds.
- The vessel is required to be equipped with a minimum of two independent rudder angle indicating systems.

7.2.3(c) Speed Measuring System

The vessel is to have a speed measuring system in compliance with 3/13.3 and 3/27 TABLE 1, item: A10 along with the following:

- Speed indicators are to be provided in different locations i.e. positions required for safe conning, monitoring, navigating, maneuvering, and docking operations of the ship.
- Vessel is to be fitted with a speed measuring system capable of providing speed over ground in longitudinal and transversal directions.
- The speed measuring system is to provide continuous radar and denote speed through water and speed over ground out simultaneously.
- The speed measuring system components are to be easily accessible for maintenance while the vessel is afloat.

7.2.3(d) Radar System

The vessel is to be fitted with a radar system in compliance with 3/13.5 of this Guide and MSC. Res.192(79).

7.2.3(e) Bridge Navigational Watch Alarm System (BNWAS)

The vessel is to be fitted with means to monitor the alertness of the officer of the watch and alarm other bridge personnel as per the requirements listed in 3/13.8 of this Guide in association with the following:

- Approved motion sensors or initiating operation of various navigation equipment may be considered in addition to reset devices if the vessel's flag administration does not prohibit its use. External devices such as Radar, which can act as reset devices, are to be in position where proper lookout can be performed by the officer of watch.
- Sensors approved for intrusion and holdup alarm systems in accordance with EN 50131 may be used and are to comply with the following:
  - Timer resets if a forearm moves 0.5 to 1 m/s at the working positions.
  - Tampering or failure of the motion sensor deactivates the timer reset function.
  - Timer does not reset due to moving objects, warm surfaces or shifting sunlight.
  - Proper masking of sensor coverage is to be prepared inside the motion sensor enclosure when masking is needed.
- Wireless portable devices may be used to sound the alarm to reach the assigned individual to attend the bridge.

- The second and third stage remote audible alarms are not to be acknowledged by the motion detection system and activation of the motion detection function is to only reset the first state audible alarm on the bridge.
- Emergency calls are to be activated by a single operator action and appropriate protective safety measures are to be taken to prevent activation of any emergency call by mistake.
- Unacknowledged alarms are to be transferred and means to immediately trigger an emergency call is required.

7.2.3(f) Vessel's Automatic Identification System

The vessel is to be fitted with an Automatic Identification System as per the requirements listed in 3/13.10 of this Guide.

- The Automatic Identification System is to be capable of supporting interconnection with the radar systems listed in above paragraph 7.2.5(d) and the route planning requirements listed in 3/13.9 of this Guide.

7.2.4 Propulsion Engine/Thruster Controls

The vessel is to be fitted with means for propulsion engine/thruster controls in compliance with 3/15 of this Guide and Section 4-9-2 of the *Marine Vessel Rules*.

In addition, control of propulsion and steering including thrusters (if fitted) are to be provided in the workstations from where docking operations are conducted.

7.2.5 Automatic Telephone system

The vessel is to be fitted with a means for an automatic telephone system in compliance with 3/17 of this Guide, paragraph 4-8-2/11.5.3 of the *Marine Vessel Rules*, and the following:

i) The automatic telephone network is to be designed to carry at least 4 simultaneous calls.

ii) Incoming calls are to be distinguishable by lights and/or different ring tones.

iii) All applicable locations are to be provided with a transceiver readily available for portable two-way voice communication equipment to be used for compliance with the back-up telephone requirements.

iv) Areas with an ambient noise level above 75 dB(A)are to possess or utilize noisy environment mitigations such as noise-cancelling headphones.

v) The bridge is to have a minimum of 4 portable ultra-high frequency (UHF) transceivers that operate in the 457 to 467 MHz band and which have the capacity to operate continuously for a minimum of 5 hours.

- The battery charger is to be located within the wheelhouse and capable of re-charging all UHF transceivers

vi) A communication system for mooring operations is to be provided between the wheelhouse, bridge wings, and mooring stations on board that support hands free two-way voice transmission.

- If portable UHF transceivers are used for mooring operations, then the total of the number of transceivers provided are to be not less than 2 times the number of mooring stations onboard. However, the total numbers of transceivers are to include the above mentioned 4 portable transceivers required for the bridge. Battery chargers that are able to re-charge all transceivers simultaneously are to be installed in the wheelhouse.

7.2.6 Nautical Radio Communication

The vessel is to be fitted with means for nautical radiocommunication in compliance with 3/19 of this Guide along with the following:

- The wheelhouse is to be equipped with two fixed and independent Very High Frequency (VHF) transceivers
- Means of radio communication on the bridge wings to communicate with other Vessels is to be provided.
- Antennas for the nautical radio communication system are to be located to minimize damage or malfunction of the equipment. These are to be located with warning labels of safe distance with information pertaining to human risk warnings.

7.2.7 Internal Communication

The vessel is to be equipped with two independent and separate internal communication systems.

The officer of the watch is to be capable of calling the crew members from accommodation, open deck or any noisy area as needed.

7.2.8 Weather Surveillance System

The vessel is to have a weather surveillance system installed that is equipped with an anemometer that displays the relative wind speed and direction in a presentation mode in accordance with international standards. The system is to provide information about wind speed, direction, air humidity, barometric pressure, and air temperature that can be displayed on a weather information system.

i) Wind speed sensors are to operate at a minimum range of 0 – 100 knots with an accuracy and resolution of 2.5 knots or higher.

ii) The wind direction sensor is to cover an azimuth of 360° with an accuracy and resolution no less than 5º.

iii) The weather sensors are to be located to minimize air flow distortion from the ship's structure.

iv) The sensor is not to be located at the same height adjacent to a large radar mast or similar structure. In the event the sensor is located in this manner, a secondary sensor is to be installed on each side of the ship with the processing ability to weigh the dual data outputs, relative to wing direction.

v) Relative humidity is to be measured within 0-100% with an accuracy rate of 5% or higher.

vi) Air temperature is to be measured within -15°C to 55°C with an accuracy rate of ±0.5°C (with >10 knots wind speed and sunlight) or higher.

vii) Pertinent humidity and temperature measurements are to be displayed with a resolution not inferior to the accuracy.

viii) Barometric pressure is to be measured with accuracy better than 5 mbar(500 Pa) with a minimum resolution of 2 mbar.

ix) The system is to be capable of receiving reliable weather information relevant to the vessel's area of operation and displayed in a user-friendly manner.

x) The forecasts received by the system are to last a minimum of 5 days in time steps not exceeding 6 hours with a minimum geographical resolution of 60 km x 60 km.

7.2.9 Sound Reception System

The vessel is to have a sound reception system that complies with 2/5.6.3 and 2/5.6.4 of this Guide and comply with the following:

i) The sound reception system is to have the capability of sound detection along with wind and mechanical noise suppression with the audio band range of 70-700 Hz. The system performance is to have microphones in a position so that ambient noise does not exceed 65 dB(A).

ii) The system is to be capable of muting noise up to 75dB(A) to manage severe weather ambient noise in increments no greater than 3 dB(A).

iii) The system is to include filters to minimize background noise other than ship whistles and be able to determine the direction of the sound (port, starboard, forward or abaft) within ±5°.

iv) The system is to display sound direction results clearly for the duration of the signal plus 2 seconds with day and night distinction on a minimum of 2 meters.

v) The system microphones are to be arranged to minimize noise and be capable of being muted during the ship's whistle and while the outdoor PA-system is in use.

vi) The volume of the system's loudspeaker is to be adjustable within the wheelhouse with a labeled volume control marked of the position where the sound level in the wheelhouse is at the same level of the outdoor listening post.

7.2.10 Public Address System

A public address system on the bridge is to be suitable for flush mounting in the workstation consoles. Every station is to have means of visualizing its state of readiness. A reference list of all public access areas is to be permanently posted.

7.3 FMEA

The FMEA required to be submitted as per 1/13.3iii) of the Guide shall include the following:

- Vessel details and Class Notations
- List of all equipment (main and standby)
- A description of each equipment and associated failure mode with its failure causes relative to operational modes of the item
- A description of the failure of each mode on other items or equipment
- The analysis is to show how a single failure in a component or sub-system including their integration will grow and how essential systems will operate during failure to avoid any collision or grounding. Accordingly, a step by step sequential operating process is to be provided for crew use in the Bridge Operations Manual. This will outline the action to be taken by the crew when a failure occurs.
- After FMEA is carried out, any corrective action, if required, is to be taken based on the results of the findings
- An updated FMEA is to be conducted and a summary report including the FMEA test program is to be submitted for information and kept on board.

9 Human Element

9.1 Background

The ambient environment in which tasks are performed has a significant influence on human performance and vessel equipment. This section addresses task performance design considerations associated with the navigation bridge work environment and various vessel equipment including vibration; noise; lighting; device and instrument illumination; and heating, ventilation, and air conditioning (HVAC).

9.2 Ambient Environment Criteria

Table 1 below lists the ambient environmental criteria and testing requirements. With the exception of the vibration criteria, all ambient environment criteria are taken from the ABS *Guide for Crew Habitability on Ships*. Applicable sections from this Guide are identified below:

TABLE 1

	*Criteria**	*Test Planning*	*Test Requirements*	*Test Reporting*
Vibration	6 mm/s (214/mm/s^2)	3/6	3/7	3/8
Noise	Max Noise Level: 65 dB(A)	4/6	4/7	4/8
Indoor Climate	5/5	5/6	5/7	5/8
Lighting	6/5 (Table 3 and Table 6)	6/6	6/7	6/8
Note: * Vibration criteria are based on ISO 21984:2018.				

9.3 Personnel Safety

9.3.1 Background

To achieve personal safety for bridge personnel, the bridge is to be designed to offer protection from injury during normal weather conditions as well as rough weather conditions. The following guidelines address improving personnel safety on the bridge.

9.3.2 Bridge Physical Hazards

The bridge area is to be free of physical hazards to bridge personnel. There are to be no:

i) Trip hazards on the bridge deck such as curled up carpet edges, loose gratings, duckboards, or equipment.

9.3.3 Securing Equipment

Means are to be provided for securing portable equipment such as chairs and tables.

Where integrated bridge systems are provided that present a centralized position from which piloting, navigation and communications can be performed, a permanent seat is to be provided for the persons on watch duty. This seat may be moveable on tracks.

9.3.4 Safety Equipment Accessibility

All safety equipment on the bridge is to be clearly marked, easily accessible and have its stowage position clearly indicated.

9.3.5 Radiation Hazard

All equipment posing a radiation hazard is to be protected and located in areas that do not present hazards to personnel.

9.3.6 Emergency Lighting

Emergency lighting is to be provided for the bridge control center, stairways and exits.

9.3.7 Redundant Lighting Circuits

Bridge control center lighting is to be provided from two separate circuits so that in the event of loss of one circuit, lighting on the bridge is not interrupted.

9.3.8 Handrails and Grab Rails

Sufficient handrails or grab rails are to be fitted to enable personnel to move or stand safely during inclement weather. Protection of stairway openings are to be given special consideration.

9.3.9 Bridge Finishes

The surface finishes on the bridge are to be considered an integral part of the structure, layout and environmental design.

9.3.10 Non-Slip Surfaces

Wheelhouse, bridge wings and upper bridge decks are to have non-slip surfaces.

9.3.11 Robust Surfaces

All surfaces of deckheads, bulkheads, doors and floors are to be robust enough to withstand the daily wear of the at-sea environment. All surfaces are to be capable of withstanding a temperature range of -20 to +70 degrees Celsius (-4 to +158 degrees Fahrenheit), seawater, oils and solvents common to Vessels and ultra-violet light.

9.3.12 Electrical Circuit Fault Isolation

Circuits for equipment on the bridge are to be designed to allow isolation of a fault without having to take other circuits out of service and to allow safe and easy replacement.

9.3.13 Grounding of Metal on the Bridge

All metal parts on the bridge not intended to carry electricity are to be effectively grounded.

9.3.14 Component Replacement Safeguards

Replaceable components on the bridge are to be designed and arranged so that it is not possible to connect or replace them incorrectly.

9.4 Human Machine Interface

9.4.1 Human Expectations

Previous experience influences how humans interpret a display or operate a control. Equipment design is to be consistent with those expectations. Design of control actions and display response (directions of movement) are to be consistent across workstations. When selecting bridge hardware and software from different vendors, consideration is to be given to consistency.

9.4.2 Design within Physical and Perceptual Limits

Equipment design is to take into account the ability of humans to exert force, reach for and manipulate objects and sense the physical environment.

i) Controls are to be placed within easy reach and adjacent to related displays.

ii) Displays that are viewed from a nominal position are to be:

- Easy to read (e.g., character size compatible with viewing distance),
- Within an immediate field of view (directly in front of the viewer) and not obscured,
- Provided sufficient color, brightness, and contrast,
- Large enough to be seen from expected viewing distances and under expected ambient environments (day/night and weather conditions).

iii) The physical environment is to be controlled so that ambient conditions do not interfere with visual or audible signals.

iv) Controls are to be designed to prevent inadvertent operation.

v) The bridge is to be arranged so that objects can be easily and readily reached and manipulated.

9.4.3 Limit Memory Requirements

Human memory is limited in capacity, is often unreliable and can be affected significantly by factors such as fatigue, stress, and physical health. Equipment and controls are to:

i) Provide efficient methods of calling up the display of important or changing information.

ii) Avoid having to scroll through several displays to access frequently used or critical information – It is to be possible to display time critical information immediately.

iii) Avoid the need to cross-reference between information displays.

iv) Clearly identify all controls and displays.

v) Use simple and memorable codes that are easily distinguishable.

vi) Perform rapid information updating in a timely manner to bridge personnel.

vii) Provide obvious, ongoing display of automated system status (e.g., to indicate when automatic processes have been manually overridden, disabled, or failed).

9.4.4 Facilitate Human Attention

The following measures are to be considered to mitigate possible human errors due to distraction, complacency, habituation, and high workload:

9.4.4(a) Navigation equipment designers/ vendors/ shipyards are to submit documentation to ensure the following:

i) Frequently used and important displays (e.g., navigation, helm control, radar) are located in a central viewing area.

ii) Alarms are not so frequent that they cease to attract attention.

iii) Meaningful information groupings are used to enable bridge personnel to easily cope with a large amount of information.

9.4.4(b) The owners/shipyards are to prepare appropriate document indicating the following:

i) Avoidance of any distractions or unnecessary requirements to perform meaningless tasks (during a watch).

ii) Avoidance of unnecessary tasks that compete for attention such as paperwork that is not related to standing watch.

iii) Definition of clear task priorities.

9.4.5 Standardize Display Characteristics

The vendors or equipment suppliers are to provide documentation denoting the following:

i) Colors are to be consistent and have the same meaning across all displays.

ii) Each icon or symbol represents only one object or function and is easily discriminated from all other icons and symbols.

iii) Icons are designed to look like the objects, processes, or operations they represent, by use of literal, functional, or operational representations.

iv) Schematics have similar formats (e.g., process flow is normally from left to right) to maintain, when possible, an exact spatial mapping of one display onto another.

v) Computer display and panel display information layouts are spatially compatible with one another.

vi) The typeface is readable and have true ascenders and descenders. The font is to possess uniform stroke width and uniform aspect ratio.

vii) When abbreviations or acronyms are used, they are to be meaningful, in common usage and kept to a minimum.

viii) The units of parameter being measured (voltage, mass, pressure, length, speed, temperature etc.) are clearly displayed.

9.4.6 Standardized Control Requirements

i) Controls requiring frequent adjustments or accurate settings are to be designed and placed as per the Industry Standard.

ii) Controls are to be located in positions wherein simultaneous operation of two controls will not necessitate a crossing or interchanging of hands.

iii) The most important and frequently used controls are to have the most favorable position with respect to ease of reaching and grasping (particularly rotary controls and those requiring fine settings). Keys for emergency functions are to have a prominent position and be distinctively marked.

iv) The arrangement of functionally similar or identical controls are to be consistent from workstation to workstation and panel to panel throughout the bridge.

v) If more than one person controls the action of a bridge (or related) system, all relevant information is to be simultaneously available to the person responsible for coordinating the task.

vi) All the effects of an action or command on the process are to be simultaneously observable on associated displays. If equipment of system response time is slow, feedback is to be provided indicating the action has been initiated and is progressing (e.g., rudder position and rate of turn indicators)

vii) When possible, all necessary information is to be provided simultaneously (e.g., in parallel rather than sequentially) when needed to enable a diagnosis or a control decision.

viii) Movement of a control forward, clockwise to the right or up, is to be:

i) Turn the equipment or component "**ON**"

ii) Cause the quantity to increase

iii) Move the equipment or component forward, clockwise, to the right or up.

The above requirements are to be complied with as per the industry standard.

9.4.7 Standardized Prioritize Alarms and Audible Indicators

An alarm is a visual and/or audible signal typically indicating an abnormal situation demanding human attention and response. An audible indication is usually a display of status or vessel condition (e.g., tones that indicate a telephone or radio call is incoming or that an equipment function has failed).

Alarms and audible indicators are to be clearly coded. All alarms are to be prioritized to allow quick assessment of the importance of simultaneous alarms. Prioritization schemes include:

i) Sequencing alarms in a way that enables the development of abnormal events to be better understood.

ii) Separation of critical alarm information from information or status indications.

iii) Use of dedicated computerized alarm displays.

iv) Provision of distinct audible indicators (separate from alarms) that indicate automatic or semi-automatic actions of the system (e.g., transitioning from autopilot to manual steering). If a failure by the persons on watch duty to notice the occurrence of an audible indicator can lead to unsafe conditions (e.g., failure to notice that the vessel's gyro has failed or low lube oil pressure in the steering gear) then that condition is to be considered an *alarm condition* and is not to be considered as a simple *audible indication*.

The above requirements are to be complied with as per the industry standard.

9.4.8 Acknowledging Alarms

Critical alarms are not to be dismissed until the initiating condition is resolved. . The device is to be conveniently located and readable for acknowledgement. It may be possible to silence an audible alarm only when that action does not cause a loss of alarm information (e.g., visual display of the alarmed parameters).

9.4.9 Alarm Requirements

i) Alarms are to have a unique code (audible signal) if a unique type of response is required.

ii) Color is not to be the only means of distinguishing between alarm and non-alarm conditions.

iii) Labeling and other information is to be associated with the alarm indicator for the equipment or condition about which the alarm was triggered.

11 Survey Requirements

11.1 New Construction

For a new construction vessel, navigational equipment and systems are to be tested to the satisfaction of the attending Surveyor in accordance with 3/27, MSC 137 (76) and the following:

- Review of approved layout and arrangement drawings of equipment specified in this section as described in the above paragraphs 5, 7, and 9.

11.1.1 Tests and Sea Trials

During sea trials, navigational equipment and systems are to be tested to the satisfaction of the attending. Surveyor in accordance with a test program as per 3/25, MSC 137 (76) and the following:

- Automatic resumption of primary bridge navigational equipment/systems functions are to be demonstrated following a blackout simulation for a period of 10 minutes.
- Review of approved sea trials as listed in 3/25 of this Guide.
- The operating/technical manual as described in 3/23 of this Guide is to be used for verification of the testing program for relevant navigational equipment/systems and is to be retained on board.

Note: Suitable means such as navigation system power cut-off to verify appropriate operation without total ship's blackout isacceptable.

11.2 Annual Surveys *(1 September 2021)*

Surveys are to be in accordance with 7-9-13/3 of the ABS *Rules for Survey After Construction (Part 7)*.

SECTION 5

Requirements for Notation NIBS (Navigational Integrated Bridge System)

1 General *(1 October 2020)*

The following requirements are applicable to vessel which is fitted with the navigational equipment/systems, as required in this Guide, so arranged to form an integrated bridge system (IBS). Vessels complying with Sections 1 through 3 and Section 5 of this Guide, will be assigned the notation **NIBS** (Navigational Integrated Bridge System). Equipment required for this Notation is listed in 5/21 TABLE 1.

3 Integrated Bridge System (IBS) *(1 October 2020)*

An integrated bridge system (IBS) is to be provided and is to comply with IMO SN.1/Circ.288 – *Guidelines for Bridge Equipment and Systems, Their Arrangement and Integration (BES)*. The integrated navigation system is to be so arranged that failure of one sub-system does not affect any other sub-system. In case of failure of the integrated navigation system it is to be possible to operate the primary bridge navigational equipment/systems functions separately.

3.1 Dimmer Control *(1 May 2018)*

An individual dimmer control is acceptable in lieu of a single central dimming functionality called for by the Guidelines (IMO SN.1/Circ.288) provided the number of the individual dimmer control switches is minimized as far as practicable.

5 Centralized Bridge Workstation *(1 October 2020)*

A centralized bridge workstation is to be provided to enable the navigator to perform the necessary navigational, monitoring/alarming and communication functions as required in this Guide. The equipment required in the navigation and traffic surveillance/maneuvering workstation and monitoring workstation, specified in Section 3 of this Guide, is to be integrated within the centralized bridge workstation. See also 5/21 TABLE 1 for the required equipment to be included on this workstation.

7 Central Alarm Panel *(1 October 2020)*

The centralized bridge workstation is to be fitted with a central alarm panel for instruments and systems related to the functions specified in 5/3 for easy identification and acknowledgment of the individual alarms. Acknowledgment of an alarm at either the equipment fitted on the required workstation or the central alarm panel is to cancel the audible warning at both sources. Cancellation of the visual warning on the central alarm panel is to only be possible at the pertinent workstation.

In addition to required navigational alarms and those alarm conditions listed in the "Remark" column to item B17, a through h, of 3/27 TABLE 1, the following alarm conditions are to be alarmed at the central alarm panel:

- Position fixing inaccurate/lost.
- Loss of heading input.

- Loss of log input.
- Gyro compass mis-match.
- Integrated bridge system (IBS) failure.

9 Route Planning Workstation *(1 October 2020)*

The route planning workstation is to enable the navigator to plan the intended voyage without interfering with the actual navigation or maneuvering of the vessel. It is to be large enough to facilitate the use of two charts concurrently, and adequately fitted for efficient route planning. See 5/21 TABLE 1 for the required equipment to be included on this workstation.

11 Conning Information Display

A conning information display is to be provided on the bridge and which is to be observable from the conning position(s) and designed for easy reading of the maneuvering state of the vessel. The information on continuous display is to be restricted to information relevant to the actual phase of the voyage. This display may be included on the centralized bridge workstation. See also 2/5.2.2.

13 Navigational System Requirements

Requirements contained herein are in addition to or modified those in 3/13.

13.1 Course Information System *(December 2003)*

Notwithstanding 3/13.1, the heading information system is to include a magnetic compass and two independent gyro compasses.

13.2 Speed Measuring System

In addition to 3/13.3, the speed measuring system is to be independent of the position-fixing systems.

13.3 Automatic Track-keeping System

In addition to 3/13.6, the automatic track-keeping system is to automatically enable the vessel to keep along a pre-planned track and the vessel's position is to be monitored continuously. When the vessel's position cannot be received, the current heading or rate of turn is to be maintained until manually altered by the officer of the watch, and such condition is to be alarmed. The vessel's position is to be cross-checked by dead-reckoning based upon speed over ground provided by the vessel's log.

13.4 Electronic Chart Display and Information System (ECDIS) *(1 October 2020)*

Relevant equipment associated with the ECDIS (Electronic Chart Display and Information System) is to be installed on the centralized bridge workstation and at the route planning workstation. The ECDIS is to comply with IMO Res.MSC.232(82) or IMO Res. A.817(XIX), as amended by Annex 5 to MSC.64(67) "Performance Standard for Electronic Chart Display and Information Systems (ECDIS)", and Annex 4 to MSC.86 (70) "Performance Standard for Electronic Chart Display and Information Systems (ECDIS)" .

15 Operation/Technical Manual *(1 October 2020)*

In addition to 3/23, the operation/technical manual is to include the following:

15.1 *(1 October 2020)*

Simplified diagrams of the electronic chart display and information systems (ECDIS) and integrated bridge system (IBS).

15.2 *(1 October 2020)*

Periodical testing procedures for electronic chart display and information systems (ECDIS) and integrated bridge system (IBS).

17 Workstations - Required Equipment *(1 October 2020)*

In addition to 3/21, the equipment listed in 5/21 TABLE 1 is to be fitted on the bridge.

19 Tests and Sea Trials *(1 October 2020)*

The sea trial program is to include test details of the electronic chart display and information systems (ECDIS) and integrated bridge system (IBS).

21 Survey After Construction *(1 September 2021)*

See 7-9-13/5 of the ABS *Rules for Survey After Construction (Part 7)*.

TABLE 1
Navigational Equipment for NIBS Notation *(1 October 2020)*

Workstation/ panel for	*Main functions to be performed*	*Item*	*Equipment*	*Remarks*
Centralized Bridge	• See 3/27 TABLE 1	**A1**	Equipment required in Section 3 for the Navigation and Traffic Surveillance/ maneuvering and monitoring workstations	See 3/27 TABLE 1
		A2	Central alarm panel	See 5/7
		A3	ECDIS	See 5/13.4
Conning Information	• To allow the navigator the easy reading of the maneuvering state of the vessel from the conning position	**B1**	Display panel	See 5/11. This panel may be included within the centralized bridge station.
Manual steering (Helmsman's)	• See 3/27 TABLE 1	**C1**	Equipment required in Section 3 for the manual steering workstation	See 3/27 TABLE 1
Docking (Bridge wings)	• See 3/27 TABLE 2	**D1**	Equipment required in Section 3 for the docking workstation	See 3/27 TABLE 2

Workstation/ panel for	*Main functions to be performed*	*Item*	*Equipment*	*Remarks*
Route Planning	• Determination of favorable course and optimum speed, taking into account weather conditions, current, etc. and route planning • Giving instructions as to the course and speed • Calculation of tidal data • Handling nautical records, documents, publications • Handling weather reports • Determination of documentation of position in case of conventional operation • Control of rate and error of chronometer, deviation, radio deviation, documentation of same • Keeping deck log • External communication for planning operation using the chart	**E1**	ECDIS including navigation planning station	
		E2	Route planning devices	
		E3	Chart table	
		E4	Position-fixing receiver	
		E5	Retaining device for drawing triangles, dividers, magnifying lens, pencils, etc.	
		E6	Weather chart plotter	
		E7	Main clock	
		E8	Chronometer with receiving facility for time signals	*(December 2003)* See Note 2
		E9	Radio direction finder	*(December 2003)* See Note 3
		E10	Log, including distance indicator, course plotter	
		E11	Officer of the watch check-alertness acknowledgment device	
		E12	Barograph	
		E13	Command printer	
		E14	Automatic telephone system	See 3/19

Note:

1 *Attention is drawn to items A1, B1, B5, and C1 of 3/27 TABLE 1 and D1 of 3/27 TABLE 2 under "Remarks" column.*

2 *(December 2003) Chronometer is not required, if official universal time is obtained by other means.*

3 *(December 2003) Radio Direction Finder is not required, if the vessel is provided with other radionavigation equipment suitable for use throughout its intended voyages*

APPENDIX **1**

IMO Resolutions Referenced in this Guide *(1 October 2020)*

IMO Res. MSC.74(69), Annex 4	Recommendation on Performance Standards for Echo-sounding Equipment
IMO Res. MSC.64(67), Annex 3	Recommendation on Performance Standards for Automatic Pilots
IMO Res. A.342(IX)	Recommendation on Performance Standards for Automatic Pilots [see also Res. MSC.64(17)]
IMO Res. A.382(X)	Magnetic Compasses Carriage and Performance Standards
IMO Res. A.384(X)	Performance Standards for Radar Reflector
IMO Res. A.424(XI)	Performance Standards for Gyro-compass
IMO Res. A.477(XII)	Performance Standards for radar Equipment [see also Res. MSC.64(67), Annex 4]
IMO Res. A.526(13)	Performance Standards for Rate-of-Turn Indicators
IMO Res. A.601(15)	Provision and Display of Maneuvering Information On Board ships
IMO Res. A.617(15)	Implementation of the Navtex System as a Component of the Worldwide Navigational Warning Service
IMO Res. A.665(16)	Performance Standards for Radio Direction-finding Systems [revokes Res. A223 (VII)]
IMO Res. A.694(17)	General Requirements for Shipborne Radio Equipment Forming Part of the Global Maritime Distress and Safety System (GMDSS) and for Electronic Navigational Aids [revokes Res. A574(14)]
IMO Res. A.816(19)	Recommendation on Performance Standards for Shipborne Decca Navigator Receivers
IMO Res. A.817(19)	Recommendation on Performance Standards for Electronic Chart Display and Information System (ECDIS) [see also Res. MSC.64(67), Annex 5]
IMO Res. A.818(19)	Performance Standards for Shipborne Loran-C and Chayka Receivers
IMO Res. A.823(19)	Recommendation on Performance Standards for Automatic Radar Plotting Aids (Arpas) [for installations before 1/1/97, see Res. A.422(IX)]
IMO Res. MSC.74(69), Annex 3	Performance Standards for Automatic Identification System
IMO Res. MSC.74(69), Annex 2	Recommendation on Performance Standards for Track Control Systems
IMO Res. MSC.64(67), Annex 3	Recommendation on Performance Standards for Heading Control Systems
IMO Res. MSC.96(72)	Performance Standards for Devices to indicate Speed and Distance [for installations before 1/1/97, see Res. A.478(XII)]

IMO Res. MSC.113(73)	Performance Standards for Shipborne GLONASS receiver Equipment
IMO Res. MSC.137(76)	Standards For Ship Manoeuvrability
IMO Res. MSC.192(79)	Revised Performance Standards for Radar Equipment
IMO Res. MSC.96(72), Annex 14	Performance Standards for Devices to Measure and Indicate Speed and Distance
IMO Res. MSC.191(79)	Performance Standards for the Presentation of Navigation Related Information on Shipborne Navigational Displays
IACS Rec. 95	Recommendation for the Application of SOLAS regulation V/15, Bridge Design, Equipment Arrangement and Procedures (BDEAP)
MSC. Circular 53(66)	Performance Standards for Shipborne GLONASS receiver Equipment
MSC. Circular 64(67)	Adoption of New an Amended Performance Standards [revokes Res. A.574; amends Res. A342(IX), Res. A477(XII) and Res. A.817(19)]
IMO Res. MSC.128(75)	Performance Standarad for a Bridge Navigational Watch Alarm System (BNWAS)
IMO Res.MSC, 252(83)	Adoption of the Revised Performance Standards for Integrated Navigation Systems (INS)
IMO Res. MSC. 452(99)	Amendments to revised Performance Standards for Integrated Navigation Systems (INS)
IMO Res. MSC.232(82)	Adoption of the Revised Performance Standards for Electronic Chart Display and Information System (ECDIS)
IACS UI SC 235	Navigation Bridge Visibility