



GUIDE FOR

**BRIDGE DESIGN AND NAVIGATIONAL
EQUIPMENT/SYSTEMS**

JANUARY 2000 (Updated February 2014 – see next page)

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

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This Guide represents the latest position of the American Bureau of Shipping in this subject and is being released for trial use. ABS will consider the modification of these requirements as necessary and appropriate.

Updates

February 2014 consolidation includes:

- July 2012 version plus Corrigenda/Editorials

July 2012 consolidation includes:

- November 2010 version plus Notice No. 3

November 2010 consolidation includes:

- July 2008 version plus Notice No. 2

July 2008 consolidation includes:

- June 2002 version plus Notice No. 1

June 2002 consolidation includes:

- January 2000 version plus Corrigenda/Editorials

Corrigenda/Editorial Changes to 2000 Guide for Bridge Design and Navigational Equipment/Systems

The following Corrigenda/Editorial changes have been incorporated into the *Guide for Bridge Design and Navigational Equipment/Systems* and appear in the text in blue font.

Page No.	Paragraph	Comments
Part	A	General
5	A13.3	Subsection “A11.3.2” is to read “ <u>A13.3.2</u> ” and in first line “In addition to A11.2.5, the sea trial...” is to read “In addition to <u>A13.2.5</u> , the sea trial...”.
Part	C	Requirements for Notation NBLES (Navigational Bridge Layout and Equipment/Systems)
17	C13.1.1	First line: “In order to ensure the availability of course information...” is to read “In order to ensure the availability of <u>heading</u> information...”.
17	C13.1.4	First line: “When the position of the vessel cannot be received, the course of the vessel...” is to read “When the position of the vessel cannot be received, the <u>heading</u> of the vessel...”.
21	C23	Third line: “The operating manual...” changed to “The operating/ <u>technical</u> manual...”.
21	C23	Fifth line: “The operating manual...” changed to “The operating/ <u>technical</u> manual...”.
22	C23.5	First line in second paragraph “The operating manual is to be submitted for review by the American Bureau of Shipping solely to...” is to read “The operating/ <u>technical</u> manual is to be submitted <u>to the Bureau</u> for review solely to...”.
22	C23.5	Second sentence in second paragraph “The American Bureau of Shipping is not responsible for the operation of the vessel” is replaced with “The operation of the vessel is not a condition of the assigned class notations”.
22	C23.5	Second line in third paragraph “The operating manual...” changed to “The operating/ <u>technical</u> manual...”.
23	C27.1	“...operating manual. See C23.” is to read “...operating/ <u>technical</u> manual. See C23.”.
24	Table C1	Item A1 in fourth column of table “Gyro compass course indicator” is to read “Gyro compass <u>heading</u> indicator”.
24	Table C1	Item A2 in fourth column of table “Magnetic compass course indicator” is to read “Magnetic compass <u>heading</u> indicator”.
24	Table C1	Item A12 in fifth column of table, in first line “...and additional...” is to read “... <u>an</u> additional...”.
24	Table C1	Item A12 in fifth column of table, in third line “...changeover...” revised to “... <u>change-over</u> ...”.
25	Table C1	Item B1 in fourth column of table “Gyro compass course indicator” is to read “Gyro compass <u>heading</u> indicator”.
25	Table C1	Item B7 in fifth column of table, in first line “...and additional...” is to read “... <u>an</u> additional...”.

Page No.	Paragraph	Comments
Part C	Requirements for Notation NBLES (Navigational Bridge Layout and Equipment/Systems)	
25	Table C1	Item B7 in fifth column of table, in third line "...changeover..." revised to "...change-over...".
26	Table C1	Item C1 in fourth column of table "Gyro compass course indicator" is to read "Gyro compass <u>heading</u> indicator".
26	Table C1	Item C2 in fourth column of table "Magnetic compass course indicator" is to read "Magnetic compass <u>heading</u> indicator".
26	Table C1	First column, third row of table: delete "[See Note 1]" after " Docking (Bridge wings) ".
26	Table C1	Item D1 in fourth column of table "Gyro compass course indicator" is to read "Gyro compass <u>heading</u> indicator".
26	Table C1	First three bullet paragraphs in second column, third row "Giving instructions, performing an controlling..." are to read "Giving instructions, performing <u>and</u> controlling...".
26	Table C1	Fourth bullet paragraph in second column, third row "Handling communication with maneuvering g stations" is to read "Handling communication with maneuvering stations".

Part D	Requirements for Notation NIBS (Navigational Integrated Bridge System)	
29	D7	Second line in second paragraph "...to item B19..." is to read "...to item <u>B17</u> ...".
30	D15	First line: "...the operating manual..." changed to "...the operating/ <u>technical</u> manual...".
32	Table D1	Items C1 and D1 in fourth column of table "Equipment required in Part C for the manual steering workstation workstation" is to read "Equipment required in Part C for the manual steering workstation".
32	Table D1	Second bullet paragraph in second column, third row "Giving instructions as to the course an speed" is to read "Giving instructions as to the course <u>and</u> speed".
32	Table D1	Note at the bottom of the table " <i>Attention is drawn to items, items A1, B1, B5, C1 and D1, Table C1, under "Remarks" column.</i> " is to read " <i>Attention is drawn to items A1, B1, B5, C1 and D1 <u>of</u> Table C1 under "Remarks" column.</i> ".

Foreword

This Guide is rewritten and incorporates changes to the previously published *Guide for One Man Bridge Operated (OMBO) Ships* based on IMO decision to discontinue night time one man bridge experiment and shifted emphasis to bridge design and navigational systems.

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 a vessel. The requirements for vessels fitted with an integrated bridge system for navigational purpose is also included in this Guide.

The title of the Guide has been changed to *Guide for Bridge Design and Navigational Equipment/ Systems*. The new notations “**NBL**”, “**NBLES**” and “**NIBS**” are introduced to replace the previous “**OMBO**” notation and to define the expanded scope of the subject Guide.

Effective 1 January, 2000, this Guide supersedes the 1992 edition of the *Guide for One Man Bridge Operated (OMBO) Ships*.

**GUIDE FOR
BRIDGE DESIGN AND NAVIGATIONAL
EQUIPMENT/SYSTEMS**

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Part A – General

A1 Application

- A1.1** The requirements of this Guide are applicable to vessels possessing valid SOLAS certificates, and having the 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 the requirements of this Guide, and when found satisfactory, a classification notation as specified in **A5** will be granted. Application of the requirements of this Guide is optional.
- A1.2** The composition and qualifications of the crew remains the responsibility of the flag Administrations.
- A1.3** *(December 2003) 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.*

A3 Operational Assumptions

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

- A3.1** Plans for emergencies and the conditions under which the vessel is intended to operate are clearly defined in an operational manual acceptable to the flag Administration. The manual should clearly state the bridge crew composition required under any particular set of circumstances.
- A3.2** The requirements of the International Conventions on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) and other applicable statutory regulations are complied with.

A5 Optional Notations

A5.1 Notation NBL (Navigational Bridge Layout)

Where requested by the Owner, a vessel having its bridge found to comply with the requirements in Parts A and B of this Guide, as applicable, and which has been constructed and installed under survey by the Surveyor, will be assigned the notation **NBL**.

A5.2 Notation NBLES (Navigational Bridge Layout and Equipment/systems)

Where requested by the Owner, a vessel which is found to comply with the requirements specified in Parts A through C of this Guide and which has been constructed and installed under survey by the Surveyor, will be assigned the notation **NBLES**.

A5.3 Notation NIBS (Navigational Integrated Bridge System)

Where requested by the Owner, a vessel which is fitted with an integrated bridge system (IBS) for navigational purpose, is found to comply with the requirements specified in Parts A through D of this Guide, and which has been constructed and installed under survey by the Surveyor, will be assigned the notation **NIBS**.

A7 Regulations

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 provided onboard the vessel and made available to the Surveyor upon request.

A9 Flag Administration and National Authorities

Vessel owners or other interested parties are urged 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.

A11 Definitions *(December 2003)*

The following list provides definitions of the terms 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, who has been designated by the vessel master to be on call if assistance is needed on the navigation bridge.

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

Bridge Wings – Those parts of the bridge on both sides of the vessel's wheelhouse which, in general, extend to the vessel's side.

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.

CPA (Closest Point of Approach) – The shortest target vessel-own vessel calculated distance that will occur in case of 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 adequate performance of voyage planning/plotting activities.

Commanding View – View without obstructions which would interfere with the navigator's ability to perform his immediate task.

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

Course – The horizontal direction in which a vessel is steered or intended to be steered, expressed as an angular distance from north. Course applies to direction 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

ECDIS – (Electronic Chart Display and Information System) 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

FOV (Field of Vision) – Angular size of a scene that can be observed from a position in the vessel's bridge.

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) – This system is defined as a combination of systems which are interconnected in order to allow centralized access to sensor information or command/control from workstations, with the aim of increasing safe and efficient vessel’s management by suitable qualified personnel. 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.

Main Workstation – See “navigation and traffic surveillance/maneuvering workstation”.

Manual Steering Workstation – Workstation from which the vessel can be steered by a helmsman, possibly designed for working in a seated position.

Monitoring – Act of constantly checking equipment and environment in order to detect any changes.

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 integrated presentation of information and operating equipment. It shall be possible from this location to operate the vessel safely, in particular when a fast sequence of action is required.

NAVTEX – A narrow-band direct printing telegraph equipment for reception of navigational and meteorological warnings and urgent information to vessels.

Normal Sailing Conditions – When all 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 – Comparison of heading and preset heading (control error).

Officer of the Watch – Person responsible for safe navigating, operating 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 are: gyro compass, radar, position-fixing system and electronic chart system.

Public Rooms – Public rooms are those portions of the accommodations which are 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 whole process of target detection, tracking calculation, 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 fixing and documenting all vessel’s operation takes place.

Sea-going Vessel – 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 horizontal direction of travel with respect to earth.

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

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

Wheelhouse – Enclosed area of the bridge.

Workstation – Position at which one, or several tasks constituting a particular activity are carried out.

A13 Plans and Data to be Submitted

(2011) 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.**

A13.1 Applicable to NBL, NBLES and NIBS Notations

A13.1.1 Details of navigational equipment to verify compliance with B3.

A13.1.2 A complete layout and dimensional details of the bridge area and workstations installed therein. This is to include:

- a 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, de-icing/de-misting, sunscreens, etc.).
- b Fields of vision from the bridge workstations, including any blind sectors caused by obstructions outside of the wheelhouse.
- c Location and arrangement of workstations, including dimensions of consoles, layout of instrumentation and controls, handrails, seating, etc.
- d Clearances between floor and ceiling, or between floor and the underside of ceiling mounted instruments, throughout the wheelhouse.
- e Arrangements for the general illumination of the bridge and the individual illumination of workstation instruments and controls.
- f Details of wheelhouse ventilation and heating systems.
- g Details of internal communication systems operable from the bridge.
- h Arrangements/details of exterior catwalk in front of bridge windows.
- i Details of non-slip flooring. See B5.6.5.
- j Details of wheelhouse doors, including hold-back arrangements. See B5.6.8.
- k Location of toilet. See B5.6.7
- l Arrangements for drainage of bridge decks. See B5.6.6.
- m Arrangements/details as to the measures to be taken to minimize hazards to personnel. See B5.6.10.

A13.2 Applicable to NBLES and NIBS Notations

A13.2.1 A list of navigational equipment. This is to include for each item the manufacturer's name and model number, together with copies of relevant type approval certificates.

A13.2.2 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.

- A13.2.3 A simplified one-line diagram of the relevant systems described in C13 through C19. 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, etc.
- A13.2.4 Operating/technical manuals for the installed navigational equipment/systems. A single copy only is to be submitted for information. See C23.
- A13.2.5 Sea trial test schedule. A single copy only is to be submitted. See C25.

A13.3 Applicable to NIBS Notation

- A13.3.1 Details and arrangements of the workstations and systems described in Part D.
- A13.3.2 *(December 2003)* In addition to A13.2.5, the sea trial program is to include test details of the electronic chart display and information systems (**ECDIS**) and integrated bridge system (IBS).

Part B – Requirements for Notation NBL (Navigation Bridge Layout)

B1 General

Vessels complying with Parts A through B of this Guide, will be assigned the notation **NBL** (Navigation Bridge Layout).

B3 Equipment Design and Construction

B3.1 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 B3 are applicable to navigational related equipment required in this Guide

B3.2 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.

B3.3 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.

B3.4 Self-support

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. In case the last method is used, means of bracing is to be flexible to allow deflection of the deck without buckling the assembly structure.

B3.5 Configuration of Devices

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 realize this intent. 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 the arrangement for sequential operation.

B3.6 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:

B3.6.1 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).

B3.6.2 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.

B3.6.3 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.

B3.6.4 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).

B3.6.5 Mechanical Control

The shape of mechanical controls are to indicate the method 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.

B3.6.6 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.

B3.6.7 Illumination and Lighting

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 (wave length 620 nm or higher) is to be used.

B3.7 Earthing

Non-current carrying metal parts are to be effectively earthed.

B5 Bridge Arrangement and Working Environment

B5.1 Fields of Vision

B5.1.1 General

Requirements found in Section 3-6-1, “Visibility” of the *ABS Rules for Building and Classing Steel Vessels (Steel Vessel Rules)* are to be complied with.

B5.2 Control of Vessel

B5.2.1 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.

B5.2.2 Conning Position (*December 2003*)

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 watch 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.

B5.2.3 Navigation and Traffic Surveillance/Maneuvering Workstation

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.

B5.2.4 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.

B5.2.5 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.

B5.2.6 Manual Steering Workstation

The workstation for manual steering is preferably to be located on the vessel's center-line. If the workstation for manual steering is located off the center-line, 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 center-line, sufficient to obtain a clear view ahead.

B5.2.7 Docking Workstations

The workstations for docking of the vessel 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 center-line is greater than 10 m (32 ft 10 in.).

B5.3 Routes and Working Clearances

B5.3.1 Across Wheelhouse (1 July 2012)

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:

- a. There is clear visibility for individuals on either side of the obstruction to see each other as they approach the area of reduced width,
- b. the length of the obstruction along the passageway does not exceed 1 m (39.4 inches),
- c. 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.)],
- d. the above actions will not interfere with any crew member at a station required to be continuously manned, and
- e. the attending Surveyor is satisfied that two (2) individuals traveling in opposite directions can pass through the area of reduced width with only a very brief pause by one of the two (2).

B5.3.2 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 B5.3.1.

B5.3.3 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.

B5.3.4 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.).

B5.4 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.

B5.5 Workstations

B5.5.1 General

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: 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 B5.5.2 and B5.5.3 do not apply to radar consoles.

B5.5.2 Configuration

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

- a *Vertical Part:* Instruments dealing with information/presentation of data are to be placed in the vertical part.
- b *Horizontal Part:* Controls of the relevant equipment are to be placed in the horizontal part.

B5.5.3 Dimensions

- a *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 1.3.5 of the *Steel Vessel Rules*:
- b *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.).
- c *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.) slits in front and back of the table to accommodate charts which are larger than the table.

B5.5.4 Instruments and Controls

- a *General:* Instruments and controls are to be grouped according to their main functions; these are: navigating and traffic surveillance/maneuvering, and communication.
- b *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.
- c *Glare:* To avoid glare, all instruments and controls are to be positioned relative to the operator considering the surrounding light sources.

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

B5.6 Other Considerations

B5.6.1 Lighting and Illumination

- a *General:* A satisfactory level of lighting is to be provided to enable personnel to complete required bridge tasks at sea and port, day time and night time. To this end, individual task areas are to have a greater luminance than the general lighting level.
- b *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 B3.6.7). 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.

B5.6.2 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).

B5.6.3 Sound Signals

Fixed vessel's 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).

B5.6.4 Noise Levels

- a *General:* 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 good weather is not to exceed 65 dB(A).
- b *Others:* The noise of ventilation fans, engine intake fans and other noise sources are to be excluded from the bridge operational area by suitable siting of the fans and associated trunking.

B5.6.5 Surfaces

- a *Glare-free:* All prepared surfaces are to be glare-free.
- b *Non-slip:* The flooring throughout the bridge is to be provided with non-slip surfaces, effective in both wet and dry locations.

B5.6.6 Drainage

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

B5.6.7 Toilet Facilities

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

B5.6.8 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.

B5.6.9 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.

B5.6.10 Safety of Personnel

- a *Sharp Edges and Protuberances:* There are to be no sharp edges or protuberances which could cause injury to personnel.
- b *Hand-rails or Grab-rails:* Sufficient hand-rails or grab-rails are to be fitted to enable personnel to move or stand safely in bad weather.
- c *Seat Securing:* Where provisions for seating is made in the wheelhouse, means for securing same are to be provided, having regard to storm conditions.

B7 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.

Part C – Requirements for Notation NBLES (Navigational Bridge Layout and Equipment/Systems)

C1 General

Vessels complying with Parts A through C of this Guide, will be assigned the notation **NBLES** (Navigational Bridge Layout and Equipment/Systems). Equipment required for this notation is listed in Table C1 (found at end of Part C).

C3 Documentation, Type Approval and Performance Standards of Navigational Equipment

C3.1 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 C3.2 and C3.3.

C3.2 Type-approved Equipment

Navigational equipment is to be type approved to the satisfaction of the Administration in conformity with appropriate performance standards acceptable to IMO.

C3.3 IMO's Performance Standards

In general, relevant navigational equipment is to comply with IMO's 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 C13 and Part D.

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 A for a list of IMO Resolutions referenced in this Guide.

C5 Manual Mode of Operation

Navigational systems intended for automatic operation are to be fitted with manual operating facilities 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 C13.

C7 Alarm Systems

C7.1 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.

C7.2 Audible Alarm Circuits

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

C7.3 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.

C7.4 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.

C7.5 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.

C9 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.

C11 Power Supply

C11.1 Sources

Electrically operated systems and equipment covered in Parts C and D 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.

C11.2 Emergency Service

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 4-8-2/5.5.4 of the *Steel Vessel Rules*.

C11.3 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.

C13 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 C13.1 through C13.9.

C13.1 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:

C13.1.1 In order to ensure the availability of heading information the vessel is to be fitted with an independent gyro compass

C13.1.2 Means for taking optical bearings is to be made available onboard the vessel.

- C13.1.3 Means are to be provided for correction of errors induced by speed and latitude.
- C13.1.4 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.

C13.2 Steering System

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

- C13.2.1 *(December 2003)* The automatic pilot with an on/off indicator is to comply with IMO's Res. A.342(IX), as amended by Annex 3 to MSC.64(67) "Performance Standard for Automatic Pilots".
- C13.2.2 *(December 2003)* 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,s Res. MSC.64(67), Annex 3 "Recommendation on Performance Standards for Heading Control Systems" and the track control system is to comply with IMO,s Res. MSC.74(69), Annex 2 "Recommendation on Performance Standards for Track Control Systems".
- C13.2.3 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.
- C13.2.4 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's Res. A.526(13), "Performance Standards for Rate-of-Turn Indicators".
- C13.2.5 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.

C13.3 Speed Measuring System *(December 2003)*

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, aft and athwartship directions. The speed log is to comply with IMO's Res. MSC.96 (72), Annex 14 "Performance Standards for Devices to Indicate Speed and Distance".

C13.4 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's Res. MSC.74(69), Annex 4 "Performance Standards for Echo-Sounding Equipment".

C13.5 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's Res. A.477(XII) as amended by Annex 4 to MSC.64(67), "Performance Standards for Navigational Radar Equipment" and the following:

C13.5.1 *(December 2003)* If the vessel's minimum reflective cross section area is less than 100 m², 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's Res. A 384(X) "Performance Standard for Radar Reflector"**.

C13.5.2 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.

C13.6 Automatic Traffic Surveillance System *(December 2003)*

The vessel is to be fitted with an automatic traffic surveillance system to automatically plot the range and bearing of other vessels in order to determine collision risk. This traffic surveillance system is to comply with IMO's Res. A823(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:

C13.6.1 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.

C13.6.2 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.

C13.6.3 For vessels 10,000 GT and above, means to automatically control and keep the vessel in a straight track is to be provided.

C13.7 Position Fixing System

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's Res. A819(19), "Performance Standards for Shipborne Global positioning System (GPS) Receiver Equipment" and the following:

C13.7.1 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.

C13.7.2 A means to self-test the major functions of the system is to be provided.

C13.7.3 *(December 2003)* 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".

C13.8 Watch Monitoring and Alarm Transfer System

Means to monitor the alertness of the officer of the watch and alarm other bridge personnel if disability occurs is to be provided. 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.

C13.8.1 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 C13.8.2.
- 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 C13.8.2b, in the event of a failure of the alertness-check alarm system.

C13.8.2 Alarm Transfer System

- 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 Table C1 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.

A wireless portable device capable of receiving watch alarms and 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.

- 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 C13.8.2b. The fixed installation required under C13.8.2a may serve this purpose.

C13.9 Route Planning

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

C13.10 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's Res. MSC.74(69), Annex 3 "Recommendation on Performance Standards for an Universal Shipborne Automatic Identification System".**

C15 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 *Steel Vessel Rules*.

C17 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.**

C17.1 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

C17.2 The automatic telephone network is to be designed to carry at least 2 simultaneous calls.

C17.3 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.

C19 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.

C21 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 Table C1 is to be fitted at the various workstations to enable the officer of the watch and other operators to carry out the required tasks.

C23 Operating/Technical Manual

An operating/**technical** manual which is consistent with the information and criteria upon which the notation **NBLES** is based is to be placed onboard the vessel for the guidance of the operating personnel. The operating/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/**technical** manual is to include the following, as a minimum.

C23.1 Vessel's name and ABS ID number.

C23.2 Simplified diagrams of the systems described in C11 through C19.

C23.3 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.).

C23.4 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.

C23.5 Periodical testing procedures for relevant navigational equipment/systems.

The operating/**technical** manual is to be **submitted to ABS for review** solely 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.

C25 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:

C25.1 Applicable to All Relevant Navigational Equipment

C25.1.1 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.

C25.1.2 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 C11.3.

C25.2 Specific Equipment or System

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 Watch monitoring and alarm transfer 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.

C27 Survey After Construction

The following items are to be satisfactorily examined or verified at each Annual Survey of the vessel.

C27.1 Ready availability of the approved operating/technical manual. See C23.

C27.2 Required bridge's fields of vision. See B5.1.

C27.3 The systems described in C13 through C19. Additionally, subject to the discretion of the attending Surveyor, such systems may be tested in accordance with C25.

C27.4 Following a loss of power supply, resumption of same to navigational equipment. See C11.3.

TABLE C1 – Navigational Equipment for NBLES Notation (December 2003)

Workstation for	Main functions to be performed	Item	Equipment	Remarks
Navigation and Traffic Surveillance/ maneuvering . [See Note 1]	<ul style="list-style-type: none"> • 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 D13.1). 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 C13.2.4 and .5
		A10	Speed and distance indicator	For NIBS notation, the speed measuring system is to be independent of the position-fixing systems. See D13.2
		A11	Depth water indicators with adjustment controls	See also C13.4
		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 C13.5.2
		A13	Automatic traffic surveillance system including ARPA	See C13.6. For NIBS notation, see D13.3
		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 C13.7
		A15	Officer of the watch check-alertness acknowledgment device	
		A16	Back-up navigator call alarm device	Two-way communication wireless portable device to be provided. See C13.8.2b
		A17	Facilities for use of navigation charts	This may be separated from the navigation and traffic surveillance/ maneuvering workstation. See also C13.9
		A18	Vessel’s automatic identification system	
		A19	Propulsion engines/thrusters controls including emergency stops.	Compliance with Part 4, Chapter 9, Section 2 of the “Rules for Building and Classing Steel Vessels” 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 C17
		A25	Radiocommunication equipment	See C19
		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: <ul style="list-style-type: none"> • whistle • automatic device for fog signal • general alarm • Morse signaling light 	
		A28	Search light controls	
		A29	Controls for windscreen wiper, washer, heater	

TABLE C1 – Navigational Equipment for NBLES Notation (cont'd) (December 2003)

Workstation for	Main functions to be performed	Item	Equipment	Remarks
		A30	Night vision equipment	
		A31	Sound reception system	(December 2003) If required, see B5.6.3
		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
Monitoring [See Note 1]	<ul style="list-style-type: none"> • Observation of all vessels and objects • Recognizing dangerous situations • Checking own course and speed • 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 D13.1). 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 C13.2.4 and .5
		B5	Speed and distance indicator	For NIBS notation, the speed measuring system is to be independent of the position-fixing systems. See D13.2
		B6	Depth water indicators	See also C13.4
		B7	Radar	For vessels 3,000 GT and above, an additional independent radar together with a change-over switch is to be provided. See C13.5.2
		B8	Officer of the watch check-alertness acknowledgment device	
		B9	Propulsion engines/thrusters emergency stops	
		B10	Propeller revolutions indicator	
		B11	Automatic telephone system	See C17
		B12	Radiocommunication equipment	See C19
		B13	Signal transmitter for whistle	
		B14	Controls for windscreen wiper, washer, heater	
		B15	Workstation lighting control device	
		B16	Clock	
		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
		<ul style="list-style-type: none"> a) Off-heading b) Off-track c) Planned route deviation d) Pre-warning of approach-way point, and closest point of approach e) Off-preset water depth f) Gyro compass failure g) Failure of alarms prescribed in C13.8.1 h) Failure of power supply to distribution panel serving relevant equipment <p>(Alarming of the above conditions at the monitoring workstation is not a substitute for alarming at the required relevant workstations)</p>		

TABLE C1 – Navigational Equipment for NBLES Notation (cont'd) (December 2003)

Workstation for	Main functions to be performed	Item	Equipment	Remarks	
Manual steering (Helmsman's) <i>[See Note 1]</i>	<ul style="list-style-type: none"> 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)	<i>(December 2003)</i> For NIBS notation, two independent gyro compasses are to be provided on the bridge (See D13.1). 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 C17
		C9	Controls for windscreen wiper, washer, heater		
Docking (Bridge wings)	<ul style="list-style-type: none"> 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	<i>(December 2003)</i> For NIBS notation, two independent gyro compasses are to be provided on the bridge (See D13.1). See note 2.	
		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 C13.4
		D14	Officer of the watch check-alertness acknowledgment device		
		D15	Whistle controls		
		D16	Search light and Morse lamp controls		
		D17	Automatic telephone system		See C17
		D18	Radiocommunication equipment		See C19
		D19	Workstation lighting control device		

Notes:

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

Part D – Requirements for Notation NIBS (Navigational Integrated Bridge System)

D1 General

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 Parts A through D of this Guide, will be assigned the notation **NIBS** (Navigational Integrated Bridge System). Equipment required for this notation is listed in Table D1 (found at end of Part D).

D3 Integrated Bridge System (IBS)

An integrated bridge system (IBS) is to be provided and is to comply with IMO's Res. MSC.64(67), Annex 1 – Recommendations on Performance Standards for Integrated Bridge Systems (IBS). 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. 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.

D5 Centralized Bridge Workstation

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 Part C of this Guide, is to be integrated within the centralized bridge workstation. See also Table D1 for the required equipment to be included on this workstation.

D7 Central Alarm Panel

The centralized bridge workstation is to be fitted with a central alarm panel for instruments and systems related to the functions specified in D3 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 Table C1, 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 mismatch.
- Integrated bridge system (IBS) failure.

D9 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. It is to be large enough to facilitate the use of two charts concurrently, and adequately fitted for efficient route planning. See Table D1 for the required equipment to be included on this workstation.

D11 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 B5.2.2.

D13 Navigational System Requirements

Requirements contained herein are in addition to or modified those in C13.

D13.1 Course Information System *(December 2003)*

Notwithstanding C13.1, the heading information system is to include a magnetic compass and two independent gyro compasses.

D13.2 Speed Measuring System

In addition to C13.3, the speed measuring system is to be independent of the position-fixing systems.

D13.3 Automatic Track-keeping System

In addition to C13.6, 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.

D13.4 Electronic Chart Display and Information System (ECDIS) *(December 2003)*

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's 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)".

D15 Operating/Technical Manual

In addition to C23, the operating/technical manual is to include the following:

D15.1 *(December 2003)* Simplified diagrams of the electronic chart display and information systems (ECDIS) and integrated bridge system (IBS).

D15.2 *(December 2003)* Periodical testing procedures for electronic chart display and information systems (ECDIS) and integrated bridge system (IBS).

D17 Workstations – Required Equipment

In addition to C21, the equipment listed in Table D1 is to be fitted on the bridge.

D19 Tests and Sea Trials *(December 2003)*

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

D21 Survey After Construction

In addition to C27, the systems described in D3 and D13 are to be included.

TABLE D1 – Navigational Equipment for NIBS Notation (December 2003)

Workstation/panel for	Main functions to be performed	Item	Equipment	Remarks
Centralized Bridge	<ul style="list-style-type: none"> See Table C1 	A1	Equipment required in Part C for the Navigation and Traffic Surveillance/ maneuvering and monitoring workstations	See Table C1
		A2	Central alarm panel	See D7
		A3	ECDIS	See D13.4
Conning Information	<ul style="list-style-type: none"> To allow the navigator the easy reading of the maneuvering state of the vessel from the conning position 	B1	Display panel	See D11. This panel may be included within the centralized bridge station.
Manual steering (Helmsman's)	<ul style="list-style-type: none"> See Table C1 	C1	Equipment required in Part C for the manual steering workstation	See Table C1
Docking (Bridge wings)	<ul style="list-style-type: none"> See Table C1 	D1	Equipment required in Part C for the docking workstation	See Table C1
Route Planning	<ul style="list-style-type: none"> 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 C19

Note:

- Attention is drawn to items A1, B1, B5, C1 and D1 of Table C1 under "Remarks" column.
- (December 2003) Chronometer is not required, if official universal time is obtained by other means.
- (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 A
IMO Resolutions Referenced in this Guide (December 2003)

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-compasses
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.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.96(72), Annex 14	Performance Standards for Devices to Measure and Indicate Speed and Distance
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)]