

L.H.A. φ , which latter corresponds to the time at which the stop watch was started.

The author of this interesting method is to be congratulated for his systematic and thoroughly seamanlike solution.

REFERENCE

¹ Método directo para o cálculo do ponto astronómico por observação de Estrelas ou Planetas. Mário Gama, Capitão da Marinha Mercante. (*Neptuno: Revista da Marinha Mercante Nacional*, No. 211, Jan./Mar. 1969, 42-54.)

Amendments to the Rules

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A GREAT deal has already been written about possible amendments to the Collision Regulations, but as there may be an international conference on the subject in 1972 the various schemes should be discussed as much as possible so that their advantages and disadvantages will be fully appreciated.

Criticism of the present Steering and Sailing Rules is mainly concerned with Rule 21. Disadvantages of this rule include the following:

- (1) If a giving-way vessel on a crossing course takes no action the privileged vessel must not act until collision cannot be avoided by the giving-way vessel alone. By such time collision is likely to be inevitable.
- (2) Small sailing vessels which may not easily be seen, especially at night, are required to maintain course and speed for large power-driven vessels.
- (3) High-speed vessels such as hovercraft are required to maintain course and speed for low powered ships crossing from the port side.
- (4) No provision is made for different types of hampered vessel approaching one another so as to involve risk of collision. If deep-draught vessels in certain areas are to be included in this category in the future the question of priorities may have to be considered.
- (5) An ordinary power-driven vessel is not permitted to give way to a tow on the port bow. In certain circumstances a tow is permitted to show the lights and shapes for a vessel not under command, though this is not generally appreciated.
- (6) A vessel being overtaken is apparently always required to keep her course and speed even though some hampered vessels carrying out special operations at high speeds may be unable to take action to keep clear.
- (7) Rule 21 can only apply to vessels in visual sight of one another. Any rules or guidance for vessels using radar in fog could not be consistent with the present Steering and Sailing Rules.

Rule 16 and the Annex are criticized mainly on the grounds that there is insufficient instruction or guidance for a vessel using radar in fog. Such a vessel

may take early and substantial action to avoid a close-quarter situation, and an alteration to starboard is said to be generally preferable for vessels on opposite or nearly opposite courses. A vessel which alters course to starboard to pass astern of a vessel on her starboard bow may well find that the other vessel will turn to port so that the two ships come on to a new collision course with an increased speed of approach.

There seems to be a growing body of opinion in favour of drafting new rules, based on dual responsibility, which would apply in all conditions of visibility. Advocates of this approach usually support the anti-clockwise system proposed by Dr. Calvert. Under this scheme both vessels are required to manoeuvre (if possible), the action of one complementing the action of the other. Alterations to starboard are required for a vessel forward of the beam and alterations to port for a vessel abaft the beam. Reductions of speed are permitted for a vessel on the starboard side and increases of speed for a vessel on the port side. In effect, a vessel is required to cross ahead of a vessel on the port side and to cross astern of a vessel on the starboard side.

Such a system would have the following disadvantages:

- (1) Anti-clockwise rules could not be applied by all vessels. Sailing vessel manoeuvres are dependent on the direction of the wind. Hampered vessels, which sometimes move at high speed, may not be able to take prescribed action. If such vessels are to be privileged would power-driven vessels be required to cross ahead of them when they approach from the port side so as to involve risk of collision?
- (2) When a vessel is abeam or nearly abeam to port, the prescribed action is to increase speed. This is not usually possible in clear weather and may be dangerous for vessels proceeding at moderate speed in fog.
- (3) An alteration to port to cross ahead of a vessel on the port quarter could result in a new collision situation with an increased speed of approach. Such action is not mandatory and will probably be unnecessary if the overtaking vessel keeps out of the way, but if the overtaking ship fails to take action an attempt to cross ahead could be dangerous.
- (4) In poor visibility vessels using radar are encouraged to take early action to avoid a close-quarter situation which may be indicated by a slowly changing bearing as well as a steady bearing. If the compass bearing of a vessel on the port bow is rotating clockwise, or increasing, and the other vessel is expected to pass about a mile or more away it may be dangerous to alter course to starboard and attempt to cross ahead, especially if the speed of the other vessel is high. The other vessel might well consider that no action is required for a target with a nearest approach of over one mile on her starboard quarter. It has been suggested that in such cases the two vessels should agree to reverse the manoeuvres, but it is unlikely that they could always communicate to this effect in practice.
- (5) A reduction of speed would not be permitted in poor visibility when there is another vessel on the port side with a practically constant bearing, as such a reduction would cause a clockwise rotation of the sight line. A power-driven vessel would not be required to stop her engines on hearing a fog signal forward of her beam or when the radar indicates a dangerous close-quarter situation.

It would be difficult to get international agreement on a completely new set of regulations and there may be considerable opposition to the principle of dual responsibility. Captain Kemp¹ has suggested amending Rule 21 to allow a privileged vessel more freedom to manoeuvre whilst continuing to assign responsibility to one vessel. This approach is more likely to be acceptable but the proposal to avoid crossing astern of a vessel on the port side involves the same difficulties as the anti-clockwise system.

In order to see what amendment could be made to Rule 21 it is necessary to consider which would be the safest action for a privileged vessel to take in a number of different situations. If the giving-way vessel fails to keep clear when

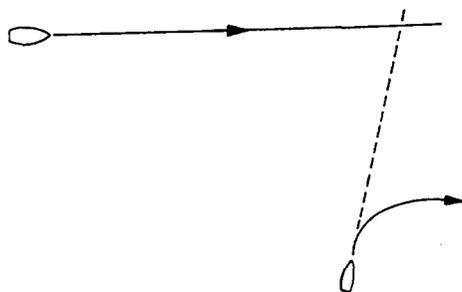


FIG. 1. Result of a large alteration to starboard when another vessel is broad on the beam

two power-driven vessels are crossing it would be dangerous for the privileged vessel to turn to port, and a reduction of speed may not be effective in the time available. An alteration to starboard is the obvious answer, but this does not necessarily involve crossing ahead to make the bearing rotate in an anti-clockwise direction. If the other vessel is broad on the bow it would probably be safer to make a large alteration to starboard so as to turn on to a parallel course (Fig. 1). This could be followed by a reduction of speed, or a round turn, if the

other ship continues to keep her course and speed.

If a crossing vessel fine on the port bow fails to give way, a power-driven vessel would probably be able to alter course to starboard and cross ahead without difficulty, but yachts and other small craft with small turning circles might find it safer to turn sharply and bring the other vessel almost directly astern (Fig. 2).

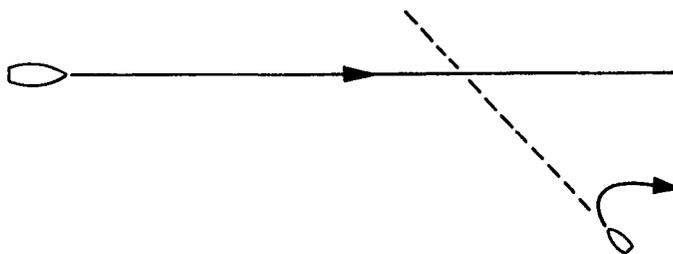


FIG. 2. Safest action for small craft if another vessel, fine on the port bow, fails to give way

The safest action for a sailing vessel or hampered vessel which has a power-driven vessel on the starboard side failing to keep clear would be to turn to port. An alteration to starboard would be dangerous as the power-driven vessel is likely to turn to port in accordance with Rule 22.

When an overtaking vessel fails to give way it might be dangerous to cross ahead and a reduction in speed would increase the speed of approach and make it more difficult for the giving-way ship to cross astern if she makes a late attempt to do so. The sensible manoeuvre in these circumstances is to turn on to a parallel, or slightly diverging, course and allow the other vessel to draw well forward of the beam before resuming course.

In each case the safest action for the privileged vessel is to turn away from the giving-way ship. If such action is to be taken it should not be left too late. A vessel which makes a late turn to starboard for another vessel fine on the port bow risks being cut in two as she swings broadside-on to the approaching ship.

Rule 21 could therefore be worded as follows:

'Where by any of these Rules one of two vessels is to keep out of the way, the other shall keep her course and speed or alter her course so as to turn away from the giving-way vessel. When, from any cause, a vessel keeping her course and speed finds herself so close that collision cannot be avoided by the action of the giving-way vessel alone she also shall take such action as will best aid to avert collision'.

Turning away from the giving-way vessel should always be a safe manoeuvre when the other ship is broad on the bow or abaft the beam. If the compass bearing of a vessel fine on the port bow is constant or decreasing it should be safe to cross ahead by turning to a course which is 90° to starboard of the bearing. An attempt to cross ahead could be dangerous if the compass bearing is, in fact, increasing and it may be necessary to put a caution to this effect in the Rule.

If the above amendment is accepted it may be necessary to delete the words 'if the circumstances of the case admit' from Rule 22. Rule 27 would cover special circumstances.

Amending Rule 21 would not make it possible to have one set of rules for all conditions of visibility. It will surely be necessary for all vessels to go at a moderate, or safe, speed in fog, and for a power-driven vessel to stop her engines on hearing a fog signal forward of the beam from a vessel whose position has not been ascertained. Rules 17, 20 and 21 could not apply in poor visibility. However it would be possible to give guidance to vessels using radar in fog which would be generally consistent with the rules for power-driven vessels in clear weather if Rule 21 were to be amended. Such guidance could be given in Annex 6 and 7 as follows:

ANNEX 6. The direction of an alteration of course is a matter in which the mariner must be guided by the circumstances of the case but it is strongly recommended that:

- (a) An alteration of course for a vessel forward of the beam, or on the port quarter, should be to starboard.
- (b) An alteration of course for a vessel astern, or on the starboard quarter, should be to port.

ANNEX 7. An alteration of speed either alone or in conjunction with an alteration of course should be substantial. A number of small alterations of speed should be avoided. A reduction of speed to avoid a close-quarter situation is particularly recommended:

- (a) When the other vessel is abeam, or nearly abeam, to starboard.
- (b) When the compass bearing of a vessel ahead, or on the port bow, is slowly increasing.

In order to give more weight to the above recommendations, Rule 16(c) could be worded as follows:

RULE 16(c) A power-driven vessel which detects the presence of another vessel forward of her beam before hearing her fog signal or sighting her visually shall, whenever practicable, take early and substantial action to avoid a close-quarter situation, preferably by altering her course to starboard or reducing speed in accordance with recommendations 6 and 7 in the Annex of the Rules. If a close-quarter situation cannot be avoided such power-driven vessel shall, so far as the circumstances of the case admit, stop or, if necessary, reverse her engines in proper time to avoid collision and then navigate with caution, avoiding any alteration of course to port, until danger of collision is over. Any vessel which detects the presence of another vessel abaft her beam without sighting her visually may take action to avoid a close-quarter situation, preferably by altering her course so as to turn away from the vessel detected.

Suggested alterations of course could be indicated in a manœuvring diagram (Fig. 3).

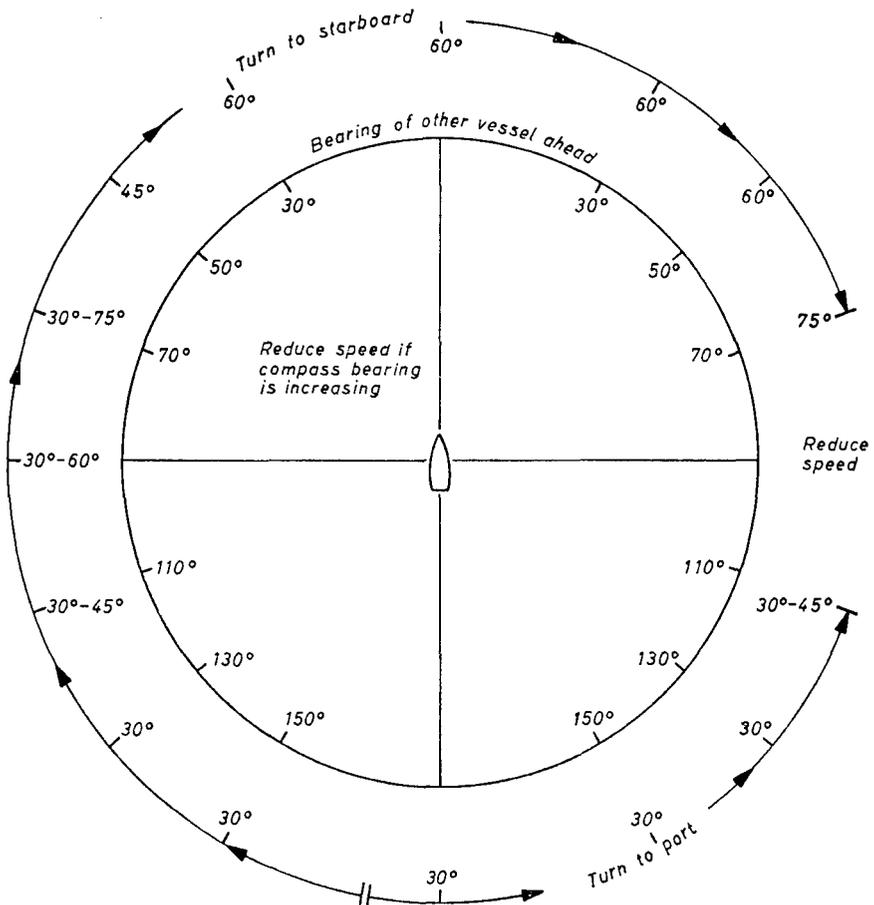
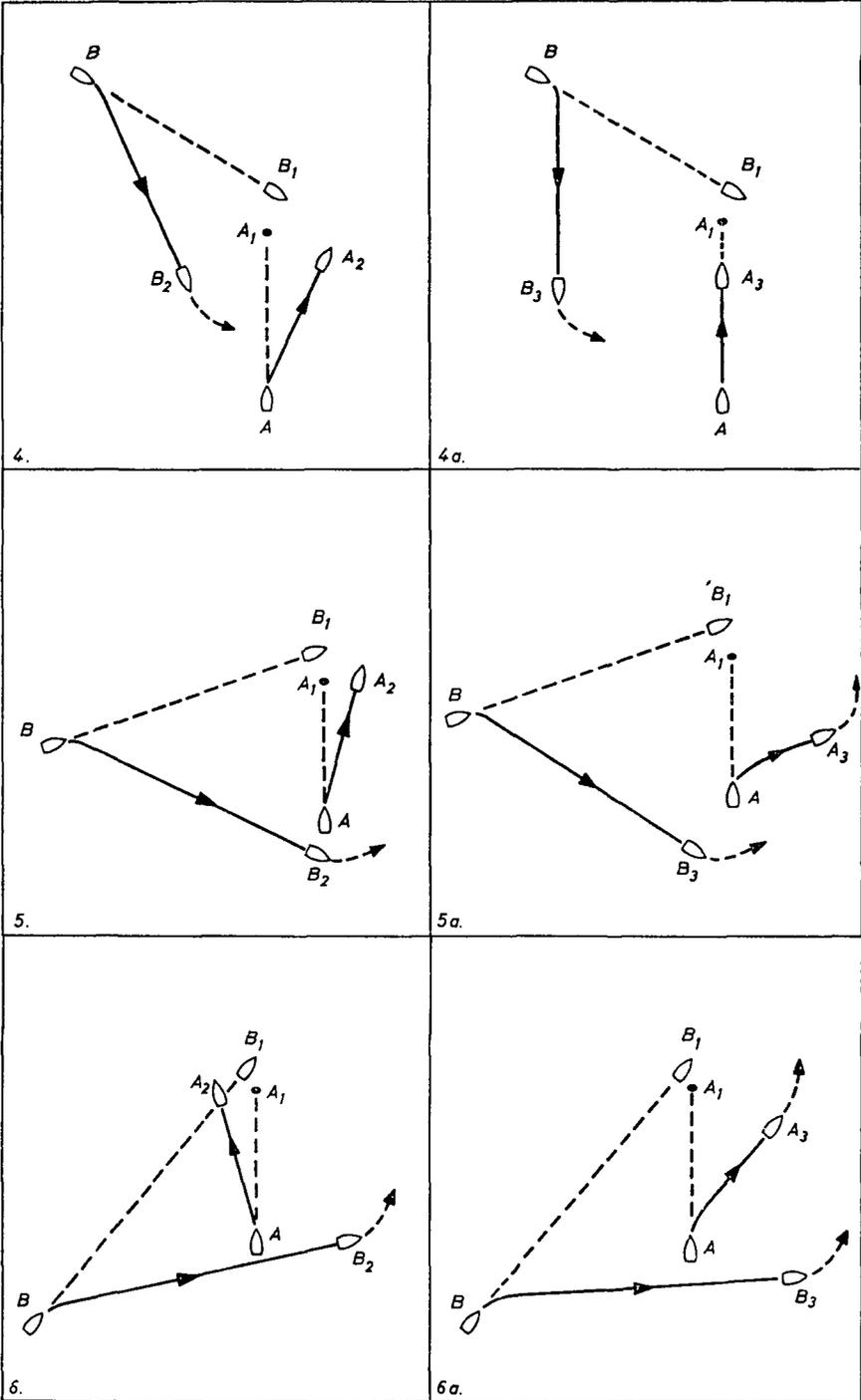


FIG. 3. Manœuvring diagram showing suggested alterations of course in conjunction with Rule 16(c)



FIGS. 4, 5, 6

Action taken in accordance with the above amendments differs from anti-clockwise manœuvres in the following respects:

- (1) A reduction of speed, rather than an alteration to starboard, is recommended to avoid a close-quarter situation when the compass bearing of a vessel on the port bow is increasing.
- (2) When the other vessel is abeam, or nearly abeam, to port an alteration of course to starboard, or a reduction of speed, is recommended instead of an increase in speed.
- (3) An alteration to starboard, rather than to port, is recommended for a vessel on the port quarter.

In Figs. 4, 5 and 6, A_1 and B_1 indicate the positions of vessels A and B at nearest approach if both keep their course and speed. A_2 and B_2 indicate their respective positions after the same interval if both manœuvre to make the bearing rotate anti-clockwise. It can be seen that, in each case, the action of vessel A is unsafe if B keeps course and speed.

In Figs 4a, 5a and 6a, A_3 and B_3 indicate the positions of A and B at times corresponding to A_1 and B_1 , after taking action in accordance with the suggested amendments to Annex 6 and 7. The manœuvres are safe whether B takes prescribed action or takes no action.

The recommendations to vessels using radar in reduced visibility are sufficiently flexible to be applicable in a multi-ship situation. Some discretion is left to the master. They do not conflict with anything contained in the existing Rule 16 and the Annex.

The suggested amendments appear to overcome most of the objections to the present Rules whilst avoiding the disadvantages of the anti-clockwise system. They do not involve any radical change. Recommended actions are generally in accordance with existing practice.

REFERENCE

- ¹ Kemp, J. F. (1965). Some suggestions on the rules for Preventing Collision at Sea. *This Journal*, 18, 233.