
 NYK Maritime College	<b>NYK SHIPMANAGEMENT PTE LTD</b> <i>Training Centre, No 25 Pandan Crescent</i> <i>#04-10 Tic Tech Centre, Singapore, 128477</i>	Original Date 01/08/2006	Approved by H.K.	Edition: 5th Oct-2016	 NYK SHIPMANAGEMENT
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**Chapter 1 Duties Assigned to 3<sup>rd</sup> Officer** → SMS Manual no. ZZ-S-P-02.10.05

**1.1. Responsibilities of 3<sup>rd</sup> Officer**

**1.1.1 Duties**

The Third Officer shall carry out watch keeping duties under the direction of the Master. He shall also follow the instructions of the Chief Officer and carry out various duties, including the cargo work watch and other work, and be responsible for these duties.

**1.1.2 Familiarization with Safety Management System**

The Third Officer shall be familiar with the Safety Management System. He shall carefully read the SMS Manual and observe the contents thereof.

**1.2. Navigation**

**1.2.1 Watchkeeping at Sea**

As a rule, the Third Officer shall keep the 0800-1200 and 2000-2400 watch.

**1.2.2 Noon Calculations**

Third Officer shall prepare the Noon Report every day at noon and retain it after receiving the Master's approval of the report. He shall also distribute it to the Chief Engineer and the Chief Radio Officer as applicable.

**1.2.3 Calculation of Various Matters Pertaining to Voyage**

Third Officer shall calculate the daily sunrise and sunset times, the moon rise and moon set times, the tide, the tidal stream, and other factors as applicable.



**1.3. Maintenance**

**1.3.1** The Third Officer is responsible for the control of the signaling equipment and devices. He shall also check that they are in proper working order before sailing.

**1.3.2** The equipment and machinery coming under his charge shall be in accordance with "Standard Duties."

**1.4 Entering and Leaving Harbor**

**1.4.1 Operations for Entering and Leaving Harbor**

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- a) The Third Officer's station when entering and leaving harbor shall, as a rule, be the bridge where he shall carry out telegraph operations in accordance with the Master's orders, make entries in the bell book, and supervise the helmsman to make sure he steers in accordance with orders.
- b) After the operation for entering and leaving harbor is finished, he shall make a record of entering or leaving of the harbor in the ship's log book.



#### 1.4.2 Draft

The Third Officer just after entering harbor or just before leaving harbor shall read the draft of the ship, report it to the Master as well as make entries in the ship's log book and condition note book. During this check, pay special attention to the following points:

- a) When a visual check is not possible because of cargo-work preparations, perform it at the earliest occasion after berthing.
- b) Comply with the regulations and restrictions of the terminal and obtain appropriate permission.
- c) Be sure to wear a life jacket and/or the protective gear specified in the terminal safety regulations.
- d) Record the differences between the readings on the draft mark and the readings on the draft gauge at the CCR console. Any form/style for recording is acceptable.
- e) In addition to the regular draft check, check the following conditions:
  - i) Dents or damage on the side plating of the ship
  - ii) Paint conditions on the side plating of the ship
  - iii) Display condition of the draft marks
  - iv) Condition of seaweed adhering to the side plating near the waterline

#### 1.5 In-port and Cargo Watch

The Third Officer shall be on in-port watch when the ship is in port and also supervise cargo operations in accordance with the Chief Officer's orders and make various calculations and prepare the documents pertaining to the cargo work.

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## 1.6 **Ship's Stores and Flags**

The Third Officer is responsible for controlling the flags. Also, the Third Officer shall control the signaling equipment and other ship's stores in his charge and shall submit to the Chief Officer by the specified time any ship's stores needing requisitioning.

## 1.7 **Office Documents**



The Third Officer shall assist the Chief Officer in the preparation of office documents pertaining to the deck department. Second and third officer shall carry out duty related to other matters as instructed by Master or Chief Officer.

## **Chapter 2 Watchkeeping at Sea (Navigation Bridge) → SMS Manual no. ZZ-S-P-07.10.00**

### 2.1. **Duties for Officer of Watch (OOW)**

The OOW shall:

- a) Make every effort at all times for the safe operation of the ship and for the marine environmental protection. Above all, have due regard to the International Regulations for Preventing Collisions at Sea (COLREGS) and the International Convention for the Prevention of Pollution from Ships (MARPOL);
- b) Strictly comply with the procedures of the SMS manual, the standing orders prepared by the master, and the contents of the order book;
- c) While on watch, whether it is day or night, always keep a proper and effective lookout, understanding that during the watch he is responsible for the safety and security of the ship. He shall not leave the bridge until he is relieved by the master or by another deck officer;
- d) Have responsibility until master takeover the Conn even master is on the bridge.
- e) Check to see if the helmsman on watch is faithfully and properly performing his duties, and give directions, if necessary, to him;
- f) Secure a means of communication and maintain close contact with the engine room, and, when occasion demands, notify it of any pertinent matters;
- g) Be thoroughly familiar with the handling of navigation instruments and use them effectively for the safe operation and marine environmental protection.

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- h) Be thoroughly familiar with vessel maneuvering characteristics, Basic Ship handling of vessel etc.
- i) Fulfill the reporting duties, giving due care to what to record as well as what to report to the superiors.
- j) Shall not hesitate to use the helm, engines and sound signaling apparatus in case of need. However, timely notice of intended variations of engine speed shall be given where possible or effective use made of UMS engine controls provided on the bridge in accordance with the applicable procedures.
- k) Thoroughly familiar with SOLAS requirement of rendering assistance to other vessels in distress and knowing the fact that failing to do so may result in criminal prosecution under local and/or international law.
- l) The OOW may visit the chart room, when essential, for a short period for the necessary performance of navigational duties, but shall first ensure that it is safe to do so and a proper look out is maintained.

## 2.2. **Watch-keeping on Navigation Bridge**

The OOW shall do the bridge watchkeeping in accordance with the following procedures:



### 2.2.1 **Lookout**

#### 2.2.1.1 **Proper Lookout**

A proper lookout shall be maintained, with careful regard to the existing situation, risk of collision, stranding or any other danger to navigation, by the following methods:

- a) By visual checks using the naked eyes or binoculars;
- b) By radar and ARPA (use radars in parallel so far as the situation permits);
- c) Using ECDIS, if equipped.
- d) By Sound Reception System (if fitted), also refer [section 3.3.3](#) for details)
- e) By hearing (whistles, sirens, distress signals, VHF, etc.); and
- f) All other available means appropriate to the circumstances.

As it is dangerous to rely on only one means of lookout, a systematic lookout shall always be kept with a combination of several methods used.

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### 2.2.1.2 Lookouts

The lookout shall give full attention to the keeping of a proper lookout and no other duties shall be undertaken or assigned which could interfere with that task.

The duties of the lookout and helmsman are separate and the helmsman shall not be regarded as the lookout while steering. The trainee/cadet shall not be considered as a lookout person or helmsman.

A lookout shall not leave the bridge during the watch as this contravenes the requirements of SOLAS and STCW. Safety Patrols of the vessel as per SMS ZZ-S-P-07.43.00 "[Ship Security Matters and Safety Patrols](#)" shall be conducted after the end of each watch during the hours of darkness, typically from 2200 to 0600 hrs.

### 2.2.1.3 Watch-keeping Arrangements and Watch Level

The navigational watch shall be kept at least by two persons. The watch level (the number of persons in BTM) and role assignment of BTM shall be as per the [S-071000-04FIG](#) "Watch Level".

### 2.2.1.4 Meeting Policy on Navigation Bridge

As a company policy, the Master shall avoid conducting meetings (e.g. Onboard Safety and Sanitary Committee Meeting, Shipboard Management Meetings, De-briefing after completion of drills, etc) on the Bridge to avoid distraction to the OOW.

## 2.2.2 B-1 Watch-Keeping / Sole Lookout



### 2.2.2.1.1 Tankers (VLCC, Product, Chemical Tankers & LNG Tankers)

B-1 watch-keeping is not permitted on Tanker Vessels (Oil, Product, Chemical & LNG Tankers).

### 2.2.2.1.2 Dry Cargo and LPG Vessels

- At the discretion of Master, the helmsman may be assigned to other duties (hereinafter referred to as "B-1 watch-keeping"), during the period from sunrise to sunset. This is to re-emphasize that B-1 watch-keeping shall not be performed from sunset to sunrise.
- B-1 watch level shall only be allowed in open sea areas.
- B-1 Watch shall not be allowed on the day of departure from port, to allow the OOW to be well rested.



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### 2.2.2.2 Risk Assessment Prior B- 1 Watch-Keeping

- a) A risk assessment shall be carried out and reviewed prior B-1 watch keeping, for each leg of sea passage, to confirm without doubt that it is safe to do so.
- b) The result of risk assessment review and measures shall be disseminated to all concerned.
- c) The result of risk assessment review shall be entered in the "Record of Risk Assessment and Review" ' [S-090000-02 FRM](#)'.



### 2.2.3 Factors to be Considered Prior B- 1 Watch-Keeping:

In assessing the situation for B-1 Watch-Keeping and OOW as the sole look out, full account of all relevant factors shall be considered, including but not limited to following:

- a) State of weather and sea conditions.
- b) State of visibility.
- c) Traffic density including fishing vessels.
- d) Proximity of dangers to navigation, coastal passage, narrow channels.
- e) The attention necessary when navigating in or near traffic separation schemes.
- f) Operational condition of navigational equipment and other Critical Machinery.
- g) Experience of OOW and master's confidence in the professional competence and experience of the OOW.
- h) OOW shall have met the STCW and ILO rest hours criteria.

### 2.2.2.4 Measures to be Followed During B-1 Watch-keeping

- a) OOW is not assigned any other duties which may interfere with the safe watch keeping.
- b) In the judgment of the Master, the anticipated workload on OOW is well within his capacity to maintain a proper look-out and he can remain in full control of the prevailing circumstances.
- c) Back-up assistance (AB) to the OOW has been clearly designated.



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- d) The back up shall not be designated any job which restricts his response time, ability to hear general alarm and call on hand held radio. (e.g. jobs like entering in to enclosed space, stand by person monitoring personnel in enclosed space, job in noisy areas, chipping, etc).
- e) The duties assigned to back-up shall be such that he is able to respond to call and be summoned on bridge promptly to be able to change over to hand steering in sufficient time.
- f) Duty AB shall carry a hand held radio with him during his watch.
- g) Alternative means of communication shall be established, in case of hand held radio failure.
- h) Master shall periodically verify that the B-1 watch-keeping requirements are being complied with.

#### **2.2.2.5 The OOW during B-1 watch-keeping shall observe the following:**

- a) The OOW confirms the AB designated for back-up assistance and test communication link (hand held radio) with him prior start of B-1 watch-keeping.
- b) The communication between OOW and AB shall be tested and verified periodically.
- c) One Man (dead-man) alarm / BNWAS shall be kept on, if fitted.
- d) OOW is well aware of the situations when to call back up.
- e) All essential equipment and alarms on the bridge are fully functional.
- f) Understand that he alone is the lookout and shall not engage in desk work or in any other duties that may interfere with the safe navigational watch keeping. For example, Charts and Nautical publications correction and other ancillary work (preparing port papers etc.) shall not be done whilst on B-1 watch.
- g) When he considers it necessary to have the helmsman on the bridge, judging from weather conditions, visibility, or traffic congestion, he shall immediately place the helmsman on it.

The criteria of sole look out shall be displayed prominently in bridge (other than on Oil and Chemical Tankers) and known to all concerned.

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#### 2.2.2.6 Additionally on LPG Vessels

- a) Company shall be informed and approval taken prior start of B-1- watch-keeping.
- b) The Risk Assessment shall be sent to Company along with the request for approval of B-1 watch keeping.

#### 2.2.3 Calling the Master

The O.O.W. shall call the master immediately under any one or more of the following circumstances or whenever the O.O.W. is in the slightest doubt.



- a) If the visibility deteriorates or expected to deteriorate below 3 n.m.
- b) If the movements of other vessels, including fishing vessels, are causing concern.
- c) If difficulty is experienced in maintaining course due to heavy traffic, rough weather or strong tides or currents or if the vessel is not steering well.
- d) When OOW has felt uneasy because of the geographical conditions of the waterway or vessel traffic
- e) If shipping seas heavily, or if the vessel is pounding or rolling heavily or if speed drops by 25% or more, comparing engine speed and speed over the ground, or if weather damage is suspected or if there is any doubt about its possibility.
- f) On failure to sight land or a navigation mark or to obtain depth soundings by the expected time.
- g) If either land or a navigation mark is sighted unexpectedly or if an unexpected reduction in water depth occurs.
- h) On the breakdown of the main engine, steering gear, ARPA, satellite navigation system, ECDIS, other critical machinery or any essential navigation or communications equipment.
- i) When notification is received from the duty engineer about an abnormality related to the engine.
- j) If the O.O.W. observes any sudden change in the sea, such as a sudden swell or water discoloration which may indicate shoals or other dangers.

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- k) If the barometric pressure drops by more than 4 millibars below the expected range or if there is a sudden drop in pressure.
- l) If any of the signs associated with a TRS are observed.
- m) When O.O.W receives weather forecast predicting bad weather or development of TRS.
- n) If any hazards to navigation, such as derelicts, unlit craft etc, are observed.
- o) If a distress broadcast is received or a distress signal is seen.
- p) If the O.O.W. is feeling unwell or fatigued or is unable to stay alert for any reason whatsoever.
- q) If any unusual phenomena such as Water spout, Halo, Discoloration of sea, Sighting of whales, Presence of oil sheen, etc are witnessed.
- r) If any close quarter situation is likely to develop or unavoidable with another vessel.
- s) If any of the following conditions related to ECDIS are experienced:-
  - i) Failure or Malfunction of ECDIS or any of its sensors
  - ii) Any alarm, indicator or parameter setting found different from standard settings.
  - iii) Any doubt with regards to accuracy of chart or available data.
  - iv) Any special instruction by Master.
- t) When other matters as per Master's Standing or Night order occur or if there is an emergency.

OOW shall allow reasonable time for the Master to come on the bridge so as to adjust himself to the night vision.

Master shall come on the bridge in sufficient time and confirm the situation with OOW prior taking over of conn by him, so as to have a proper situational awareness for safe navigation of vessel.

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#### 2.2.4 Safe Speed



The ship shall at all times proceed at a safe speed so that she can take proper and effective action to avoid collision and other dangers and be stopped within a distance appropriate to the existing circumstances. In determining a safe speed, full consideration shall be given to Rule No. 6 of COLREGS.

#### 2.2.5 Relief of Watch

##### 2.2.5.1 Handing Over Duties

The OOW shall hand over his duties to the relieving officer of the next watch by checking the following in addition to the matters stipulated in the order book and other orders from the master. The relieving officer of the next watch shall take over the watch after checking all the necessary matters and advising the OOW that "I am relieving you of the watch":

- a) The relationship of the ship to other ships;
- b) The ship's position and the presence or nearness to shoals, danger reefs, etc.;
- c) Nautical chart of navigating area (one with the course line laid down);
- d) Settings of ECDIS (not limited to, but including information & settings of safety depths/contours, display, radar overlay, grounding / look ahead function etc.)
- e) Weather and sea conditions (particularly what affects the ship's course or speed);
- f) Course (gyro/magnetic), speed, and amount of deviation from course;
- g) State of navigation lights;
- h) State of operation of navigation instruments and signal lamps;
- i) If during the ballasting or deballasting operations, then the state of those operations;
- j) State of work of the deck department (what work is being done, and where);
- k) State of transfer of fuel oil; and
- l) Gyrocompass errors and deviation or variation of the magnetic compass.

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In addition, check list '[S- 071000-03CHK](#)' shall be used by O.O.W. for handing over navigational watch. A laminated copy of the handing over check list shall be kept in bridge and compliance to the check list shall be recorded in the log book by taking over officer by writing phrase "Check list S-07100-03CHK complied with". The hard copy of the check list '[S- 071000-03CHK](#)' for each watch is not required to be maintained on board.



#### 2.2.5.2 Inappropriate Relief

- The watch shall not be relieved when the OOW is engaged in navigating the ship to avoid the danger of collision, etc.
- The OOW shall not hand over his watch if he judges that his successor is injured, sick, under the influence of alcohol or drugs, or otherwise unfit to keep watch. He shall immediately report the facts to the master and receive instructions from him.
- The next OOW may refuse to take over the watch if he has some doubts about the handing over of the watch of his predecessor and judges that it is not appropriate to relieve the watch. In such a case, he shall immediately report the facts to the master and receive instructions from him.
- The next OOW on night watch shall not take over the watch until his eyes have become accustomed to the dark.

#### 2.2.5.3 Items to Be Confirmed after Taking Over Watchkeeping Duties

The OOW shall reconfirm the following items immediately after taking over the watchkeeping duties:

- The relative relation between the ship's position and the planned track, or shoals, other dangerous obstructions, etc.;
- The intention and tendency of other ships around;
- Comparison of the planned track drawn in 360 degrees on the chart with the course to be steered entered nearby;
- The information related to the nautical chart and the bridge notebook; and
- The operational conditions of the manual steering gears.

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## 2.2.6 Bridge Navigation Equipment

### 2.2.6.1 Handling of Equipment

The operation of navigation instruments shall be conducted in accordance with the procedures of respective Critical Machinery Operation for the Navigation Instrument in this SMS Manual and of the respective instruction books.

Also, a good understanding of the functions of the bridge console for operating the main engine, bow thruster, etc. and a thorough familiarity with the handling of such equipment are required. (Crash astern, program by-pass, slow down by-pass, trip by-pass, override switch, their resetting operations, etc.)

In addition, the chief officer prepares the "Bridge Daily Check List "([S-071000-02CHK](#))" in order to carry out a daily check of the equipment mentioned above, according to which each OOW shall carry out the daily check.

#### 2.2.6.2 Gyrocompass and Magnetic Compass

The comparison of the readings of the gyrocompass with those of the magnetic compass shall be made every hour so as to maintain the fixed course of the ship, and determine and check the deviation and variation of the magnetic compass.

#### 2.2.6.3 Navigation Lights

The helmsman on duty shall report on the state of lights every hour at night or under the restricted visibility.



#### 2.2.6.4 ECDIS

For vessels fitted with ECDIS shall be additionally comply with procedures of "[ECDIS Operations](#)" in the SMS Manual and respective instruction books.

The Procedures and instructions included are applicable to vessels fitted with one or more approved Electronic Chart Display and Information System (ECDIS) units. All procedures and instructions as per "NYK Standard for Navigation Using ECDIS" ("ECDIS Standard") shall be complied with at all times.

The procedures and instructions are not applicable to vessels fitted with Electronic Chart Systems (ECS). ECS, if fitted, shall only be used as an additional aid to navigation and will only be back up to paper charts. ECS shall not be considered as back up for ECDIS. The procedures related to ECDIS are not applicable to ECS.

If a vessel is equipped only with a single ECDIS, then vessel shall continue to use full folio of paper charts as primary means. ECDIS shall be back up only and all ECDIS related procedures, as applicable, should be complied.

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Exemptions: VLCCs & LNG Carriers fitted with dual ECDIS shall carry a full folio of paper charts and continue to use paper charts as primary means until such time company instructs clearly to use ECDIS as primary means; however such instruction from company must be issued after complying with proper change management procedures. ECDIS shall be back up only and all ECDIS related procedures, as applicable, should be complied with.

If the ECDIS is used for real time navigation monitoring, the statutory requirements regarding monitoring of the progress of the voyage and marking of positions shall be complied with. In conjunction with SMS ZZ-S-P-07.10.00 "Watch-keeping at Sea (Navigation Bridge)", for route monitoring including voyage recording, please be guided by Chapter 7 and 8 as per ECDIS Standard.

**ECDIS shall not be used for collision avoidance.**

OOW shall carry out checks in accordance with ECDIS Watch Checklist ([S-075003-02CHK](#)) prior taking over watch and tests / checks as per Bridge Daily Checklist ([S-071000-02-CHK](#)) periodically during the watch.

Master shall be informed immediately at least in the following cases (related to ECDIS):

- i) Failure or Malfunction of ECDIS or any of its sensors (including error in the primary position system i.e. between two GPS).
- ii) Any alarm, indicator or parameter setting found different from standard settings.
- iii) Any doubt with regards to accuracy of chart or available data.
- iv) If license of ENC has expired during the watch.
- v) Any special instruction by Master.

#### **2.2.6.5 Sound Reception System (SRS)**

For the purpose of standardizing these instructions, two modes of operational terms have been used as follows:-



Mode 1) : Power switch is "ON", but the Monitor switch is "OFF".

In this condition the Speaker will automatically switch "ON" in case sound signal / external sound is received by the microphone and the sound will be reproduced inside the Bridge.

Mode 2) : Power switch is "ON" and Monitor switch is also "ON".

In this condition the Speaker will remain "ON" at all times and any sound signal / external sounds received by the microphone will be reproduced inside the Bridge.



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In case more than one sound signal is received by the microphone, the system will capture and indicate the direction of the sound with the higher level.

SRS shall be used in accordance with following guidelines:-

- a) The SRS shall be kept switched "ON" at all times during Navigation. This is to enable the watch keepers to hear sound signals and determine their direction.
- b) The SRS shall be included in the "Bridge Daily Checklist" ["S-071000-02CHK"](#) . The condition / status of the (SRS) shall be checked by the OOW, during each watch as per the "Bridge Daily Checklist" .
- c) The OOW shall check and adjust the microphone sensitivity & Speaker volume so that sound signals can be heard clearly inside the Bridge.
- d) The Monitor switch shall be switched "ON" under the following circumstances, so that the Speaker will always reproduce sound signals / external sounds.
  - i) At all times when it is deemed necessary to set Minimum Watch Level on the Bridge to 2 (as per [S-071000-04FIG](#))
  - ii) During all other conditions when it is deemed necessary by the OOW and/or Master.
- e) In case of failure of the SRS, company shall be informed. Applicable Bridge Port Holes (which have opening facility) shall be opened after taking into account existing weather conditions, so that sound signals / external sounds can be heard within the Bridge.
- f) Vessels fitted with the SRS shall prepare ship specific "Work Instructions" for use of the system. Same shall be displayed near the SRS.
- g) Bridge team members shall be familiarized with use of SRS.



#### **2.2.6.6 Bridge Navigation Watch Alarm System (BNWAS) – The BNWAS shall not be used in “automatic” operation mode (if available).**

- a) The Bridge Navigational Watch Alarm System (BNWAS) shall always be in operation whenever the ship is underway at sea, at anchor and at all times except when the ship is alongside, in Dry-dock or at a repair facility.  
Note: During Leaving Harbor testing of navigational equipment, although BNWAS may be tested, it might be required to switch off till actual departure due

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to avoiding unnecessary alarms. The BNWAS Placard should be used such situations.

- b) The switching On / Off of the BNWAS shall only be performed by the Master. A record of switching on/off the BNWAS shall be maintained in the deck log book. The key or the password for the BNWAS shall be kept strictly confidential in the custody of the Master.
- c) The setting of the Timer for the BNWAS Alarm shall be as per Master's discretion (basis vessel's speed, Traffic density, visibility etc.) however it shall not exceed 12 minutes. [Note: Other dormant period or delays between warnings and various stages of alarms shall not be adjusted on board (should be as per BNWAS Performance Standards)].
- d) The condition of the BNWAS (On / Off) and the Timer Setting (minutes) shall be prominently displayed on the Bridge using the 'BNWAS Status Placard, [S-071000-05 FIG](#)'.
- e) The BNWAS shall be included in the "Bridge Daily Checklist, [S-071000-02CHK](#)". The condition / status of the BNWAS and setting of Timer shall be checked by the OOW, during each watch as per the "Bridge Daily Checklist".
- f) Since the BNWAS would be OFF during port stay OOW shall confirm status/required setting from Master during taking over conn from Master after leaving harbour.
- g) Vessels fitted with the BNWAS shall prepare ship specific "Work Instructions" for use of the system. Same shall be available on the Bridge.
- h) All Bridge team members should be familiarized with procedures and instructions regarding (BNWAS should be included in "Bridge Familiarization Checklist, [S-071000-02CHK](#)
- i) The Master or back up officer receiving the Alarm / alert call (if feature available) shall immediately proceed to the Bridge and take necessary actions. If back up officer proceeds to the bridge, the Master shall also be notified about the reason for receiving the alarm.
- j) In case of any malfunction or failure of BNWAS, the company shall be immediately notified.

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## 2.2.7 Helmsman

### 2.2.7.1 Attention to Course Keeping

Regardless of whether the ship is on manual or automatic steering mode, check to see if proper steering is being done and if the helmsman or autopilot is always keeping the set course.

### 2.2.7.2 Stationing of Helmsman

The helmsman shall be stationed within an area that will permit him to be placed on steering duties when it is necessary to put the steering into manual control.

### 2.2.7.3 Switching Over of Steering Equipment

When switching over from manual to automatic steering, or vice versa, either the OOW shall do it or have the helmsman do it under his supervision.

### 2.2.7.4 Weather Observations

The OOW shall make an hourly weather observation and enter the necessary information in the ship's log book and other record books, as appropriate.

## 2.2.8 Patrol of Ship



At night (between sunset and sunrise), after the relieved officer has completed his watch, he shall, according to the procedures of "[Ship Security Matters and Safety Patrols](#)", patrol around the ship, checking to see if all is well, and report the findings to the OOW. The OOW shall enter the facts in the ship's log. Personnel engaged in lookout shall not leave the bridge during the watch as this contravenes the requirements of SOLAS and STCW. These safety patrols of the vessel shall be conducted after the end of the watch.

## 2.2.9 Marine Meteorological Observation and Reporting

Marine meteorological observation is an indispensable tool for providing marine weather forecasts or warnings, and is also used for monitoring and study of climate change such as global warming. Although all vessels are encouraged to make meteorological observations and report them to National Meteorological Agency, be guided by company instructions regarding observation and reporting exemptions, if any.

For vessels participating in the observation and reporting:-

- The OOW shall record and report the weather observations made on the ship to the concerned authorities as and when applicable.

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- b) Japan Flag Vessels are obliged to report meteorological observations to the Japan Meteorological Agency (JMA) in compliance with the Meteorological Service Act and its Implementation Regulation in Japan.
- c) To ensure accuracy of the data collected, the vessel shall also report to the authorities the information about weather monitoring equipment on the ship, and at the same time always try to keep it in good repair.

## 2.3. **Coastal Navigation**



Navigation in waters in which it is possible to fix the ship's position by visual means or by radar is deemed as coastal navigation. The OOW shall make safe navigation possible by strictly observing the following:

### 2.3.1 **Points to Be Checked during Coastal Navigation**

- a) That the nautical charts (including ENCs & Raster Charts), publications, etc. being used are adequate, correct scale and updated;
- b) That the set course line is safe. (Are there any reefs and shoals? Is the indication of the course on the nautical charts correct?);
- c) The relationship between the ship's draft and the depth of water;
- d) The tides, tidal streams and currents of the navigating area;
- e) The presence of concentration of fishing boats;
- f) The presence of unlit fishing boats or other small vessels;
- g) Hull squat in shallow waters; and
- h) Local information broadcast from coastal nations, etc.

### 2.3.2 **Watchkeeping Arrangements**

The watchkeeping arrangement shall be maintained in accordance with the "Watch Level" which have been decided and described in the "Bridge Notebook" by the master prior to sailing. However, it may be changed and revised by the master's discretion according to the circumstances in order to secure the safe operation of the ship.

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### 2.3.3 Proper Use of Navigation Instruments

Navigation instruments (not limited to Radar, ARPA, and ECDIS) shall be used in accordance with the respective procedures and instructions in this SMS Manual and onboard instruction manuals.

#### 2.3.3.1 Radar and ARPA

Radar (including ARPA) is an effective tool for aiding lookout or fixing the ship's position, and shall be used properly in accordance with the procedures of "[Radar and ARPA Operations](#)" and respective instruction manuals/books.

In particular, parallel indexing is an effective means of setting a clearing line, when navigating in a state of restricted visibility, or under conditions which make it difficult to determine the ship's position, or in congested waters, and thus efforts shall be made at all times to become thoroughly familiar with its operation.



#### 2.3.3.2 ECDIS

ECDIS having an interface with one or more of the following equipment is an effective tool for aiding lookout, safe navigation or fixing the ship's position :-

- a) ARPA
- b) Radar
- c) AIS
- d) GPS
- e) Echo sounder
- f) Gyro

ECDIS shall be used effectively in accordance with the procedures of "[ECDIS Operations](#)" in the SMS Manual and respective instruction manuals/books.

In particular, grounding, look ahead or other similar functions if used properly on ENC's are effective means of obtaining means of early warning for any navigational hazard and thus efforts shall be made at all times to become thoroughly familiar with its operation including understanding available interfaces, limitations and settings required. Availability of charts (ENCs or Raster), their scales etc. shall be considered. If raster charts are used then appropriate paper charts shall be utilized for position fixing and monitoring.

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### 2.3.3.3 Sound Reception System (SRS)

As per section 2.2.6.5 above

### 2.3.4 Actions to Avoid Risk of Collision

In coastal navigation, the density of vessel traffic is high, and the ship is likely to have a new danger when keeping out of the way of other vessels, so any action to avoid risk of collision shall be taken in ample time and in an area as far from other vessels as possible, having careful regard to her maneuverability, speed, the traffic density, the relationship between the depth of water and the ship's draft, the presence of shoals, etc. When keeping clear, the ship, if necessary to do so, may alter course or slacken her speed.

### 2.3.5 Fixing Ship's Position



#### 2.3.5.1 Marking of Ship's Position (Refer to [S-071000-01FIG](#))

The ship's position shall be plotted on the chart by marking it with a description of the means by which it was determined and by adding the time it was obtained.

#### 2.3.5.2 Points to Be Observed in Fixing Ship's Position

The following points shall be observed:

- a) The position is fixed not by relying on one method but by a combination of methods.
- b) If GPS is only means of position fixing available in given circumstances, the display of both the GPS shall be compared prior plotting GPS fix on chart. The notice of this effect shall be displayed at GPS.
- c) Bearings shall be taken as visually as possible
- d) Selection of a conspicuous object. (As a rule, one in the bridge notebook);
- e) Radar bearings may usually involve large errors;
- f) False echoes are liable to exist in radar image;
- g) The positions of light-buoys and light ships may differ from those shown on nautical charts;
- h) The depth of water obtained by an echo sounder may serve as an effective line of position (particularly when shifting from ocean passage to coastal navigation);

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- i) Instrumentation and human errors are contained in the line of position; and
- j) The lights of navigational aids are the same as those shown on the nautical charts.
- k) While changing over to new passage chart, the last position of the previous chart shall be transferred to the new chart.
- l) Uses of dead reckoning technique to cross check and confirm the position fixing.

### 2.3.5.3 Time Interval of Fixing Positions

The position fixing interval shall be decided at the passage planning stage. This shall be entered in the Bridge Note Book and on the charts. As a minimum the position fixing interval shall be such that there will always be two further fixes before the vessel could run into a danger or reaches a navigational hazard.

In normal coastal navigation, the ship's position, as a rule is fixed at least every 15 minutes and at least every 10 minutes in conditions during coastal navigation when bridge watch level is 2 or higher (ref [S-071000-04FIG Watch Level - Bridge](#)) and appropriately plotted on the nautical chart.

However, the time interval of fixing positions which has been decided and described in the "Bridge Notebook" by the Master has precedence over the general rule. When the master orders, whilst the ship is entering and leaving harbor, or anchoring, etc, or may encounter a danger, navigating through reefs and shallows, safety shall be checked by taking fixes continuously whenever appropriate. Furthermore, irrespective of the requirements mentioned above, the ship's positions shall be confirmed immediately after the course has been altered.

### 2.3.5.4 Confirmation Items after Fixing Positions



When the ship's positions obtained and fixed on the nautical chart have been far deviated, after keeping clear of other vessels, etc., from the planned track, or when fixing the obtained ship's position on the nautical chart immediately after the ship's course has been altered, the OOW shall draw the new course line from the relevant ship's position obtained, confirming that there are no shoals nor dangerous obstructions there.

## 2.3.6 Traffic Separation Schemes

### 2.3.6.1 Ship's Routing

The traffic separation schemes shown on nautical charts include those adopted by IMO, those based on the domestic law of a coastal state, those recommended on a



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voluntary basis by marine organizations, of a coastal nation, or others. To determine whether or not there is an obligation to use the traffic separation schemes, check with "Ship's Routing" issued by IMO, and other sources.

### 2.3.6.2 Article 10 of COLREGS

Article 10 of COLREGS is applicable only to the traffic separation schemes adopted by IMO. Depending on a coastal state, heavy fines may be levied for the violation of that Article, so every effort shall be made to abide by the rules. However, when it is considered inappropriate to follow those rules to ensure the safety of the ship, the ship may not comply with them after obtaining permission by means of VHF, etc. from the nearest marine safety authorities, etc.

### 2.3.6.3 Traffic Separation Schemes Established by Coastal Nation

Traffic separation systems established by the coastal nation shall be complied with.

## 2.4. Ocean Passage

During ocean passage the OOW shall comply with the following:

### 2.4.1 Points To Be Observed during Ocean Passage

- In the areas where the service of a ship's position reporting system (AMVER, JASREP, AUSREP, etc.) is available, the ship shall participate in that service;
- Be aware that there may be vessels that fail to watch during ocean navigation; and
- Be aware that there may be sudden changes in weather and sea conditions. (If this happens, report to the master)



### 2.4.2 Fixing Ship's Position

#### 2.4.2.1 Marking of Ship's Position (S-071000-01FIG)

#### 2.4.2.2 Periods between Fixings of Ship's Position

When using electronic position fixing aids (GPS, etc.) which allows ship's position to be fixed at any time, the ship's position shall be plotted on the nautical chart at least every hour. Furthermore, the average speed and course made good shall be calculated from the noon position or the departure point and from the position the preceding hour, and entered into a specified notebook or sheet.



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### 2.4.3 Usage of ECDIS

Additionally, usage of ECDIS for navigation and monitoring of passage shall be done in accordance with the procedures of "[ECDIS Operations](#)" in the SMS Manual and respective instruction manuals/books.

### 2.5. Noon Calculations

The officer on the 8-12 watch shall obtain the approval of the master on the results of the following calculations and make them known throughout the ship:

- a) Noon position and dead reckoning noon position;
- b) Distance (log and over the ground) run from noon on the previous day;
- c) Average speed (log and over the land) from the previous noon;
- d) H.U.W. and H.P. from noon on the previous day;
- e) Current, set and drift;
- f) Total distance run from the port of departure;
- g) Remaining distance to the port of destination; and
- h) Estimated time of arrival at the port of destination.



## Chapter 3 Entering Harbor → SMS Manual no. ZZ-S-P-07.20.00

### 3.1. Check Work on Day before Entering Harbor ("Entering Harbor Checklist 1")

#### 3.1.1 Information

- 3.1.1.1** The Master shall check that information required for entering harbor has been obtained.

On this occasion, he shall confirm and comply with various cargo handling regulations or standards and conditions for safety concerning port entry and berthing specifics as items agreed upon with the terminal, such as restrictions on port entry in nighttime, berth lateral closing speed, berthing criteria and necessary number of tugs in relation to weather and sea conditions.

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**3.1.1.2** The Master shall check, all the arrival formalities & necessary communications have been conveyed to the parties concerned.

### **3.1.2 Engine**

The Chief Engineer shall have the First Engineer and each engineer carry out the necessary engine readying work.

### **3.1.3 Mooring Winch/Windlass**

The Chief Officer (or Officer as assigned by Master - [Ch ZZ-S-P-02.10.00, section 6.1](#)) shall order the Deck ratings to test & operate the mooring winches and windlasses and shall check that they are in order.

### **3.1.4 Prevention of Black Smoke and Soot**

**3.1.4.1** To prevent the generation of black smoke, the Master and the Chief Engineer shall discuss the operation method of the main engine, the manual operation of the boiler, and confirm the characteristics and proper use of the main engine. To reduce the risk of black smoke in harbor are as the Chief Engineer shall prepare work instructions for the following:

- a) Timing for burner replacement
- b) Timing for parallel operation of generators
- c) Implementation of soot blowing



**3.1.4.2** Additionally for PCC vessels, proper actions shall be taken for soot prevention and crew are aware of these proper actions.

### **3.1.5 Special Waters**

The Master shall abide strictly by the national laws, special requirements for private berths and terminals etc. of the waters the vessel enters. In particular, when entering and leaving U.S. waters, proper actions shall be taken in accordance with Sections 164.11, 164.25, 155.700, etc. of 33CFR.

### **3.1.6 Necessary Documentation**

The Master shall check that documentation for customs and immigration and other necessary documentation are in order.

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### **3.2. Check Work on Day of Entering Harbor ("Entering Harbor Checklist 2")**

#### **3.2.1 Information**

- 3.2.1.1** The Master shall check that various cargo handling regulations or standards and conditions for port entry and berthing specified as items agreed upon with terminal, such as berthing criteria in respect of weather and sea conditions have been satisfied.

#### **3.2.2 Navigation Instruments**

- 3.2.2.1** The duty officer shall confirm that the navigation instruments are in good order four hours before the pilot is due to board ship, record the results in the ship's log book, and report to the Master.
- 3.2.2.2** If a deficiency is found in the above-mentioned instruments and shipboard repair is not possible, the Master should communicate the fact, as occasion demands, either directly to the pilot or through the ship's agent and to the maritime security authorities, etc..
- 3.2.2.3** After the above-mentioned operational tests, the radars and the power units for steering gear shall be operated in parallel.



#### **3.2.3 Check Items around Deck**

The Chief Officer (or Officer as assigned by Master -ref [Ch ZZ-S-P-02.10.00, section 6.1](#)) shall order the Deck ratings to have the necessary preparations for port entry made on deck, such as sealing up coaming plugs, plugging up deck scuppers, etc., and check the results.

### **3.3. Operations for Port Entry (Refer to "Entering Harbor Checklist 2")**

#### **3.3.1 Engine Department Preparatory Work**

- 3.3.1.1** The Master shall advise the Chief Engineer of the estimated time to ring S/B Engine in ample time, and the Chief Engineer shall set entering harbor S/B stations at the appropriate time. (In case of UMS operation, the Chief Engineer shall assign his Engineers to watches)
- 3.3.1.2** The duty officer, based on the Master's instructions, shall notify the duty engineer of the fact at least one hour before S/B Eng. to allow for sufficient time to slow down the main engine and to make the engine related preparations smoothly.

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**3.3.1.3** The Chief Engineer, in accordance with the S/B procedure of each ship, shall order the duty engineer and the engine ratings to S/B Eng. and shall carry out the following S/B operation to enter harbor.

- a) Slow down the main engine.
- b) Preparatory work of the boiler, exhaust gas economizer, etc.
- c) Parallel Operation of the generators.
- d) Work related to the shaft generator or steam turbine generator if equipped.
- e) Preparation and inspection of air compressors and starting air system.
- f) Various work and inspection of fuel oil system.
- g) Various work and inspection of lubricating oil system.
- h) Various work and inspection of cooling fresh water and sea water systems.

**3.3.1.4** The duty engineer, when the various preparatory works before S/B Eng. is finished, shall immediately report the fact to the Chief Engineer.

The Chief Engineer shall confirm the completion of the work and report the fact to the bridge.



**3.3.1.5** The duty engineer shall check that contact has been established between the bridge and the engine control room by direct telephone and by setting the transceiver channel.

### **3.3.2 Master's Attendance on Bridge**

**3.3.2.1** The Master shall attend on the bridge at least 10nm prior arrival pilot station or earlier (sufficiently in advance before arriving any other designated area) prior entering harbour. After which he shall take the conn when he deems it necessary.

**3.3.2.2** The Master, regardless of the above, shall specify the position at which he himself will attend on the bridge and annotate it on the nautical chart, and the OOW shall report the Master when the ship arrives at that position.

**3.3.2.3** The Master shall give the order "S/B Eng." at an appropriate time giving consideration to the maneuvering characteristics of the ship, the density of traffic, waterway restrictions, visibility conditions, etc.

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- 3.3.2.4** The Master shall give orders to the Helmsman to steer her manually well in advance giving consideration to the ship's speed and draught, the depth of the water, and the density of vessel traffic, etc.

### **3.3.3 Embarkation of Pilot**

- 3.3.3.1** The Master shall order on Officer to complete preparation of the pilot ladder at least 15 minutes before the pilot station.
- 3.3.3.2** The Deck Officer ordered by the Master shall direct deck hands to carry out the preparatory work in accordance with the procedure entitled "[Pilot Embarkation/Disembarkation](#)".
- 3.3.3.3** The Officer ordered by the Master shall attend and witness the boarding of the pilot and, after he has done so, immediately report the fact to the Master.
- 3.3.3.4** The OOW, after making the necessary entries in the pilot card, shall show it to the pilot through the Master
- 3.3.3.5** The OOW shall immediately notify the engine control room that the pilot has boarded the ship.

### **3.3.4 "S/B Stations" for Port Entry**



- 3.3.4.1** The Master, at an appropriate time, shall order "S/B stations" for port entry.
- 3.3.4.2** After the issuance of the order "S/B stations" for port entry, the crew shall take the prescribed stations and carry out the entering harbor work.
- 3.3.4.3** The Master, at the earliest opportunity, shall relay to the fore and aft stations pertinent information about which side of the ship will be berthed, the anchors to be used, the positions of the tugboats, etc.

### **3.3.5 Work of Stations**

#### **3.3.5.1 Bridge Station Work**

The Master shall make the following checks and enter the results in the ship's log book.

- Astern engine test.
- Steering test.
- Bow thruster test.

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- d) Sounding of whistle.

The Third Officer (or Officer as assigned by Master -ref [Ch ZZ-S-P-02.10.00, section 6.1](#)) shall carry out the following work.

- a) Activation of the echo sounder when ordered by the Master.
- b) Preparatory work checklists entered by the fore and aft stations.
- c) Check of communications between the bridge and the fore and aft stations.

### 3.3.5.2 Fore Station Preparatory Work



The Chief Officer (or Officer as assigned by Master -ref [Ch ZZ-S-P-02.10.00, section 6.1](#)) shall check the following work and report it to the Master.

- a) Roll-call of personnel.
- b) Activation of the hydraulic motors (in cold climates, start activation early in consideration of the warm-up time required).
- c) Ready to send ashore mooring hawsers and heaving lines.
- d) Standby state of anchors on both sides of the ship (walking back to a'cockbill at the Master's instructions, and disengaging of stopper controller and clutch).
- e) Line up of cooling water for hydraulic motors as occasion demands.

### 3.3.5.3 Aft Station Preparatory Work

The Second Officer (or Officer as assigned by Master -ref [Ch ZZ-S-P-02.10.00, section 6.1](#)) shall check the following work and report it to the Master.

- a) Roll-call of personnel.
- b) Activation of the hydraulic motors (in cold climates, start activation early in consideration of the warm-up time required).
- c) Ready to snake down and heaving lines.
- d) Ready the gangway ladder if there is time.
- e) Line up of cooling water as occasion demands.

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### 3.3.5.4 Watching Stationed Fore and Aft

In addition to an ordinary lookout, the Deck Officers stationed fore and aft shall pay attention to movements of tugboats, the speed of docking and distance to other ships, and report to the Master immediately when he infers the ship is in dangerous condition.

### 3.3.6 Stretching of Mooring Lines

The mooring lines are strung and stretched in accordance with the following procedure.

- a) The number and the order of lines sent shall be strung and stretched in accordance with the Master's instruction.
- b) The tension of the lines shall be even.
- c) Hold the lines with the braking power of the mooring winches and disengage the clutches.

## 3.4. Completion of Harbor Entering Work ("Entering Harbor Checklist 3")



### 3.4.1 Finish with Engine

**3.4.1.1** The Master shall order F/Eng. when he judges from the number of mooring lines that are stretched, the mooring condition of the ship, etc. that the use of the main engine is no longer necessary.

**3.4.1.2** The Chief Engineer, after discussions with the Master and depending on the in-port (or port stay) time, surrounding circumstances, etc., shall order the Engineers and the Engine ratings to carry out the necessary warming up and cooling down work of the engine plant.

### 3.4.2 Dismissal of Harbor Entering S/B Stations

The Master shall order the dismissal of harbor entering stations when he judges that the fore and aft mooring lines have adequately been strung and the safety of mooring of the ship is ensured.

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## Chapter 4 Watch-keeping in Port (Deck) → SMS Manual no. ZZ-S-P-07.10.03

### 4.1 Duties of Duty Officer

The duty officer shall perform his duties of watch keeping in port, in accordance with the following procedures:

#### 4.1.1 Cargo Watch

The duty officer, when cargo work is being conducted, shall perform duties as the officer on cargo work watch, following the instructions given by the chief officer, and shall direct the cargo work related duties.

#### 4.1.2 Mooring Lines

The duty officer, when the ship is alongside a wharf, shall ensure that the state of the mooring lines is good, and if there is any deficiency in the state, he shall have it rectified.

A check of the mooring lines shall be made once per hour but in harbors where there are large tides, swells and where the effects of passing vessels can be expected, checks shall be made at shorter intervals.

#### 4.1.3 While Anchored

The duty officer shall carry out the detection of a running anchor in accordance with Section 2.1 of the procedures of "Anchoring".

#### 4.1.4 Accommodation Ladder (and Gangway if used)



The duty officer shall check, at appropriate times, and maintain the following:

- That the gangways are suitably lowered to permit safe embarkation and disembarkation;
- That adequate lights are provided at night;
- That safety nets are properly strung underneath the gangways;
- That lifebuoys with lifelines and self-igniting lamps are always provided in the vicinity of the gangways; and
- That steps are not slippery.

#### 4.1.5 Accident Prevention

The duty officer shall make the utmost effort to prevent accidents on board and around the ship, and shall make the crew and contractors abide strictly by the procedures of the SMS manual and laws and regulations related to safety.



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#### 4.1.6 Security

The duty officer shall strive for security on the ship in accordance with the SMS procedures titled "Security Matters and Safety Patrols" (ZZ-S-P-07.43.00 ).

#### 4.1.7 Measures against Rough Weather

The duty officer, when rough weather is expected, shall check and consider the following:

- Maintain close contact with agents
- Check to see if there is the necessity of increasing the number of mooring lines (considering wind and current, windage area, strength of lines, etc.);
- Check to see if there is the necessity of arranging for a tugboat to support the mooring;
- Judge whether or not the engine needs to be used and if required, notify the duty engineer in ample time;
- Consider the necessity of suspending or ceasing cargo work; and
- Note to see if there is the necessity of instructing the crew members on shore to return to the ship.
- Upon receiving instruction from Master, preparing to leave the berth in order to shift the vessel to safe water area, if required.

#### 4.1.8 Ensign and Illuminations

The duty officer shall have the necessary flags (flag of port of registry, flag of port state, other flags required by law, etc.) hoisted from sunrise to sunset.

At night, he shall ensure that all the flags have been lowered and put away, and that necessary lights on the decks, in the holds, or on passageways, gangways, etc. are illuminated.

While the ship is anchored, he shall ensure that all lights and shapes stipulated by the regulations for preventing collision at sea are properly lit or hoisted.



#### 4.1.9 Prevention of Sea Pollution

The duty officer, while on watch, shall monitor the vessels activity such that oil, garbage, daily wastes, etc. are not improperly discharged overboard.

He shall also notify the master and the duty engineer if he discovers any oily bilge, floating in the vicinity of the ship, and if necessary, shall take action in accordance with the procedures of "Oil Spill".

#### 4.1.10 Prohibition of Fishing in Port

While the vessel is alongside / STS or if involved in cargo operation at anchorage, ensure ship's crew are not involved in fishing activities. If some terminal/ local regulations prohibit fishing in port limits such information should be highlighted to crew members and complied with strictly.

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#### 4.2. **Change of Watch**

The duty officer shall hand over the following matters to the relieving officer:

- a) The state of the tide and tidal current;
- b) The depth of water and ship's draft;
- c) Anchors used and shackles (when anchored);
- d) The state of mooring lines (number of ropes, tension, etc.);
- e) The state of readiness of the engine;
- f) Cargo work related information;
- g) Oil replenishment, and the state of ballasting and deballasting;
- h) Crew members remaining on board;
- i) Visitors to the ship; and
- j) Master and chief officer's instructions.

### Chapter 5 **Leaving Harbor** → SMS Manual no. ZZ-S-P-07.20.01



#### 5.1. **Check Work before Leaving Harbor**

**5.1.1** The Master, taking seaworthiness into consideration, shall check that the necessary preparation (Refer to the "[Leaving Harbor Check List](#) (S-072001-01CHK) " has been completed.

#### 5.1.2 **Notification of Estimated Time of Departure**

**5.1.2.1** The Master shall advise the Chief Engineer of the estimated time of departure (ETD) well in advance and discuss with him the time for the main engine trial.

**5.1.2.2** The Chief Officer, as soon as the ETD has been decided, shall immediately make it known to the entire crew and ship, as well as put up notices to that effect at the gangway, in the office and other conspicuous places. The Chief Officer shall also make an announcement to persons on board entirely every time there is a change in the ETD.

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## 5.2. Roll Call of Crew

Each department head shall make a roll call of the crew under his supervision by one hour before the ETD and inform it to the Chief Officer, who will then put the information together and report it to the Master.

## 5.3. Stowaway Search

**5.3.1** The Master, when the departure port is the last port of call of the country concerned, shall strive to find stowaways by conducting a stowaway search in accordance with the following procedures.

- a) The search should be partially completed before hand by searching, locking and putting "Tamper Proof Labels" on those places that can be sealed before entering harbor and while berthing.
- b) Carry out the search widely before sailing as much as possible.
- c) Finish the shipboard search after leaving harbor to confirm that there are no stowaways on board.
- d) Taking the ship's trade route and so on into consideration, and as occasion demands, conduct a stowaway search after leaving port by anchoring or drifting.

**5.3.2** The Officer of the watch, when a stowaway search has been conducted, will record the results in the ship's log.

**5.3.3** The Master, when a stowaway is discovered, shall immediately contact the parties concerned and also deal with the matter as per the procedure entitled "[Other Casualty Handling](#)."



## 5.4. Preparations for Voyage

### 5.4.1 Check of Passage Plan

The Master shall prepare a passage plan in accordance with the procedure entitled "[Passage Planning](#)" and check there are no obstacles to the voyage.

### 5.4.2 Preparation of Nautical Charts and Bibliography

The Second Officer shall keep ready the nautical charts of the sea area and the relevant harbor and other hydrographic publications necessary for the passage in

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accordance with the procedure entitled "[Charts and Nautical Publications](#) ," and report to the Master.

#### **5.4.3 Preparation of Report for Ship's Position Reporting System**

The Second Officer, when the ship is participating in a ship's position notification system (AMVER, JASREP, AUSREP, etc.), shall ready the report for the system.

#### **5.4.4 Gathering and Evaluation of Weather and Navigation Information**

The Master shall obtain necessary information in accordance with the procedure entitled "[Navigational Information](#)" and, from that information, check that there is no hindrance to the navigation.

#### **5.4.5 Check of Draft, Hull Stability, and Hull Strength**

The Chief Officer, before leaving port, shall make the necessary calculations with respect to the ship's draft, trim, GoM, longitudinal strength, stability and hull strength, in accordance with the procedure entitled "[Trim and Stability / Longitudinal Strength](#)" and report to the Master.

#### **5.4.6 Check of Cargo Lashing and Closure of Openings**

The Chief Officer shall order the deck crew to lash down the cargo and close the hatch covers, the watertight doors, and other openings, and after checking the work, report to the Master.



#### **5.4.7 Check of Navigational Equipment**

Master shall verify that all navigational equipment, especially those that are included in the critical equipment list are fully operational prior leaving the port. All effort shall be made to make the equipment functional prior leaving the port. Vessel may depart port with critical equipment working erratic, if a detailed risk assessment has been conducted and approval has been given by company.

### **5.5. Preparations for Leaving Harbor**

#### **5.5.1 Check of Documents Pertaining to Leaving Harbor**

The Master shall check if all documents necessary for leaving the harbor are available.

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## 5.5.2 Sailing Conditions

**5.5.2.1** The Third Officer, before leaving the harbor, shall check the sailing conditions, record the facts in the following, and also report to the Master by the described form.

- a) Condition Note, and
- b) Pilot Card

**5.5.2.2** The Master shall check the following with regard to the sailing conditions.

- a) That the draught is below the ship's load line and that it meets the permissible draught of the channel, etc. to be navigated.
- b) That the state of the trim is appropriate.
- c) That there is an adequate supply of fuel oil, lubricating oil, and fresh water.

## 5.5.3 Warming Up and Preparing of Main Engine(s)



**5.5.3.1** The Duty Engineer shall warm up the main engine(s) and ready it for operation in accordance with the procedure entitled "[Main Diesel Engine Operation](#) )" or "Main Turbine Operation."

**5.5.3.2** The Duty Engineer shall, through the process of warming up and readying the main engine(s) for operation, check and report to the Chief Engineer that related machinery, equipment and facilities are in order.

**5.5.3.3** The Chief Engineer shall check and report to the Master that the preparation of the main engine(s) for operation is completed.

## 5.5.4 Check of Parallel Operation of Generators

The Chief Engineer shall confirm that parallel operation of generators is ensured.

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### 5.5.5 Check of Operation of Navigational Equipment

The Third Officer or the Officer of the watch shall check the operation of the navigational equipment, report the results to the Master and also enter the facts in the ship's log book.

### 5.5.6 Check of Operation of Communications Equipment

The Chief Radio Officer/Radio Officer (or other appointed deck officer) shall inspect the following, check that they are in good working order, enter result in GMDSS / Radio Log book and report to the Master

- a) MF/HF radio equipment (Including DSC)
- b) VHF (Including DSC)
- c) INMARSAT System
- d) Internal communications equipment
- e) Printers, ink and other accessories related to communication equipment

### 5.5.7 Check of Operation of Steering Gear

**5.5.7.1** The Duty Engineer shall inspect the steering gear in the steering gear compartment in accordance with the procedure entitled "[Steering Gear Operation](#)," and, after checking that it is in good working order, report to the Chief Engineer and Master.



**5.5.7.2** At the same time, the Third Officer shall check the operation of the steering gear from the bridge and report the results to the Second Officer and also to the Master.

**5.5.7.3** The Third Officer shall enter the results and the fact of the operation test of the steering gear in the ship's log book.

### 5.5.8 Check of Disembarkation of Ship's Visitors and Shore Workers

The Chief Officer shall check that the agent's staff, cargo workers, repair contractors and all other non-crew persons have disembarked, and report to the Master.

### 5.5.9 Pilot Embarkation/Disembarkation Preparations

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The Master shall order a Deck officer to prepare for the pilot's embarkation and disembarkation. The Deck Officer ordered by the Master shall direct the deck hands to carry out the preparatory work in accordance with the procedure entitled "[Pilot Embarkation/Disembarkation](#) ."

## 5.6. Engine(s) Trials

**5.6.1** When engine(s) trials are being carried out, Master shall have the necessary personnel stationed at the bow, stern and gangways and have them do the following.



- Stretch the mooring lines uniformly.
- Check that the vicinity of the propeller is clear of obstacles.
- Check the state of other ships in the vicinity of the bow and stern.
- Lift the gangways from the pier or shore facilities.
- Be careful of the cargo handling installations on the pier.

**5.6.2** The Master and the Chief Engineer shall have the main engine(s) test operated in accordance with the following procedures and shall check that it starts up / stops properly.

- Check the air running and start up / stop of the main engine from the engine control room.
- Check the start up / stop of the main engine from wheel house operations.

**5.6.3** The Chief Engineer shall check that state of the main engine(s) is in good order in accordance with the procedure entitled "[Main Diesel Engine Operation](#)," or "[Main Turbine Generation](#)," and the Engineer of the watch shall report to the Master.

**5.6.4** The Third Officer (or Officer as assigned by Master -ref [Ch ZZ-S-P-02.10.00, section 6.1](#)) shall enter the results of the test operation of the main engine in the ship's log book.

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## 5.7. **Leaving Harbor**

### 5.7.1 **Bridge Station Preparatory Work**

The Master, after checking that all preparations to leave harbor are finished, shall carry out the following work, and have the whole crew take harbor leaving stations.

- Order to station all crew members for leaving harbor by public addressor or transceiver.
- Start the bow thruster.
- Standby the main engine.

The Third Officer (or Officer as assigned by Master -ref [Ch ZZ-S-P-02.10.00, section 6.1](#)) shall carry out the following and report to the Master.

- Check and hoist the H flag and other necessary harbor leaving signals.
- Check communications with the fore and after stations.

### 5.7.2 **Fore Station Preparatory Work**



The Chief Officer (or Officer as assigned by Master -ref [Ch ZZ-S-P-02.10.00, section 6.1](#)) shall check the following and report to the Master.

- Roll call of the personnel.
- Check communications with the bridge.
- Check operation of the windlasses and mooring winches.
- S/B of anchors of both sides of the ship. Chain stopper shall be kept lifted up and clutch shall be disengaged.
- Check flow of cooling water to mooring winches.

### 5.7.3 **Aft Station Preparatory Work**

The Second Officer (or Officer as assigned by Master -ref [Ch ZZ-S-P-02.10.00, section 6.1](#)) shall check the following work and report the results to the Master.



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- a) Roll call of personnel.
- b) Check communications with the bridge.
- c) Check operation of the mooring winches.
- d) Check flow of cooling water to mooring winches.

#### 5.7.4 Watching Stationed Fore and Aft

In addition to an ordinary lookout, the Deck Officers stationed fore and aft shall pay attention to movements of tugboats, distance to other ships, no obstructions around the propeller, etc., and report to the Master immediately when he infers the ship is in dangerous condition.



#### 5.8. Completion of Harbor Leaving Work

The Master, after the harbor leaving work is completed, shall confirm safety and then lift harbor leaving stations at an appropriate time and have the OOW take the conn. After judging full safety from the surrounding circumstances, he shall put the main engine on R/U and inform the Chief Engineer of the required RPM for the passage. Also, upon direction of the Master, the Chief Officer shall instruct and check the following in order to avoid difficulty in anchoring in the case of blackout:

- a) Disengaging of the clutch after the brake band is used on the windlass.
- b) Giving of adequate clearance to chain stoppers so that these can be manually managed.

#### 5.9. Reference Documents

- a) Passage Planning
- b) Charts and National Publications
- c) Navigational Information
- d) Trim and Stability/Longitudinal Strength
- e) Steering Equipment Operation
- f) Main Diesel Engine Operation

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- g) Main Turbine Engine Operation
- h) Pilot Embarkation/Disembarkation
- i) UKC Policy
- j) Air Draft Policy

## Chapter 6 Reporting Procedures

### 6.1 Reporting manners FWD and AFT stations

Vessel's maneuvering – berthing, un-berthing, anchorage, etc are critical operations on board, with major consequences in case of any human's errors. Therefore all involved crew should pay special attention during maneuvers.



In this chapter will be highlighted the importance of communication during maneuvers of the Vessel, reporting procedure of Fore and Aft stations.

Chief Officer (Forward) and Second Officer (Aft) should report to the Bridge whenever required by Master, and in addition, whenever they consider necessary for the safety of the maneuver.

Forward and Aft stations must cover all blind sectors from the Bridge, becoming extensions of the Bridge, especially during berthing and un-berthing, when eyes / sight / view are the most reliable tools, rather than any electronic equipment.

The reporting should include – but not be limited to – the following:

- 1) Bow / stern passing fixed objects, such as: breakwater, corner of the jetty, buoys, pillars, dolphins, other vessel's alongside or at anchor, etc – and any other fixed conspicuous targets.
- 2) Bow / stern passing moving objects, such as: vessels and any other mobile crafts,  
fishing nets, logs or any suspicious floating objects which might impede safe passing of own vessel.
- 3) Distance / clearance to any of the above fixed or moving objects, tendency and projection in the near future: Decreasing, Increasing or Constant / Un-changed.
- 4) Bearing / direction to any of the above fixed or moving objects, as seen from the forward / aft stations positions, tendency and projection in the near future: Decreasing, Increasing or Constant / Un-changed.

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(the bearing / direction can be measured in points, degrees or simply following clock indications: 2 points in the starboard bow, 45 degrees in the port quarter, 10'o'clock in the bow, etc).

- 5) Speed / velocity of the Bow and Stern relative to any of the above fixed or moving objects, estimating how fast the distance / clearance and bearing / direction are changing.

## 6.2 Reporting manners BRIDGE / FWD / AFT – Berthing Speed

After an incident involving a VLCC berthing in May 2012, with pilot on board, one of the causes of the accident was the pilot's attitude which was observed to be complacent and he appeared to be impatient and in a hurry. Therefore preventive action should be taken, such as

loud reporting by officers from the bridge (fore / aft station) to provide warning to the pilot and deter him from doing dangerous maneuvering.

- Officers must understand basic reporting manner from fore / aft station and from the bridge. (Report: fore / aft dist., head-way, stern-way, **lateral dist. & speed**, turning clearance, etc)
- Officers must understand importance of loud reporting from the bridge (fore / aft station) irrespective of whether there are indicators on the bridge wing.
- Communication between the bridge and fore / aft station is an important part of BTM/BRM.
- Officers should think what report is necessary for the Master under maneuvering for berthing / un-berthing.
- Safety awareness and ability of detecting a sign of incident by learning a lesson from past accident cases should be discussed and confirmed among Officers during BTM meetings.



Instruction of reporting manner from fore / aft station and the bridge

Attached GI/FLT/016/12 dated 11/06/2012 – Lateral Approach Speed while Berthing.

- Loud reporting from the bridge / fore / aft stations is very important, with the major effect of warning the master and the pilot and deter them from doing dangerous maneuvering.
- Officers are encouraged to confirm with the master what his intended berthing plan is. - -
- Master should instruct officers of **standard / required lateral berthing speed** at BTM briefing before entering port. If he does not tell that, officers have to challenge the master to confirm it.
- Master should encourage the Officers to report whenever they feel un-comfortable with the lateral approach speed.

### **Standard lateral berthing speed (NYKSM Maneuvering Standard)**

Ref. Lateral Berthing Speed (NYKSM Maneuvering Standard)		
RANGE	VLCC	PCC/CNTR
200m	20 cm/s	—

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100m	15 cm/s	20 – 30 cm/s
60m	10 cm/s	15 cm/s
30m	5 cm/s	10 cm/s
Final	MAX 5 cm/s	8 cm/s



- Lateral approaching speed information sources:

- At bridge, can be obtained from Doppler sonar, GPS and ECDIS.
- At fore / aft station,
  - (a) to remember the movement and confirm speed at that timing with bridge report,
  - and (b) compare with known distance such as bitt interval, breadth of own ship and so on,
  - (c) by a sense of distance and speed.

### 6.3 Examples of reporting

#### a) Reporting request from the BRIDGE:

- fore & aft, report when passing the breakwater in our port/side;
- fore / aft, what is the distance to? (forward vessel / aft vessel);
- fore / aft, report the distance to the forward / aft vessel every “x” meters;
- fore / aft, report the distance to the (any object) continuously;
- fore / aft, is the vessel swinging clear like this? What is the CPA to the (object)?
- forward, is the bow clear? Aft, is the stern clear?
- fore / aft, how is the sternway / headway?
- fore / aft, what is the clearance to the jetty? Is increasing / decreasing / constant?
- fore / aft, what is the clearance to the buoy / vessel in our stb/port/beam?
- fore / aft, report when we are clear from the vessel / buoy / berth;
- fore / aft, what is the lateral distance to the jetty?
- fore & aft, we are going to swing clockwise, report clearance fore&aft every minute;
- fore & aft, call bridge if you see any suspicious floating object in the water;



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b) Reporting from Forward and / or Aft Stations:

- bridge, forward distance to (object) is “x” meters, increasing / decreasing / constant;
- bridge, aft distance to the barge is “x” meters, increasing / decreasing / constant;
- bridge, bow passing the stern of the vessel in our starboard beam;
- bridge, bow in line with the bridge-mark on the jetty;
- bridge, aft, our stern is in line / passing the bow of the vessel port/side alongside;
- bridge, forward, our bow is approaching fast to the jetty;
- bridge, aft, our stern is moving away from the jetty, we cannot hold the (stern) lines;
- bridge, forward, lateral distance to the jetty is 50 meters, decreasing;
- bridge, aft, lateral distance to the jetty is 40 meters, increasing;
- bridge, forward, about 50 meters overlap to clear the bow of the vessel port side;
- bridge, aft, we have strong sternway, I cannot hold the spring lines;
- bridge, forward, we still have headway (with regards to anchoring maneuver, too);
- bridge, aft / forward, now mooring boat is picking up the line in our stern / bow;
- bridge, forward, I can see some oil spill in the water, 20 meters ahead of us;
- bridge, aft, the stern is passing clear the green buoy in our port quarter;
- bridge, forward, the bow will clear the buoy swinging like this, CPA 100 meters;
- bridge, aft, about 50 meters more to clear the corner of the jetty in our port quarter;

c) Reporting from Bridge, Forward and / or Aft Stations of lateral speed:

- Captain, 3/Off, lateral speed of the bow / stern is .... cm/second, increasing / decreasing / constant.
- bridge, forward, the bow is coming very fast toward the jetty – estimated speed is...
- bridge, forward, lateral distance in the bow / from the jetty is ....., and is rapidly decreasing!

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- bridge, aft, the stern is coming very fast toward the jetty – estimated speed is...
- bridge, aft, lateral distance in the stern / from the jetty is ....., and is rapidly decreasing!

## Chapter 7 **Anchoring** → SMS Manual no. ZZ-S-P-07.20.02

### 7.1. **Pre Arrival Checks (Prior Entering Harbor / Arrival Anchorage)**

Checks as per [Entering Harbor checklists 1](#) and [Entering Harbor Checklists 2](#) shall be carried out as applicable prior arrival anchorage (as prior entering harbor).

### 7.2. **Preparing To Cast Anchor**



Conduct the preparatory work for anchoring in accordance with the following:

**7.2.1** The master, at an appropriate time before arriving at the anchoring area for use, shall station the forecastle chain-party at forward and advise the chief officer of the anchors to be used, expected number of chains to be laid out, expected depth of anchoring area for use, and other necessary information.

#### 7.2.2 **Officer on Watch Conducts Following on Bridge:**

- a) When the ship is approaching the anchorage, take continuous soundings to check the depth and report to the master;
- b) Check the head way of the ship (over ground and through the water) and report to the master at appropriate time;
- c) Check frequently the ship's position and distance from other ships, and report to the master;
- d) Keep a particularly close lookout of the surroundings to check the movements of other ships, and successively report to the master; and
- e) Plot, as occasion demands, the positions of other anchored ships on the nautical chart.

**7.2.3.** The OOW determines the anchor position in accordance with the following procedures and enters the "Bridge Turning Circle" on the nautical chart:

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- a) Immediately after checking the heading at the time of anchoring, select a conspicuous object in the surroundings, and plot the ship's position (position of the bridge) on the nautical chart;
- b) From the above position on the nautical chart, the anchor position shall be the bridge-to-stem distance away on the heading; and
- c) With the anchor position as the center, draw the "Bridge Turning Circle" with a radius of the distance of the bridge to the stem plus amount of anchor chain laid out.

### 7.3. **Watch Level at Anchor**

An Officer of Watch shall always be assigned for bridge watch whilst vessel is at anchorage.

- a) On LNG Carriers, sole lookout/ watch level B-1 is not permitted (day or night) and Watch Level -1 or higher shall always be maintained.
- b) On all other types vessels, B-1 watch may be allowed at the discretion of the Master during the period from sunrise to sunset. All requirements as per SMS Procedures ZZ-S-P-07.10.00 "Watchkeeping at Sea- Navigation Bridge" sections 2.2.2 to 2.2.5 shall be complied with. Under no circumstances shall B-1 watch be allowed if heavy weather (or anticipated heavy weather), restricted visibility, congested anchorages etc.

### 7.4. **Anchor Watch under Normal Weather Conditions**



The master, after making the necessary entries in the "Anchor Watch Duties" <[S-072002-03FRM](#)>, shall give the necessary keeping an anchor watch to the officer of the watch (OOW)

The OOW shall pay careful attention to any changes of the weather and sea condition, and grasp at any time the relationship of the position between the own ship and the others, or shoal and dangerous objects. In particular, he shall strive to detect running (dragging) anchor at least once an hour to find such critical condition well in advance.

#### 7.4.1. **Detecting Running (Dragging) Anchor**

##### 7.4.1.1 **Check of Ship's Position**

To determine the ship's position by means of radar or by landmark and judge whether or not the anchor is dragging by checking to see if the ship's position is inside the "Bridge Turning Circle"

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#### **7.4.1.2. Record of Course Recorder**

The anchor might be dragging when the recorder stops drawing a steady sine curve.

#### **7.4.1.3. Swinging of Ship**

The anchor might be dragging when the ship stops making steady swings and remains in one posture against the wind. The number of times when the vessel swings to complete 360° turns should be recorded.

#### **7.4.1.4. Tautness of Anchor Chain**

The anchor might be dragging when the anchor chain does not slacken and remains taut.

#### **7.4.1.5. Speed over Ground**

To check the speed over the ground by Doppler log.

#### **7.4.1.6. Changes in Relative Positions of Other Ships**

To pay careful attention to any changes in the relative positions of other ships.

#### **7.4.2. Dragging Anchor of Own or Other Ships**

To monitor for dragging not only the anchor of the ship but those of other ships as well. Critical Wind Velocity should be known and monitored.

When the cable is slipping or anchor is dragging, situation shall be reviewed.



An extra length of cable may be paid out or anchor heaved up. At initial anchoring, it is recommended to keep lengths of reserve cable, which may be used later. Vessels with large windage area (i.e. PCC) shall avoid paying out long cables, as it may not significantly prevent anchor from dragging and may pose additional risks of damage to machinery and equipment, if required to heave up anchor later.

#### **7.4.3. Watching Other Ships**

**7.4.3.1.** When other ships pass near by, the master shall pay careful attention to the movement of the ship and attract their attention in order to prevent collision (contact) using the day-light signals and/or VHF if necessary.

**7.4.3.2** When other ships drop their anchor close to the own ship and the master considers it dangerous as the anchoring position is too close to the own ship, he shall





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immediately request the other ship to heave up their anchor and change their anchoring position.

#### 7.5. **Anchor Watch under Rough Weather Conditions**

The master shall take the following necessary countermeasures when rough weather is expected while anchored:

- a) Check with the agent or the nearest maritime safety authorities whether or not there have been any gale warnings, etc;
- b) Keep a listening watch on VHF Ch16 and obtain information of other ships, warnings, etc.;
- c) Obtain weather information from weather maps, navigational warnings, etc.;
- d) Maintain a safe distance from other ships and, if possible, shift her anchorage;
- e) Grasp the critical wind velocity for dragging anchor
- f) Lay out the anchor chain for an appropriate length considering the draft and length of the ship, the depth of water, the nature of the sea bottom, etc., or carry out double anchoring, stand by the other anchor, and drop another anchor to check her swing;
- g) Place engine on S/B if, judging from the weather and sea conditions, it is necessary;
- h) Make steering equipment ready for immediate use;
- i) When the ship's draught is light, take on more ballast water to reduce the windage area, and also trim the ship by the head; and
- j) Pay out extra anchor chain and use the engine at appropriate times to prevent the anchor from dragging.
- k) Weather conditions shall be periodically monitored. Anchors shall be heaved well in advance of the onset of bad weather. Vessel may proceed to a safe place where vessel can keep safe distance from other vessels, while drifting.
- l) If it is unavoidable and required to weigh anchor under unfavorable weather conditions, due regard shall be given to the excessive load coming on the windlass and chain. Burst of engine, bow thruster and steering etc may be used to ease the load on the cable and an efficient communication shall be maintained between forward station and bridge to closely monitor the lead and load on the anchor cable.

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## 7.6. Inspecting Anchor



When the ship remains at anchor for a long period, if prevailing circumstances permit, the master should temporarily heave up her anchor and let go again at the interval mentioned below as a standard in order to maintain good anchoring condition:

- a) In a river or estuary where tidal current is significant:  
Once every 3 days;
- b) At area where there is a lot of moving muddy sand in sea bed:  
Once every 5 days;
- c) Other area:  
Once every 1 week.
- d) If 10 completed 360° turns are made earlier than above listed intervals in 'a', 'b' or 'c', as applicable.

## 7.7. Collision Avoidance at Anchor

When on watch at anchor, comply with following:

- a) Maintain proper lookout for the need to appraise the situation fully including the dragging of anchor and as well as to establish whether risk of collision exists with other vessels.
- b) If the circumstances allow, a ship at anchor could be expected to take action to avoid collision by either using the engines to move the ship or by releasing more of the anchor cable to drop astern.
- c) Keeping engines ready for immediate maneuver, during restricted visibility.

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## Chapter 8 Pilot Embarkation and Disembarkation → SMS Manual no. ZZ-S-P-07.20.03

### 8.1. Preparing for Pilot Embarkation

#### 8.1.1 Maintenance of Pilot Ladder

The Chief Officer shall instruct the deck ratings to keep the pilot ladder always in clean and good condition. Periodic Inspection and Maintenance shall be carried out as per SMS procedures ZZ-S-P-10.30.06 "[Maintenance of Ladders](#)".

#### 8.1.2 Rigging of Pilot Ladder

##### 8.1.2.1 The preparation of the pilot ladder shall be done in accordance with IMO requirements and the IMPA recommendations entitled "[Required Boarding Arrangements for Pilot](#)".



Please also note that:-

- a) Mechanical Pilot Hoists shall not be used for pilot transfers.
- b) Ship side doors used for pilot transfers shall not open outwards.

##### 8.1.2.2 The preparation of the pilot ladder shall always be carried out by at least two workers.

##### 8.1.2.3 The Officer ordered by the Master shall inspect the following and check that the pilot ladder has been suitably rigged.

- a) The height of the pilot ladder from the surface of the water (the height specified by the pilot if requested);
- b) At night, the lighting of the pilot ladder and the vicinity of the boarding entrance;
- c) checking of lifebuoy and self-igniting light in vicinity of boarding place;
- d) pilot ladder is secured to ship's side;
- e) manropes are rigged and ready for use if required by the pilots.
- f) stanchions at boarding entrance are fitted;
- g) bulwark ladder is attached;

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- h) accommodation ladder is rigged (state of stanchions, safety ropes and hoisting wire);
- i) readying of heaving line;
- j) Safety of passageway for pilot (clean up slippery water and oil stains);

## 8.2. **Embarkation and Disembarkation of Pilot**

### 8.2.1 **Steering of Ship during Pilot Embarkation/Disembarkation**



The Master shall steer the ship by observing the following for the safety of the pilot's embarkation and disembarkation.

- a) As a rule, the side of the pilot's embarkation and disembarkation shall take all her way off the lee side.
- b) Reduce to an appropriate speed (4 to 6 knots) or, when necessary, stop.
- c) If the course and speed are instructed by the pilot when he is boarding or leaving the ship, follow those instructions.

### 8.2.2 **Attendance of Deck Officer**

The Officer who was ordered from the Master shall attend the pilot's embarkation and disembarkation and shall carry out the following.

- a) Just before the pilot's embarkation and disembarkation, make the checks listed under Sec.1.3.3 above and ensure that it is safe for the pilot to embark or disembark.
- b) Check himself that the pilot ladder has been secured in good condition by mounting the pilot ladder and testing it under his weight.
- c) If combination ladder is rigged, the officer, properly donned with life vest carrying portable radio, shall go down up to the boarding platform of accommodation ladder to receive pilot.

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- d) Advise the bridge at appropriate times how the pilot boat is approaching.
- e) Monitor and supervise the safety of the pilot's embarkation and disembarkation.
- f) Report to the bridge immediately after the pilot has boarded or left the ship safely.
- g) Guide the pilot safely to the bridge or the pilot boarding entrance.
- h) Carry a transceiver to ensure proper communication with the bridge.
- i) At night, carry an adequately bright flashlight.

### 8.2.3 Matters To Be Checked during Pilot Embarkation/Disembarkation

The Officer who was ordered from the Master shall check and record the following in the S/B Book when the pilot is embarking and disembarking.

- a) The ship's position when the pilot embarks and disembarks (bearing and distance from a conspicuous landmark).



### 8.3. Notifications to Pilot

The Master shall submit the "Pilot Card" 'S-072003-01FRM' to the pilot immediately after this boarding to notify him of the necessary information about the ship and also shall convey to the pilot the passage plan in the waters concerned which the Master himself had prepared.

### 8.4. Master and Pilot Information Exchange

The Master shall discuss and confirm with the pilot the necessary matters among the following and shall properly convey them to the Deck Officers.



- a) Information about the passage from the point where the pilot boarded the ship up to the final guiding point of pilotage;

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- b) Number and horsepower of tugboats and their positions;
- c) Name of the berth, side of the ship to be berthed, the method of berthing and how the mooring lines will be strung;
- d) Which side of the ship the pilot ladder is to be rigged when the pilot disembarks, its height from the surface of the water, the ship's speed, etc;
- e) The prevailing tide, effect of current and vessel speed;
- f) The effect of squat, maximum speed and resultant UKC. In case of Tankers and Gas carriers vessel compliance with company UKC policy;
- g) Approach or departure plan for mooring and unmooring;
- h) The "Lateral Berthing Speed" (S-072000-04FIG) of the vessel during berthing, in case stricter local or terminal requirements are in force, same shall be complied with.
- i) Contingency plan in case of failure of Main engine, Bow Thruster or Steering;
- j) Cautionary positions where special care may be required;
- k) Thoroughly exchange necessary information with the pilot regarding the ship operation when entering and leaving port, On that occasion, the Master shall confirm the following items and require the pilot, if necessary, to implement the following items;
  - i) Method of use and engine output of tugs.
  - ii) Method of main engine maneuvering
  - iii) More specific use and adjustment method of engine power of tugs and specific use method and plan for the main engine in a situation where there is the possibility that the ship may move at the same time when the mooring ropes are released. Carefully operate the ship considering the characteristics and the proper use of the main engine to prevent black smoke.
- l) Other necessary matters;

## 8.5. **Matters to Be Observed while Pilot Is on Board**

### 8.5.1 **Navigation Responsibility and Monitoring Duties**

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The Pilot's duty is simply to assist the Master, and even though he is on board, the responsibility for navigation lies with the Master.

Also, the Master shall closely monitor the pilot's action and do his utmost to ensure the safety of the ship.

### 8.5.2 Operations by Master

When the Master judges that it is not proper to let the pilot maneuver the vessel, he shall immediately override the pilot's instructions and maneuver the vessel as in deemed necessary.

### 8.5.3 Direction and Command of Ship's Operations

When the Master and the pilot give conflicting steering or engine operation orders, etc, the Officer of the watch and the helmsman shall comply with the Master's directives and orders.

### 8.5.4 Advice of Pilot

The Master shall respect the pilot's advice and, if necessary, shall revise his passage plan.

### 8.5.5 Duties of Officer of Watch



The Officer of the watch, even while the pilot is on board, shall engage in fixing the ship's position and other normal navigating duties in accordance with the procedure entitled "Watchkeeping at Sea (Navigation Bridge) ."

## Chapter 9 Hazardous Navigation → SMS Manual no. ZZ-S-P-07.30.00 to 04

### 9.1 Restricted Visibility (Refer to Checklist no. S-073000-01CHK)

#### 9.1.1. Reporting to Master

The Officer of the watch shall report to the Master immediately when visibility has reduced to 3 nautical miles or less or when it becomes less than the visibility specifically instructed by the Master.

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### 9.1.2. Master's Command

The Master, when navigating under restricted visibility, shall himself take over command on the bridge when he deems it necessary, judging from the circumstances of his ship, the traffic density, and the surrounding circumstances, etc.

### 9.1.3. Navigating under Restricted Visibility

The Master, when navigating under restricted visibility, shall strive for safe navigation by strictly observing the following.



#### 9.1.3.1. Proper Lookout

When visibility is restricted, a proper lookout shall be maintained by sight and hearing as well as by all available means appropriate in the prevailing circumstances and conditions.

The following shall be considered with respect to lookout:

- a) Parallel operation of radars.
- b) Strict enforcement of radar plotting and appropriate use of ARPA.
- c) Increase of deck officers to intensify lookout by radar.
- d) Increase in lookouts and the appropriate stationing of them.
- e) Strict enforcement of visual lookout employing binoculars.
- f) Keeping a listening watch on VHF Ch.16 or the channel specified by local rule.
- g) Communications with other ships using VHF.
- h) Use of AIS
- i) Effective use of ECDIS, as per ECDIS Operations and ECDIS Standard in SMS, with respect to: approved type of electronic charts, sensors input, proper scale used, alarms settings, layers settings, display and symbols settings, ship's parameters, route parameters, contingency plans, manual positions, limitations of equipment, risk of over-reliance, possible errors and system's failures, back-up systems, and any other considerations as required.



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#### **9.1.3.2. S/B of Main Engine**

Advise the Chief Engineer or the Duty Engineer, in ample time as much as possible, of the fact that visibility has deteriorated or expected to deteriorate, and if on UMS operation, to switch to the watch system as occasion demands, ready to increase or reduce the speed of the main engine.

#### **9.1.3.3. Safe Speed**

Navigation shall be at safe speed considering the state of visibility, the density of congestion of ship traffic, the maneuverability of the ship and radar performance, etc.

(Reference: Rule 6 of COLREGS)

#### **9.1.3.4 Fog Signals and Navigation Lights**

Sound fog signals on the whistle and also switch on the navigation lights. It shall be understood that in fog, only fog signals should be sounded and that other ship maneuvering signals shall not be given until the other ship comes in sight.

#### **9.1.3.5 Check of Ship's Position**

During coastal navigation, when passing through confined waters, efforts shall be made to prevent the grounding/stranding of the ship by accurately fixing the ship's position by radar and, also as occasion demands, by taking continuous soundings.

#### **9.1.3.6 Changeover to Manual Steering**

Put the steering gear in parallel operation and change over to manual steering as and when the necessity arises.



#### **9.1.3.7 Temporary Anchoring**

If continuing the navigation is dangerous and the sea area allows the vessel to anchor temporarily, waiting at a temporary anchorage for the visibility to improve shall be studied.

### **9.1.4. Collision Avoidance**

#### **9.1.4.1 When to Take Action To Avoid Collision**

A general guide to taking evasive action by radar, based on the distance between two ships in open waters, is as follows:

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- a) 12 n.m. or more..... Track the other ship on the scope
- b) 12 to 8 n.m..... Judge the risk of danger by plotting
- c) 8 to 6 n.m..... Judging and executing evasive action
- d) 6 to 4 n.m. .... Monitoring of progress
- e) Within 4 n.m..... Urgent action

#### 9.1.4.2 Judging Risk of Collision



When another ship is detected solely by radar when visibility is restricted, an early judgment shall be made as to whether or not there is a risk of collision with that ship by employing the following.

- a) Measuring changes in Radar bearings;
- b) Carrying out radar plotting;
- c) Using ARPA;

#### 9.1.4.3 Action To Avoid Collision

Make sure to give way well in advance to any vessel which is detected solely on radar in accordance with the following.

- a) Always take substantial action to keep well clear, so that your intention is clearly conveyed to the other ship, therefore, a change in course of 60 or more degrees and/or, a change of speed of 2/3 or more of the present speed is desirable.
- b) When avoiding action consists of an alteration of course, so far as possible, do not alter the course to port for a vessel forward of the beam, other than for a vessel being overtaken, or do not alter the course towards a vessel abeam or abaft the beam.
- c) Avoiding action by increasing speed reduces the time required to evaluate and/or adjust the action taken and would increase the damage caused when there is a collision, so it shall not be done except when it is unavoidable.
- d) As a rule, the effective action to take, is to alter course when the other ship approaches from forward and reduce speed when it approaches from abeam.
- e) In congested waters, giving way by reducing speed is the desirable thing to do.

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#### 9.1.4.4 General Points To Be Observed when Avoiding Collision by Radar

- Detect other approaching vessels as early as possible by switching the radar range all the time appropriately;
- Plot targets systematically from as far a distance as possible;
- Because action to avoid the other ship may cause ships that were safe up to then to face danger, keep track of the relationship with ships which are not a direct risk;
- Set a safe navigation distance with ample margin to compensate for measuring and analyzing errors and take collision avoiding in ample time and substantially;
- Remember that the results of plotting are based on the past information and do not necessarily indicate the current movements;
- Should an emergency arise or uneasiness is felt, reduce the ship's speed early and, if necessary, stop;



#### 9.1.4.5 Use of AIS

A judicious use of AIS in restricted visibility may be helpful to gather information regarding course and speed of the ships in the vicinity. AIS has certain advantage over Radar, namely

- Targets do not get lost in sea and rain clutter;
- As AIS operates in real time, therefore, it detects the change of target course and speed instantly;
- AIS does not swap the two different targets;

While using the AIS, its limitation shall be borne in mind. Followings are among a few of its limitations:

- Not all ships carry the AIS.
- The AIS fitted on other ships as a mandatory carriage requirements might be switched off by professional judgment of the master. Thus OOW should bear in mind that AIS may not be giving a complete or correct picture of shipping traffic in the vicinity.
- The transmission power of AIS of ship in vicinity could be changed over to low power, therefore, target may not be detected at sufficient range.

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- d) The sailing condition and other information of vessel displayed on AIS may not be updated one.
- e) Poorly configured or calibrated sensors of AIS might lead to incorrect information being transmitted to other ships.

#### 9.1.5. Entry in Ship's Log

The Officer of the watch shall enter in the ship's log book the time when sounding of the fog signal is started and when it is stopped.

#### 9.1.6. Ending of Navigation under Restricted Visibility

The Master, when navigation under restricted visibility has finished or when he judges that visibility is not restricted any more, shall change the watch to normal navigation watch and call off the S/B state of the engine.

### 9.2 Confined Water Passage (Refer to checklist no. S-073001-01CHK)

#### 9.2.1. Preparing for Navigation in Confined Waters

The master shall make preparations for navigation in confined waters in accordance with the following:

##### 9.2.1.1 Plans for Navigating in Confined Waters



When confined waters are to be navigated, the optimum passage plan shall be drawn up by taking the following steps in advance; Checking and studying nautical charts, sailing directions, coast pilot, and notices to mariners, etc. and grasping the topography, depth, and navigational aids, weather and sea conditions, and the passage of other ships:

##### 9.2.1.2 Check of Nautical Charts and Course Line

Check that nautical charts, necessary for navigating the confined waters are available and that the course line to be navigated is safe and appropriate.

##### 9.2.1.3 Establishing of Landmarks for Altering Course and Clearing Line

Select conspicuous landmarks abeam of the ship at way points and set the course so that steering targets can be obtained. Also establish a clearing line by means of conspicuous leading marks in transit on the fore and aft or bearings so as to ensure safe passage by evading with certainty such obstacles as sunken rocks and shoals.

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#### 9.2.1.4 Adjustment of Draft and Trim

Order the chief officer to adjust the draught and trim of the ship before navigating confined waters if, considering the draught for passing the seaway, shallow water effect, maneuverability, etc, it is deemed necessary.

#### 9.2.1.5 Calculation of Tidal Current, Tides, Etc.

The third officer shall calculate and enter in the Tide and Current Note the tidal stream, tides, sunrise and sunset, and other parameters and also display them in the specified location on the bridge.

#### 9.2.1.6 Check of Main Engine Start Up

- Before entering confined waterways, as far as practicable the main engine shall be stopped in a safe area and tested for going forward and astern and the main engine and steering gear checked to see if they operate properly. However, when safety is not ensured because of dense traffic or because of weather and sea conditions, etc, this may be waived at the discretion of the master.
- The fact of the main engine trial operated and the results, or that the operation check could not be carried out, shall be entered in the ship's log.
- In case of Main Turbine engine, it is acceptable to confirm only influx of astern steam at dead slow astern handle position depends on the circumstances. In such case, the Master and the Chief Engineer shall discuss how to confirm and report the astern test prior the test.

#### 9.2.1.7 Reporting to Master



- The master shall advise the officer of the watch the ship's position at which the master wishes to be notified and also mark the position on the nautical chart.

#### 9.2.1.8 Bridge Team Management Meeting

An additional bridge team management meeting should be held prior to entry of confined waters e.g. Singapore Straits, One Fathom Bank, Gulf of Suez, Dover Straits, Straits of Hormuz, Bab-El Mandeb, Bosphorus Strait, Strait of Gibraltar, Sunda Straits, Baltic Sound, Kanmon etc.

As a minimum at least include the following in agenda:-

- Passage plan, e.g.:-
  - Charted course(s), alterations etc.
  - No go areas, contingency areas or other markings on chart important for the watch-keepers such as calling master/informing Master etc.

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- Navigation aids, position fixing methods, parallel indexing etc.
  - Watch levels
  - UCK, ship's draught, tides and currents etc.
  - Squat and other shallow water effects
  - Daylight / night time passing of danger points or areas.
  - Traffic likely to be encountered - flow, type direction etc.
  - Traffic Separation Schemes and routing information.
  - Communications, Vessel Traffic services etc.
  - Speed restrictions
- b) Information from Sailing instructions and any special instructions or circulars for the area including company instructions.
- c) Weather, including visibility
- d) Matters related to checking and testing of bridge equipment and Engines
- e) Any limitations or malfunction of any bridge equipment or engines.
- f) Any security or environmental matters
- g) Navigations warnings.

A record of this meeting should be made in the deck log book. In case of consecutive confined waters passages, a combined meeting of these multiple passages can be held e.g. for One Fathom Bank and Singapore Straits

### 9.2.2. Master's Command



The master himself shall take command on the bridge when navigating confined waters, where applicable

### 9.2.3. Passage through Confined Waters

The master shall strive for the safety of the ship by strictly observing the following when passing through confined waters:

#### 9.2.3.1 S/B of Main Engine

- a) The master shall advise in ample time the chief engineer or the duty engineer, the time scheduled for S/B eng.

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- b) The chief engineer, if the ship is on UMS operation, makes the engineers and engine department ratings go on watch at an appropriate time.
- c) The duty engineer shall carry out the preparatory work and put the engine room in an S/B condition in accordance with the S/B work procedure of each ship.
- d) The chief engineer shall direct the engine work from the engine control room.
- e) The master shall order S/B eng. when the scheduled S/B Eng. position is reached.
- f) The chief engineer shall ensure parallel operation of generators.

#### 9.2.3.2 Proper Lookout

A particularly strict lookout shall be kept when passing through confined waters, by giving consideration to the following:

- a) The keeping of a visual lookout and not just radar and ARPA; and
- b) Listening to VHF Ch. 16 or the channel specified by local rule.

#### 9.2.3.3 Switching to Manual Steering

Put the steering gear in parallel operation and switch to manual steering as and when the necessity arises. Also, if necessary, station a person to relieve the helmsman.

#### 9.2.3.4 Check of Ship's Position



The master shall have the duty officer of the watch fix the ship's position promptly and frequently from such sure marks as conspicuous landmarks or sea beacons, which he shall check and shall also grasp the deviations from course by targets fore and aft of the course or by the distance abeam from targets.

#### 9.2.3.5 Notification by Reporting System

When there is a reporting system established by the government of the coast of the confined seaway through which the ship is passing, report in compliance with that system.

#### 9.2.3.6 Traffic Separation Schemes

When a traffic separation scheme is employed in the confined seaway through which the ship is to pass, comply with that scheme and proceed.

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### 9.2.3.7 Signals to Attract Attention and Maneuvering Signals

Ready signal lights on the bridge so that they be used at any time and actively give signals to attract attention to unlit fishing boats, etc. and strangely acting vessels, etc. Give maneuvering and warning signals specified in COLREG as occasion demands.

### 9.2.3.8 Signals of Deep Draft Vessel

When deemed necessary judging from the ship's draught, the depth of the seaway and other surrounding circumstances, hoist three red lights in a vertical line by night and a black cylinder by day.

### 9.2.3.9 Soundings

When necessary, monitor depths continuously by keeping echo sounder ON at appropriate scale relevant to the depth of the water.

### 9.2.3.10 Housed Anchor and Anchor Chains

Keep the windlass clutches and chain stoppers operable by man power, when their electric power is switched off., so that the anchors on both sides are ready to be cast.



### 9.2.3.11 Vessel Traffic Services (VTS)

- If any VTS or similar services are available in the confined waters and related requirements should be mentioned in the passage plan and relevant information should be marked on the applicable charts.
- Reporting requirements, radio frequencies to use in communication and detailed list of information to be provided should be well understood by the Bridge Team.
- At all times, bridge team members shall exercise alertness in monitoring VTS communications and grasp impact on their own vessel's navigation and react appropriately.
- As in any navigation situation, Masters and other Bridge team members are expected to exercise good seamanship and comply with the Collision Regulations. The authority of the Master is never compromised by participation in a VTS.

### 9.2.4. Ending of Navigation in Confined Waters

When vessel has safely exited confined waters or when the Master judges that the ship is safe from identified hazards (Confined waters), he shall change the watch to



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normal navigation watch and call off the S/B state of the engine.

#### **9.2.5. Safe Navigation of VLCC through Malacca and Singapore Straits**

The master, when passing through the Strait of Malacca and the Strait of Singapore, shall ensure safe navigation by making a comprehensive judgment based on the ship's draught, tidal height and current, the likelihood of squalls, the activities of fishing boats, traffic density, the time of passing through confined waters, and other factors.

#### **9.2.6 Safe Navigation of LNG Carriers through Malacca and Singapore Straits**

The master, when passing through the Strait of Malacca and the Strait of Singapore, shall ensure safe navigation by making a comprehensive judgment based on the ship's draught, tidal height and current, the likelihood of squalls, the activities of fishing boats, traffic density, visibility, the time of passing through confined waters, and other factors.

#### **9.2.7 Safe Navigation of Dry Cargo Vessels through Singapore Straits**



The master, when passing through the Straits of Singapore, shall ensure safe navigation by making a comprehensive judgment based on the ship's draught, tidal height and current, minimum UKC requirements, the likelihood of squalls, haze, the activities of fishing boats, traffic density, the time of passing through confined waters, and other factors. Reference should be made additionally to following:  
 - Passage Planning Guide Malacca & Singapore Straits (BA Chart 5502)

**"Off Singapore" / "Straits of Singapore" means the following water areas:**

- a) For westbound vessels: From around Horsburgh Lighthouse (104-24E) westward to Off Tanjung Piai Light Beacon (103-29E)
- b) For eastbound vessels: From Off P. Iyu Kecil (Off Brothers) (103-20E) eastward to Off Horsburgh Lighthouse (104-24E)

##### **9.2.7.1. Navigating Speed**

Vessel's navigating Off Singapore shall at all times proceed at safe speed consistent with safe Navigation and shall be in a maximum state of maneuvering readiness.

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#### 9.2.7.1.1. Deep Draught Vessels

A vessel having a draught of 15 meters or more shall be deemed to be a deep draught vessel. The navigating speed for all dry cargo deep draught vessels in the areas Off-Singapore shall not exceed 12 knots, over the ground and engine shall be S/B.

#### 9.2.7.1.2 Container and PCC Vessels (Non deep draught)

It is recommended that in the areas Off Singapore, speed should be maintained less than 15 knots, over the ground. However in the following areas vessels shall always navigate at speeds less than 15 knots, over the ground and engine shall be S/B:-

- a) Westbound: From Off T. Setapa Light (104-10E) westward to Off Sultan Shoal Light Beacon (103-39E)
- b) Eastbound: From Philip Channel South Cardinal Light beacon Racon "D" (103-39E) eastward to SSE Off Pilot Eastern Boarding Ground "A" (103-56E in Eastbound TSS Lane).
  - i) In case vessel departs from around Pilot Eastern Boarding ground "A", then vessel should safely join the Eastbound TSS Lane before increasing beyond 15 knots even if passed eastward of 103-56E.
  - ii) In case vessels departs from around Pilot Eastern Boarding Ground "B", then this 15kts speed restriction is extended from 103-56E to Off Batuampar Light (104-00E) or till she has safely joined the Eastbound TSS lane whichever is later.



#### 9.2.7.1.3 Bulkers and General Cargo Ships (Non deep draught)

The areas of speed restrictions shall be as mentioned in section 1.1.2 however the speed limitation shall be of 13 knots, over the ground (instead of 15 knots).

#### 9.2.7.2 Overtaking Restrictions

Overtaking restrictions for the purpose of these procedures are defined as follows:

- a) Avoid overtaking of vessels - unless a safe CPA of at least three (3) cables is maintained, and - the speed difference between the two respective vessels is more than two (2) knots.

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- b) Overtaking, however, is allowed under circumstances where such avoidance of overtaking is likely to result in a dangerous situation. Overtaking of fishing boats, pleasure boats and small craft may be carried out safely.

Above mentioned Overtaking Restrictions shall apply to dry cargo vessels as follows:-

- a) Westbound: From Off T. Setapa Light (104-10E) westward to Off Sultan Shoal Light Beacon (103-39E)
- b) Eastbound: From Philip Channel Racon "D" (103-39E) eastward to Off Horsburgh Lighthouse (104-24E).

### 9.2.7.3 Watch Level (W/L)



Watch Level (W/L) requirements as per SMS chapter [ZZ-S-P-07.10.00](#) and [S-071000-04 FIG](#) shall apply in general. As minimum W/L requirements shall apply to waters Off Singapore (Master can set higher W/L if deemed necessary)-

#### 9.2.7.3.1 Additional Watch Level (W/L) 3.5

This is extension of W/L 3 wherein the Extra Officer or OOW shall be Chief Officer

#### 9.2.7.3.2 Westbound

a)	W/L – 2	From NE Off Horsburgh Lighthouse (104-30E) to Off Batuampar Light (103-58E) <i>(if crossing over to West of Singapore Straits)</i>
<b>Special Requirement depending on destination or conditions:-</b>  If restricted visibility, heavy traffic or if in this region during night:-Commence W/L 3 from Off T. Setapa (104-10E)  If bound for PEBG "A" or "B", change to W/L – 3 around 104-00E and maintain W/L till respective Pilot station.		
b)	W/L-3	
c)	W/L-3	
d)	W/L - 3.5	From Off Batuampar Light (103-58E) to Off Sebarok Lt (103-49'E) <i>(except for PEBG "A" or "B" for which follow W/L-3 as in above (c))</i>
e)	W/L - 3	If departing westbound from Southern Pilot Boarding Ground <i>(lies in above limits)</i> : Maintain W/L-3 from Pilot station till Off Sebarok Lt. (103-49'E)
f)	W/L - 2	From Off Sebarok Lt (103-49'E) to Off Tanjung Piai Light Beacon (103-29E)

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### 9.2.7.3.3 Eastbound

a)	W/L - 2	From 5nm prior Off P. Iyu Kecil (103-20E) to Off Buffalo rock (103-48E)
b)	W/L - 3.5	From Off Buffalo Rock (103-48E) to SSE of PEBG-"A" in Eastbound Lane (103-55E) ( <i>applicable even if bound to / from any Pilot boarding ground in the above limits</i> )
c)	W/L - 3.5	<b>Special Requirement depending on destination or conditions:-</b>  If bound for PEBG "B", continue W/L 3.5 (103-55E to PEBG "B") and if departing from PEBG "B", maintain W/L 3.5 till joined Eastbound Lane safely on Eastbound course or 103-58.5E whichever is later.
d)	W/L - 2	From SSE of PEBG-"A" in Eastbound Lane (103-55E) to Off T. Berakit Lt (104-37'E)

### 9.2.7.3.4 Fatigue Prevention

It is reminded that proper planning / pre planning of rest (or work) hours should be done prior arrival Singapore to ensure watch keeping are properly rested and fit to carry out all watch keeping duties. If it requires minor changes to standard watch routines prior to arrival, Master's should adjust the watch schedules accordingly.

*Note: [Refer to Appendix-1: Tools and Miscellaneous Information of e-SMS](#) - A graphic showing an approximate outline of the requirements for dry cargo vessels has been provided for reference purposes. It also shows approximate locations of some recent collision incidents in Singapore Straits as well as some past significant incidents.*

## 9.3 Heavy Traffic Water Passage (Refer to Checklist no. S-073002-01CHK)



### 9.3.1. Reporting to Master

The duty officer shall immediately report to the Master when the ship enters or is expected to enter a sea area which has heavy traffic.

### 9.3.2. Master's Command

The Master himself shall take command on the bridge when navigating in heavy traffic waters.

### 9.3.3. Navigating in Heavy Traffic Sea Area

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The Master shall strive for safe passage by strictly observing the following when in a sea area with heavy traffic.

### **9.3.3.1 S/B of Main Engine**

**9.3.3.1.1** Advise the Chief Engineer or the duty engineer of the fact that there is heavy traffic, and if on UMS operation, to switch to the watch system and keep the main engine ready to increase or reduce speed.



**9.3.3.1.2** If it is expected that S/B of Main Engine may be required, then:

- a) The master shall advise in ample time the chief engineer or the duty engineer of the time scheduled for S/B eng.
- b) The duty engineer shall carry out the preparatory work and put the engine room in a S/B condition in accordance with the S/B work procedure of each ship.
- c) The chief engineer shall direct the engine work from the engine control room.
- d) The master shall order S/B eng. when the scheduled S/B Eng. position is reached.
- e) The Master and The Chief Engineer shall consider if the parallel operation of generators is necessary.

### **9.3.3.2 Proper Lookout**

In heavy traffic waters, it is important that a particularly sharp lookout is kept. The following shall be considered with respect to lookout.

- a) Parallel operation of radar.
- b) Strict enforcement of radar plotting and appropriate use of ARPA.
- c) Increase in the number of lookouts and appropriate posting.
- d) Strict enforcement of visual lookout employing binoculars.
- e) Listening watch on VHF Ch.16 or the channel specified by local rule.
- f) Communications with other ships using VHF.

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#### 9.3.3.3 Switching to Manual Steering

Put the steering gear in parallel operation and change over to manual steering as and when the necessity arises.

#### 9.3.3.4 Evasion of Other Ships

Any altering action of course, to avoid collision shall be large enough, done in ample time to spare. Such evasive action shall not place the ship in another close quarter situation with other vessels.

#### 9.3.3.5 At-close-quarters Situation with another Ship

Keep ready at hand signal lights in the daytime on the bridge so that they can be used at any time and actively give attention evoking signals to strangely acting vessels, etc. Give steering and warning signals as specified in COLREGS as occasion demands.

#### 9.3.4. Ending of Navigation in Heavy Traffic Waters

The Master, when out of the sea area in which there is heavy traffic, shall change the watch to normal navigation watch and call off the S/B state of the main engine if it is on S/B.

### 9.4 Heavy Weather (Refer to checklist no. S-073003-01CHK)



#### 9.4.1. Obtaining of Weather Information

The Master shall strive to grasp weather conditions by directing the Chief Radio Officer to obtain the following information in as short intervals as possible.

- Weather map chart
- Wave map
- Typhoon information
- Weather information according to navigational warnings, etc.

#### 9.4.2. Avoiding Heavy Weather

The Master, when heavy weather is expected according to the above information, shall give consideration to avoiding heavy weather the highest priority.

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### 9.4.3. Preparing for Heavy Weather

When the ship is liable to encounter heavy weather, the Master shall announce the fact throughout the ship, caution the crew not to leave their living quarters heedlessly during heavy weather, and instruct the department heads to make preparations for heavy weather

- Adjust the Course and Speed of the vessel so as to reduce the impact of wind and waves as much as possible.
- Put the steering gear in parallel operation (where applicable) and switch to Manual Steering if deemed necessary.
- Keep a good lookout using all available means (including Radar, ARPA, etc.) considering that in most cases visibility will be poor in Heavy weather, and
- Increase Watch Level if required. Master should take over from the Duty Officer, if deemed necessary.

### 9.4.4. Master's Command

The Master, in navigation in heavy weather, shall take command of the bridge himself when he deems it necessary.

### 9.4.5. Heavy Weather Navigation

The Master, when there is heavy weather, shall make utmost efforts for safe navigation, including maintaining safe distance off the coast, observing the following matters.

#### 9.4.5.1 S/B of Engine



Notify the Chief Engineer or the Duty Engineer of heavy weather, and if in UMS operation, to change over to the watch arrangement to be ready for use of the engine.

#### 9.4.5.2 Adjusting of Course and Speed

Adjust the course and speed of the ship so as to navigate with a minimum of impact of wind and waves as possible.

#### 9.4.5.3 Switching to Manual Steering

Put the steering gear in parallel operation and switch to manual steering as occasion demands. Also, if necessary, post a man to relieve the helmsman.

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#### 9.4.5.4 Proper Lookout

Keep a full lookout by means of radar, ARPA, etc. considering that in most cases visibility is poor in heavy weather, and that maneuverability of other ships is also constrained.

#### 9.4.5.5 Lighting of Navigation Lights

Switch on the navigation lights if necessary even during the daytime.

#### 9.4.5.6 Weather Observation

In heavy weather, pay careful attention to changes in weather and sea conditions by having the Officer of the watch make weather observations at shorter intervals.

#### 9.4.6. Entry in Ship's Log

The Officer of the watch, when heavy weather is encountered and when it is over, shall enter those facts in the ship's log book.

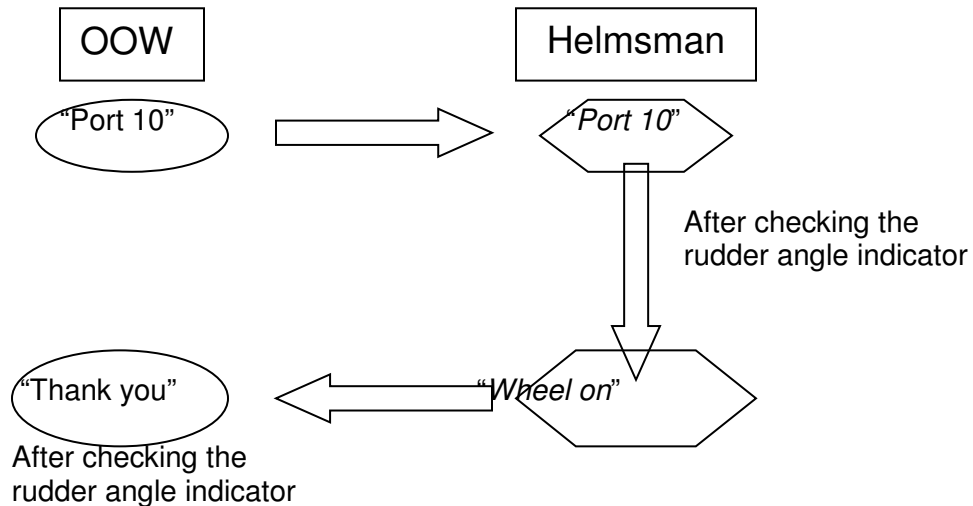
## Chapter 10 Standard Wheel Orders

### 10.1 Steering Procedures

- 1) When the OOW requires a course to be steered by compass, the direction in which the wheel will be turned must be checked if it is clear of other ships and is safe.
- 2) All wheel orders and repetition of said orders should be loud and clear.
- 3) All wheel orders given should be repeated by the helmsman.
- 4) The OOW should ensure that they are carried out correctly and immediately.
- 5) The helmsman should report immediately if the vessel does not answer the wheel.





Example:



## 10.2 IMO Standard Wheel Orders

<u>ORDER</u>	<u>ANSWER</u>
Port Five	Port Five or Port Five, Sir
Starb'd "Ten" "Fifteen" "Twenty" "Twenty-five" "Hard-A-Starb'd (Port)	
Midship	Midship or Midship, Sir
Ease To Five "Ten"...	Ease To Five Port (Starb'd) Five, Sir
Steady	Steady Steady On XXX, Sir
Steady As She Goes	Steady As She Goes Steady On XXX, Sir
Port, Steer One Eight Two	Steer One Eight Two Steady On One Eight Two, Sir

\*Course XXX must be in 3-digit number; No skipping of zeroes, From <001> to <360>

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## Chapter 11 Passage Planning → SMS Manual no. ZZ-S-P-07.41.02

### 11.1 Delegation of Passage Planning

The Master may delegate Second Officer and/or other navigational officers to work on the following activities under his supervision.



- Readying of nautical charts, nautical publications and other reference material necessary for the voyage;
- Preparation of the Bridge Notebook and route plan on ECDIS;
- Entering of the intended track and/or the necessary clearing bearing/circles in the nautical charts to be used;
- Entering in the nautical charts navigational warnings, sea way information and other data necessary for the sea area to be navigated;
- Other preparation or work ordered by the Master;
- "[Passage Planning Checklist](#)" shall be used to assist the officer in preparing for the intended passage;

### 11.2 Selection of Routing

Rough routing selection based on the past experiences, sailing directions and other information sources shall be completed before passage appraisal. The following factors shall be taken into account for routing selection. For ships equipped with approved ECDIS, guidelines and instructions as per SMS "[ECDIS Operations](#)" shall be complied with in addition to this chapter.

#### 11.2.1 Ocean Passage

- Interrelation between the ship's service speed and the distance for the voyage;
- The endurance based on fuel, Lube oil, provisions on hand;
- Possibility and necessity of supply en route weather routing service agencies;
- Availability of safe navigation based on the political reason;
- Relationship between the area to be navigated and the ship's free board line;
- The state of weather and sea condition from weather routing service agencies.

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### 11.2.2. Coastal Passage

In general, a coastal passage shall be defined as a passage where vessel is navigating within 20 miles from the coast line, or within 30 minutes of sailing time from grounding line (draft) whichever is lesser.

However, above mentioned margins may be made more stringent as per discretion of the Master considering below mentioned points:-

- Distance off, the coast line for safe navigation, including maintaining safe distance off the coast during heavy weather.
- Traffic Separation Scheme according to the IMO.
- Relationship between the depth of water and the ship's draft.
- Navigable area in an archipelago.
- The state of congestion at the area to be navigated.
- Others.

### 11.2.3 Calculations of Consumables

The calculation of required fuel, diesel, lubricating oils and FW shall be recorded in "Calculation of Consumable <S-074102-07CHK>" and filed with the Bridge Notebook. This checklist is required to cover all port to port passages.



For short coastal passages (for e.g. touching 5 to 6 ports in a week, in Japanese or European waters), one such completed checklist covering full voyage from first port of arrival at the start of coastal passage to the last, shall be made and recorded with the first leg of the passage plan.

### 11.3. Passage Planning (See S-074102-02FIG)

The following consideration shall be given to the passage planning in addition to the procedures prescribed in ICS "Bridge Procedure Guide" and SMS [ZZ-S-P-07.50.03](#) "ECDIS Operations" (latter is for ships equipped with approved ECDIS).

#### 11.3.1 Selection of Nautical Charts

Collect together all the charts for the intended voyage, putting them into the correct order. Charts not absolutely necessary for the voyage but which are adjacent to the area to be navigated shall be included, as shall very Large scale charts. Although it may not be necessary actually to use such charts, they may include information

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which could prove of use during the voyage. The position of change of chart with its number shall clearly be marked on the chart in use. The position at the time of change of chart shall be plotted on both charts.

### 11.3.2 No-Go Area and Margin of Safety

Coastal charts shall be examined and all areas where the ship can not go, shall be carefully shown by cross-hatching or by use of pencil only. Permanent markers or highlighters shall not be used.

In waters where the tidal range may be large, no-go areas shall be determined taking the tidal height into consideration.

Before tracks are marked on the chart the Margins of Safety shall be determined in order to give her enough sea room to keep away from any danger even in case of a worst scenario. The Margins of Safety shall be determined taking the following factors into consideration, and it is advisable to set an appropriate head mark, clearing bearings and PI targets to allow OOWs to confirm that she has enough safe sea room.

- a) Size of the ship
- b) Reliability of navigational equipment
- c) Tidal current
- d) Maneuverability and the speed
- e) Others



### 11.3.3 Track Selection

#### 11.3.3.1 Ocean Track

Ocean tracks shall first be drawn on the small-scale charts, according to the decisions made based on the section regarding the route. Any information out of passage appraisal shall be taken into consideration for the track selection.

#### 11.3.3.2 Coastal Tracks

Coastal tracks will also be constrained by the decision made at the appraisal stage and shall be first drawn on the small-scale charts starting from the departure port to the arrival port. These first tracks will form the basis of the plan and from them may be obtained distances and steaming times. When completed, these tracks shall be transferred to and drawn on the larger- scale charts of the area to be navigated.

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### 11.3.3.3 Distance Off

The distance away from the coast and dangerous objects shall be determined based upon the Margins of Safety and the following factors. Distance off shall warrant that the ship has enough sea room in order not only to give other vessels the way and/or to keep the ship away from any danger in case of such emergency situations as Main Engine failure or Steering Gear failure.

- State of visibility, traffic density and presence or not of fishing boats.
- Maneuverability and speed of the ship.
- Availability of landmarks and/or navigational aids for position fixing, and the OOW's skill for that.
- Accuracy and scale of nautical charts to be used.
- Effect of external affecting factors such as tides, current, weather, etc.
- State of traffic congestion.

### 11.3.3.4 Course Altering Targets



Take the following into consideration when selecting the targets for altering course.

- As targets for altering course, select conspicuous promontories, islands, lighthouses, & other landmarks or targets in transit near beam of the ship.
- For targets after altering course, select nearby and clear targets that are or nearly parallel to the direction of the new course. Also use targets in transit and bow and stern targets.
- When a prominent target cannot be found and in sea areas where there is a critical course altering point around which many ships and fishing boats plying the sea, always select a reserve target.

### 11.3.4 Position Fixing Interval and Methods

Ship's position shall be fixed, as a rule, at least every 60 minutes during ocean passage, at least every 15 minutes during coastal navigation and at least every 10 minutes in conditions during coastal navigation when bridge watch level is 2 or higher (ref [S-074102-03FIG](#) Minimum Watch Level Matrix).

Appropriate fixing intervals for each navigation area shall be determined taking account of the safety margins, status of traffic, ship's speed, etc. The frequency of

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position fixing shall be such that the vessel can not run into danger during the interval between the fixes. This shall be indicated on the chart.

In addition, primary/secondary position fixing method, radar/visual target and navigation aids to be used for fixing shall be determined beforehand. The safe progress of the ship along the planned track shall be closely monitored at all times. This will include regularly fixing the position of the ship, particularly after each course alteration. At least two methods of position fixing shall be used, where possible. In situation, when GPS is only means of position fixing, the display of both the GPS shall be compared prior plotting GPS fix on the chart.

### 11.3.5 Markings of Prominent Navigational Aids

Navigational aids and targets to be used are to be high lighted. Consideration shall be given that targets located on the edge of charts are likely to be overlooked.

### 11.3.6 Clearing Bearing/Circle



Establish clearing bearings/circles easy to use and effective in helping achieve safe maneuvering taking into consideration the topographical features around the intended track, the types and number of targets, whether passage is in the day or night, and other factors.

The following are the types of clearing bearings/circles.

- By use of targets in transit (leading line).
- By use of the bearing from a single target.
- By use of a range from the single target or from the coast line by radar.
- By utilizing contour lines.
- Others.

### 11.3.7 Parallel Indexing

Parallel indexing (PI) is a useful method of monitoring cross-track tendency and the necessary information needed for planned PI shall be marked on the charts. Parallel indexing shall only be used with fixed objects such as light house or headlands and not with the floating objects unless their position is positively checked for accuracy.

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### 11.3.8 Under Keel Clearance (UKC) and Air Draft

The Master shall ensure that there is adequate UKC as per the Company's UKC Policy as per [ZZ-S-P-07.41.03](#) "UKC Policy" is maintained at all stages of the voyage and at all times while moored alongside. The Master shall also ensure that adequate net air clearance as per [ZZ-S-P-07.41.04](#) "Air Draft Policy" is also maintained at all stages of the voyage.

The Master shall carefully plan ahead, calculate squat, monitor the UKC closely during depth restrictions or channel passages and reduce speed to minimize squat where required.

Master shall discuss the effect of squat and the available UKC and Air Draft with pilot during master pilot information exchange to ensure that company UKC policy and Air Draft Policy is met at all times. The record of the discussion shall be noted in "Pilot [Card and Master-Pilot information exchange](#)"



### 11.3.9 Other Information to be shown on Nautical Charts

The following shall be drawn on the nautical charts (including on ENC and RNC) for achieving safe navigation.

#### 11.3.9.1 Routine Checks and Changes

In addition to any routine safety information, following shall also be marked adjacent to the intended track.

- Start of manual steering.
- Man quartermaster adjacent to the steering wheel.
- Tests and changeover of nautical instruments and steering gear.
- Notice to the ECR. (1 hour before S/B, etc.)
- Astern engine test.
- Change of watch level.
- Call Master.
- Clearing anchor
- Start of PI.

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- j) Change of position fixing method and change in position fixing interval.
- k) Alteration of speed and/or change in the status of any machinery (e.g. start of an extra generator etc).
- l) Change of charts.
- m) Position where echo sounder shall be started to monitor depths. (whenever echo sounder is switched on, the officer on watch shall mark the same on the recorder paper with ship's local time and position, however if there is no recorder paper fitted, the time of switching-on of echo sounder shall be recorded in the log book and a record of depth shall be maintained with the same interval as frequency of position fixing applicable for that leg of passage plan.)
- n) Crossing or encounter of heavy traffic areas.
- o) Reporting to Vessel Traffic System.
- p) Areas of significant tides, tidal streams or current.
- q) Transits, heading marks and leading lines.

#### 11.3.9.2 Aborts

When approaching constrained waters such as narrow channels or pilot boarding areas, the topographical features or traffic situation may preclude the ship from altering course, halting the maneuvering or returning from the danger: it will not be possible to do other than proceed. The point of no return shall be determined and marked on the chart in order for the Bridge Team to make a correct decision whether the ship shall proceed or not even in case of an emergency such as follows.

- a) Unexpected large deviation from the intended track.
- b) Main engine failure.
- c) Malfunction of navigational instruments.
- d) Unavailability of tug boats and/or unavailability of the berth.
- e) Dangers happening in the coast line and/or harbor facilities.
- f) Others.



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### 11.3.9.3 Contingency

Contingency planning shall be made at the planning stage and clearly shown on the chart so that the bridge team does not spend looking for and planning safe action when the passage does not go as planned. Contingency planning will include:

- a) Alternative course.
- b) Waiting areas.
- c) Safe anchorage.
- d) Emergency berths.

### 11.3.9.4 Wheel Over Point (W/O)



When the ship is navigating in confined waters, the margins of safety may require the ship to commence altering course at the wheel-over position some distance before the track intersection in order to achieve the new planned track. Wheel-over points shall be clearly shown on the chart and every bridge team member is requested to confirm them beforehand.

## 11.4. Bridge Notebook (See S-074102-05FRM)



### 11.4.1 Items to be shown on Bridge Notebook

Pick up the necessary information out of the items stipulated in section 3 above and include in the "Bridge Notebook" in chronological order so that the bridge team can utilize it as a check list as the passage goes along. Bridge Notebook shall consist of at least following information and shall be approved by the Master before commencement of the voyage.

- a) Column for confirming way point passing time.
- b) Way points, course altering points from the particular target and/or by latitude and longitude.
- c) Distance and course made good between way points.
- d) Distance to the arrival port.
- e) Clearing bearing/circle.

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- f) Necessity of Capt. call.
- g) Watch level (to be specified later in this document.)
- h) Expected UKC.
- i) Navigational instruments to be used.
- j) Position fixing interval.
- k) Conspicuous visual/radar target.
- l) Any danger which preclude safe navigation.
- m) Abort point.
- n) Contingency Plan.
- o) Landfall navigation aids and light.
- p) Total distance for the voyage and calculated total steaming hour for the service speed.
- q) Signature for the Master and OOWs.
- r) Other information needed for safe navigation.
- s) The summary of the voyage charts which is to be used during passage
- t) The summary of the publication that used for planning the passage
- u) The reference of relevant pages of Sailing direction and Ocean passage related to route information and weather.
- v) The instructions from the shore staff or administrative guidance from relevant authorities related the voyage.
- w) The important stability detail relevant to voyage.
- x) The reference to the tidal calculation relevant to the passage.
- y) The reference to the relevant section of publications giving information about the arrival port.
- z) The details related to reporting to VTS, Port as per the ALRS.

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- aa) The reference to the regulation/instruction applicable to the voyage e.g. relevant instruction by company related to passage, SECA, MARPOL special areas; Restriction on navigation in environmentally sensitive areas such as Great barrier reef etc.
- bb) The summary of evaluation of the voyage at the completion of the passage including the positive and negative points of the voyage.
- cc) Company's Air Draft Policy shall be complied with. Any specific written instruction by local port / terminal regarding air draft shall be handled according to [ZZ-S-P-07.41.04](#) "Air Draft Policy".

#### 11.4.2 Use of Column for Remarks

In the 'Remarks' column of the Bridge Notebook, enter various kinds of information which require to draw the attention of the OOWs, by referring to the following:



- a) Time to call the pilot;
- b) VHF channel to use;
- c) Times of sunrise and sunset;
- d) Name of reference material;
- e) Contingency plan;
- f) Proper Immarsat-C Network Coordinating Station (NCS), sea area where the coast station for the NAVTEX receiver and EGC receiver shall be changed over;
- g) Others.

#### 11.4.3 Use of Passage Plan Map ([S-074102-06FIG](#) )

The "Passage plan map" , which shows the outline of a voyage, shall carry such information as weather and sea conditions, marine traffic situation, conspicuous targets, things to be reported, sea area where the coast station for the NAVTEX receiver and EGC receiver shall be changed to another one, in addition to distance and navigation method, and be attached to the Bridge Notebook.

#### 11.4.4 Use of Route Plan (Generated from ECDIS)

For vessels fitted with ECDIS, a validated route plan in accordance with "[ECDIS Operations](#)" procedures shall be prepared and be attached to the Bridge Notebook.

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## 11.5. **Executing and Monitoring Plan**

### 11.5.1 **Required Speed and ETA**

#### 11.5.1.1 **Required Speed**

Following shall be taken into consideration for deciding the steaming speed:-

- Company's instructions in relation to the intended voyage;
- Weather and Sea condition to be encountered;
- Condition of Main Engine;
- Endurance in terms of fuel on hand;
- Interrelation between the speed, displacement and fuel consumption;

#### 11.5.1.2 **ETA**



The following factors shall be taken into account for determining ETA.

- Passenger boarding, necessity of Quarantine and/or Pilotage, cargo operation, bunkering, requirement from the shipper/consignee, any restriction for the navigation established by the port state;
- Weather and Sea condition to be encountered;
- Possible time loss resulted from passing constrained waters such as narrow channels, topographically or politically dangerous area en route;

#### 11.5.1.3 **Way Point Passage**

When determine the passing time of way points, the following factors shall be taken into account.

- Constrained waters such narrow channels shall preferably passed during day time;
- Necessity of speed control for adjusting the passing time of the shallow water area where ship's draft requires the certain tidal height in order to achieve safe UKC;

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## 11.5.2 Briefing

The Master shall brief navigational officers on the established passage plan before entering the constrained waters. When the ship will encounter hazardous navigation, role assignment and requirements for OOWs shall be clearly briefed.

## 11.5.3 Fatigue Control

The Master is requested to ensure that rested and unfatigued personnel fit for watchkeeping duty is available taking the following into account.

### 11.5.3.1 Rest (From Section A-VIII/1, STCW 2010)



- All persons who are assigned duty as an officer in charge of a watch or as a rating forming part of a watch shall be provided a minimum of 10 hours of rest in any 24-hour period.
- The hours of rest may be divided into no more than two periods, one of which shall be at least 6 hours in length.
- The requirements for rest periods laid down in sections a) and b) above, need not be maintained in the case of an emergency or drill or in other overriding operational conditions.
- Notwithstanding the provisions of sections a) and b), the minimum period of ten hours may be reduced to not less than 6 consecutive hours provided that any such reduction shall not extend beyond two day and not less than 77 hours of rest are provided each seven day period.

## 11.5.4 Bridge Team Management (BTM)

BTM is aimed at eliminating the risk that an error on the part of one person may result in a disastrous situation. The Master and all OOWs shall understand the concept of BTM and make the best use of all resources available for watchkeeping duties.

### 11.5.4.1 Encouragement of Assertiveness

BTM does not refer to an act of management by one person but a continuous adaptation of all the team members to fulfill the team roles that they have been assigned. It is thus of utmost importance to function all watchkeepers as part of the team. The Master is required to encourage and motivate every team member to participate in the watchkeeping duty as a crucial part of the team. In addition, the

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Master shall bear in mind that the high authority management is likely to deteriorate assertiveness of subordinates; it is advisable therefore not to give the impression of useless or redundancy when receiving reports from the team members.

#### **11.5.4.2 Reporting**

Since reporting in a clear and simple manner is considered to be the most important factor to achieve the best possible effect of the BTM, every watch keeper is requested to mutually report or give orders loud and clear so that the important information can be conveyed to the third person at the same time.

#### **11.5.4.3 Instructions to Quartermasters**

The Master and OOWs shall give appropriate orders with regard to the following and confirm that those are effectively performed to utilize quartermasters to achieve safe and smooth watch keeping by quartermasters in relation to lookout.

- a) Reporting system for information given from lookout;
- b) Correct and consistent steering based on the order given by the OOW and maintaining;
- c) Things to be done the course to be steered;
- d) Others which the Master or the OOW deems necessary;



#### **11.5.4.4 Instructions to OOW'S**

The Master shall give orders to OOW'S regarding the following and ensure that every team member will function effectively as a member of the team

- a) Matters related to taking over the con;
- b) Matters related to role assignment of OOW'S;
- c) Matters to be reported to the Master;
- d) Other Master's requirements to OOW's;

#### **11.5.5 Monitoring Passage Progress**

The Master and OOW'S shall utilize navigational charts, ECDIS monitoring functions (as per "ECDIS Operations") and information shown on the Bridge Notebook properly and constantly confirm that the passage is going as it is planned.



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If the passage plan needs to be amended or Master deviates from passage plan, a risk assessment shall be conducted and the probable hazards identified in the Risk assessment shall be the same as when making a new passage plan. The hazards or changes identified shall be reflected in the amended passage plan. In case sudden change is done e.g. when under Pilotage etc, a formal risk assessment may not be possible therefore as a minimum the Master shall give consideration to all factors that would affect the vessel's safe navigation (e.g. draught, depth, UKC, Zone of Confidence, TSS, traffic conditions, currents, bottom of sea, sand waves, No Go Areas, local rules and regulations etc.) If any passage plan is revised, the revised route shall be plotted on the chart and ECDIS with amended course line, No Go Areas etc.

#### 11.6. **Evaluation and Improvement**

The Master shall evaluate adequacy of the passage plan followed by assessment on how much the plan is performed based on the concept of the BTM, any errors or special condition experience in the use of ECDIS and give the necessary instruction if needed. The record of such evaluation shall be maintained as '[Checklist of Bridge Team Management](#)'. Any comments deemed significant for sharing with other vessels shall be reported to the company as an email message.

## **Chapter 12 Case Study**

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**[CS-1] Inadequate Log Book Entry:** (Ref: Tanker-A / GEN / 011 / 10)

During the recent SIRE inspection, one of our tanker fleet vessels was pointed out with following **HIGH RISK observation**:

- Vessel maintained Watch level 1, when the visibility was restricted and recorded as 2.2 miles.

Upon investigation the following noted:

1. Vessel was encountering heavy weather and watch level 2 was maintained during the restricted visibility. In between the visibility improved to more than 3 miles and watch level was changed from level 2 to level 1. The duty officer did follow the company checklist as relevant in the circumstance, entry in the log book was also made for the compliance of checklist and the watch level maintained. However in the weather column of the deck log book the visibility was recorded as 5 which corresponds to visibility range of 2.2 miles or less. The wrong entry in the log book went unnoticed before it was pointed out by the SIRE inspector.



Credibility of the record was suspected and it was concluded that watch level 1 was maintained even though the actual visibility was poor; however the facts were exactly as mentioned above.

We all are aware of the importance of various records maintained onboard. All the shipboard records are legally binding and have serious consequences if proven to be wrong. Attempts of ascertaining innocence are suspected in most of the cases and can have serious repercussions on the commercial aspect of vessel's acceptability// suitability.

**Corrective Action**

In few cases when, vessel encounters restricted visibility for consecutive days, and the continuous presence of Master is difficult on bridge for maintaining watch level-2. In these situations Master must follow the company SMS procedure and may leave the bridge for short time after a careful risk assessment, taking in account of all the associated circumstances including the performance of navigational equipment.



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**[CS-2] Lateral Approach Speed while berthing:** (Ref : GI/FLT/016/12)

One of our managed VLCC was involved in an allision (contact) incident while berthing at Ningbo (Ref: HSEQ/ALL/059/012). Excessive speed (lateral and approach) speeds were identified as one of causes for this incident.

Recommended Lateral Speeds for various vessel types as per NYKSM Manoeuvring Standard:

<b>Lateral Berthing Speed</b>		
<b>RANGE ( Distance off berth)</b>	<b>VLCC</b>	<b>PCC / CNTR</b>
200 mtrs	20 cm/sec	-
100 mtrs	15 cm/sec	20 - 30 cm/sec
60 mtrs	10 cm/sec	15 cm/sec
30 mtrs	5 cm/sec	10 cm/sec
Final Approach	< 5cm/sec (Max 5cm/sec)	< 8cm/sec
<b>Notes:</b> a) For Cape Size Bulk carriers, Tankers (other than VLCCs) and LPGs it is recommended to use speeds as for VLCC as reference criteria. b) For other vessels such as general cargo vessels, speed restriction as for PCC/CNTR should be used.		



Table-1

**[Action Required]**

- Please be guided by the Lateral Berthing Speeds for your vessel type in accordance with NYKSM Manoeuvring Standard (Ref GI/FLT/011/12).
- These reference speeds should be used as a guidance in planning vessel's berthing during Master/Pilot Information Exchange. The berthing speed limitation should be clearly mentioned in the Pilot card partC
- Please post a placard with Lateral Berthing Speed on the bridge wings at conspicuous location where it can serve as good reference/reminder information for Masters and/or Pilots during berthing. Pls note that if the vessels are fitted with a Doppler Log read out panel on bridge wings pls post this information placard in the vicinity of this display.

< Background >

On 18<sup>th</sup> May 2012 at 1116LT, during berthing maneuver while coming alongside to Daxie Shihua Crude Oil Terminal Berth #3 (Lat: 29 - 55.6 N, Long: 121 - 59.5 E), Daxie Dao Island, Ningbo from outer anchorage with pilot on board, a NYK operated VLCC came in contact with fenders #1 and #2. Vessel made heavy contact with the fender of dolphin #1 resulting in damage to fender and subsequent damages to the concrete block and supports of dolphin.

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While approaching the berth, the master noticed that the lateral approaching speed was high and advised the pilot to instruct the tugboats to pull instead of pushing. However, Master was unable to confirm actual pilot order to tugs and action due to language barrier.  
At time of contact with the berth, Lateral Approach speed was **1.3 knots (67 cm/sec)!**

### **[CS-3] Tanker vessel collided with tug & tow**

One of our managed Tanker was involved in a contact incident with a barge of a Tow in the Java Sea, resulting in breach of hull of own vessel and the barge.

#### **Condition at the time of incident:**

1. Course: 130 degrees (T), speed: about 12.7 knots, voyage from Singapore to Brisbane, Australia
2. Steering: Auto pilot.
3. Weather and Visibility: Wind speed was Easterly force 3, sea slight and visibility more than 11 NM, Cloudy skies.
4. Draft / Displacement : F 8.26m , A 9.96m / Disp 38940 MT, Cargo State : Loaded
5. Watch Level 1: 3/O and AB on the bridge.
6. Chart: BA 945, Position fixing every 30 mins using GPS.
7. Traffic: No traffic of concern, nothing on the course line.
8. CPA and TCPA setting on ARPA: 1.5 miles and 15 minutes respectively.

(All times are in Ship's Mean Time = GMT +8 hrs)

#### **28 May 2013:**

0200: Engines full away for next port of call Brisbane, Australia, ETA 10 Jun /2000 hrs LT, basis average speed of about 12.0 kts.

#### **30 May 2013:**

1600 hrs: 3/Off and AB took over watch.

**1825 hrs - 1837 hrs : Duty AB and 3/Off were at the chart space engrossed in some discussion.**

1837 hrs : 3/Off saw a target on X band radar on a bearing of 104.4° X 2.77' and acquired it by ARPA.



1839 hrs: The target was on a bearing of 105 X 2.49', CPA was 0.34 nm, TCPA of 13 min., bow-crossing 0.70' in 10 min. ARPA gave a CPA/TCPA alarm, which was acknowledged by 3/Off. At the same time 3/Off placed the EBL on the target.

1849 – 1851 hrs : 3/Off saw the tow line on the port bow. (At this instance, tug was right ahead, crossing from port to starboard). Hand steering was immediately engaged by duty AB and on 3/Off orders rudder was put "hard to port" for avoiding collision.

Simultaneously 3/Off tried calling Master in his cabin (telephone).

With rudder hard to port vessels bow swung to port and own vessel cleared the towing line and bow of towed barge. As the vessel was swinging to port, own vessel's bow (bulbous bow & stbd side) collided with the barge at her starboard quarter at approximately 1851 hrs

1852 hrs : Master on the bridge and Engines stopped thereafter.

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Damages sustained in Fore Peak tank above water level at 3 locations, and in way of ballast tank no 1S, 2S & 3S, the side shell plating has deformation but no cracks observed.

No pollution or injuries were reported on own vessel or on the Tug and tow.

#### **[CS-4] Duty Officer & Duty AB found sleeping on the Bridge**

(Ref: HSEQ/INCIDENT ALERT/015/14, Date: 25 Aug 2014)

Occurrence of the following incident on board a chemical Tanker under our management:

**Duty Officer and Duty AB were both found sleeping on the Bridge during watch, by Master.**

The willful default and negligence on part of the 2 watch keepers resulted in the vessel and her crew being placed in grave danger.

#### **Details of the Incident are as follows:**

Date / Time of Incident: 19 Aug 2014 / 0615 LT  
 Bridge Watch: 0400 - 0800  
 Composition of Watch: 3rd Officer & Duty AB  
 Location of Incident: Caribbean Sea (off Cayman Islands)  
 Type of vessel: Chemical Tanker  
 Previous port: St. Charles, New Orleans, USA  
 Next port (Bound for): Cristobal, Panama Canal (for transit)  
 Cargo: Naphtha



#### **Sequence of Events:**

When the Master went to the Bridge at around 0615 LT, he found the 3rd officer sleeping on the Table on one side of the Bridge and the Duty AB was just getting up from the table on the other side.

Arrangements had been made on the port & starboard side tables for sleeping (see attached photos)

A paper had been taped to the BNWAS sensor and the AC duct had been adjusted in a manner to prevent the Alarm from triggering due to the flapping of the paper.

**Master's shall reiterate to all Bridge Team members the importance of keeping safe watch.**

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## **Chapter 13 Basic Ship Handling**

### **13.1. Turning circle of the vessel and W/O point**



A turning circle maneuver can be performed to both starboard and port. The rudder angle is to be the as per vessel's design, maximum permissible rudder angle can be used depending on ship's speed and weather conditions.

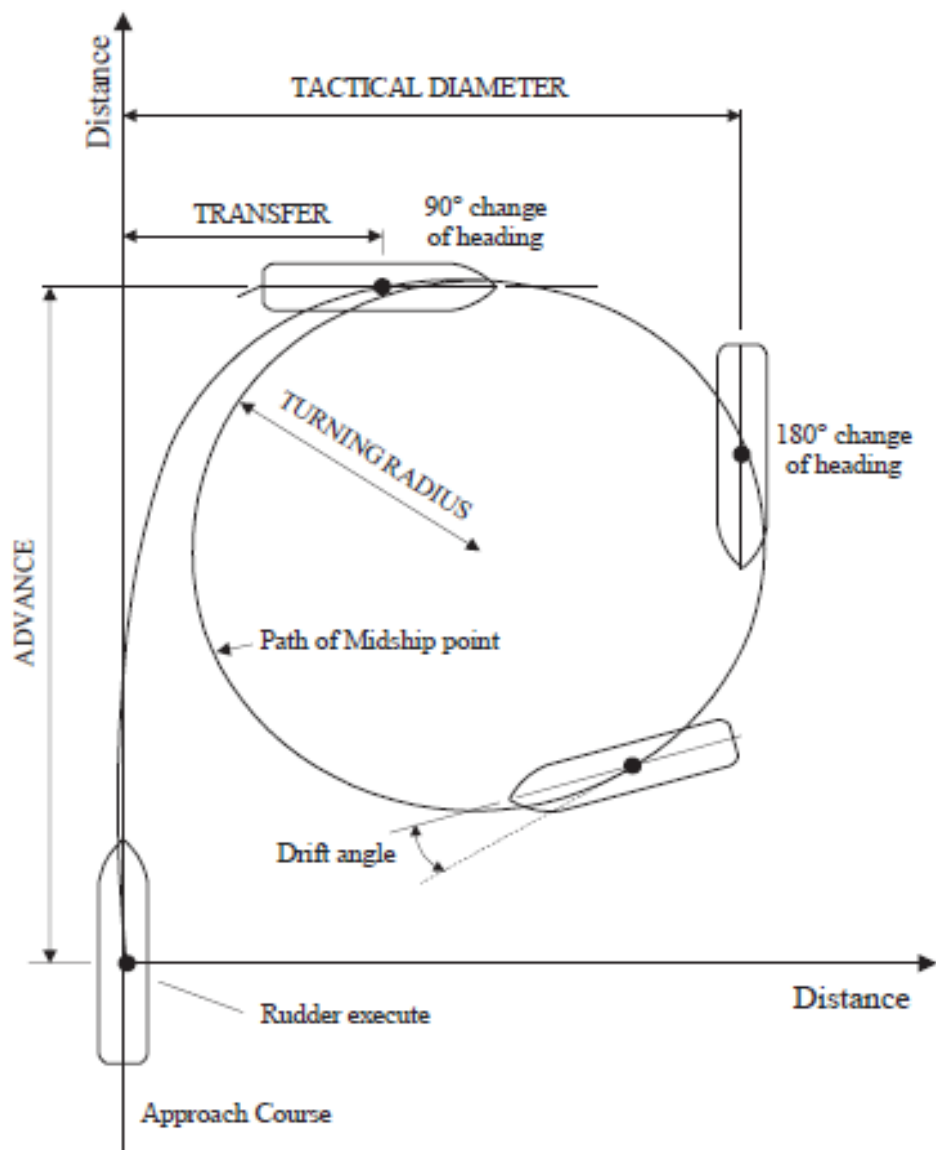
The rudder angle is executed following a steady approach, with zero yaw rate. During trials, it is necessary to complete a turning circle of 360 degrees for both starboard and port turns. The following information is to be obtained:

- Tactical diameter
- Advance
- Transfer
- Loss of speed in steady turn
- Time taken to change heading by 90 degrees
- Time taken to change heading by 180 degrees

#### **FACTORS THAT AFFECT A TURN:**



- Structural design & length of the vessel.
  - Draught & trim of the vessel.
  - Size & motive power of the main machinery.
  - Amount of helm used.
  - Available depth of water.
- A vessel trimmed by stern will steer more easily, but the tactical diameter of the turn is increased. Trim by head will decrease the diameter of the turning circle but it will be difficult to steer the vessel. Listed vessel will be subject to delay in turn. A larger turn will be experienced when turning into the list. External forces, wind & current will affect the turn.
- Turning ability is the measure of the ability to turn the vessel using hard-over rudder (or other primary mean of directional control), the result being a minimum "advance at 90° change of heading" and "tactical diameter" defined by the "transfer at 180° change of heading".

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#### Wheel over position calculation:

Wheel over positions should be determined from the ship's maneuvering data and marked on the chart. Suitable visual & radar cues should then be chosen to determine when the ship is at the wheel over position. The best cues for large alterations of course consist of Parallel Indexes or visual bearings parallel to the new track, whereas for small alterations a near beam bearing is often better. Even when the pilot has the con the wheel over position should be shown on the chart so that the OOW will be aware of its imminence & importance.

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<b>CONSTANT RUDDER ANGLE TURN</b>	<b>CONSTANT RADIUS TURN</b>
1. Larger drift angle with a corresponding loss of speed	Lesser drift angle & hence lesser loss of speed
2. A large rudder angle is needed to steady the vessel on new course	At the end of the turn, the new course can be steadied with lesser rudder angle
3. Uncertainty of ship's position during the turn	Proper control of ship's posn. during the turn
4. Higher fuel consumption due to zigzagging with excessive use of helm.	Lesser fuel consumption, with reserve rudder and engine power available

Constant radius turn technique is based on the following formula:

$$\text{Rate of turn (Degrees/ minute)} = \frac{57.3}{60} \times \frac{V}{R}$$

where V= Ship's speed over ground, in knots and,  
R= Radius of the turn in nautical miles.

The distance of wheel over point from the point where the turn is to become effective is usually taken as one ship's length but it is recommended to find it out by some practice turns on the type of ship one is serving.



The distance of wheel over point from the point where the turn is to become effective is usually taken as one ship's length but it is recommended to find it out by some practice turns on the type of ship one is serving.

Following formula can be used to find the distance of wheel over line from the new course line and the same can be used to set the parallel indexing line or the line of turn for giving the wheel over order:

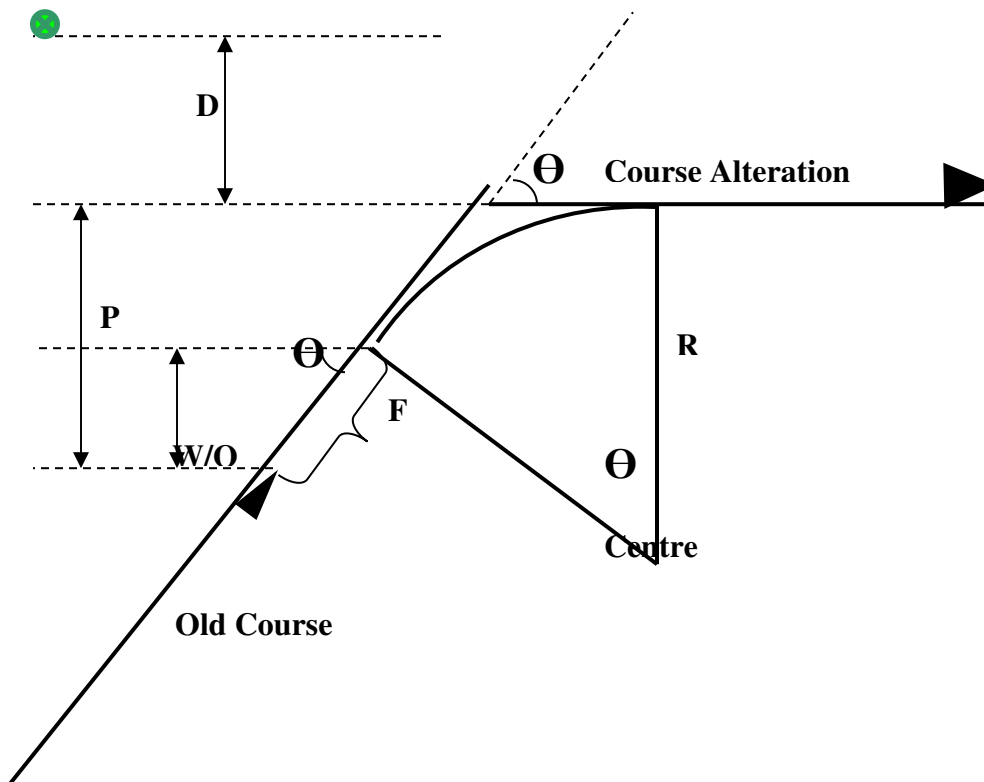
Distance of wheel over line from the new course line

$$= F \sin \theta + R (1 - \cos \theta) \text{ where,}$$

F = one ship's length (usually),  
R = Radius of the turn

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### WHEEL OVER POSITION:



F = Head Reach – Distance traveled by vessel after giving wheel over & before commencing turn, i.e. distance to overcome inertia.

P = Perpendicular distance from wheel over point to new course extension.

D + P = Parallel Index distance at W/O position.

D = Parallel Index distance from new course, as obtained from chart.

R = Radius of turn.

Θ = Change of course angle.

### TO FIND & MARK APPROX. W/O POSITION:

F = 0.1 to 0.15 NM

$P = R(1 - \cos \Theta) = F \sin \Theta$



Rate of turn =  $(V / R) \times 0.96$  where V = speed of vessel

Distance to new course = Radius x Tan Θ/2

First the Master of the vessel has to decide the radius of turn required, depending on the maneuvering characteristics of the vessel & available sea room.

A reference point such as an island, buoy, etc. can be also used to decide the radius of turn.

Wheel over point = F + Distance to new course

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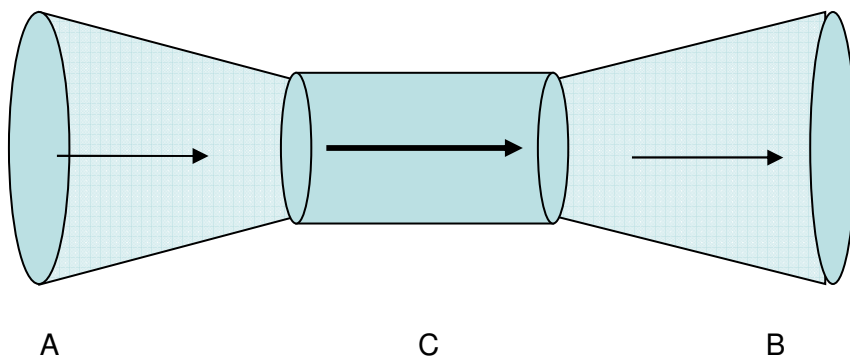
### 13.2. Hydrodynamic Effects

Any ship (regardless of its size) navigating through restricted waterways is heavily affected by hydrodynamic effects: Squat and Bank effects.

**13.2.1 Squat effect:** When a ship moves through the shallow water, some of the water displaced rushes under the vessel to rise again at the stern. This decreases the upward pressure on the hull, making the ship sink deeper in the water than normal and slowing the vessel. This is known as squat effect, which increases with the speed of the vessel.

**13.2.2 Bank effect:** Bank effect refers to the tendency of the ship's stern to swing towards the near bank when the ship is operating in a river or restricted waterway. When the ship is near to the bank, the water is forced between the narrowing gap between the ship's bow and the bank. This water tends to pile up on the starboard side of the ship, causing the ship to sheer away from the bank.



Consider a horizontally placed hourglass-shaped transparent cylinder. Let us make an arrangement wherein water passes through that cylinder which is partially constricted at the middle as shown below; the liquid flows at a faster pace in the constricted area.



**Fig 1.**

a) There is an equation in physics that is known as "Continuity Equation" which states that when a fluid is in motion, it must move in such a way so that the mass is conserved. This means that in a continuous flow of fluid in fig 1, the mass of fluid passing through point A is equal to that at B and also at C, in unit time.



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Clearly, the mass of the fluid passing through the cross section (shaded area) at point A will be equal to that passing through point C or B.

To make this happen, the rate of flow of water at constricted point C must be more than that at A or B. This also means that the velocity of flow at a constricted point is always greater so as to satisfy the Continuity Equation.

b) The next is Bernoulli's Principle, which states that for an inviscid flow (flow of an ideal fluid that has no viscosity), an increase in the speed of the fluid (i.e. its Kinetic Energy) occurs simultaneously with the decrease in pressure or decrease in its Potential Energy and vice-versa.

This principle is a corollary of the Law of Conservation of Energy which says the sum total of all the energies in an isolated system always remains the same

Thus in our first experiment (fig 1), the increased speed at constricted point C caused a decrease in pressure at that point. So, theoretically, if  $P$  is the pressure at a point and  $v$  is the velocity of an incompressible fluid, then:

$$v = 1/P$$

### **Squat Effect**



Let us consider a ship in restricted waters, with trim by the stern - F draft < A draft, which means the respective clearance under keel: UKC-fwd > UKC-aft.

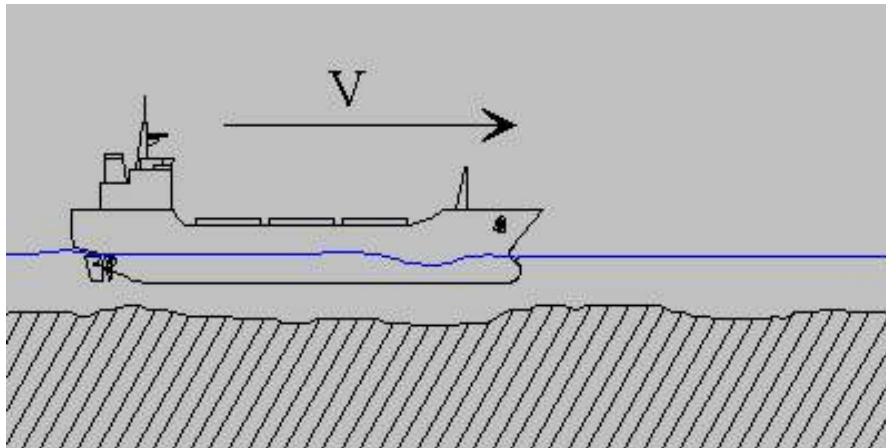
From the Continuity Equation we know that velocity of the flow of water at the stern is greater than that of the bow, or simply the flow is asymmetric.

But Bernoulli's principle tells us that with increase in speed of flow aft, there is a decrease of all round pressure aft, which means that the stern of the ship will sink further and may touch the bottom. If the vessel is trim by head, the bow will tend to sink more.

Squat effect increases doubly with speed. If the ship sinks  $x$  cm due to Squat Effect due to  $y$  speed then it will sink  $4x$  cm in  $2y$  speed.

Thus to minimize squat, the pilot or the master of the ship has to maintain slow speed. If the pilot sees that with no considerable change in shaft speed, the vessel is slowing down, then the Squat is happening. He should immediately reduce the speed to minimize the Squat effect.

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### **Bank Effect**

The phenomenon occurs when the vessel is sailing close to a solid wall or bank or shore line. In this case force and yawing moment are created usually trying to push it towards the bank and to reject the bow from the bank causing the vessel to swing, that may result with stern hitting the bank.

When the ship is close to the bank, then counter-flow is created between the bank and side of the ship and because of the reduction of the flow cross section area between the ship and the bank. This effect is governed by the continuity law.

On the other side of the ship, the flow cross-section area is not reduced and the water velocity does not change (when comparing to the open-water situation). If water velocity increases, then according to the Bernoulli's law, the dynamic pressure increases and in consequence static pressure is reduced causing the water level sinkage. The difference of pressures on both ship sides creates a force that is directed from the higher static pressure area towards the lower static pressure area. This is the suction force drawing the ship closer to the bank.

The bow of the ship on the other hand is rejected from the bank because of the increased pressure around the bow (bow cushion) of the moving ship and proximity of the bank. As a result a yawing moment is pushing its bow away from the bank.

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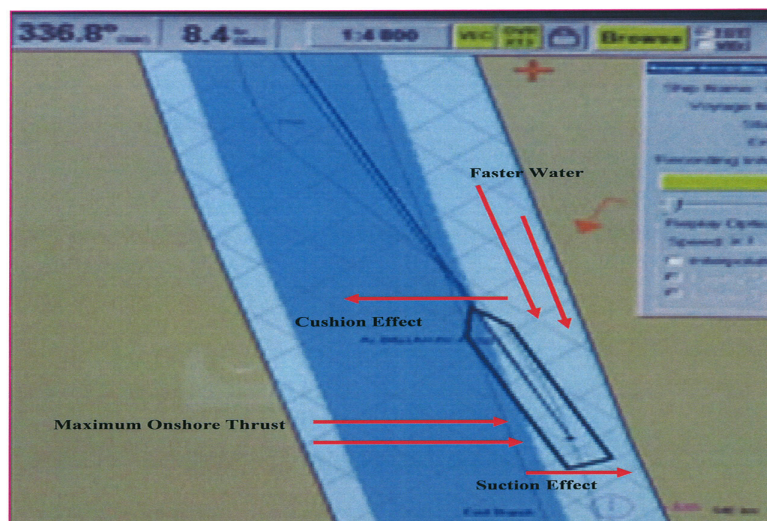
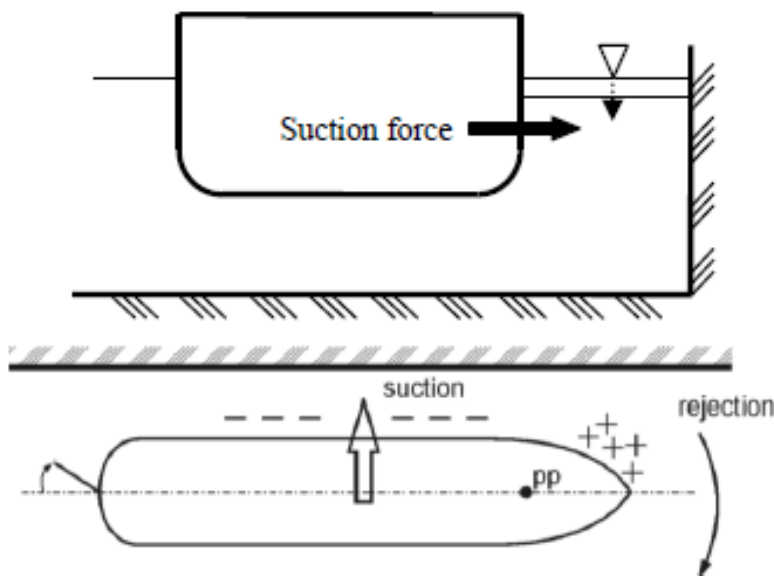


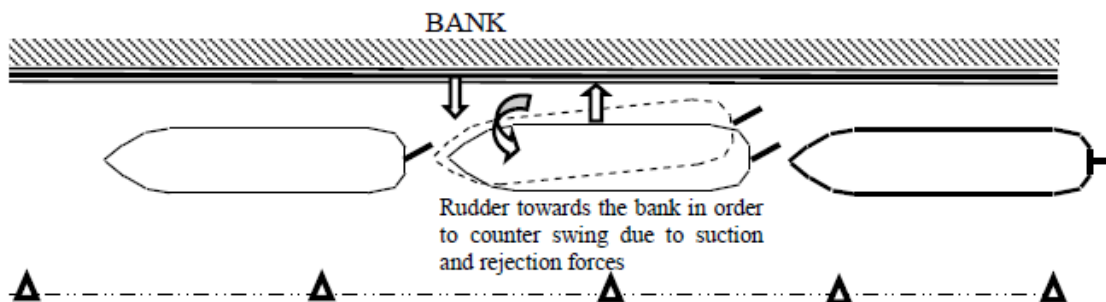


Diagram indicating concept of Bank Effect

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- Bank effect increases with increases in speed, blockage and low UKC. If speed is too high, bank effect can be severe and sudden. It is advisable to slow down and to **steer towards the bank**, in order to get a balance, with the ship running parallel to the bank.

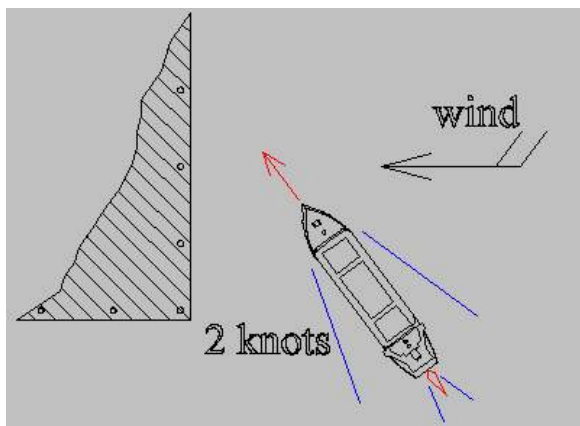


### 13.3. **WIND and CURRENT effects**

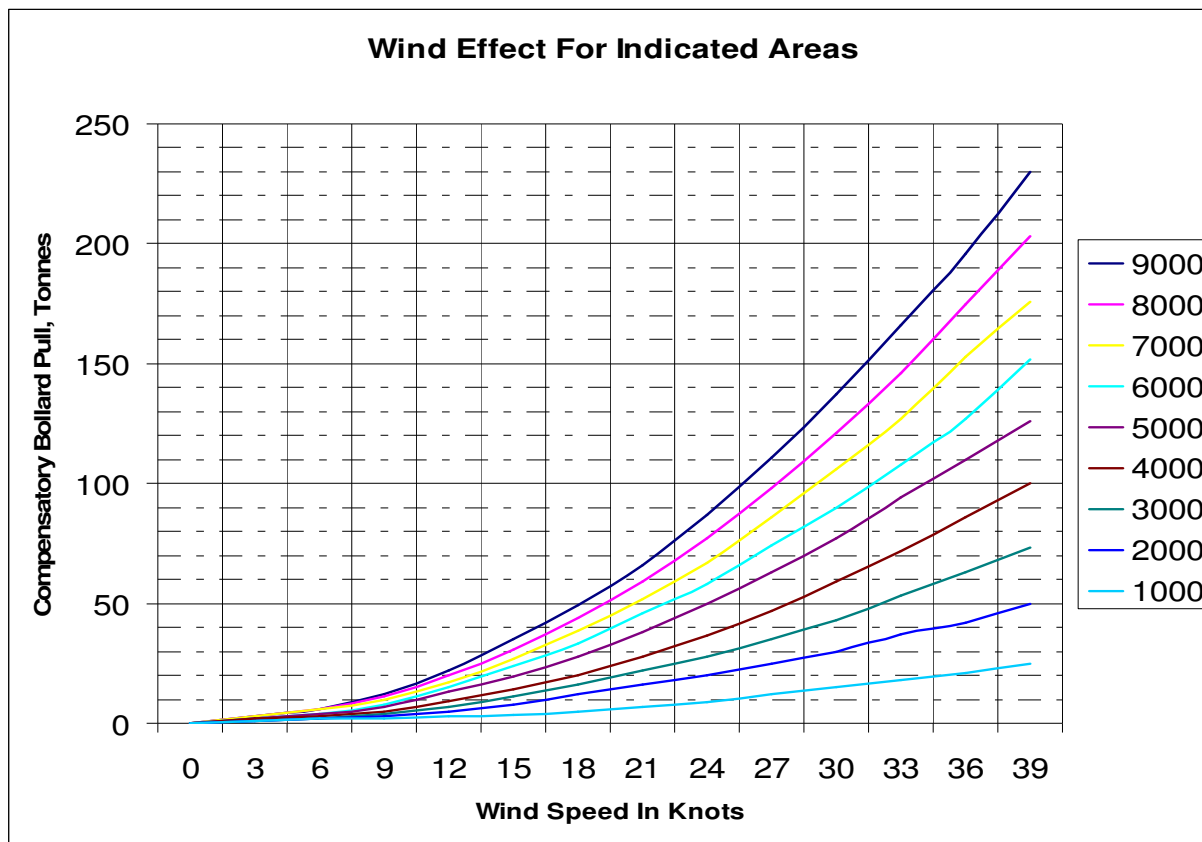
#### 13.3.1 Wind Effect



- Wind has a significant effect on a ship, and failure to compensate correctly for wind during berthing is a major cause of accidents. The difficulty arises from the variable effect that wind can have on a ship because of changes in heading and speed.
- Although wind force & direction can be estimated from various sources, the actual / local conditions can change rapidly and with little warning.
- Sometimes how wind will affect own ship may be difficult to predict (for example, experience shows that different ships stopped in the water may lie with the wind forward of the beam, rather than fine on the bow). - The point of influence of wind (W) is that point on the ship's above-water structure upon which the whole force of the wind can be considered a single act;
- W moves depending on the ship's profile presented to the wind.
- When wind is abeam, W is aft of midship in the case of aft accommodation and forward of the midship if the accommodation is forward.
- Vessels with relatively high free-board (PCC, Containers, Passengers, LNG, and other vessels in ballast) have significantly large windage area, which will affect their maneuvers. It is especially difficult to predict the effect of wind on a partially loaded container ship.

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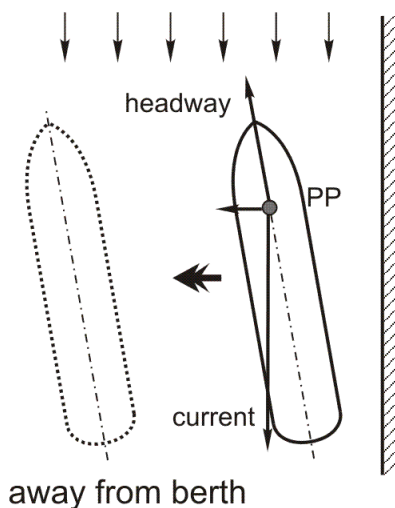
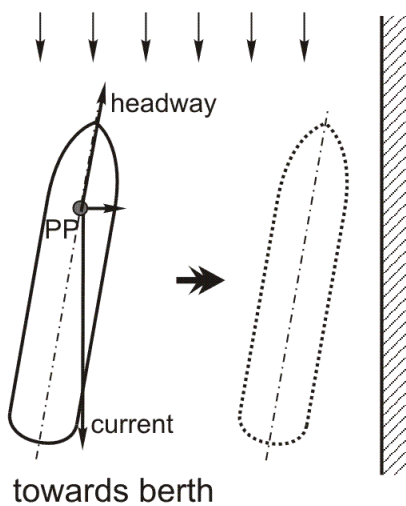
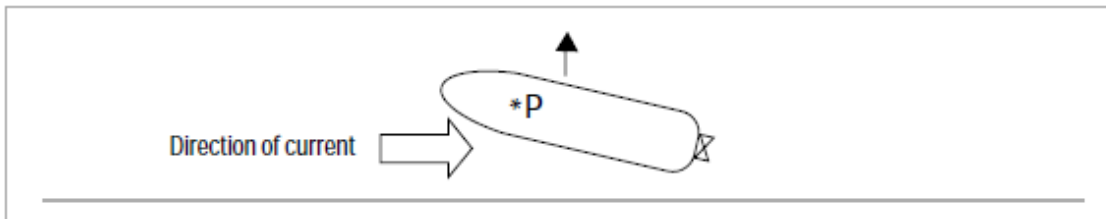
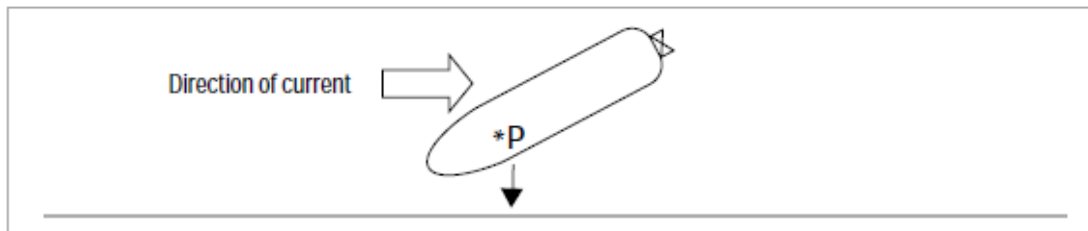
- Ensure that conditions are safe and suitable for the maneuver. *It will be cheaper to delay the ship until the wind moderates.*
- Wind force acting on a ship increases with the square of the wind speed. *Gusts of wind are dangerous.* Take early corrective action – anticipate wind effect.
- Consider any special circumstances: trim, freeboard and deck cargo can vary the position of W.
- Apply large passing distances when it is windy, passing any obstructions well upwind.





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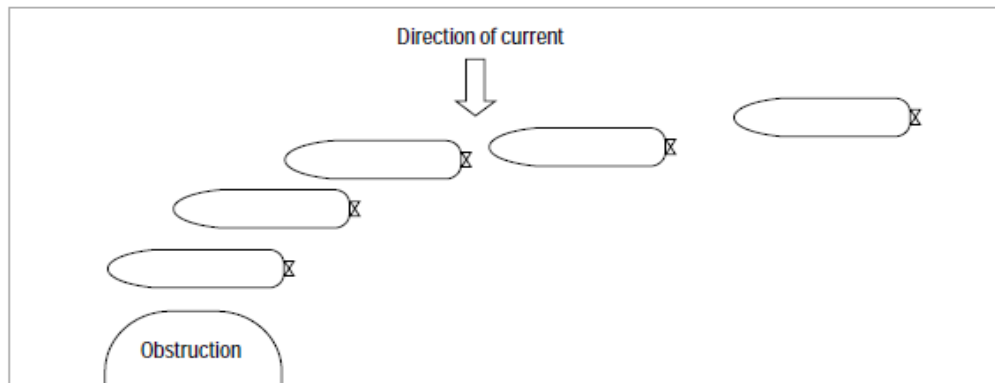
### 13.3.2 Current Effect

- It is common for a berth to lie in the same direction as the prevailing current so it can assist the berthing: approaching with bow into the current in order to get the advantage of relatively high speed through the water with a reduced speed over ground.
- Advantage of berthing heading in current is that it can be used to push a ship alongside. Position the ship off the intended berth but at a slight angle towards it.
- Then allow the current to produce a sideways movement towards the berth.

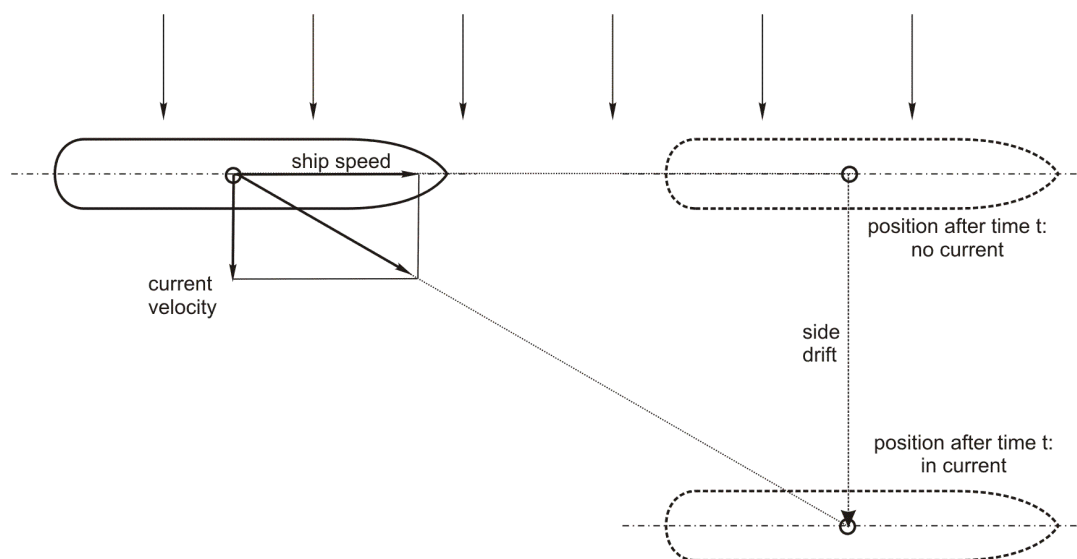


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- In many places a counter current flows in opposition to the main current close to the bank. Usually local knowledge will provide this information.
- Current can vary with depth of water and large deep draught ships can experience different current effects at differing parts of the hull.
- As ship's speed is reduced, the increased proportion of the ship's vector attributable to current may set the ship close to obstructions.
- Always make a generous allowance for current. A mistake made during berthing or anchorage is often impossible to correct.



The effect of the current depends on velocity of the current, under-water area exposed to the current, water depth and UKC.

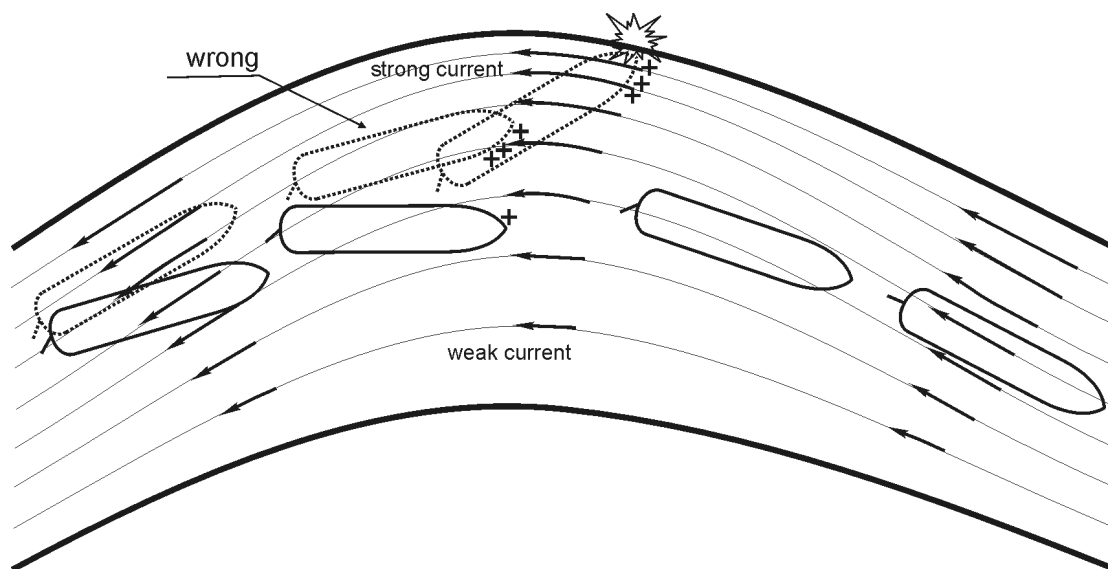




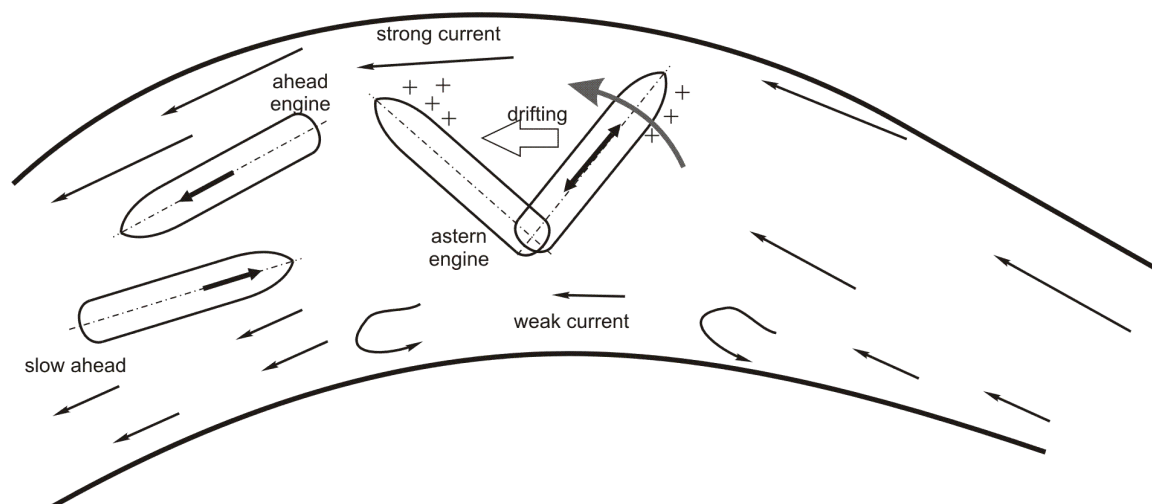
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### Maneuvering in Current / Tide from the Head:

- When a ship is negotiating a bend in channel with a tide from ahead, it is possible to get into the position where the ship is influenced by tides of differing strength.
- A turning moment which is opposing the intended turn and if it is not anticipated with appropriate helm and power, resulting in ship not responding & clear the bend.
- *It may be better to steer the vessel inside of the bend so that the bow does not enter the area of stronger tide at any time during the turn.*





### Vessel turning against the tide:

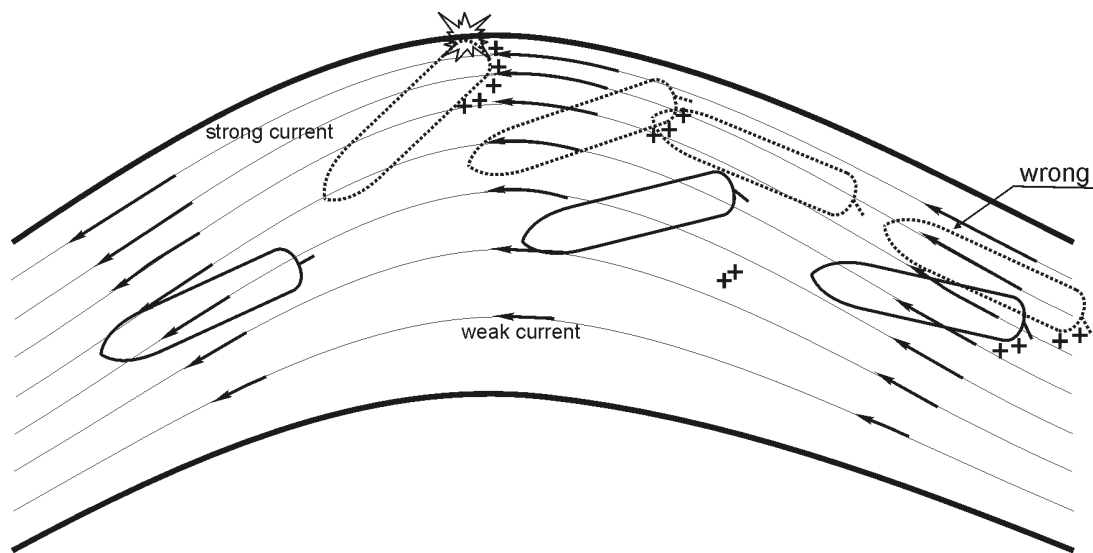


### Maneuvering in a Following Current / Tide:



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- A ship can react both violently & rapidly to this force.
- When a large ship is rounding the bend in a channel with strong following tide, the ship may be positioned in such a way that the larger under-water area is located aft, tide's effect is more on the stern.
- With the pivot point forward, the tide is thus creating a stronger turning lever, and a turning force is created. This swing can be corrected with a kick ahead.



Vessel turning in following tide:

