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NAVIGATION EQUIPMENT

1. GENERAL

All Navigating Officers are expected to be thoroughly familiar with the use and proper operation of all the navigational equipment on board; and the advantages and limitations of each.

Undue reliance should not be placed on a single navigational system or method. Where more than one system or method of position fixing is available at least two systems or methods should be used and the results obtained by different systems or methods carefully compared in order to ensure the safe and proper navigation of the vessel.

Alarms where fitted to navigation equipment must be used and tested e.g. off course alarms; ARPA close approach alarm, equipment failure alarms, ECDIS safety contour and area alarms etc.

2. USE OF NAVIGATIONAL EQUIPMENT

The OOW has unrestricted access to make the most effective use of all navigational equipment.

3. PERIODIC CHECKS OF NAVIGATIONAL EQUIPMENT

On ships fitted with direct bridge control of engine systems, prompt and effective engine responses shall be tested prior to entering restricted waters and at any time it is anticipated that manoeuvring control may be needed.

See **Section 6, DUTIES OF THE OOW**, para 6.5

See **BRIDGE PROCEDURES GUIDE** - Chapter - Duties of The Officer of the Watch / Periodic Checks of Navigational Equipment

4. DAILY TESTS

In addition to the periodic checks the OOW in charge of the 12 to 4 watch, shall be responsible for the following daily tests:

At noon each day while the vessel is at sea and before entering restricted waters the whistle, telephones and general alarm bells must be tested. The whistle shall not be tested when the presence of other vessels might result in it being mistaken for a passing signal.

Clocks on Bridge and in Engine room to be synchronised at noon.

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The navigation lights, both mains and emergency, shall be tested a half an hour before sunset.
A procedure for testing of the navigation light failure alarm shall be posted on the bridge.¹

The automatic pilot shall be disengaged and the vessel steered in manual mode at least 10 minutes each day.

The VDR is to be checked to ensure that it's in good working order without any alarms.

5. MAINTENANCE / FAILURE² / REPAIR

Navigational Equipment shall be maintained in accordance with the Manufacturer's Instructions and kept in proper operating order at all times.

The Second Officer (0000-0400/1200-1600 watch keeper³) is responsible for the maintenance of the navigational equipment on board; filing service reports and the updating of the Radio & Nav. Aid maintenance file.

In case of navigational equipment failure, the contingency plan pertaining to the equipment shall be complied. Contingency plan covers the failure scenario of the key navigational equipment – Gyro, GPS, ECDIS, Log Speed, Radar and Steering Gear.⁴

The failure of the navigational equipment must be immediately reported to office by telephone or by email.⁵

The Master must undertake a risk assessment and take additional mitigating measures including issuance of clear instructions in the Master's Bridge Order Book, on procedures to be followed until the equipment can be restored to operation.⁶

Additional mitigating measures may involve the following:

- Raising the bridge manning level
- Extra lookouts
- Hand steering
- Manual plotting of the targets in the event of an ARPA failure.

¹ W 44 / 2023

² W 26 / 2020

³ W 26 / 2020

⁴ W 26 / 2020

⁵ W 26 / 2020

⁶ W 26 / 2020

- Use of any other available standby equipment and resources⁷

Where required, office will arrange dispensation letter for the non-operational navigational equipment from the flag state.⁸

The trouble shooting using maker's instruction manual shall be carried out on board to recover the equipment in operational condition.⁹

Repairs and service to Navigational Equipment which are beyond the capability of ship's personnel shall be arranged when and where required through the office. Refer to the Company repairs and maintenance procedures

Any urgent repairs are to be sent to the attention of Marine Superintendent and Ship Manager. Job card for repair will then be placed in [Mespas](#)¹⁰

On tankers, all defects to navigational equipment are to be entered in [Mespas](#)¹¹ defect management in order to identify the recurring defects to navigational equipment across the fleet.¹²

5.1. Spare Parts for Navigational Equipment¹³

The minimum spare parts for the navigational equipment are recommended as following to insure that the equipment are operational at all times.

S.No.	Navigational Equipment	Spare Part Name	Minimum quantity recommended
1.	Magnetic Compass	Bulbs	2 nos.
		Magnetic correctors	2 pcs each Athwartship, Fore & aft and Flinders bar
2.	Aldis Lamp	Bulbs	3 nos.
3.	VDR	Spare Hard Drive	1 nos. (To be placed on board when last save attempt is left)
4.	SAT C Printer	Paper Rolls	6 pcs
		Printer cartridge	1 pc
5.	Navtex printer (if fitted)	Paper Rolls	6 pcs

⁷ W 26 / 2020

⁸ W 26 / 2020

⁹ W 26 / 2020

¹⁰ W 03 / 2024

¹¹ W 03 / 2024

¹² W 26 / 2020

¹³ W 26 / 2020

S.No.	Navigational Equipment	Spare Part Name	Minimum quantity recommended
6.	Course Recorder (if fitted)	Paper rolls	6 pcs
		Head / Stylus Stylus (as applicable)	1 pc each colour
7.	Echo sounder printer (if fitted)	Paper Rolls	6 pcs
8.	Engine Telegraph	Paper rolls	6 pcs
9.	MF/HF Printer	Paper rolls	6 pcs
		Cartridge	1 pc
10.	Weather Fax Receiver	Paper rolls	6 pcs
11.	Navigational lights	Bulbs	30 nos.
12.	Radar S & X Band	Magnetron	1 pc each ((in view of shelf expiry date, new magnetrons are to be placed on board towards the expiry of the running hours the in use magnetrons)
	Radar X-band	Carbon brush	2 pcs

6. RADAR AND ARPA

See **BRIDGE PROCEDURES GUIDE** – Chapter – Operation and Maintenance of Bridge Equipment / Radar and Radar Plotting Aids

See **Section 10, NAVIGATION GENERAL – RADAR para 10.8**

Radar(s) must be kept on either standby or full operating status, at all times when the vessel is at sea, and must be kept in full operation:

- When visibility is less than 10 miles
- When in or near shipping lanes, where high density traffic may be expected
- Whenever the Master has set double watches
- When making landfalls
- When underway in inland waters
- When within 30 miles off land
- From sunset to sunrise

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h. When the Master or OOW deems it advisable.

The ARPA radar should be used when visibility is poor or when high density traffic may be expected.

Although 3cm radar normally provides finer bearing discrimination and a 'sharper' picture, 10cm radar is far less affected by disturbances which reduce radar performance such as fog, wet snow, rain and sea return.

Generally, 3cm radar should be used for navigation purposes and short-range search and the 10cm radar operated at the same time on long range search.

When sea clutter is heavy, 10cm radar should be used for short range search.

Discrimination between targets on the same bearing is more a function of pulse length than equipment operating frequency or wave length.

Before anybody goes up the radar mast the radar must be turned off, the fuses/breakers pulled, and a tag out notice posted at the radar console to indicate that men are aloft.

NOTE: The radar must not be switched on, the notice must not be removed and the fuses/breakers must not be closed until all personnel have descended from the radar mast.

7. STEERING GEAR AND AUTOMATIC PILOT

See **BRIDGE PROCEDURES GUIDE** - Chapter – Operation and Maintenance of Bridge Equipment / Steering Gear and Automatic Pilot and [Appendix C – C2.1¹⁴](#) Steering Gear Test Routines

See **Section 14, NAVIGATION – ARRIVAL/DEPARTURE, para 14.8**
[Company Checklist Nav B01-Steering Gear Test Routines¹⁵](#)

SOLAS Chapter V Safety of Navigation Reg.26 Steering Gear: Testing and drills

¹⁴ W 08 / 2024

¹⁵ W 08 / 2024

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8. MAGNETIC AND GYRO COMPASSES

See **BRIDGE PROCEDURES GUIDE** - Chapter – Operation and Maintenance of Bridge Equipment / Compass Systems

A spare magnetic compass, interchangeable with the standard magnetic compass, shall be carried unless a steering compass or gyro compass is fitted.

The magnetic compass shall be properly adjusted and its table or curve of residual deviations shall be available at all times.

A steering magnetic compass.

Unless heading information provided by the standard compass above is made available and is clearly readable by the helmsman at the main steering position.

Spare magnetic compasses should be stored upside down to avoid wear of the needle bearing.

The error of the gyro should be determined by external observations – celestial bearings, transits etc. and the gyro and magnetic compass headings then compared to determine the magnetic compass error. Where a gyro repeater is used to take a bearing, an accurate comparison between the repeater and the master gyro should be made.

The previous record completed by a qualified compass adjuster should be retained to prove that adjustment has not been required in the intervening period. A comparison between the magnetic and gyro headings should be made at each substantial course alteration and once each watch. Details must be recorded in the Deck Log Book. Some Administrations require compass errors to be recorded in the Deck Log Book rather than a separate Compass Error Book.

The Magnetic compass errors recorded in the compass error book should broadly agree with the deviation card. The Magnetic compass deviation may be excessive at the time of inspection due to the presence of external metal structures such as loading arms, gangway towers etc.

9. INTEGRATED BRIDGE SYSTEMS (IBS)

See **BRIDGE PROCEDURES GUIDE** - Chapter – Operation and Maintenance of Bridge Equipment / Integrated Bridge Systems and Integrated Navigation Systems.

10. ELECTRONIC CHARTS & DISPLAY SYSTEMS

Refer to Section 10, and; see **BRIDGE PROCEDURES GUIDE** - Chapter – Operation and Maintenance of Bridge Equipment / Electronic Chart Display and Information Systems.

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The full functionality of ECDIS cannot be achieved when operating in the raster chart display (RCDS) mode and thus the system should always be operated in ECDIS mode.

ECDIS that is not updated for the latest version of the International Hydrographic Organisation (IHO) standards may not meet the chart carriage requirements set out in SOLAS V Reg 19.2.1.4. The list of current standards is maintained on the IHO web site www.iho.int

Data input from the gyro compass, speed log, echo sounder and other electronic equipment should be periodically monitored to ensure accuracy.

11. ECHO SOUNDERS

Company vessels are fitted with an echo sounder to monitor chartered depths and contours, which shall be maintained in an operational condition. All users must be familiar with the equipment operating handbook.¹⁶

The echo sounder recorder should be switched on and operated continuously when making land fall, coastal and pilotage waters , prior to entry into shallow water (as a guide , depth less than 100m), navigating in the vicinity of shoals, when anchoring, when navigating in/near an area where the survey data is inadequate, port entry and departure and additionally as per master's discretion.¹⁷

Many modern electronic echo sounders have an inbuilt memory (electronic log) which can be recalled. If an electronic memory is not provided, the echo sounder shall be provided with a printed record.¹⁸

The date and time of switching on/off should be marked on the recorder chart. In addition, the date and time of passing significant land or seamarks should be marked on the recorder. Also at the end of every watch, when the echo graph is in operation, the OOW is to mark the date and time and initial the same.¹⁹

If uncertain of vessels position, soundings should be taken at frequent intervals until the vessels position is accurately fixed. The Master must encourage the use of the echo sounder and frequent practice of identifying the vessel's position with the aid of the echo sounder.²⁰

If the echo sounder is fitted with a shallow water alarm, the alarm should be set to an appropriate safe depth to warn of approaching shallow water. Depth alarms should be used in accordance with the equipment manufacturer's instructions. Minimum depth alarm must not be

¹⁶ W 44 / 2023

¹⁷ W 44 / 2023

¹⁸ W 44 / 2023

¹⁹ W 44 / 2023

²⁰ W 44 / 2023

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set less than the required under keel clearance for the area.²¹

The echo sounder depth shall be compared with the charted depth at different ranges and scales for testing the performance of the echo sounder. At least one comparison of depths shall be recorded in deck log book during each watch where applicable. Where available, the height of tide is to be deducted from the depth obtained from echo sounder for comparison.²²

Care shall be taken to check whether units of soundings on the echo sounder are same as those used on the chart in use.²³

Whenever there is a concern of adequate depth at berth, hand lead shall be used to check the accuracy of depth.²⁴

Data input from echo sounder into ECDIS (if provided) should be periodically monitored to ensure accuracy.²⁵

Often it is found that aids like echo-sounders etc are not used regularly, at times to save paper. Such practices should be avoided and record of depths, for all navigations through areas less than 100 meters should be recorded. The paper recordings should be accordingly marked.²⁶

The echo sounder paper recorder shall be checked for alignment, recording paper and ink supply, and proper printing/markings, as applicable, during pre-arrival testing and testing prior to getting underway.²⁷

Vessel shall have sufficient spare printer rolls for which requisition should be raised well in advance.²⁸

The echo sounder printout shall be marked with date and time of any incident involving bottom contact or suspected bottom contact.²⁹

Used echo sounder printouts must be carefully labelled and retained on board.³⁰

12. SPEED/DISTANCE RECORDER

²¹ W 44 / 2023

²² W 44 / 2023

²³ W 44 / 2023

²⁴ W 44 / 2023

²⁵ W 44 / 2023

²⁶ W 44 / 2023

²⁷ W 44 / 2023

²⁸ W 44 / 2023

²⁹ W 44 / 2023

³⁰ W 44 / 2023

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See **BRIDGE PROCEDURES GUIDE** - Chapter – Operation and Maintenance of Bridge Equipment / Speed and Distance Log

13. ELECTRONIC POSITION FIXING SYSTEMS – GPS -(SOLAS V/19.2.1.6)

See **BRIDGE PROCEDURES GUIDE** - Chapter – Operation and Maintenance of Bridge Equipment / Electronic Position Fixing Systems

GPS is referenced to WGS84 and it is recommended that the GPS receiver is maintained referenced to that datum. Hydrographic offices are gradually changing all charts to WGS84 and these charts include the legend “WGS84 positions can be plotted directly on this chart”. Some charts contain information on latitude and longitude shift values that should be applied to GPS positions before they are charted. Occasionally these can be significant, and many charts still show the land or obstructions in the wrong position when compared with GPS data.

Accuracy of positions using GPS can be affected, amongst other things, by differences in datums, solar activity and powerful radar or radio transmissions, including deliberate jamming.

Discrepancies in charted positions of obstructions can also introduce significant differences between GPS derived positions and more traditional methods.

The OOW shall ensure that the GPS is indicating its current operating status and any associated alarms or errors. The OOW shall be familiar with the GNSS system used onboard.³¹

13.1. Jamming and spoofing of GNSS³²

Jamming is usually caused by interference to the signals at GNSS frequencies to jam GNSS signal reception. This can happen in an area of increased military presence.³³ Intentional jamming is designed to overpower the very weak GNSS signals receiver.

GNSS spoofing is the provision of GNSS-like signals, transmitted locally and coded to fool the receiver to think it is somewhere it is not.

Incidents of the GPS jamming and spoofing were reported mainly in the eastern Mediterranean and Black sea region, Gulf areas etc³⁴ where GPS showed false position which was significant distance away from the ship’s actual position. The OOW may notice a position jump on ECDIS or when cross checking position, the GNSS position may be unreliable.³⁵

³¹ W 44 / 2023

³² W 28 / 2019

³³ W 44 / 2023

³⁴ W 44 / 2023

³⁵ W 44 / 2023

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13.1.1. Actions for detecting GPS Spoofing and Jamming³⁶

- Use of radar overlay on ECDIS when in the range of land
- Verify GPS positions by secondary means – radar and visual fixes as applicable
- Observing significant difference between DR position and GPS fix
- Observing and verifying by using an echo sounder to compare the depths when sailing in suitable depth areas.

13.1.2. Actions on Detection of Jamming and Spoofing³⁷

- Operate ECDIS in the DR or EP mode
- Start plotting position using radar and visual means as applicable
- Activate ECDIS contingency plan for GPS sensor failure
- Use the parallel indexing method during coastal navigation to keep safe distances and determine turning waypoints.
- If unable to ascertain vessel position relative to navigational hazards then stop the vessel.
- Report to office

All deck officers are to be familiar with the actions required for handling jamming and spoofing events.

13.2. GPS Errors³⁸

Jamming and spoofing of GPS signal as explained above is a deliberate act.

The geometry, atmospheric conditions, and even nearby objects (e.g. building, mountain) can reduce the quality of a GPS signal. Here are the main causes of error and degradation of GPS signal:

Dilution of Precision (DOP) or Geometrical DOP (GDOP)

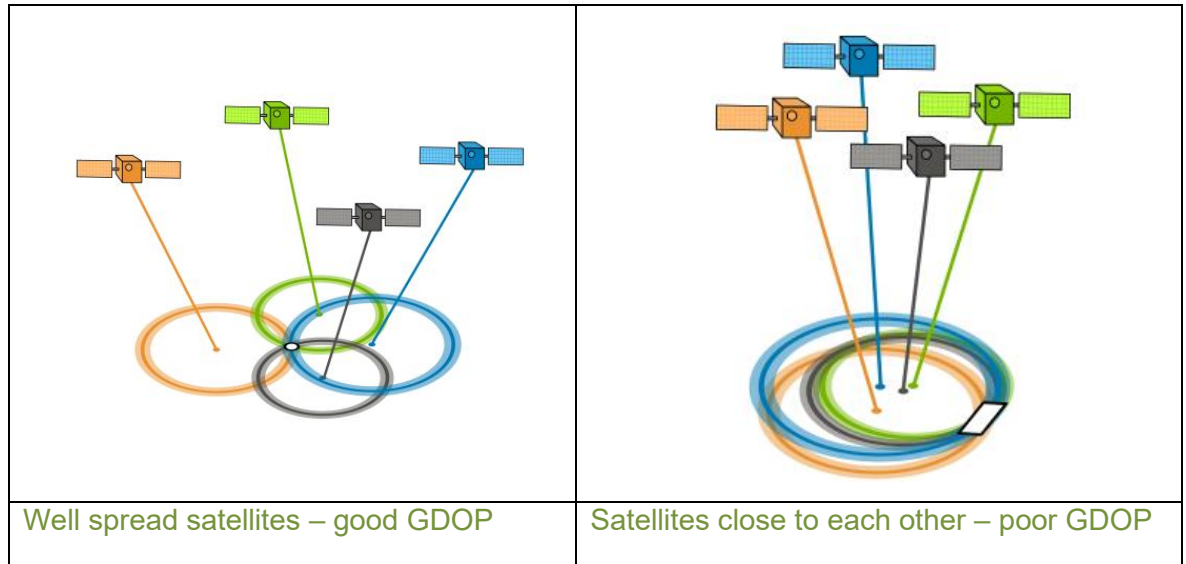
Describes the error caused by the relative position of the GPS satellites. This error occurs when fewer satellites are available to the ship. It is common when sailing in area with high

³⁶ W 28 / 2019

³⁷ W 28 / 2019

³⁸ W 47 / 2022

mountains such as Alaska or Norway.³⁹ Poor GDOP values mean ‘bad’ positioning of satellites. On the contrary, ‘well’ distributed satellites produce good values.



DOP values highly depend on the number of available satellites and their positions.

Dilution of precision is explained through four or more different parameters. The most important DOP value used in marine navigation is Horizontal Dilution of Precision- HDOP.

HDOP

It reflects the position fixing accuracy. The accuracy increases as the value decreases. The value increases when the satellites are gathered close to each other, and it reduces when the satellites are spattered, which in turn means increased accuracy. The IMO standard for the GPS specifies that the calculated position should not be used for accuracy evaluation when HDOP value exceed 4. DOP value 1-2 is considered excellent. Refer maker’s manual GPS alert on HDOP value

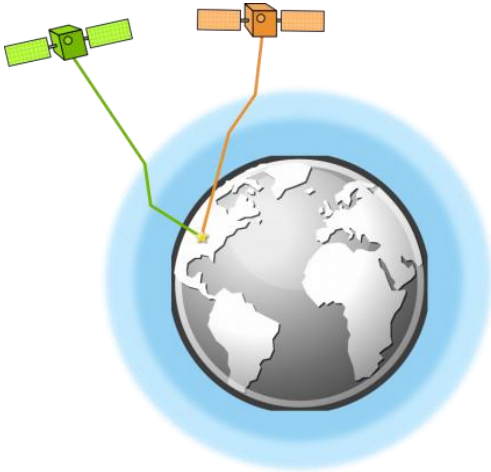
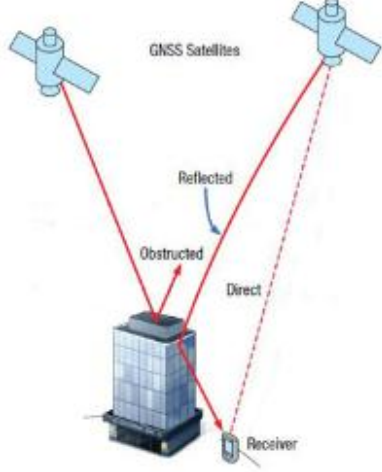
Atmospheric Refraction

The troposphere and ionosphere can change the speed of propagation of a GPS signal. Due to atmospheric conditions, the atmosphere refracts the satellite signals as they pass through on their way to the earth’s surface.

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Multipath Error

The GNSS receiver may be blocked or receiving a double signal.⁴⁰ Multipath errors appear when a GNSS signal arrives at the receiver GNSS antenna after having been reflected from an object such as the surface of a building (see diagram below), mountain etc. The reflected signal clearly has to travel further to reach the antenna and so it arrives with a slight delay. This delay can cause positional error.

	
Atmospheric Refraction	Multipath Error

Techniques to improve accuracy:

Despite all the potential types of errors that can reduce the accuracy of a GPS, following techniques are used to improve accuracy.

- GPS Differential Correction / DGPS
- Receiver autonomous integrity monitoring (RAIM)

DGPS

Represents the Differential Global Positioning System, which is a system to improve the position fixing accuracy by receiving the correction data with a beacon receiver for a given GPS satellite, which is transmitted by the beacon station with a known position.

Receiver Autonomous Integrity Monitoring (RAIM)

This error relates to the quality of the data being sent to the GNSS receiver. If the system

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detects a drop in quality, it will alert the user. RAIM⁴¹ is a diagnostic function which tests the accuracy of the GPS signal. GPS satellites can broadcast slightly incorrect information that can cause navigation information to be incorrect, but there is no way for the receiver to determine this using standard techniques. RAIM uses redundant signals to produce several GPS position fixes and then compares them to figure out if there are any inconsistencies. A statistical function determines whether or not a fault can be associated with any of the signals. Refer maker's manual for the level of accuracy/alerts (safe/caution/unsafe in Furuno GPS) which is displayed on the screen.

14. EMERGENCY NAVIGATION LIGHTS & SIGNAL EQUIPMENT

See **BRIDGE PROCEDURES GUIDE** - Chapter – Operation and Maintenance of Bridge Equipment / Navigation Lights and Signaling Equipment

All ships of over 150 gt, when engaged on international voyages, shall have on board an efficient daylight signaling lamp which shall not be solely dependent on the ship's main source of electrical power. (SOLAS 1974 V/11). Every vessel will carry at least three spare bulbs.

15. COURSE RECORDER

Operate on UTC, only when underway.

Notations may be made on chart rolls:

Ship's noon position, together with the date and a notation that the recorder clock and settings have been checked.

Important deviations from the ship and course as planned by the Master, as made to avoid traffic, navigation hazardous or emergency situations.

Last two used rolls to be retained unless they support accident, near miss or claim under investigation. on board.

In case of accidents, entire roll (properly identified) to be removed from recorder; kept on board, awaiting instructions.

⁴¹ W 44 / 2023

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16. GMDSS/NAVTEX

See **BRIDGE PROCEDURES GUIDE** - Chapter – Operation and Maintenance of Bridge Equipment / GMDSS Communications. Section B – B19 False Distress Alerts

16.1. NAVTEX (SOLAS IV/7.1.4)

The Navtex system broadcasts coastal warnings which cover the area from the fairway buoy out to about 250 miles from the transmitter, or occasionally up to 400 miles in unusual propagational conditions. Each Navtex message begins with ZCZC, followed by a space and four characters. The first, B1, identifies the station, the second, B2, the subject (i.e. navigation warning, weather forecast, gale warning, distress alert, etc.) and the third and fourth the consecutive number of the message from that station.

The Navtex should be programmed to the stations for the area in which the vessel is sailing and to the type of B2 messages which are required to be received. Message types A, B and D are mandatory, but it is recommended that the receiver be programmed to receive most

17. ASSORTED NAVIGATIONAL GEAR

CHRONOMETERS
SEXTANT(S)
BINOCULARS
ALDISLAMP & BATTERY
SEARCHLIGHT(S) (SUEZ -)
GONG, BELL, WHISTLE
SHAPES

METEOROLOGY INSTRUMENTS
HYDROMETERS / THERMOMETERS

All gear to be kept ready for immediate use.

The Second Officer is responsible for the care and upkeep of above gear. Loose gear shall be locked away whilst in port.

18. FLAGS

National Flag (country of registry) to be flown from stern/gaff from sunrise to sunset (whilst in port).

Vessels in foreign ports shall fly (starboard yardarm) the relevant National Flag of the port

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concerned. Certain countries have strict rules concerning their National Flags. Check with agents as fines may be imposed for incorrect procedure.

Worn National Flags shall never be used as 'rags'.

Dipping the ship's National Flag to passing navy units shall be according to International Maritime tradition.

19. SAFEGUARD AGAINST LIGHTNING STRIKE

A lightning strike can disable a variety of navigation and communications equipment and may jeopardize the safe navigation of the vessel. As a safeguard, all navigation and communication equipment wiring should be checked to ensure that it is properly earthed and covers should be securely screwed on

20. VOYAGE DATA RECORDER VDR (BRIDGE PROCEDURES GUIDE REFERENCE 4.8)

Masters are to ensure that the VDR data pertaining to any event/ incident that may precipitate an investigation / inquiry must be saved so as to be available to investigators. Recall that the data for the preceding 12 hours is saved when “hitting the button” and any activity thereafter is not. Careful consideration is thus required so as to determine when best to activate the save function and this must be clearly communicated to the Marine Superintendent.

Masters are to ensure they and the bridge watch keeping officers are fully au fait with the operations of the VDR and that clear and concise operating instructions are in plain sight on the bridge.

The procedures as per maker’s instruction manual for downloading data from VDR post incident or operational anomaly should be posted near to VDR cabinet.

21. BRIDGE NAVIGATIONAL WATCH ALARM SYSTEMS (BNWAS)

21.1. DESCRIPTION⁴²

The purpose of a bridge navigational watch alarm system (BNWAS) is to monitor bridge activity and detect operator disability which could lead to marine accidents. The system monitors the awareness of the OOW and automatically alerts the Master or another qualified OOW if for any reason the OOW becomes incapacitated and thus incapable of performing his duties. This purpose is achieved by a series of indications and alarms to

⁴² W 44 / 2023

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alert first the OOW and, if he/she is not responding, then to alert the Master or another qualified OOW. Additionally, the BNWAS may provide the OOW with a means of calling for immediate assistance if required.

The deck officers shall refer to manufacturer's guidelines for operational and maintenance requirements of the system.

21.2. FUNCTIONALITY⁴³

The BNWAS incorporates the following operational modes:

- **Automatic:** automatically brought into operation whenever the ship's heading or track control system is activated and inhibited when this system is deactivated.
- **Manual ON** (in operation constantly): in this mode, the system will be activated continuously irrespective of whether the heading or track control is activated or deactivated.
- **Manual OFF** (does not operate under any circumstance): this will inhibit the system completely and there will not be any monitoring or alarm.

The BNWAS shall at all times be operated only in the **MANUAL MODE**. The operational mode of the equipment should be indicated to the OOW.

Note: **BNWAS** is **NOT** to be used on **AUTOMATIC** mode, and a sign stating this shall be posted near the BNWAS control panel.

21.3. ACTIVATION⁴⁴

SOLAS V , 19.2.2.3 requires that "the bridge navigational watch alarm system shall be in operation whenever the ship is underway at sea".

The Company interprets "underway at sea" as being whenever:

- the ship is underway on passage with the heading or track control system engaged or;
- the vessel is drifting or;
- the vessel is at anchor or;

The BNWAS shall accordingly be in operation during the above times.

⁴³ W 44 / 2023

⁴⁴ W 44 / 2023

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The BNWAS may be de-activated by the Master at his discretion during pilotage when all three of the following requirements are met:

- the Bridge Manning Level is greater than 2, and
- the watch alarm system is not required for the intended purpose, and
- it may be a distraction to the bridge team.

Activating and deactivating of the BNWAS system (or any change in system settings) is to be logged in the logbook.

21.4. OPERATIONAL SEQUENCE OF INDICATIONS AND ALARMS (AS PER MSC.128(75))⁴⁵

The alarm system should remain dormant for a period of between 3 and 12 minutes. The **Master must ensure** that the alarm system remains dormant for a period not more than 12 minutes.

At the end of this dormant period, the alarm system initiates a visual indication on the bridge.

If not reset, the BNWAS additionally sounds a first stage audible alarm on the bridge 15 seconds after the visual indication is initiated.

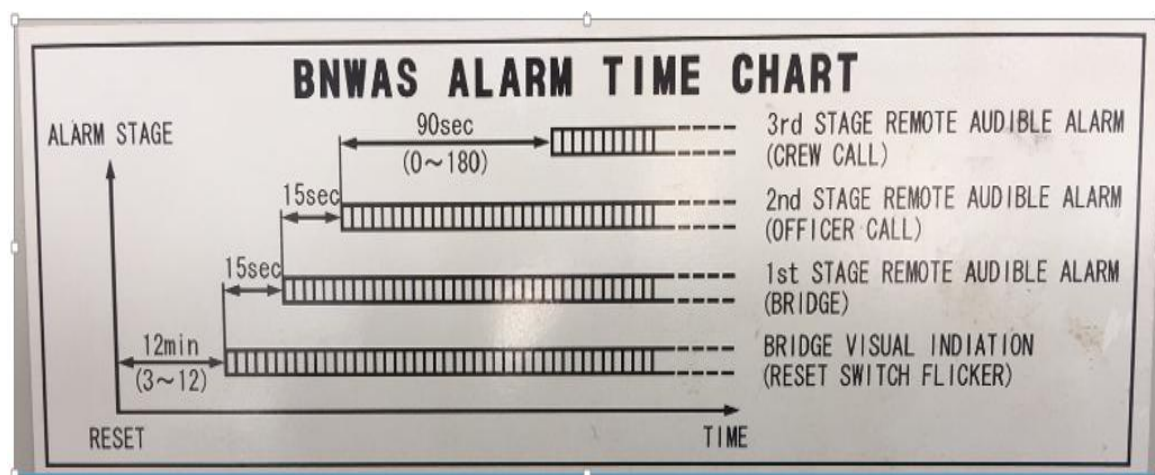
If not reset, the BNWAS additionally sounds a second stage remote audible alarm in the back-up officer's and/or Master's location 15 seconds after the first stage audible alarm is initiated.

If not reset, the BNWAS additionally sounds a third stage remote audible alarm at the locations of further crew members capable of taking corrective actions 90 seconds after the second stage remote audible alarm is initiated.

The second or third stage remote audible alarms may sound in all the above locations at the same time. If the second stage audible alarm is sounded in this way, the third stage alarm may be omitted.

The equipment specific alarm criteria should be displayed on the Bridge at a prominent location close to the BNWAS console for clear understanding by the OOW.

⁴⁵ W 44 / 2023



21.5. RESETTING THE ALARM⁴⁶

To initiate the reset function, an input representing a single operator action by the OOW is required. This input may be generated by reset devices forming an integral part of the BNWAS or by external inputs from other equipment capable of registering physical activity and mental alertness of the OOW.

Means of activating the reset function are generally available in several locations on the bridge where a lookout would normally be maintained and preferably adjacent to visual indications (e.g. conning position, the workstation for navigating, monitoring and manoeuvring and the bridge wings). A reset function may be initiated by navigational equipment such as radar, auto-pilot or ECDIS.

Use of BNWAS 'motion sensors' are not permitted by the flag state. In addition, reset buttons located behind the chart table curtain are also strictly prohibited as a proper look out cannot be maintained.

The reset function, by means of a single operator action, cancels the visual indication and all audible alarms and initiates a further dormant period. If the reset function is activated before the end of the dormant period, the period re-initiates to run for its full duration from the time of the reset.

The OOW shall be vigilant and ensure that the alarm is reset within 15 seconds after the visual indication is initiated so that the first stage alarm is not sounded on bridge.

If unable to reset due to prevailing circumstances, every effort shall be taken to reset the first stage audible alarm on bridge.

21.6. EMERGENCY CALL FACILITY⁴⁷

⁴⁶ W 44 / 2023

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Means may be provided on the bridge to immediately activate the second, and subsequently third stage remote audible alarms by means of an Emergency Call push button or similar. This function, if provided, will help the OOW in times when he needs more resources to be called on bridge immediately

21.7. SECURITY⁴⁸

Activation and deactivation of the system is to be accomplished either by password or by key as applicable to the design of the equipment strictly under the Masters direct control.

The means (password or key) for selecting the operational mode and the duration of the dormant period or alarm settings should be protected so that access to these controls is restricted to the Master only. The Master shall always have the key under his custody.

The Master should not reveal this password to any of the bridge watchkeepers.

The setting key or password of the BNWAS is to be clearly handed over during the change of command.

21.8. AUDIBLE ALARM⁴⁹

The first stage audible alarm which sounds on the bridge at the end of the visual indication period shall have its own characteristic tone or modulation and shall alert, but not startle, the OOW. This alarm shall be audible from all operational positions on the bridge where the OOW may reasonably be expected to be stationed.

The second and third stage remote audible alarm which sounds in the locations of the Master, officers and further crew members capable of taking corrective action at the end of the bridge audible alarm period should be easily identifiable by its sound and indicates urgency. The volume of this alarm should be sufficient for it to be heard throughout the locations above and to wake sleeping persons.

Also if a failure (example internal communication failure) or power supply failure is detected, it shall be indicated by visual and audible alarms.

The OOW shall be familiar with the operation of the BNWAS as per maker manual in particular the emergency call, test and reset functions, time setting of alarms, audible and visual alarms and should recognize the second stage and third stage remote alarm in remote locations where alarm is relayed such as Masters cabin, public spaces, etc.

⁴⁷ W 44 / 2023

⁴⁸ W 44 / 2023

⁴⁹ W 44 / 2023

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21.9. TEST AND CHECKS⁵⁰

The second officer is responsible for the testing of BNWAS and the Emergency Call Alarm (if fitted).

The OOW shall test the operation of BNWAS prior departure port. (Nav B6)

Other periodic testing as per maker's recommendations / PMS shall be carried out by the second officer as well.

The system is to be maintained as per manufacturer's requirements.

In addition, the main power supply for the BNWAS shall be simulated to fail to establish whether the equipment is still operational, and alarms generated on main power failure. Note that there is NO requirement to 'trip' the backup battery supply in this case.

22. VESSEL'S MANOEUVRING CHARACTERISTICS POSTER

For all ships of 100 metres in length and over and all chemical tankers and gas carriers regardless of size, a pilot card, wheelhouse poster and manoeuvring booklet should be provided. (IMO Res. A.601(15))

Note: The recommended form of the wheelhouse poster is contained in IMO Res. A.601(15) and in the Bridge Procedures Guide (Annex A3 Page 93)

This poster is to be displayed on the bridge.

23. MANAGEMENT OF BRIDGE ALARMS⁵¹

The alarms and Indicators are provided to alert the Navigator to a condition that has exceeded a design/set limit or in other words to alert the navigator to relevant abnormal operating situation thereby insuring swifter, more accurate response from the Navigator.

No navigational alarm shall be disabled or muted without master's permission. Immediate action shall be taken to analyse the cause of the alarm for taking appropriate action for the safety of navigation.

23.1. Equipment Failure Alarms

- Master shall be immediately informed in the case of any equipment failure alarm

⁵⁰ W 44 / 2023

⁵¹ W 38 / 2019 (Entire Section 23)

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- Immediate action shall be taken to identify and mitigate the risk exposed by the equipment failure
- If the fault is not rectified, office should be informed immediately
- Contingency plan pertaining to the equipment failure as applicable shall be activated

23.2. Action to be taken other than navigational alarms

During Navigational Watch if any other alarms (General, Fire, High Bilge level etc) is activated, OOW to immediately call assistance and maintain focus on navigational safety.

23.3. Alarms settings

- No changes shall be made in the Alarm settings without obtaining permission from the Master.
- Any change in alarm setting shall be after approval from the master, recorded in voyage plan or deck log book as applicable and OOW shall be informed during handover.
- Navigating Officer (Second Officer) in charge of nautical equipment shall check the alarm settings of various equipment during day watch while at sea.

The following are minimum settings, Master may increase or decrease the safety margin in accordance with his professional judgement and prevailing conditions.

BNWAS – Alarm interval is set by master in accordance with the performance standard protected by password or a key held under master's custody

Echo sounder – Not less than the company's UKC requirement for various stages of the voyage, refer chapter 10B.0, section 4.0

Radar/ARPA – Refer chapter 5.0, section 10.2 for minimum CPA and 11.1(f)

ECDIS – Refer chapter 7B.0, section 6.5 for alarm settings and section 11.0 alarm management

Off course alarm – maximum 10 degree

24. MAINTENANCE OF NAVIGATIONAL EQUIPMENT SOFTWARE⁵²

To ensure navigational equipment software is updated to the required version, the latest software

⁵² W 55 / 2022

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version of the Navigational equipment shall be available in the Navigational

Equipment Software Form 1.8.3. The Form contains details of the latest software version against the equipment.

The form shall be updated on a least 6 monthly basis with the latest software version applicable for the equipment with help of the equipment makers.

Software upgrade required to comply with any change in performance standard or GPS rollover etc will be performed as and when required. There are other minor software versions released by makers for the equipment, these software upgrades will only be carried after assessment of contracted service provider. If software upgrade on an equipment is required, it will be carried out during GMDSS equipment annual service or whenever technician visits vessel to service/repair navigational equipment on board. The Ship Manager is to be kept informed regarding software update and Form 1.8.3 amended accordingly.