PASSAGE PLANNING

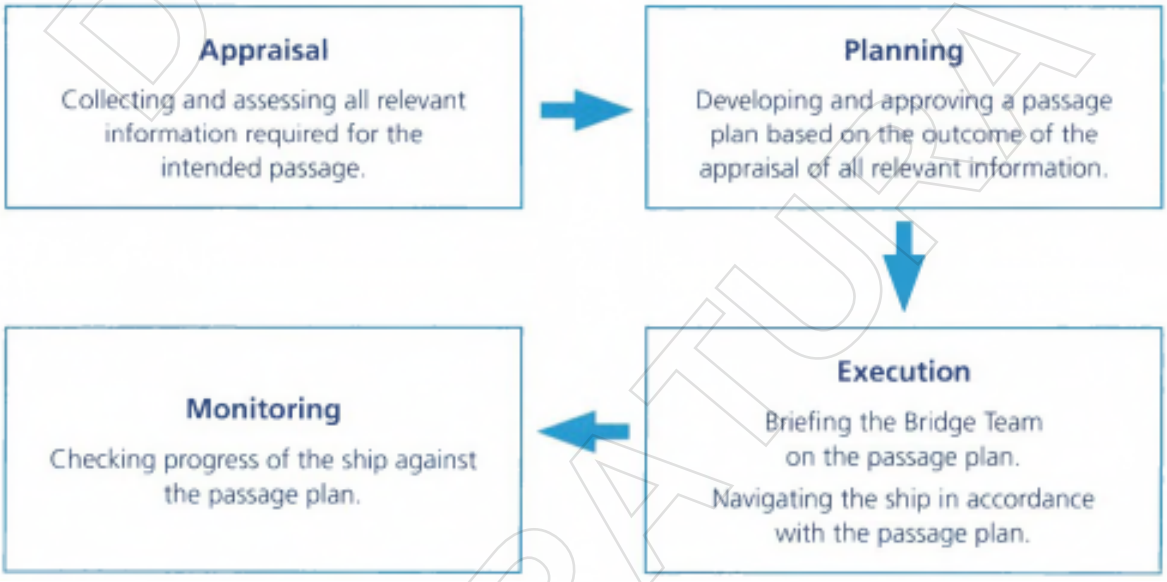
2.1 PRINCIPLES

The purpose of passage planning is to develop a comprehensive navigation plan for the safe conduct of the ship from berth to berth.6

The plan for the intended passage should identify a route which:

- Recognises hazards, and assesses associated risks and decision points;
- Ensures that sufficient sea room and depth of water is available;
- Includes appropriate position fixing opportunities;
- Complies with relevant reporting requirements and routeing measures for ships;
- Takes into account anticipated traffic and weather conditions; and
- Complies with all applicable environmental protection measures.

The four stages to achieve a safe passage plan are:



2.2 RESPONSIBILITY FOR PASSAGE PLANNING

It is the responsibility of the Master to ensure that the passage plan provides the basis of safe navigation for the intended passage. This responsibility is irrespective of who carries out the task of preparing the passage plan.

The Master should check and approve the passage plan before departure.

6 IMO Resolution A.893(21) Guidelines for Voyage Planning. In this Guide the term passage planning means the same as voyage planning.

2.2.1 COMPANY INVOLVEMENT

The SMS should include guidance for passage planning. If the Company provides a standard passage plan for a particular voyage this should be reviewed on board before departure.

2.2.2 PASSAGE PLANNING CONSTRAINTS

A comprehensive passage plan should be prepared and approved prior to departure. However, it might be impractical to include all details, particularly some of those relating to arrival. A comprehensive plan should be finalised as soon as practicable. Once finalised and at an appropriate time, the Bridge Team should be briefed on the completed plan.

2.3 APPRAISAL

Appraisal is the process of gathering all information relevant to the proposed passage which will allow risks to be identified and assessed to ensure that the passage plan is safe. Amongst the factors that should be considered during the appraisal of a passage plan are:

Navigation

- Advice in sailing directions
- Anchoring and contingency options
- Availability and adequacy of charts and reliability of hydrographic data
- Availability and reliability of navigation aids
- Available sea room and traffic density
- Communications including MSI and GMDSS
- Pilotage requirements
- Draught restrictions including air draught, under keel clearance (UKC) requirements and squat
- Position fixing requirements
- Reliability of propulsion and steering systems and defects affecting the control or navigation of the ship
- Route selection and waypoints
- Routeing and reporting measures
- Weather routeing

General/Operational

- Berth requirements
- Bridge manning
- Bunker calculations
- Cargo considerations
- Commercial and charter considerations
- Helicopter operations
- Mooring and tug operations
- Port entry requirements
- Security and anti-piracy measures
- Strength and stability

Environmental

- Ballast water management
- Emission Control Areas (ECA)
- MARPOL Special Areas
- National or regional requirements
- Particularly Sensitive Sea Areas (PSSA)
- Port reception facilities

Contingency

- Emergency response plans
- Notifications and reporting
- Passage plan amendments

Up to date, official charts and nautical publications (electronic or paper) should be used together with other relevant information to make a full assessment of the intended passage. This should include consultation with the Chief Engineer to ensure that sufficient appropriate fuel, water and lubricants are available, particularly taking into account environmental protection requirements.

A passage plan appraisal checklist is included in this Guide as Checklist B9.

2.3.1 OFFICIAL CHARTS

Only up to date, official nautical charts should be used for passage appraisal and planning. Any additional charts and publications needed for the intended passage should be identified and obtained before departure. In the case of electronic charts, sufficient permits/licences for the charts required for the intended route should be available prior to departure, or else the process for obtaining them on passage (dynamic licensing) should be clearly understood.

The following factors should be taken into account when appraising paper and electronic charts during passage planning:

Appropriateness of Scale

For coastal and pilotage planning and for plotting each course alteration point, large scale charts should be used.

For ocean passage planning and open water legs, the largest scale charts that are appropriate should be used.

Accuracy of Chart Data

Paper chart and RNC source data diagrams allow the reliability of chart depth information to be assessed.

The Category Zone of Confidence (CATZOC) allows the accuracy and reliability of ENC data to be assessed.

Further details of CATZOC symbols and their meanings can be found in relevant hydrographic office publications eg: UKHO NP 5012.

Notices to Mariners

Notices to Mariners should be consulted (see Section 2.3.2). Some hydrographic offices also issue Temporary & Preliminary (T&P) Notices to Mariners for their electronic charts as well as paper charts.

Additional Information

Additional Information to that found on charts may be contained in sailing directions and should be consulted.

ENC, RNC and paper charts are usually based on the same hydrographic survey data. This means that an ENC is not more accurate than a RNC or paper chart covering the same area.

Paper charts show charted objects (including hazards) with a precision of approximately 0.3 mm (15 metres or more at scales of 1:50,000 or smaller). Due to the screen resolution of ECDIS, the precision of charted objects on ECDIS may not be substantially different from that of paper charts.

When planning a passage on ECDIS, the OOW should:

- Be aware that the charted objects on an ENC are not more accurate or precisely plotted than charted objects on the corresponding RNC or paper chart; and
- Ensure that there is a sufficient safety margin between charted hazards and the ship's intended route to allow for the accuracy and precision of charts.

2.3.2 OFFICIAL NAUTICAL PUBLICATIONS AND ADDITIONAL INFORMATION

A full appraisal of the passage plan should include a review and consideration of information additional to that on navigational charts, including but not limited to:

Sailing Directions

Provide essential information on all aspects of navigation including hazards, buoyage, weather patterns, pilotage details, regulations, port facilities and guides on port entry.

Ocean Passage/Routeing Charts and Guides

Provide information on established ocean routes.

Port Guides

Provide port approach details that include information based on the experience of seafarers.

Notices to Mariners

Provide essential corrections and amendments to official nautical charts and publications.

May also be used by Port Authorities and Harbourmasters to provide specific local safety information to ships.

Lists of Lights

Provide information on all lights of navigational significance.

Lists of Radio Signals

Provide information on maritime radio communications, particularly vessel reporting and VTS, GMDSS and information on availability of MSI.

Tide Tables and Tidal Stream Atlases

Provide detailed information on tidal conditions in coastal areas, port approaches and harbours.

Load Line Charts

Provide information on zones and seasonal periods for consideration when determining compliance with load line requirements.

Maritime Security Charts

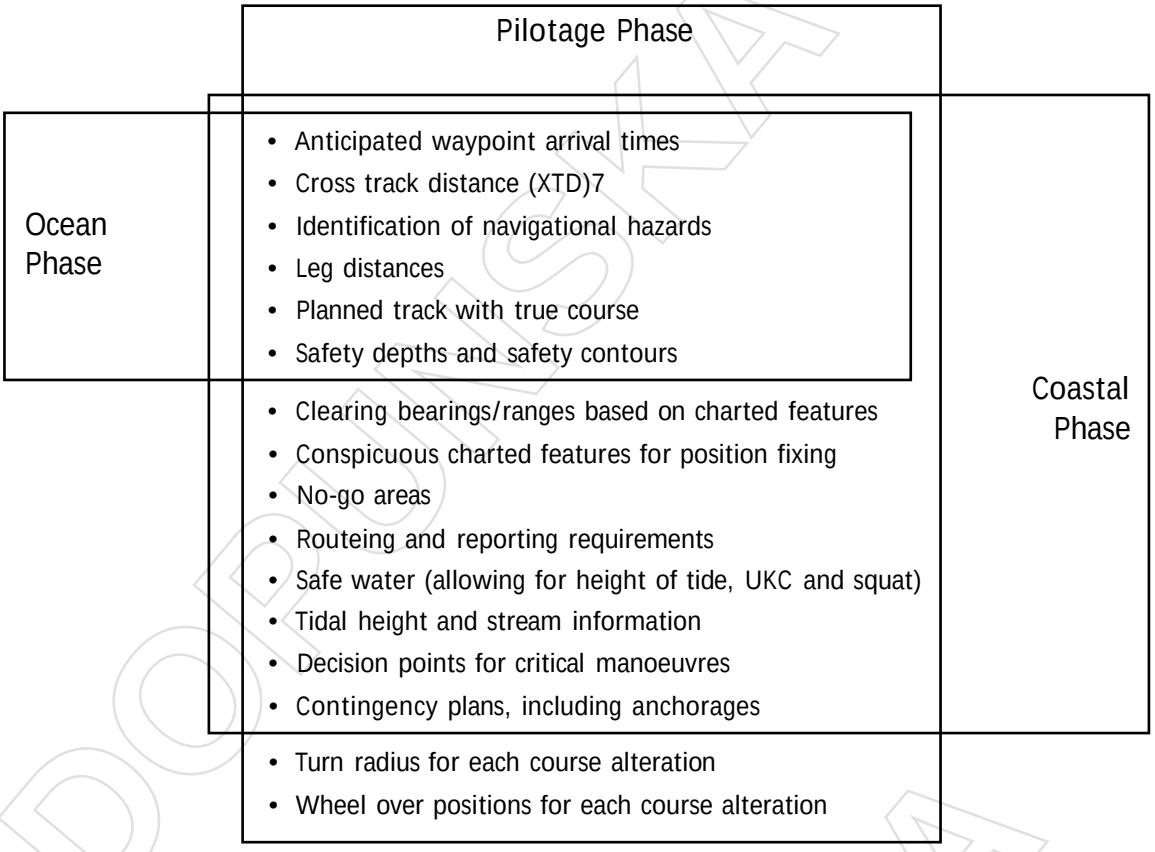
Provide security advice and information about reporting schemes in designated areas.

2.4 PLANNING

Following the appraisal of all charts, nautical publications and additional information, a detailed passage plan should be prepared. This should cover the entire passage from berth to berth, including pilotage areas.

Planning for any one section of a route should be undertaken using either all electronic or all paper charts rather than a mixture of chart types.

Whether planning using paper charts or ECDIS, the plotting of the route should follow established conventions that include showing the following details, where appropriate:



2.4.1 PASSAGE PLANNING IN OCEAN WATERS

When planning ocean passages, particular consideration should be given to:

- Ocean routeing charts which provide information on ocean currents, winds, ice limits and load lines;
- Load line charts which provide information on zones and seasonal periods required to assist in compliance with the IMO International Convention on Load Lines;
- Weather routeing services (see Section 2.4.9); and
- The use of gnomonic projection charts for plotting great circle routes, as appropriate.

The following considerations may have an impact on the selection of an ocean route:

- Ocean currents and the impact on passage speed;
- Weather conditions including anticipated seasonal variations such as heavy weather, tropical storms, ice and reduced visibility; and
- Environmental protection measures and associated requirements that may extend into an ocean route (see Section 3.17).

Landfall targets need to be identified and the expected radar and visual ranges considered. With respect to lights, this will include rising and dipping ranges and the arc/colours of sector lights.

7 To support route scanning on ECDIS an XTD should be setup for all elements of the passage, including ocean passage elements. XTD information may not be required for plotting ocean routes on paper charts.

2.4.2 PASSAGE PLANNING IN COASTAL WATERS

Margins of safety in coastal or restricted waters are likely to be less than for ocean passages due to the available depth of water, proximity of land, coastal infrastructure and increased traffic density.

The following factors should be amongst those taken into account when planning a passage through coastal waters:

- The importance of passing charted and other features at a safe distance;
- Advice in sailing directions;
- Available depth of water and tidal information contained in tide tables and tidal stream atlases;
- Availability of visual and radar fixing opportunities;
- Ship's routing and reporting measures, as well as the availability of Vessel Traffic Services (VTS);
- The reliability of the ship's propulsion and steering system; and
- Environmental protection measures and associated requirements, including fuel changeover procedures (see Section 3.17).

In shallow water due allowance should be made for the increased draught and effects on steering caused by ship squat, which increases with increased ship speed.

2.4.3 PASSAGE PLANNING IN PILOTAGE WATERS

As part of the passage plan, a pilotage plan is required when:

- The vessel is navigating in a non-mandatory pilotage area and no pilot has been embarked;
- The vessel is in pilotage waters and a pilot is embarked; or
- The vessel is in pilotage waters and pilotage is being conducted by a ship's officer holding an appropriate and valid Pilotage Exemption Certificate (PEC).

The pilotage plan contains additional details which reflect the closer proximity to navigational hazards and the need to comply with local requirements. The pilotage plan, as appropriate, should take into account:

- Recommended routes and channel information;
- Procedures for pilotage including pilot boarding points and means of embarkation;
- Local conditions, rules and restrictions on navigation;
- Reporting and communications procedures; and
- Details of the prospective berth and/or anchorages.

For further detailed guidance on pilotage refer to Chapter 5.

2.4.4 PASSAGE PLANNING USING ECDIS

ECDIS is a useful tool for increasing the efficiency of passage planning. Effective use of route planning tools, voyage notes and action points should be part of a comprehensive passage plan.

The following should be considered when using ECDIS for passage planning:

- Availability of and access to the required up to date ENCs and RNCs for the intended passage. This should include identification of areas where ECDIS may need to be in Raster Chart Display System (RCDS) mode and where paper charts might therefore be required;
- If reusing a previous passage plan the route will need to be rechecked to confirm that it remains safe;
- An appropriate large scale ENC or RNC should be used when planning a route;

- The need to ensure that any old or previous routes are removed from the display;
- The need to select chart symbols (pick report) on ENCs to obtain additional detailed safety and navigational information;
- A maximum acceptable cross track distance (XTD) should be applied to each leg of a route. This should comply with any requirements in the SMS and be appropriate for the area;
- Safety depths and safety contours should be calculated and setup in accordance with the UKC requirements in the SMS;
- ETA information should be set manually or using route planning tools. If this is set incorrectly it may affect tidal data and time dependent information associated with the route;
- Current and tidal data, if integrated with ECDIS and up to date, should be applied to the route; and
- Information relating to the vessel's characteristics should be checked and confirmed as correct. This includes information about draught (including any allowance for squat or additional safety margins), turn radius and vessel dimensions.

The passage plan should be saved, backed-up and locked to prevent unauthorised editing.

2.4.5 FINALISING THE PASSAGE PLAN

The passage plan should be appropriately concise so that critical information is not lost in excessive detail. The plan should be available in a format that can be readily understood by the Bridge Team.

When the officer planning the passage has completed preparing the berth to berth passage plan to the fullest extent possible, it should be checked and approved by the Master. Checking of the proposed passage plan should include a careful inspection of navigational charts to ensure that the route is appropriate and safe.

When checking a route on ECDIS, it should be visually inspected at optimum scale (1:1) for the ENC or RNC in use. When a route is plotted on an ENC, the route scanning function of ECDIS should be used in addition to a visual inspection. For the route scanning function to be effective, ECDIS should be correctly setup with safety depths and contours reflecting under keel clearance (UKC) requirements.

A detailed review of the passage plan route should always be carried out in conjunction with an automated route scan when using ECDIS.

2.4.6 PASSAGE PLAN BRIEFING

A briefing should be held to ensure that all Bridge Team members understand their role in executing the passage plan. The briefing should address the factors identified in Checklist B9.

Prior to sailing, all watchkeeping officers should be appropriately briefed and confirm their understanding of the passage plan.

2.4.7 AMENDMENTS TO ROUTES

Planning should be updated in the event that the intended route is amended to reflect changing circumstances and conditions before or during a passage (see also Section 3.11.4).

2.4.8 TRANSFERRING POSITIONS

Care must be taken when transferring route and hazard information between paper charts, electronic charts and/or different Global Navigation Satellite Systems (GNSS) to ensure that appropriate

corrections are applied. This is necessary as the geodetic datum used by different hydrographic offices, on different types of charts and equipment, may vary (see Section 4.9). The circumstances in which this may be a particular consideration include:

- Transferring positions between different GNSS systems;
- Transferring positions between GNSS systems and paper charts or RNCs; and
- Transferring positions between paper charts or RNCs and ENCs.

2.4.9 MARITIME SAFETY INFORMATION

Weather information (including gale warnings), NAVAREA warnings and coastal navigational warnings are broadcast by radio-telephony from coast radio stations and by NAVTEX. Long range weather warnings are broadcast via satellite communications systems, such as SafetyNET, along with NAVAREA navigational warnings as part of the World-Wide Navigational Warning Service (WWNWS).

Details of weather routeing services for ships and information for shipping are contained in lists of radio signals and in Volume D of the World Meteorological Organization (WMO) Publication No.9.

2.4.10 PLANNING AN ANCHORAGE

When planning to anchor, the following are amongst the factors to be considered:

- The purpose for anchoring and anticipated duration;
- Availability of appropriate space at the anchorage;
- Position fixing opportunities;
- Weather conditions and available shelter;
- Tidal height and stream for the duration of the anchorage;
- Sea room and proximity of navigational hazards, including traffic;
- Nature of seabed and holding characteristics;
- Scope of anchor cable required/available and anticipated swinging circle;
- Port requirements;
- Security measures required by the Ship Security Plan (SSP) and the latest industry best practices and guidance on responses to piracy and armed robbery at sea;
- Requirements for machinery availability;
- Availability of required services; and
- Watchkeeping arrangements to ensure maintenance of a proper look-out.

Also see Checklist B12.

2.4.11 SHIPS' ROUTEING

Routeing measures for ships are designed to:

- Reduce the risk of collision between ships in areas of high traffic density;
- Reduce the risk of grounding; and
- Manage shipping in environmentally sensitive sea areas.

Ships' routeing measures can be adopted internationally by IMO. Such measures are recommended for use by, and may be mandatory for, all ships, or certain types of ship, or for ships carrying certain cargoes. Mandatory ship's routeing measures should always be used unless the ship has compelling safety reasons for not following them. IMO routeing schemes will be shown on charts with a note of any pertinent provisions as to their use. Fuller detail may be included in sailing directions.

2.4.12 SHIP REPORTING SYSTEMS

Ship reporting systems allow coastal States to monitor ships navigating through their waters and are intended to contribute to the safety of life at sea, the efficiency of navigation and the prevention of pollution.

Routinely, ship reporting systems require information on the position, course, speed, persons on board, cargo and the destination of ships. In certain areas, information on defects affecting ship navigation equipment, propulsion or steering may be requested by coastal authorities.

Where a ship reporting system has been adopted by IMO, the Master should comply with the requirements of the reporting system. Reporting may be required on entry and exit from an area covered by a reporting system or when there has been a material change in the condition of the ship. Masters may expect IMO adopted reporting systems to be able to provide information to assist the ship, if requested.

Ship reporting requirements will be referred to on charts with a note of any relevant provisions as to their use, including details of their mandatory/recommended status. Further details will be found in lists of radio signals.

2.4.12.1 Automated Ship Reporting and Monitoring

The Automatic Identification System (AIS) provides traffic reporting systems with the ability to monitor ships in real time. This has reduced the need for reports from vessels in certain areas but Masters should continue to make reports as required by individual reporting systems.

Masters should ensure that the static, passage and dynamic data programmed into AIS equipment is accurate, in order to avoid the transmission of false data to reporting systems and other ships.

2.4.13 VESSEL TRAFFIC SERVICES

Vessel Traffic Services (VTS) monitor ship compliance with local regulations and optimise traffic management. VTS is established in areas where the volume of traffic and risk to navigation and the environment is high, and in approaches to ports and other areas of confined water.

VTS reporting requirements are frequently marked on charts, with further details being provided in sailing directions and in lists of radio signals. The passage plan should include references to the specific radio frequencies to be monitored by the ship in order to communicate with VTS. Masters should expect VTS to be able to provide:

- An information service (IS) which may include reports on the position, identity and intentions of other traffic, waterway conditions, weather, hazards or any other factors that may influence the ship's passage;
- A navigational assistance service (NAS) in difficult navigational or weather conditions or when a ship is suffering defects or deficiencies. The Master may request this service from the VTS; and
- A traffic organisation service (TOS) to establish and manage priority of vessel movements, allocation of space, mandatory movement reporting, route information and speed limits or other appropriate measures.

2.5 EXECUTING AND MONITORING THE PASSAGE PLAN

The ship's passage should be monitored to ensure that it is executed in accordance with the plan as checked and approved by the Master and as briefed to the Bridge Team.

Further guidance on executing and monitoring the passage plan by the OOW is contained in Chapter 3.