Advisory Circular

Part 45 Navigational Equipment

Issue No. 45-1 10 May 2000

1. General

Maritime Safety Authority Advisory Circulars are designed to give you assistance and explanations about the standards and requirements set out in the rules. However, the notes contained in Advisory Circulars should not be treated as a substitute for the rules themselves, which are the law.

When a number such as 45.4 is referred to, this is a reference to a specific rule within Part 45.

2. Amendments to ship requirements

Part 45 incorporates the following changes from previous regulations for navigational equipment and associated requirements -

- There are new standards for ARPAs fitted to vessels on or after 1 January 1997 and for devices to indicate speed and distance fitted to vessels on or after 1 January 1997.
- All passenger ships and most non-passenger ships that proceed into the unlimited area will require a radar installation capable of operating in the 9 GHz band. This is so that the radar installation is compatible with the radar transponder, for search and rescue purposes.
- Compass requirements for non-SOLAS ships have been slightly altered.
- Compass requirements for fishing ships under 12 metres and other ships under 6 metres have been set.
- Compass adjusters will require a certificate of recognition, which must be renewed at least once every five years.

MARITIME SAFETY AUTHORITY OF NEW ZEALAND

Te Mana Ārai Hauata Moana o Aotearoa

3. Magnetic compasses

(1) The master should be aware that deviations could become "permanently" or "temporarily" excessive in the following circumstances –

- after relocation of the compass;
- after alterations to fittings and equipment which could influence the compass;
- after a ship has been laid up for a long period;
- after structural alterations;
- after arc welding;
- after sand-blasting on the vessel;
- after grounding;
- after being struck by lightning;
- when cargoes with a magnetic influence are being, or have been, carried.

(2) In complying with the requirements for carrying a magnetic compass, all mariners should be aware of the requirement contained in rule 45.4(3)(a)(ii) (namely, that the compass be "fit in all respects for its intended use").

(3) A summary of the magnetic compass requirements of Part 45 is given in Table 1 of this Advisory Circular.

(4) The table of deviations for each magnetic compass should contain the information in Figure 1 of this Advisory Circular and any other information on the configuration of the correctors that may be relevant.

TABLE 1. Summary of Magnetic Compass Requirements (Rules 45.20 to 45.24)

Type	Size	Operating Limit	Requirement
Passenger	150 tons gross tonnage or more	Restricted coastal, coastal, offshore	Two magnetic compasses capable of being adjusted. 45.20[1]
Passenger	less than 150 ton gross tonnage	Restricted coastal, coastal, offshore	One magnetic compass capable of being adjusted. 45.21
Passenger	6 metres or more in length	Restricted limits	One magnetic compass capable of being adjusted. 45.21[2]
Passenger	less than 6 metres	Restricted limits	Magnetic compass mounted on the centreline. 45.22[2]
Non-passenger	less than 45 metres	Restricted coastal, coastal, offshore	One magnetic compass capable of being adjusted. 45.21
Non-passenger	12 metres or more in length	Restricted limits	One magnetic compass capable of being adjusted. 45.21[2]
Non-passenger	6 metres or more BUT less than 12 metres in length	Restricted limits	Magnetic compass mounted as near as practicable to the centreline. 45.22[2]
Non-passenger	less than 6 metres in length	Restricted limits	A magnetic compass. 45.23[2]
Fishing	Any size	Unlimited	Two magnetic compasses capable of being adjusted. 45.24[1]
Fishing	Any size	Coastal, restricted coastal or offshore limits	One magnetic compass capable of being adjusted. 45.21
Fishing	12 metres or more in length	Restricted limits	One magnetic compass capable of being adjusted. 45.21[2]
Fishing	6 metres or more BUT les than 12 metres length	Restricted limits	Magnetic compass mounted as near as practicable t the centreline. 45.22[2]
Fishing	less than 6 metres in	Restricted limits length	A magnetic compass. 45.23[2]

1. Or one adjustable magnetic compass and one gyrocompass.
2. Vessels which operate only on a river or other restricted waterway are excluded, because such vessels are not required to have a compass.

FIGURE 1. Table of Deviations of the Standard/Steering* Compass

Ship's head by standard/steering compass and corresponding deviation

Head	Deviation	Head	Deviation	Head	Deviation	Head	Deviation
000°		090°		180°		270°	
010°		100°		190°		280°	
020°		110°		200°		290°	
030°		120°		210°		300°	
040°		130°		220°		310°	
045°		135°		225°		315°	
050°		140°		230°		320°	
060°		150°		240°		330°	
070°		160°		250°		340°	
080°		170°		260°		350°	

Description, location and size of the correctors

Corrector	Alignment	No.	Diam.	Length	To centre of compass system
Fore and aft magnets	Red end F ☐ A ☐				From centre of magnets
Thwartships magnets	Red end P ☐ S ☐				From centre of magnets
Vertical magnets	Red end Up ☐ Down ☐				From top end of magnets
Flinders Bar	F ☐ A ☐ of compass				From nearest point of corrector
Quadrantal correctors	Type				From nearest point of corrector

The above description of the correctors may be supplemented by a plan showing their position.

The deviations were obtained by means of .....

Type of vertical force instrument used.....

Declaration: I hereby declare that I have today examined the Standard* and Steering* compasses of the above ship, that I have adjusted the correctors as necessary, and that the compasses are now in good order.

Signed.....
(Person competent to adjust compasses in accordance with Part 45 of the Maritime Rules.)

Date.....Place.....

*Delete as appropriate

4. GPS / GLONASS

The International Maritime Organization has recognised -

- the Global Positioning System Standard Positioning Service (GPS-SPS); and
- the Global Navigation Satellite System (GLONASS);

as components of the World-Wide Radionavigation System. These systems are therefore acceptable as the "other radio navigation equipment" referred to in rule 45.17(1)(c).

Mariners should note however that such systems are not considered to be suitable for navigation in harbour entrances and approaches, or for other waters in which freedom to manoeuvre is limited.

The carrying of a GPS does not relieve the owner and the master of a ship of their obligation to fully meet the requirements of Part 45.

5. Hand lead line

A hand lead line, consisting of a lead weight of at least three kilograms and a line of at least 46 metres length, should be provided for ascertaining the depth of water in a shallow port or for ascertaining the depth of water where a grounding has occurred. The lead line should be recessed at the bottom for 'arming' with grease to obtain a sample of the bottom.

6. Radio direction finder

(1) Calibration

A direction-finder should be calibrated as soon as practicable after:

(a) it is installed; or

(b) any change or repair is made to its antenna system; or

(c) any change is made to an antenna installation, where that antenna installation is on or above the uppermost deck and is within 17 metres of an antenna which forms part of the direction-finder; or

(d) any change is made to a structure or fitting on or above the uppermost deck which may affect the accuracy of the calibration tables or curves:

Calibration referred to in 6.(1)(b), (c) or (d) above is not required if check bearings indicate that the change has not substantially affected the accuracy of the calibration tables or curves, or both.

The owner and the master of the ship should arrange for check bearings to be taken in accordance with International Maritime Organisation Assembly Resolution A.665(16) in order to verify the accuracy of calibration tables and curves.

Check bearings should be taken at least at yearly intervals[1] to verify the accuracy of calibration tables and curves.

(2) Format for certificate of calibration for a radio direction finder and record of check bearings

A certificate of calibration for a radio direction-finder should contain the information as laid out in Figure 2 of this Advisory Circular.

FIGURE 2.

Certificate of Calibration of Radio Direction-Finder

We, the undersigned, certify that we have this day –

(a) Calibrated in accordance with Part 45 of the Maritime Rules the radio direction-finder installed on the ship _____;

(b) Handed to the master of that ship tables of calibration corrections;

(c) Adjusted the radio direction-finder so that the readings taken, when corrected with those tables, differed from the correct bearings by no more than 2°.

We further certify that the master of the ship has been provided with a diagram indicating the conditions and position, at the time of calibration, of the aerials and all movable structures on board the ship which might affect the accuracy of the radio direction-finder.

_____Radio Observer

_____Visual Observer

_____Date

The record of check bearings taken by means of the radio direction-finder should contain the information in Figure 3.

[1] See 45.17(2).

FIGURE 3. Record of Check-Bearings Taken by Means of the Radio Direction-Finder

(1) Serial number of bearings		
(2) Date		
(3) Times (GMT)		
Ship's Approximate position	(4) Latitude	
	(5) Longitude	
(6) Distance from transmitter		
(7) Direction-finder bearing of [Name]		
(8) Direction-finder relative bearings corrected for Q.E.		
(9) Ship's head by compass 0/360°		
(10) Total compass error		
(11) ½ convergency applied		
(12) Ship's head corrected (true)		
(13) True bearing by direction-finder col. (8) and col. (12)		
(14) True bearing by visual check or calculation (whether visual or calculation to be indicated; if by calculation, the method to be stated)		
(15) Correction required to make col. (13) equal col. (14) (indicating whether – or +)		
(16) Signature of observer or observers		

7. Rudder angle indicator and propeller revolution indicator

The International Maritime Organization has not published any specifications for rudder angle or propeller revolution indicators. Reference is however made to the Recommendation on General Requirements for Shipborne Radio Equipment Forming Part of the Global Maritime Distress and Safety System (GMDSS) and for Electronic Navigational Aids (International Maritime Organization Assembly Resolution A.694(17)).

8. Siting recommendations

Owners and masters are advised that for navigational equipment to be considered "fit in all respects for its intended use" (rule 45.4(3)(a)(ii)), the following should be complied with –

(1) All Installations

Every navigational equipment installation should be mounted in a manner which ensures that the performance and reliability of such navigational equipment installation is not adversely affected by vibration or other causes.

(2) Indicating Devices

The display unit of an indicating device should be sited on the navigating bridge in a position where it can be readily seen by the person responsible for the navigation of the ship.

(3) Gyro-compass Installations

The master gyro-compass should be sited so as to avoid excessive errors being caused to the gyro-compass installation by the ship rolling, pitching, or yawing.

(4) Radar

(a) The scanner unit of each radar installation should be sited so that satisfactory performance is achieved in relation to:

(i) the avoidance of shadow sectors, particularly in the forward direction;

(ii) the avoidance of false echoes caused by reflections from the ship's structure;

(iii) the effect of aerial height on the amplitude and extent of sea clutter.

(b) The radar display unit should be sited on or near the navigating bridge.

(c) The siting of one of the displays should be such that an observer faces the ship's bow when viewing the display.

(d) The angular width and bearings of any shadow sectors likely to affect the information displayed by a radar installation should be determined, recorded, and permanently displayed near each display unit. The shadow sector information should be kept up to date following any change likely to affect the shadow sectors.

(5) Echo Sounding Equipment

(a) Every transducer unit of an echo sounder installation should be sited so that satisfactory overall performance is achieved.

(b) The echo sounder graphical display should be sited on or near the navigating bridge, in a position which facilitates easy access and viewing and where the effect of any lighting necessary for the equipment does not interfere with the keeping of an effective lookout.

(6) Radio Direction-Finding Systems

Adequate precautions should be taken to protect the cables connecting the direction-finder aerial system to the receiver forming part of the direction-finder installation, from the ingress of water and other damage (including damage caused by excess heat).

(7) Electrical Energy

(a) There should be provided in every ship to which Part 45 applies, at all times while such ships are on a voyage and at all reasonable times while such ships are in port, a supply of electrical energy suitable and sufficient for:

(i) the operation of the navigational equipment installations;

(ii) the testing of the navigational equipment installations; and

(iii) the charging of any batteries that are a source of electrical energy for the navigational equipment installations.

(b) The variation in voltage or frequency of the electrical energy supply for the navigational equipment installations should not exceed the limits recommended by the manufacturer of such navigational equipment installations.

(c) Means should be provided for readily isolating each navigational equipment installation from its source of electrical energy, without causing any interruption to or adversely affecting the supply of electrical energy to other equipment.

(d) Where two radar installations are provided:

(i) both radar installations should be installed so that failure of one of the radar installations does not cause the supply of electrical energy to the other radar installation to be interrupted or adversely affected; and

(ii) each radar installation should be capable of being operated from the ship's emergency source of electrical energy.

9. Recommendation on the use and testing of shipborne navigational equipment (International Maritime Organization Assembly Resolution A.152(ES.IV))

International Maritime Organization Assembly Resolution A.157(IV) on the use and testing of shipborne navigational equipment recommends the following:

(1) that governments bring to the notice of ships' masters the importance of making the most effective use of all navigational aids at their disposal;

(2) that operational tests of shipborne navigational equipment be carried out at sea by the master or the officers as frequently as practicable as circumstances permit, and in particular when conditions of hazardous navigation are expected. These tests should be recorded.

10. Availability of performance standards

International Maritime Organization Assembly Resolutions, including the performance standards for navigational equipment, may be viewed by prior arrangement at any Maritime Safety Authority office.

Copies of such standards may be purchased from Transpacific Marine Limited, P.O. Box 1874 Auckland 1, or International Maritime Organization Publications Section, 4 Albert Embankment, London SE1 7SR.

ISBN 0-478-21651-3

Published by
Maritime Safety Authority of New Zealand, PO Box 27-006, Wellington, New Zealand

Crown copyright 2000

Printed and Distributed by
Baseline, PO Box 30-390 Lower Hutt, New Zealand