

## 3.2 WATCHKEEPING

### 3.2.1 Maintaining a look-out

In compliance with the COLREGS, a proper look-out must be maintained at all times to serve the purposes of:

- maintaining a continuous state of vigilance by sight and hearing, as well as by all other available means, with regard to any significant change in the operating environment;
- fully appraising the situation and the risk of collision, stranding and other dangers to navigation;
- detecting ships or aircraft in distress, shipwrecked persons, wrecks, debris and other hazards to navigation, and to allow precautions for security reasons, especially in areas with a known risk of piracy or armed attack.

Full attention to look-out duties must be given by the bridge team on watch. Section 3.2.6 (Changing over the watch) includes advice regarding the need to allow sufficient time, during the hours of darkness, for the vision of oncoming watchkeepers to adjust to ambient light conditions. During the hours of darkness, it is essential that the wheelhouse environment and shipboard procedures support the maintenance of adequate night vision for watchkeepers and look-outs. An effective wheelhouse and chartroom blackout should be maintained; lighting used in such areas should be of low intensity and coloured red. The use of blackout curtains or heavy drapes will help to preserve darkness integrity when it is not possible fully to otherwise exclude conventional artificial light. Deck lighting should be considered carefully to avoid adversely affecting night vision from the wheelhouse, even if such lighting only affects a restricted sector of the horizon.

It should be noted that even momentary exposure to bright light can completely destroy night vision and, during the subsequent readjustment period, the ability to maintain an effective look-out will be impaired. Consideration should be given to fitting cut-out switches to doors leading into wheelhouses and chartrooms so that on opening such doors adjacent conventional white light sources are momentarily switched off.

While steering, a helmsman should not be considered to be the look-out, except in small ships with an unobstructed all-round view at the steering position.

On ships with fully enclosed bridges and all windows closed, sound reception equipment will need to be in operation continuously and correctly adjusted to ensure that all audible sounds on the open deck can be heard clearly on the bridge.

### **3.2.1.1 Sole look-out**

Under the STCW Code, the OOW may be the sole look-out in daylight provided that on each such occasion:

- the situation has been carefully assessed and it has been established without doubt that it is safe to operate with a sole look-out;
- full account has been taken of all relevant factors, including, but not limited to:
  - state of weather
  - visibility
  - traffic density
  - proximity of dangers to navigation
  - the attention necessary when navigating in or near traffic separation schemes;
- assistance is immediately available to be summoned to the bridge when any change in the situation so requires.

If sole look-out watchkeeping practices are to be followed, clear guidance on how they should operate will need to be given in the shipboard operational procedures manual (see section 1.2.4).

## **3.2.2 General surveillance**

The OOW needs to maintain a high level of general awareness about the ship and its day-to-day operations.

This may include maintaining a general watch over the ship's decks to monitor, where possible, people working on deck and any cargo or cargo handling equipment. Special watchkeeping arrangements may be appropriate in waters where there is thought to be a risk of piracy or armed attack.

Whenever work is being carried out on deck in the vicinity of radar antennae, radio aerials or sound signalling apparatus, the OOW should be particularly observant and should post appropriate warning notices on the equipment controls.

## **3.2.3 Watchkeeping and the COLREGS**

### **3.2.3.1 Lights, shapes and sound signals**

The OOW must always comply with the COLREGS. Compliance not only concerns the conduct of vessels under the steering and sailing rules, but also displaying the correct lights and shapes and making the correct sound and light signals.

A vessel drifting off a port with her engines deliberately shut down, but available for immediate restart, is not, for example, a "vessel not under command" as defined by rule 3(f) of the COLREGS.



Caution should always be observed when approaching other vessels. Vessels may not be displaying their correct light or shape signals, or indeed their signals could be badly positioned and obscured by the ship's structure when approached from certain directions. In sea areas where traffic flow is regulated, such as port approaches and traffic separation schemes, it may be possible to anticipate movements from certain ship types. In these circumstances, it is prudent to allow extra searoom, as long as it is safe to do so.

### **3.2.3.2 Collision avoidance action**

In general, early and positive action should always be taken when avoiding collisions and, once action has been taken, the OOW should always check to make sure that the action taken is having the desired effect.

VHF radio should not be used for collision avoidance purposes. Valuable time can be wasted attempting to make contact since positive identification may be difficult and, once contact has been made, misunderstandings may arise.

Attempts to avoid collision by communicating using AIS equipment should be avoided. Accident investigations have shown that such attempts waste time, distract the attention of the OOW and often fail to establish effective communication.

### **3.2.3.3 Collision avoidance detection**

In clear weather, the risk of collision can be detected early by taking frequent compass bearings of an approaching vessel to ascertain whether or not the bearing is steady and the vessel is on a collision course. Care however must be taken when approaching very large ships, ships under tow or ships at close range. An appreciable bearing change may be evident under these circumstances but in fact a risk of collision may still remain.

In restricted visibility, conduct of vessels is specifically covered by the COLREGS. In these conditions, radar, and in particular electronic radar plotting, can be used effectively for assessing risk of collision. The OOW should take the opportunity to carry out radar plotting practice in clear visibility whenever it is possible.

For details concerning the use of radar for collision avoidance, refer to section 4.2.2 of this Guide.

## **3.2.4 Recording bridge activities**

It is important that a proper, formal record of navigational activities and incidents, which are of importance to safety of navigation, is kept in appropriate logbooks.

Paper records from course recorders, echo sounders, NAVTEX receivers etc. should also be retained at least for the duration of the voyage, suitably date and time marked if practicable.

In order to allow the ship's actual track to be reconstructed at a later stage, sufficient information concerning position, course and speed should be recorded in the bridge logbook or using approved electronic means. All positions marked on the navigational charts also need to be retained until the end of the voyage.

## **3.2.5 Periodic checks on navigational equipment**

### **3.2.5.1 Operational checks**

Operational checks on navigational equipment should be undertaken when preparing for sea (see bridge checklist B2) and prior to port entry (see bridge checklist B3).

After lengthy ocean passages and before entering restricted coastal waters, it is important also to check that full engine and steering manoeuvrability is available.

### **3.2.5.2 Routine tests and checks**

The OOW should undertake daily tests and checks on the bridge equipment, including the following:

- manual steering should be tested at least once a watch when the automatic pilot is in use (see annex A7);
- gyro and magnetic compass errors should be checked and recorded at least once a watch, where possible, and after any major course alteration;
- compass repeaters should be synchronised regularly, including repeaters mounted off the bridge, such as in the engine control room and at the emergency steering position.

### **3.2.5.3 Checks on electronic equipment**

Checks on electronic equipment should confirm both that the piece of equipment is functioning properly and that it is successfully communicating to any bridge system to which it is connected.

Built-in test facilities provide a useful health check on the functional state of the piece of equipment and should be used frequently.

Electronic equipment systems should be checked to ensure that configuration settings – important for correct interfacing between pieces of equipment – have not changed.

To ensure adequate performance, information from electronic equipment should always be compared and verified against information from different independent sources.

### **3.2.5.4 Checking orders**

Good practice also requires the OOW to check that orders are being followed correctly. Rudder angle and engine rpm indicators, for example, provide the OOW with an immediate check on whether helm and engine movement orders are being followed.

## **3.2.6 Changing over the watch (see bridge checklist B12)**

The OOW should not hand over the watch if there is any reason to believe that the relieving officer is unfit to, or is temporarily unable to, carry out his duties effectively. If in any doubt, the OOW should call the master.

Illness or the effects of fatigue, alcohol or drugs could be reasons why the relieving officer is unfit for duty.

Before taking over the watch, the relieving officer must be satisfied as to the ship's position, and confirm its intended track, course and speed, and engine controls as appropriate, as well as noting any dangers to navigation expected to be encountered during his watch.

The relieving officer should also be satisfied that all other members of the bridge team for the new watch are fit for duty, particularly as regards their adjustment to night vision. Although the time varies between individuals for eyesight to adjust completely from full artificial light to allow an effective night time look-out, the time required should not be underestimated. Various factors affect individual adjustment times, but in many cases full night vision will not be achieved in less than 15 minutes (see section 3.2.1). Watchkeepers and look-outs who use spectacles fitted with



photo-chromatic (light-sensitive) lenses should be aware that when UV light is removed or reduced the lenses do not clear completely and some darkening effect is retained at all times. The ability of a watchkeeper or look-out to perform their duties effectively when wearing spectacles fitted with photo-chromatic lenses should be considered carefully.

If a manoeuvre or other action to avoid a hazard is taking place at the moment the OOW is being relieved, handover should be deferred until such action has been completed.

### **3.2.7 Calling the master**

The OOW should notify the master, in accordance with standing orders or the bridge order book, when in any doubt as to what action to take in the interests of safety.

Guidance on specific circumstances for calling the master or other back-up support should be given in the shipboard operational procedures, supported by standing and bridge orders, as appropriate. Situations where the master should always be called are listed in bridge checklist B13.

The OOW will continue to be responsible for the watch, despite the presence of the master on the bridge, until informed specifically that the master has assumed that responsibility, and this is mutually understood. The fact that the master has taken control on the bridge should be recorded in the log book.

## **3.3 NAVIGATION**

### **3.3.1 General principles**

It is important that the OOW executes the passage plan as prepared and monitors the progress of the ship relative to that plan.

#### **3.3.1.1 Deviating from or leaving the passage plan**

If the OOW has to make a temporary deviation from the passage plan for any reason, the OOW should return to the plan as soon as it is safe to do so. Consideration should be given to re-plotting the course to the next waypoint to avoid potentially confusing encounters and large alterations of course.

If the OOW has to leave the passage plan – a reporting of ice may, for example, require an alteration of course – the OOW should prepare and proceed along a new temporary track clear of any danger. At the first opportunity, the OOW should advise the master of the actions taken. The plan will need to be formally amended and a briefing made to the other members of the bridge team.

#### **3.3.1.2 Monitoring the progress of the ship**

Good navigational practice demands that the OOW:

- understands the capabilities and limitations of the navigational aids and systems being used, and continually monitors their performance;
- uses the echo sounder to monitor changes in water depth;
- uses dead reckoning techniques to check position-fixes;

- cross-checks position-fixes using independent sources of information: this is particularly important when electronic position-fixing systems, such as GPS or Loran-C, are used as the primary means of fixing the position of the ship;
- uses visual navigation aids to support electronic position-fixing methods, i.e. landmarks in coastal areas and celestial navigation in open waters;
- does not become over reliant on automated navigational equipment, including electronic chart systems, thereby failing to make proper navigational use of visual information;
- plots historical ship track forward to identify the projected/anticipated position.

#### **3.3.1.3 Plotting positions from electronic position-fixing systems**

Care should be exercised when taking geographical positions from electronic position-fixing systems like GPS and plotting these onto charts (see section 4.9.3.3).

The OOW should bear in mind that:

- if the chart datum differs from the datum (usually WGS84) used by the electronic position-fixing system, a datum shift will have to be applied to the position co-ordinates before they are plotted on the chart. It should be noted that, where an appreciable datum shift does exist for a particular chart, a “satellite-derived positions” note providing latitude and longitude datum shift values will appear on the chart;
- on charts where the survey source data is very old, accuracy may be poor in certain areas: under these circumstances in particular the OOW should not rely totally on position-fixing using electronic systems and should, where possible, increase the use of visual and radar navigational techniques to maintain safe distances off the land.

### **3.3.2 Navigation in coastal or restricted waters**

This section should be read in conjunction with section 2.5 – Notes on passage planning in coastal or restricted waters. (See also bridge checklist B6.)

As a general rule, navigation should be carried out on the most suitable large scale charts on board, and the position of the ship should be fixed at frequent intervals. All relevant navigation marks should be positively identified by the OOW before they are used. Visual and radar position-fixing and monitoring techniques should be used whenever possible.

In coastal waters, the OOW should be aware that ships' routing schemes (see section 2.8) and ship reporting systems requiring reports to be made to coast radio and vessel traffic stations (see sections 2.9 and 2.10) may exist.

Knowledge of the ship's draught, stability conditions and manoeuvring characteristics is also important. As the ship enters shallow water, squat may have a critical effect on the manoeuvrability of the ship and cause an increase in draught. Squat effect varies in proportion to the square of the ship's speed and will therefore reduce as speed is reduced. On board information should be used to confirm squat characteristics for individual loading conditions.

The importance of all the bridge team fully understanding the coastal waters phase of the passage plan, as well as understanding their individual roles and those of their colleagues, cannot be stressed too strongly.



### 3.3.3 Navigation with a pilot on board

This section should be read in conjunction with section 2.7 – Passage planning and pilotage, and with reference to section 6 – Maritime pilotage.

#### 3.3.3.1 Responsibilities

Once the pilot has embarked and has arrived on the bridge, the pilot will join the bridge team. The pilot has a specialised knowledge of navigation in local waters. Depending on local pilotage laws, the master may delegate the conduct of the ship to the pilot, who directs the navigation of the ship in close co-operation with the master and/or the OOW. It is important that the responsibilities of the pilot and the master are agreed and clearly understood so that the pilot can be integrated easily into the normal bridge management team and that any potential conflict is avoided. Should conflict arise, both parties have a responsibility to resolve this in a professional manner with the overriding priority of safety of navigation of the vessel. If the conduct of the vessel is delegated from the master to the pilot, this should be formalised and recorded.

The presence of a pilot does not relieve the master or the OOW of their duties and obligations for the safety of the ship. Both should be prepared to exercise their right not to proceed to a point where the ship would not be able to manoeuvre or would be in any danger.

#### 3.3.3.2 Pilot embarkation/disembarkation

For information on pilot boarding arrangements, refer to annex A5.

#### 3.3.3.3 Master/pilot information exchange on boarding (see bridge checklist B4)

The preliminary pilotage passage plan prepared in advance by the ship should be discussed and agreed with the pilot immediately after boarding. There should be sufficient time and searoom to allow this to happen safely.

Where lack of time or searoom does not allow the plan to be discussed fully, the bare essentials should be covered immediately and the rest of the discussion held as soon as it is safe to do so.

On a long pilotage passage, it may be appropriate to review and update the plan in stages.

#### 3.3.3.4 Monitoring the pilotage

The safe progress of the ship as planned should be monitored closely at all times. This will also include track monitoring and regular fixing of the position of the ship, particularly after each course alteration, and monitoring underkeel clearance.

Verbal orders from the pilot also need to be checked to confirm that they have been carried out correctly. This will include monitoring both the rudder angle and rpm indicators when helm and engine orders are given.

It is recommended that communication between the pilot and the bridge team is conducted in the English language or a language common to all relevant personnel (see section 1.2.11).

If the master leaves the bridge, the OOW should always seek clarification from the pilot when in any doubt as to the pilot's actions or intentions. If a satisfactory explanation is not given, the OOW should notify the master immediately, taking whatever action is necessary before the master arrives. Whenever there is any disagreement with decisions of the pilot, the cause of concern should always be made clear to the pilot and an explanation sought.

The OOW should bear in mind that, during pilotage, the ship will need to be properly secured for sea. Excessive use of deck lighting at night may cause visibility interference.

### **3.3.4 At anchor (see bridge checklist B8)**

On anchoring, a fix on the anchor drop position should be made and the ship's swinging circle ascertained, based upon the length of cable in use. Landmarks and transits should be selected for ease of monitoring the position of the ship as it lies at anchor, and appropriate light and shape signals should be exhibited in accordance with the COLREGS and any local regulations.

While at anchor, the OOW should maintain a check on the ship's position to monitor that the ship does not drag its anchor or move too close to any other anchored ship.

A proper look-out must be maintained and ship inspection rounds made periodically, particularly if the ship is anchored in waters which might present a risk of attack by pirates or armed robbers.

The master should be notified immediately if the ship drags her anchor, or if sea conditions or visibility deteriorate.

## **3.4 CONTROLLING THE SPEED AND DIRECTION OF THE SHIP**

### **3.4.1 Use of the engines**

In order not to jeopardise the safety of the ship, the OOW should not hesitate to use the engines to change speed on passage if the situation so requires.

Whenever possible, timely notice of intended changes to engine speed should be given to the engine room. If the ship is fitted with bridge control of the main engines, direct control of the engines will be possible from the bridge.

#### **3.4.1.1 Safe speed**

In compliance with the COLREGS, ships should at all times proceed at a safe speed. In restricted visibility, safe speed may require a reduction in service speed to reduce the stopping distance of the ship. When near ice, ships are specifically required to proceed at moderate speeds. Speed changes may be required to avoid a collision in circumstances where the ship is unable to alter course.

High speed craft and fast conventional ships should assess the risk caused by wash and wake, particularly in shallow water.

#### **3.4.1.2 Control and different engine types**

To control the main engines effectively, the OOW should be familiar with their operation from the bridge, as well as the operation of the propeller mechanism. The OOW should also be aware of any limitations the system may have and appreciate that the type and configuration of the ship's engines could have implications when changing speed. Direct-drive diesel, diesel through gearbox/clutch, turbo-electric and gas turbine engines all have relatively quick responses to change, provided the engines are on stand-by. Geared turbines are less responsive.



## 3.4.2 Steering control

Steering control of the ship will comprise manual steering, probably supplemented by an automatic pilot (autopilot) or other track control system.

In areas of high traffic density, in conditions of restricted visibility and in all other potentially hazardous situations, a helmsman should be available on the bridge, ready at all times to take over steering control immediately.

When steering the ship under autopilot, it is highly dangerous to allow a situation to develop to a point where the OOW is without assistance and has to break the continuity of the look-out in order to take emergency action and engage manual steering.

Changing between automatic and manual steering should always be made in good time under the supervision of the OOW. Manual steering should be tested once per watch and after prolonged use of the autopilot (see annex A7).

### 3.4.2.1 Use of override controls

Manual steering override controls can be used on those occasions when the autopilot is engaged and the OOW needs to take immediate and direct control of the steering.

Override controls typically have a non follow-up type of operation and are likely to differ from the main steering control position where follow-up control is usual.

The OOW needs to be familiar with the operation of the steering control systems on the bridge, as well as the method of control at the emergency steering position.

### 3.4.2.2 Manoeuvring data

Ship's manoeuvring data is contained on the Pilot Card and Wheelhouse Poster (see annexes A3 and A4). Some ships also have a manoeuvring booklet. The OOW needs to be familiar with this data.

It is important not only to record on the Pilot Card the ship's draught, but also any permanent or temporary ship idiosyncrasies that could affect the manoeuvrability of the ship. A ship may, for example, have a tendency to steer to port at full speed, but steer to starboard at slow speed.

## 3.5 RADIOCOMMUNICATIONS

### 3.5.1 General

The following basic principles apply to all communication carried out by radio:

- absolute priority should be given to distress, urgency and safety communications;
- interference with other radio users should be avoided;
- frequencies should be used for their correct purpose.

The ITU publication *Manual for Use by the Maritime Mobile and Maritime Mobile-Satellite Services* contains relevant extracts from the ITU Radio Regulations, setting out the correct procedures to be followed.

## 3.5.2 Safety watchkeeping on GMDSS ships

The OOW should normally be in possession of a General Operator's Certificate (GOC). For ships operating only in GMDSS Area A1, a Restricted Operator's Certificate (ROC) is sufficient. The OOW will be responsible for ensuring compliance with the radio watchkeeping requirements of SOLAS, the ITU Radio Regulations and any local watchkeeping rules.

### 3.5.2.1 VHF watchkeeping

The VHF watchkeeping range is 20 to 30 nautical miles, depending upon antenna height. All ships must maintain a watch on:

- o DSC Channel 70 (156.525 MHz) (Digital Selective Calling);
- o Channel 16 (156.8 MHz) when practicable (Distress, safety and calling);
- o Channel 13 (156.650 MHz) when practicable (Inter-ship).

### 3.5.2.2 MF (300–3000 kHz) watchkeeping

Medium frequency (MF) broadcasts will typically have a R/T range of between 150 and 250 nautical miles by day and a DSC range of 600 to 700 nautical miles. Reception range will be greater at night. Ships must keep a continuous watch on:

- o the NAVTEX frequency 518 kHz, when in an area where the service is provided;
- o the DSC frequency 2187.5 kHz.

### 3.5.2.3 HF (3000 kHz – 30 MHz) watchkeeping

High frequency (HF) broadcasts have an unlimited range. Ships fitted with HF must keep a continuous watch on:

- o the DSC distress frequency 8414.5 kHz;
- o at least one of the DSC frequencies 4207.5, 6312, 12577, 16804.5 kHz, as appropriate to the time of day and the position of the ship.

### 3.5.2.4 Satellite watchkeeping

Ships fitted with a ship earth station (SES) must keep a continuous watch on the satellite appropriate to the ship's position. The range of satellite broadcasts is unlimited (except in polar regions).

### 3.5.2.5 Maritime safety information

Maritime safety information (MSI) is defined as navigational and meteorological warnings, meteorological forecasts and other urgent safety related messages broadcast to ships.

A continuous MSI watch should be kept at sea at all times by all ships. The NAVTEX receiver meets this requirement while the ship is within a NAVTEX coverage area. Beyond such coverage, watchkeeping should be undertaken using the appropriate MF, HF or satellite frequencies on which MSI is broadcast.



### 3.5.3 Log keeping

A radio log must be maintained containing up to date records of all incidents connected with radiocommunications that appear to be of importance to the safety of life at sea. In particular, the following are normally required:

- a summary of communications relating to distress, urgency and safety traffic;
- a reference to important radio service incidents;
- the position of the ship at least once per day.

The log should contain the identities of other stations with which the ship communicates or attempts to communicate, and records of any difficulties experienced owing to congestion, interference, atmospheric noise or ionospheric disturbances.

Incidents involving obscene language or unnecessary transmissions should be recorded with the identities of the stations concerned, if known. This is particularly relevant to VHF Channel 16.

### 3.5.4 Testing of equipment and false alerts

Radio equipment should be tested at the intervals stated by the manufacturer and in accordance with flag state requirements. Great care should be taken to avoid the transmission of false alerts when testing equipment.

Regular testing of radio equipment will demonstrate continued compliance with the requirements of Regulation 4 of SOLAS Chapter IV (Functional requirements).

#### 3.5.4.1 Cancellation of false alerts

If a distress alert is inadvertently transmitted by either VHF, MF or HF DSC:

- the equipment must be reset immediately;
- as appropriate, the equipment should be:
  - set to VHF Channel 16, or
  - tuned for R/T on MF 2182 kHz, or
  - tuned for R/T on the HF distress and safety frequency in each band in which the false alert was transmitted;
- a broadcast message to “all stations” must be transmitted, cancelling the false alert.

If a distress alert is inadvertently transmitted by a ship earth station (SES), the appropriate rescue co-ordination centre (RCC) should be notified that the alert is cancelled by sending a distress priority message by way of the same coast earth station (CES) through which the false distress alert was sent.

If a distress alert is inadvertently transmitted by an EPIRB, the appropriate RCC should be contacted through a shore station and the distress alert should be cancelled.