



Maritime and Coastguard Agency

Navigation Safety

Notice to Owners, Masters and Deck Officers of Merchant Ships
and Skippers and Watchkeepers of Fishing and Recreational Vessels

This Guidance Note supersedes Merchant Shipping Notice No. M. 854

Summary

This notice draws attention to the need for systematic planning of all stages of a voyage. The Annex provides guidance on passage planning for masters and watchkeepers.

Key Points

- Appraise all relevant information
- Plan the intended passage
- Execute the plan taking account of prevailing conditions
- Continuously Monitor the vessel's progress against the plan
- Passage planning does not stop during pilotage.

1. Analysis of marine accidents continues to show that a contributory cause of 80% of navigational accidents is human error, and in many cases information which could have prevented the accident was available to those responsible for the navigation of the vessels concerned.
 - a) ensure that all the vessel's navigation is planned in adequate detail with contingency plans where appropriate;
 - b) ensure that there is a systematic bridge organisation that provides for:
 - (i) comprehensive briefing of all concerned with the navigation of the vessel;
 - (ii) close and continuous monitoring of the vessel's position ensuring as far as possible that different methods of determining the position are used to check against error in any one system;
 - (iii) cross-checking of individual human decisions so that errors can be detected and corrected as early as possible;
2. Most accidents happen because of simple mistakes in use of navigational equipment and interpretation of the available information, rather than because of any deficiency in basic navigational skills or ability to use equipment.
3. Masters, skippers and watchkeepers are recommended to take the following precautions to ensure that they appreciate and reduce the risks to which they are exposed:

(iv) information available from plots of other traffic is used carefully to ensure against over-confidence, bearing in mind that other vessels may alter course and/or speed;

- c) ensure that optimum and systematic use is made of all appropriate information that becomes available to the navigational staff; and
- d) ensuring that the intentions of a pilot are fully understood and acceptable to the vessel's navigational staff.

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GUIDE TO THE PLANNING AND CONDUCT OF PASSAGES

Responsibility for Passage Planning

1. In most deep-sea vessels it is customary for the master to delegate the initial responsibility for preparing the plan for a passage to the officer responsible for navigational equipment and publications. For the purposes of this guide the officer concerned will be referred to as the navigating officer.
2. On smaller vessels, including fishing vessels, the master or skipper may have the responsibility of the navigating officer for passage planning purposes.
3. The navigating officer has the task of preparing the detailed passage plan from berth to berth, to the master's requirements, prior to departure. In cases when the port of destination is not known or is subsequently altered, it will be necessary for the navigating officer to extend or amend the original plan as appropriate.

Principles of Passage Planning

4. There are four distinct stages in the successful planning and achievement of a safe passage:
 - Appraisal
 - Planning
 - Execution
 - Monitoring
5. These stages logically follow each other in the order set out above. An appraisal of information available must be made before detailed plans can be drawn up and a plan must be in existence before tactics for its execution can be decided upon. Once the plan and the manner in which it is to be executed have been decided, monitoring must be carried out to ensure that the plan is followed.

Appraisal

6. This is the process of gathering together all information relevant to the proposed passage, including ascertaining risks and assessing its critical areas. It will of course be concerned with navigational information shown on charts and in publications such as sailing directions, light lists, current atlas, tidal atlas, tide tables, Notices

to Mariners, publications detailing traffic separation and other routeing schemes, radio aids to navigation, vessel reporting schemes and VTS requirements. Reference should also be made to climatic data and other appropriate meteorological information which may have a bearing on the navigational aids in the area under consideration – for example, any areas subject to periods of reduced visibility.

7. A check list must be available for the use of the navigation officer to assist in the gathering of all the information necessary for a full passage appraisal and the circumstances under which it is to be made. It is necessary to recognise that more up-to-date information, for example radio navigational warnings and meteorological forecasts, may be received after the initial appraisal.
8. The most recent editions of all the charts to cover the areas through which the vessel will proceed should be selected and corrected up to date from the latest weekly Notices to Mariners received on board. In addition they must be corrected up to date in respect of both permanent and temporary Notices to Mariners and existing radio navigational warnings. In addition the appraisal will include details of:
 - a) currents (directions and rates of set);
 - b) tides (times, heights, direction and rate of set);
 - c) draught of vessel during the various stages of the intended passage including under-keel allowances for areas where squat may be experienced;
 - d) advice and recommendations given in sailing directions;
 - e) navigational lights (characteristics, range, arc of visibility and anticipated luminous range);
 - f) navigational marks (anticipating both their radar and visual detection ranges);
 - g) traffic separation, and mandatory and voluntary routeing and reporting schemes;

- h) radio aids to navigation (availability and coverage of Decca and/or Loran, if used, and their degree of accuracy at each stage of the passage; availability of DGPS if used);
 - i) navigational warnings affecting the area;
 - j) location of ferry routes, especially where high speed craft may be encountered;
 - k) climatological data affecting the area; and
 - l) vessel's manoeuvring data.
9. An overall assessment of the intended passage should be made by the master, in consultation with the navigating officer and other deck officers who will be involved, after all relevant information has been gathered. This appraisal will provide the master and his bridge team with a clear and precise indication of all areas of danger, and delineate the areas in which it will be possible to navigate safely taking into account the calculated draught of the vessel and planned under-keel clearance. Bearing in mind the condition of the vessel, her equipment and any other circumstances, a balanced judgement of the margins of safety which must be allowed in the various sections of the intended passage can now be made, agreed and understood by all concerned.

Planning

10. Having made the fullest possible appraisal using all the available information on board relating to the intended passage, the navigating officer can now act upon the master's instructions to prepare a detailed plan of the passage. This should cover the whole passage, from berth to berth, and include all waters where a pilot will be on board.
11. The formulation of the plan will involve completion of the following tasks:
- a) Plot the intended passage on the appropriate charts and mark clearly, on the largest scale charts applicable, all areas of danger and the intended track taking into account the margins of allowable error. Where appropriate, due regard should be

paid to the need for advanced warning to be given on one chart of the existence of a navigational hazard immediately on transfer to the next. The planned track should be plotted to clear hazards at as safe a distance as circumstances allow. A longer route should always be accepted in preference to a shorter more hazardous route. The possibility of main engine or steering gear breakdown at a critical moment must not be overlooked.

- b) Indicate clearly in 360 degree notation the true direction of the planned track marked on the charts.
- c) Mark on the chart all radar-conspicuous objects and RACONs, which may be used in radar position fixing.
- d) Mark on the charts any transit marks, clearing bearings or clearing ranges (radar) which may be used to advantage. It is sometimes possible to use two conspicuous clearing marks where a line drawn through them runs clear of natural dangers with the appropriate margin of safety; if the vessel proceeds on the safe side of this transit she will be clear of the danger. If no clearing marks are available, a line or lines of bearing from a single object may be drawn at a desired safe distance from the danger; provided the vessel remains in the safe segment, it will be clear of the danger. Parallel index lines should also be drawn where appropriate.
- e) If an electronic chart system is used to assist passage planning the plan should also be drawn up on the paper charts. Where official (ENC) vector data is available an ECDIS provided with fully compliant ENC data for the vessel's passage may be used instead of paper charts. Raster Chart Display Systems (RCDS) using official and up to date Raster charts can be used in conjunction with paper charts to assist passage planning and route monitoring. Hazards should be marked on the RCDS as well as on the paper chart. Systems which use unofficial chart data should not be used for passage planning or navigation.

- (f) Decide upon the key elements of the navigational plan. These should include, but not be limited to:
- (i) safe speed, having regard to the manoeuvring characteristics of the vessel and, when restricted by draught, an allowance for increase of draught due to squat, and heel when turning;
 - (ii) speed alterations necessary to achieve desired ETAs en route, for example where there may be limitations on night passage, tidal restrictions, etc.;
 - (iii) positions where a change in machinery status is required;
 - (iv) course alteration points, with wheel-over positions where appropriate on large scale charts taking into account the vessel's turning circle at the planned speed and the effect of any tidal stream or current on the vessel's movement during the turn;
 - (v) minimum clearance required under the keel in critical areas (having allowed for height of tide);
 - (vi) points where accuracy of position fixing is critical, and the primary and secondary methods by which such positions must be obtained for maximum reliability;
 - (vii) contingency plans for alternative action to place the vessel in deep water or proceed to an anchorage in the event of any emergency necessitating abandonment of the plan; and
 - (viii) reporting positions for voluntary or mandatory reporting schemes.
12. Depending on circumstances, the main details of the plan should be marked in appropriate and prominent places on the charts to be used during the passage. They should also be programmed and stored electronically on an ECDIS or RCDS where fitted. The main details of the passage plan should also be recorded in a bridge notebook used specially for this purpose to allow reference to details of the plan at the conning position without the need to consult the chart. Supporting information relative to the passage, such as times of high and low water, or of sunrise or sunset, should also be recorded in this notebook.
13. It is unlikely that every detail of a passage will have been anticipated, particularly in pilotage waters. Much of what will have been planned may have to be adjusted or changed after embarking the pilot. This in no way detracts from the real value of the plan, which is to mark out in advance, areas where the vessel must not go and the appropriate precautions which must be taken, and to give initial warning that the vessel is standing into danger.
- Execution**
14. Having finalised the passage plan, and as soon as estimated times of arrival can be made with reasonable accuracy, the tactics to be used in the execution of the plan should be decided. The factors to be taken into account will include:
- (a) the reliability and condition of the vessel's navigational equipment;
 - (b) estimated times of arrival at critical points for the tidal heights and flow;
 - (c) meteorological conditions, particularly in areas known to be affected by frequent periods of restricted visibility;
 - (d) daytime versus night-time passing of danger points, and any effect this may have upon position-fixing accuracy; and
 - (e) traffic conditions, especially at navigational focal points.
15. At this stage it is important for the master to consider whether any particular circumstance introduces an unacceptable hazard to the safe conduct of the passage. An example could be the forecast of restricted visibility in an area where position fixing by visual means at a critical point is an essential feature of the navigation plan. This could determine whether that section of the passage should be attempted under the conditions prevailing or likely to prevail. The master should also consider at which specific points of the passage additional deck or engine room personnel will need to be utilised.

Monitoring

16. The vessel's progress along the pre-planned track must be monitored continuously and closely. The officer of the watch, whenever in any doubt as to the position of the vessel or the manner in which the passage is proceeding, should immediately call the master and, if necessary, take appropriate action for the safety of the vessel.
17. The performance of navigational equipment should be checked prior to sailing, prior to entering restricted or hazardous waters and at regular and frequent intervals at other times throughout the passage.
18. Advantage should be taken of all the navigational equipment with which the vessel is fitted for position monitoring, bearing in mind the following points:
 - (a) positions obtained by electronic positioning systems must be checked regularly by visual bearings and transits whenever available;
 - (b) visual fixes should, if possible, be based on at least three position lines;
 - (c) transit marks, clearing bearings and clearing ranges (radar) can be of great assistance;
 - (d) it is dangerous to rely solely on the output from a single positioning system;
 - (e) the echo sounder provides a valuable check of depth at the plotted position;
 - (f) buoys should not be used for position fixing but may be used for guidance when shore marks are difficult to distinguish visually; in these circumstances their positions should first be checked by other means;
 - (g) the functioning and correct reading of the instruments used should be checked;
 - (h) account must be taken of any system errors and the predicted accuracy of positions displayed by electronic position fixing systems; and
 - (i) the frequency at which the position is to be fixed should be determined for each section of the passage.

19. On every occasion when the vessel's position is fixed and marked on the chart in use, the estimated position at a convenient interval of time in advance should be projected and plotted. With ECDIS or RCDS care should be taken to ensure that the display shows sufficient "look-ahead" distance and that the next chart can be readily accessed.
20. Radar can be used to advantage in monitoring the position of the vessel by the use of parallel indexing, which is a simple and most effective way of continuously monitoring that a vessel is maintaining its track in restricted coastal waters. Parallel indexing can be used in any situation where a radar-conspicuous navigation mark is available and it is practicable to monitor continuously the vessel's position relative to such an object. It also serves as a valuable check on the vessel's progress when using an electronic chart.

Pilotage

21. Pilots make a significant contribution to the safety of navigation in the confined waters and port approaches of which they have up to date knowledge. But it must be stressed that the responsibilities of the vessel's navigational team and officer of the watch do not transfer to the pilot.
22. After boarding the vessel, in addition to being advised by the master of the manoeuvring characteristics and basic details of the vessel for its present condition, the pilot should be clearly consulted on the passage plan to be followed. The general aim of the master should be to ensure that the expertise of the pilot is fully supported by the vessel's bridge team. (See also paragraph 16).
23. Attention is drawn to the following extract from IMO Resolution A 285 (VIII):

"Despite the duties and obligations of a pilot, his presence on board does not relieve the officer of the watch from his duties and obligation for the safety of the vessel. He should co-operate closely with the pilot and maintain an accurate check on the vessel's position and movements. If he is in any doubt as to the pilot's actions or intentions, he should seek clarification from the pilot and if doubt still exists he should notify the master immediately and take whatever action is necessary before the master arrives."

24. Mariners are also referred to the following publications which contain valuable advice on bridge watchkeeping in general and passage planning in particular:

“Bridge Team Management - A practical guide”
published by the Nautical Institute and
“Bridge Procedures Guide” published by the
International Chamber of Shipping.

