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## UNIT 2 COLLISION PREVENTION

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### 2.1 INTRODUCTION

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This unit introduces you to the International Regulations for Prevention of Collision at Sea, 1972 (IPRC).

#### Objectives

After studying this unit, you should be able to

- understand the necessity of framing, studying and memorizing International Regulations for Preventing Collisions at Sea,
- understand the structure of these Regulations,
- understand (and memorize the requisite component) “Part A: General of these Regulations”, and
- understand (and memorize the requisite component) “Part B: Sections I and II of these Regulations” except Rules 6,9,10,12 and 16.

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## 2.2 OVERVIEW OF IRPC, 1972

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### 2.2.1 Necessity for Making these Regulations

As stated in the title, the primary purpose of these Regulations is to prevent collisions at sea. When these Regulations were first formulated in the year 1910, they were called “Rules of the Road”. This name was abbreviated by the seafarers as ROR. Even today, when the actual title has totally changed, the acronym ROR is still prevalent in the seafaring world, and commonly used to describe them. This name was given because the idea of formulating these Regulations was derived from the rules which exist in any city to prevent accidents between vehicles on the roads. You must have come across such rules during your daily life when walking on the road, or when driving or riding in any big or small vehicle. Just imagine what will happen if such rules did not exist. There would be total chaos on the roads and obviously it would lead to serious accidents.

For similar reasons Regulations were made to prevent collisions at sea. Once you become a Navigating Officer after acquiring the Second Mate’s Foreign Going Certificate of Competency, you will be solely responsible for safe navigation of the ship during your duty hours. In carrying out this function you will have to ensure that under no circumstances you will allow a close quarters situation to take place with another ship. To achieve this purpose you will have to learn, understand and apply these Regulations so that at any time at sea if a risk of collision with another ship develops, you will remember these Regulations and take appropriate action to keep clear of that ship.

### 2.2.2 Necessity for Making International Regulations

The rules made for city roads apply only in one country and not necessarily in another country. This does not cause any difficulty because the vehicles on the road do not normally move from one country to another on a daily or regular basis. If someday a person goes to another country then he will have to learn the rules of that country before he will be allowed to drive a vehicle over there. However, for ships this ideology cannot be applied. A trading ship has to go from one country to another very frequently. In such a case the Navigating Officer will have to learn the Regulations of each country before he can safely navigate through their waters. This would be totally impracticable.

Furthermore when the ship is passing through large oceans it will not be passing through the territory of any country, or in other words the ship will be in International waters. In such a case the Regulations of any particular country cannot be applied because when ships belonging to different nationalities meet they would not be following the same set of Regulations. This would lead to utter confusion and obviously result in serious accidents.

Hence it is essential that all ships at all times, wherever they may be, should follow the same International Regulations to avoid collision. Just as you will be studying these Regulations in India, similarly cadets in other countries would be studying them in their institutes. This would ensure that whenever two ships of two different countries, having Navigating Officers of different nationalities, are navigating ships, will take appropriate actions in compliance with these International Regulations and thus avoid collision.

### 2.2.3 Collisions at Sea

When two ships collide at sea, it could be a total calamity in terms of loss of money, life and property, and damage to the environment, in the following ways:

- The ships may suffer severe structural damage resulting in heavy repair costs and loss of earning during the period of repair.
- The ship may even sink resulting in a severe loss for the owner.
- The cargo being carried by the ships may be damaged or lost, resulting in heavy claims on the ship owner by the cargo owners.

- Seafarers may get injured or even lose their lives. Compensation claims on the ship owner could be very heavy.
- The fuel oil, cargo or other material falling into the sea may cause severe pollution, resulting in the affected parties claiming heavy compensation from the ship owner.

The ship owner could hold the Navigating Officer on duty responsible for having caused him such heavy losses and may dispense with his services. Such an Officer may not find it easy to get another job, and may end up losing his certificate of competency.

### 2.2.4 Mandatory Compliance

These Regulations have been prepared by the International Maritime Organization (IMO) which is an important organ of the United Nations Organization. All maritime countries are members of IMO and these Regulations have been accepted by practically all such countries, including India and it is the obligation of every country to ensure that their Navigating Officers acquire total knowledge of these Regulations.

### 2.2.5 Structure of these Regulations

- There are a total of 38 Rules which are grouped under Parts A to E.
- Part A consists of Rules 1 to 3 which deal with general aspects like Application, Responsibility and Definitions.
- Part B, called the Steering and Sailing Rules, is the main operational Part of these Rules. It is divided into three sections as follows:
  - (a) Section I consists of Rules 4 to 10 which prescribe the conduct of vessels in any condition of visibility.
  - (b) Section II consists of Rules 11 to 18 which prescribe the conduct of vessels in sight of one another.
  - (c) Section III consists of Rule 19 only which prescribes the conduct of vessels in restricted visibility.
- Part C consists of Rules 20 to 31 which prescribe the lights and shapes which should be displayed by every vessel during day and night respectively. This will enable you as the Navigating Officer to identify the type of vessel you have sighted and then decide the action which you should take in accordance with these Rules to avoid collision.
- Part D consists of Rules 32 to 37 which prescribe the sound signals which should be sounded by every vessel in various situations.
- Part E consists of Rule 38 only which prescribes exemptions which were granted to certain vessels for a limited period of time. This time period however has now expired.
- Besides the above Rules there are five Annexes as follows:
  - (a) Annexes I, II and III prescribe the technical specifications for lights, shapes and sound signals which have to be carried or used as stated in the respective Rules.
  - (b) Annex IV prescribes the distress signals which may be used by any vessel in distress and requiring assistance from another vessel.
  - (c) Annex V lays down guidelines of IMO for proper implementation of these Rules.

### SAQ 1

- (a) What is the purpose of these Regulations?
- (b) What will happen if various countries prescribe their own Regulations to be followed in their territory?

- (c) Why is it so important that collision between ships should be prevented at all cost?
- (d) State in your own words the material loss which is likely to occur if a collision occurs at sea.
- (e) Why is it necessary that you should have thorough knowledge of these Regulations and also memorise some of them?

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## 2.3 PART A of IRPC, 1972-GENERAL

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### 2.3.1 Rule 1: Application

Student should know the gist of this rule without missing out any essential details.

#### Para (a)

- This Rule states that all the Rules forming part of the Collision Regulations shall apply to the ships
  - (a) On all the high seas,
  - (b) In all the waters connected with the high seas and navigable by seagoing vessels, and
  - (c) It is applicable to all vessels in all the above areas.
- The term “High sea” is not defined anywhere. However, it shall by implication include all sea areas which are navigable by sea going vessel.
- The expression “Waters connected with the high seas” means areas like harbours, rivers, lakes, sea areas where vessels would normally anchor, etc. If these areas are connected with the high seas and are used by seagoing vessels then these Regulations shall also apply in such areas.

#### Paras (b), (c) and (e)

- This Rule further states that IRPC 1972 shall not interfere with the operation of special rules made by a country.
  - (a) For navigating in harbours, rivers, lakes, sea areas where vessels would normally anchor, etc., of that country, provided these areas are connected with the high seas.
  - (b) To provide additional lights, shapes and whistle signals (more than the International Regulations) for the following vessels:
    - (i) Ships of war.
    - (ii) Vessels proceeding under convoy.
    - (iii) Fishing vessels engaged in fishing as a fleet.
  - (c) To prescribe special lights, shapes and sound-signalling appliances (different from the International Regulations) for vessels of special construction or purpose.
- By this Rule the IMO has recognized the sovereign right of every country to make its own special rules which shall be followed in lieu of the International Regulations, by all vessels when they are in the territory of that country.

- However the country making any special rule shall ensure that –
  - (a) Such special rule is similar to the International Regulations as far as possible.
  - (b) If additional lights, shapes and whistle signals as stated above are provided, then these shall not be mistaken for those prescribed in the International Regulations.

### 2.3.2 Rule 2: Responsibility

This Rule is the essence and the basic philosophy of these Regulations. As the title states, it prescribes very precisely the responsibility of the owner, master or crew of every vessel for avoiding collision at all costs. It is necessary that you should memorize this Rule so that you do not misinterpret it. At the same time you should be able to explain it in your own words. Explanation of more important parts of the rule is given below:

#### Para (a)

- No Rule within these Regulations shall excuse a ship, her owner, master or crew vessel from the consequences:
  - (a) If any one does not comply with any Rule in these Regulations.
  - (b) If any one does not take a precaution which may be required by the ordinary practice of seaman, even if such precaution is not stated in these Regulations.
  - (c) If any one does not take a precaution which may be required by the special circumstances of the case.
- “Ordinary practice of seaman” means common sense, logical thinking of a seaman, or precautions, which are required by good seamanship.
- A vessel underway is expected to stay away at a safe distance from a ship at anchor and similarly, if a ship is anchoring she is expected to anchor at a safe distance away from one that has anchored earlier are precautions which are required by good seamanship.

#### Para (b)

- Departure from the Rules is permitted only under the following circumstances:
  - (a) If it is necessary to avoid an immediate danger.
  - (b) If it becomes unavoidable, after taking into account –
    - (i) any special circumstances, and
    - (ii) limitations of the vessels involved.

The above Rule makes it amply clear that if the situation demands a departure from the rules may be necessary to avoid immediate danger of collision. Take for instance a case where two vessels are meeting end on and one of the vessels is unable to alter her course to starboard as required by Rule 14 due to a shallow patch on her starboard side – departure from the rules is permitted when there are special circumstances and there is an immediate danger.

### 2.3.3 Rule 3: Definitions

You should memorise all the definitions in this Rule. In order to help you to do so, certain important terms and phrases in certain definitions have been explained below:

#### Vessel

This is another name for a “water craft” i.e. any craft floating on water. However certain special types of crafts like WIG crafts and seaplanes, which strictly do not qualify as a water craft, have been included within the meaning of the word “vessel”.

“**Non-displacement craft**” is a special craft which is supported by a cushion of air just above the surface of water. It does not float on water but it operates at high speed close to the water surface. Seaplane and Wing In Ground craft have been defined later in this section.

Student should note that every object which floats on water can be called a water craft but it will be included within the meaning of the word “vessel” **only if it is used or capable of being used as a means of transportation on water.**

Examples of water crafts which are not used for transportation, and hence do not qualify as a vessel, are – Buoys, Pontoons, Floating dry-dock, Log of wood, etc.

### Sailing Vessel

It obviously means a vessel which moves forward with the help of sails. However it is possible that it may also be provided with machinery which may be used for propulsion when the winds are not favourable. In such a case the vessel shall be treated as a power-driven vessel. In other words, for a sailing vessel which is provided with sails and machinery, following possibilities exist:

- (a) If only sails are being used then it is a sailing vessel.
- (b) If machinery is being used then it is to be considered as a power-driven vessel.
- (c) If both sails and machinery are being used then it is a power-driven vessel.

### Vessel Engaged in Fishing

It obviously means a vessel which is engaged in catching fish by using appropriate fishing gear. However this definition prescribes an additional condition that the fishing gear being used should be of the type which would restrict the manoeuvrability of the vessel. This restriction would not allow the vessel to take action to avoid collision with another vessel. In case the fishing gear does not restrict the manoeuvrability of the vessel then it will not be treated as a vessel engaged in fishing.

From the above explanation two conclusions can be drawn:

- (a) If you come across a vessel engaged in fishing i.e. its gear does not allow it to take action to avoid collision, then you shall be duty bound to take suitable avoiding action.
- (b) When your vessel is at sea and you decide to throw a line over the side to catch fish, then your vessel cannot be considered to be a vessel engaged in fishing because your fishing line does not restrict the manoeuvrability of your vessel.

### Seaplane

It is actually an aircraft which has an additional capability of landing on water and moving slowly over it.

### Vessel Not Under Command (NUC)

It means that the vessel, **because of some exceptional circumstances, is unable to manoeuvre** as required by these Regulations and hence it will not be able to take action to avoid collision with another vessel.

Examples of the term “**Exceptional circumstances**” can be as follows:

- (a) Serious damage to the vessel’s structure.
- (b) Breakdown of vessel’s machinery or essential manoeuvring equipment.
- (c) Emergency on board which renders her unable to keep out of the way of another vessel by alternation of course and/or speed. Such

emergences could include fire, ingress of water in the vessel, shift of cargo, oil pollution.

It is obvious that if you come across a NUC vessel then you are duty bound to keep out of her way.

### **Vessel Restricted in her Ability to Manoeuvre (RAM)**

This expression applies to a vessel which, **because of the nature of her work, is restricted in her ability to manoeuvre** and hence cannot take action to avoid collision with another vessel.

Examples of such vessels are given in the definition itself. You will notice that all these vessels are engaged in some special kind of work and due to the nature of their work unable to keep out of the way of other vessels.

### **Vessel Constrained by her Draught (CBD)**

This is generally a large power-driven vessel having deep draught. It can happen that in a particular sea area near the coast, the depth of water may not be enough for this vessel to navigate freely. Within this sea area, there may be a channel, either man-made or natural, having sufficient water depth for this vessel. If so, then this vessel can manoeuvre only in this channel and she will not be able to deviate from her course to avoid collision with another vessel, for fear of running aground. She is then said to “constrained by her draft”. If your vessel is in the vicinity and you do not have similar draught problem, then you have to take action to avoid collision with this vessel.

### **Underway**

This means that the vessel is:

- (a) Not at anchor.
- (b) Not made fast to the shore, i.e. not secured to a jetty or similar structure by ropes or wires.
- (c) Not aground.

By implication it means that the vessel is not secured to land by any method and it is floating freely. While so floating there are two possibilities as follows:

- (a) It may be moving ahead due to her propulsion system, in which case, it is said to be “Making way through water”.
- (b) It may be stopped and only drifting due to the effect of wind and current. It is then said to be stopped and “**not making way through water**”.

### **In Sight of One Another**

Two vessels are said to be in sight of one another when one can be observed visually from the other, i.e. the Navigating Officer on duty on the Bridge can see the other vessel with his own eyes. Even if he uses a binocular or telescope to enlarge the image of the vessel because it may be far away, it would still mean that he has sighted the other vessel visually. However detecting a vessel by using Radar or other electronic device would not mean sighting visually or in sight of one another.

### **Restricted Visibility**

At sea, in good visibility, you may be able to see a vessel upto the horizon. But in certain weather conditions as listed in this definition, it is possible that the horizon is not visible. Then the visibility is said to be “restricted”. This restriction is due to weather conditions and not by land or other obstruction.

### **Wing-in-Ground (WIG) Craft**

This is a new special type of craft which was introduced in these Regulations in the year 2003. It is capable of flying at reasonable speed close to the water surface by creating an air cushion below itself, by utilizing surface-effect action. But it cannot fly high above the water.

### SAQ 2

- (a) Where and to whom do these Regulations apply?
- (b) Under what circumstances can a country make special rules by superseding the International Regulations?
- (c) Why does the definition of the term “Vessel” include special crafts like “Non- displacement craft”, “Seaplane” and “Wing-in-ground craft”, even though they are strictly not water crafts?
- (d) While your vessel is at sea, if you decide to catch fish by using a line and hook, then why your vessel cannot be considered to be a “Vessel engaged in fishing”?
- (e) Distinguish between a NUC and RAM vessel.

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## 2.4 PART B SECTION I: CONDUCT OF VESSELS IN ANY CONDITION OF VISIBILITY

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### 2.4.1 Rule 4: Application of Part B Section I

This Rule states that all the Rules given in Section I of Part B of these Regulations, i.e. Rules 5 to 10, shall apply in any condition of visibility. This means that these rules will be followed by all ships irrespective of whether they are experiencing good visibility conditions or operating in restricted visibility conditions.

### 2.4.2 Rule 5: Lookout

Every vessel shall at all times maintain a proper lookout by sight and hearing as well as by all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and of the risk of collision.

While memorising this Rule you should pay particular attention to certain important terms and phrases as follows:

- (a) “**Every vessel**” means any vessel regardless of the type, size, speed, mode of propulsion, operational condition, nature of work, etc., without exception.
- (b) “**At all times**” means by day and by night.
- (c) Lookout shall be maintained by “**Sight**”. In other words the Navigating Officer on duty should always keep his eyes open so that in day time he can see a vessel as soon as it comes above the horizon, and at night he can immediately see the navigation lights of a vessel as soon as they come within the visibility range.
- (d) Lookout shall also be maintained by “**hearing**”, i.e. he should keep his ears open as well so that he can hear sound signals from vessel which may not be visible to you due to restricted visibility.
- (e) In addition to keeping lookout by sight and hearing, “**all available means**” appropriate in the prevailing circumstances and conditions should be used. These available means may include:



- (i) Radar
  - (ii) ARPA
  - (iii) Clear view screen or window wiper
  - (iv) Sun shades
  - (v) Heating system for the window glass to defrost it
  - (vi) Automatic Identification system
- (f) Lookout shall be maintained so as to make “full appraisal of the situation and of risk of collision”. If an officer keeps a proper lookout then he will detect another vessel when it is still far away. This gives him enough time to fully assess the situation and take correct action to avoid collision.
- (g) “Full appraisal” means ascertaining the following data before actually taking an avoiding action:
- (i) Type of the vessel.
  - (ii) Its mode of operation (sails or machinery).
  - (iii) Is it making way, not making way, anchored, etc.?
  - (iv) If both the vessels continue on the same course and at the same speed then are they likely to come close to each other, i.e. will there be a risk of collision or not?
  - (v) Direction of approach of the other vessel.
  - (vi) If there is a risk of collision then, as per Rules, are you expected to take action or is the other vessel expected to do so, to avoid collision?
  - (vii) What action should you take as per Rules?
  - (viii) Is there sufficient space around you for taking appropriate action?
  - (ix) Are there any other vessels in the vicinity, or are there any shallow water areas around your vessel which could hamper the action which you propose to take?
- (h) If the officer sights the vessel very late he will not be able to assess the situation in detail as stated above and may not be able to take the appropriate action.
- (i) Full appraisal “should also be taken to mean that the officer on watch or person in charge must pay attention to what is happening on his ship as well. He must keep a check on steering and ensure that all equipments required for keeping the vessel on course or to take any avoiding action is functioning properly.
- (j) To maintain a “Proper lookout” you are expected to take the following steps:
- (i) Take adequate rest before coming on duty.
  - (ii) You should be physically fit and mentally alert.
  - (iii) Take proper wash so that you are wide awake and alert.
  - (iv) When coming on night duty you should adapt your eyes to darkness by standing in darkness for few minutes, before actually taking over duty.
  - (v) You will have to move around in the open when on duty, hence make sure that you are wearing proper clothes suitable for the prevailing weather conditions.

(vi) Do not engage yourself in any other work.

(vii) Do not engage in any unnecessary conversation or other modes of relaxation like reading, writing, listening to music, etc., as all these will distract you from your primary duty of keeping a proper lookout.

Mandatory standards regarding watch keeping including standards for keeping a proper lookout are contained in Part A, and guidance for principles to be observed is given in Part B of the STCW Code.

### SAQ 3

- (a) What do you mean by “Any condition of visibility”?
- (b) What is wrong in doing some official work and at the same time keeping lookout?
- (c) Why is it important to adapt your eyes to darkness when you come on night duty?
- (d) How will maintaining a lookout by “Hearing” help you to avoid collision?
- (e) Why is it essential to wear proper clothes for maintaining a proper lookout?

### 2.4.3 Rule 7: Risk of Collision

In the pervious unit you have learnt how to maintain a proper lookout, which will enable you to detect another vessel when it is still far away. After detecting that vessel you have to decide whether there is a risk of collision with the ship you have sighted or she is passing you at a safe distance.

#### Para (a)

- It is the duty of every vessel to determine if a risk of collision with another vessel exists or not. Here “**Every vessel**” has the same meaning as discussed in the pervious chapter.  
  
“Every vessel” means any vessel regardless of the type, size speed, nature of work, etc., without exception.
- To determine risk of collision “**All available means**” appropriate to the prevailing circumstances and conditions shall be used. The means or devices shall include:
  - (a) Radar
  - (b) ARPA
  - (c) Automatic identification system
  - (d) Magnetic compass
  - (e) Gyro compass and repeaters
  - (f) Azimuth ring/Pelorus
  - (g) Information received by VHF Radio communication concerning movements of other vessels.
- If you have any doubt whether the risk of collision with another vessel exists or not, then you shall take it for granted that it exists and take further action accordingly.

**Para (b)**

Radar and ARPA equipment if fitted must be used properly to obtain an early warning of the risk of collision. Proper use of the radar equipment requires that all controls are at their optimum settings, appropriate range/scale is used and in addition the officer should choose the mode of display appropriate to the circumstances in both clear and restricted visibility.

**Para (c)**

Determination of risk of collision must be based on information obtained after several successive observations which have been taken as accurately as possible, otherwise the information may be considered as “scanty”.

**Para (d)**

- (i) Risk of collision shall exist if the compass bearing of an approaching vessel does not appreciably change.

“**Bearing**” means the direction of the other vessel as measured from your vessel with the help of a Magnetic or Gyro compass. If this bearing is measured at least 3 or 4 times, at short intervals of 3 to 5 minutes, and it remains more or less constant, then the risk of collision with that vessel shall exist.

- (ii) When (a) approaching a very large vessel or (b) a tow or (c) when approaching a vessel at close range, then, even if there is an appreciable bearing change, the risk of collision may sometimes exist.

In the three cases mentioned in para d (ii) it is possible that even if the bearing of the other vessel, changes, the risk of collision may still exist. Hence the bearing change alone under those circumstances may not give a clear indication of risk of collision. You will have to confirm this by manipulating various data relating to a given situation with the help of Radar.

**2.4.4 Rule 8: Action to Avoid Collision**

This Rule prescribes various factors which you should consider before deciding the action to be taken to avoid collision.

**Para (a)**

- “**Action shall be taken in accordance with the Rules of Part B**”. Action referred to here is the action to avoid collision in rules of Part B of the IRPC, i.e. Rules 4 to 19.
- “**Action taken shall be positive**”. It means that the action which you decide to take should be such that it will definitely take your vessel away and well clear of the other vessel. You should not take a half-hearted or incomplete action which may delay the collision or create a close quarters situation.
- “**Action shall be taken in ample time**”. Once you realise that there is a risk of collision with another vessel then you should not delay your action. After you learn the use of Radar equipment in detail you will be able to calculate the time period available before the likelihood of collision. Knowing this time period you should take action well before you reach the point when action taken will not be effective.
- “**Action shall be in accordance with good seamanship**”. We have discussed the meaning of observance of good seamanship in the earlier chapters.

**Para (b)**

- “**Any alteration of course and/or speed to avoid collision shall be large enough to be readily apparent to the other vessel**”. Action to avoid

collision will normally consist of an alteration of course and/or speed. Either way you should make a **substantial** alteration. Amount of large alteration is not specified in any Rule, but the alteration may be considered to be large enough when, the Officer on the other vessel which is still far away from you, and who is observing you visually or with the help of his Radar, will notice that the bearings of your vessel from his vessel are changing.

- “**Succession of small alterations of course and/or speed should be avoided**”. You should not alter the course and/or speed by small alterations one after the other, to reach the final alteration which you intend making. This would confuse the Officer of the other vessel as he will not be able to notice these small alterations. Such actions are not considered as “Positive”. In other words, whatever alteration you decide to make, should be positive, large enough and as far as is practicable, made in a single action.

**Para (c)**

- “**Alteration of course may be the most effective action to avoid collision**”. Once you start keeping Bridge duties you will realise that in most cases an alteration of course can be implemented quickly, it is easy to carry out and it results in your vessel passing well clear of the other vessel in the shortest possible time. Reducing speed or stopping or reversing engines, is not so easy and takes a long time to be effective. Hence if you have a choice of actions then you should preferably alter course rather than alter speed. However if there is insufficient sea room around your vessel when it may not be possible to alter course, a reduction of speed may be the only suitable action.

**Para (d)**

- “**Action taken shall be such as to result in passing at a safe distance**”. Obviously when you take any action, the intention should be that your vessel will pass well clear of the other vessel. The safe distance which you should maintain between the two passing vessels, is not prescribed in any Rule. Master’s instructions should be strictly followed.
- “**Effectiveness of the action shall be carefully checked until the other vessel is finally past and clear**”. After you have taken the appropriate action, you should continuously check the bearing of the other vessel at short intervals, to ensure the action taken has been effective or not. This exercise of checking bearings should be continued till you find that the other vessel has moved away and the distance between the two vessels has started increasing.

**SAQ 4**

- (a) What is an Azimuth ring and how does it help in determining risk of collision?
- (b) When risk of collision exists between two vessels, whose duty it is to determine such a risk?
- (c) Explain in your own words the meaning of the phrase “Action taken to avoid collision shall be positive”.
- (d) If you have decided to alter course by 30° to avoid collision with another vessel, will it be better to alter 5° at a time in short spells or should you alter the full 30° at same time? Give reasons for your answer.
- (e) After taking an action to avoid collision what will be your subsequent actions?

## 2.5 PART B SECTION II: CONDUCT OF VESSELS IN SIGHT OF EACH OTHER

### 2.5.1 Rule 11: Application of Part B Section II

This Rule states that all the Rules given in Section II of Part B of these Regulations, i.e. Rules 12 to 18, shall apply when the vessels are in sight of one another, i.e. when one can be observed visually from the other.

### 2.5.2 Rule 13: Overtaking

#### Para (a)

Overtaking vessel shall keep out of the way of vessel being overtaken.

From this statement it is very clear that the overtaking vessel is duty bound to take action to avoid collision with an overtaken vessel. However the Rule does not specify what action should be taken by the former vessel. In other words the Rule is telling overtaking vessel that it can take any action out of five possible actions as follows:

- (a) Alter course to starboard
- (b) Alter course to port
- (c) Reduce speed
- (d) Stop engines
- (e) Reverse the propulsion

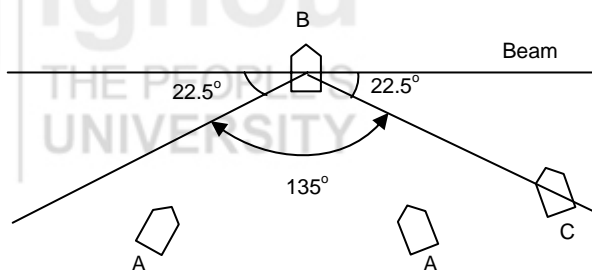


Figure 2.1: Overtaking Vessel

#### Para (b)

A vessel shall be said to be an overtaking vessel if it satisfies following conditions:

- (a) It is coming up with another vessel from a direction more than 22.5° abaft her beam.
- (b) At night the overtaking vessel would be able to see only the stern light of the overtaken vessel but neither of her sidelights.

This can be best explained by Figure 2.1. Vessel A is approaching vessel B from a direction which lies within an arc of 135°. So, as per Rule, A is an overtaking vessel and B is an overtaken vessel.

#### Para (c)

If a vessel is in any doubt whether it is overtaking the other vessel or not, i.e. it is not sure whether it is coming from a direction more or less than 22.5° abaft the beam of the other vessel, then it shall assume that she is an overtaking vessel and take action accordingly to avoid collision.

The above stated doubt can arise in two different ways:

- (i) If the overtaking vessel is nearly on the bearing line of  $22.5^\circ$  from the other vessel. This vessel is shown in Figure 2.1 as vessel C.
- (ii) During the day time when the stern or sidelights are not seen, in which case then the doubt can only be resolved by means of observations made by the overtaking vessel.

**Para (d)**

Any subsequent alteration of the bearing between the two vessels shall not make the overtaking vessel a crossing vessel.

This statement can be best explained by sketch in Figure 2.2. Vessel A is overtaking vessel as it is coming up from a direction more than two points abeam of B. But A is faster than B and gradually moves ahead from position 1 to 2 to 3. At position 3, A is forward of the beam of B and appears to be crossing her. Para (d) makes it very clear that vessel A cannot consider herself to be a crossing vessel within the meaning of these rules. She is an overtaking vessel and shall continue to be responsible to keep out of the way of vessel B until she is finally past and clear as at position 4.

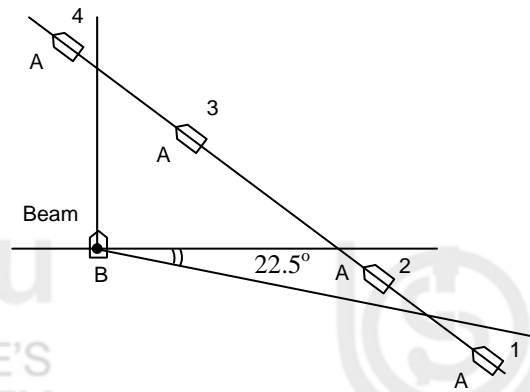


Figure 2.2: Overtaking Vessel

**SAQ 5**

- (a) What do you mean by the phrase “in sight of one another” as applied to Rule 11?
- (b) Your vessel is overtaking another vessel from port side and risk of collision exists.
  - (i) What action will you take? Give reasons for your answer.
  - (ii) After taking the action what will be your further duty?
  - (iii) When would you consider that you are finally past and clear of that vessel?
- (c) Your vessel is on the starboard side of another vessel. The relative bearing of your vessel as measured from the head of that vessel is  $112.5^\circ$ . What action will you take? Give reasons for your answer.

**2.5.3 Rule 14: Head-on Situation**

This Rule applies to risk of collision between two power-driven vessels.

**Para (a)**

- If risk of collision exists between two power-driven vessels which are in a head-on situation, then each shall alter her course to starboard so that each shall pass on the port side of the other.
- You will observe that this Rule very specifically states the action which has to be taken by both the vessels. In other words neither vessel has any choice in this situation, i.e. neither vessel can alter course to port, nor reduce speed nor continue on her course and speed.

### Paras (a) and (b)

- “Head-on situation” is said to exist when all the following conditions are satisfied:
  - (a) Two power-driven vessels are meeting on reciprocal (opposite) or nearly reciprocal courses.
  - (b) One vessel sees the other vessel ahead or nearly ahead.
  - (c) By night one vessel sees:
    - (i) The masthead lights of the other vessel in a line or nearly in a line and both sidelights, or
    - (ii) Only the masthead lights of the other vessel in a line or nearly in a line, or
    - (iii) Only both the sidelights of the other vessel.
  - (d) By day one vessel observes the corresponding aspect of the other vessel.
- “Corresponding aspect” in day time means one vessel sees the masts of the other vessel in a line or nearly in a line with her own masts.

### Para (c)

- If there is any doubt as to whether the head-on situation exists then you shall assume that it exists and take action accordingly to avoid collision.
- Such doubt may exist in the following circumstances:
  - (a) If the masthead lights or the masts of the other vessel are not exactly in a line but slightly separated from each other.
  - (b) If the courses of the two vessels are not exactly reciprocal to each other.
  - (c) If one vessel sees the other slightly on the bow and not exactly ahead.

When two vessels are dangerously close to each other port to port or starboard to starboard or on nearly reciprocal course or crossing at very fine angles, it is important that neither vessel should alter course to port. Several collisions have been caused as a result of one vessel altering course to port to increase the passing distance and the other turning to starboard.

### 2.5.4 Rule 15: Crossing Situation

- This Rule applies to risk of collision between two power-driven vessels.
- You have learnt the definitions of “Overtaking” and “Head-on” situations, given in Rules 13 and 14 respectively. However the “**Crossing situation**” has not been defined in this Rule. Indirectly it means that a crossing situation is said to exist when both overtaking and head-on situations do not exist.
- This is explained by the diagram drawn below. If you are on vessel A then vessels B and C are crossing your vessel because they are neither overtaking you nor head-on.

- If risk of collision exists between two power-driven vessels which are in a crossing situation as stated above, then the vessel which has the other on her own starboard side shall keep out of the way and shall avoid crossing ahead of the other vessel.

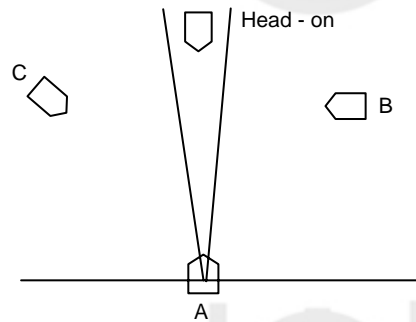


Figure 2.3: Crossing Vessel

- From the above diagram you will realise that your vessel A has to take action to avoid collision with vessel B, while vessel C will take action to avoid collision with your vessel.
- No specific action has been prescribed in this Rule. This means that the vessel which is supposed to avoid collision can take any of the following actions but must not cross ahead of the other vessel.
  - (a) Alter course to starboard and pass astern of the other vessel
  - (b) Reduce speed till the vessel passes
  - (c) Stop Engines and allow the other vessel to pass
  - (d) Reverse propulsion
  - (e) Alter Course to port, make a 360° turn, and pass astern of the vessel.

### SAQ 6

- (a) In day time you sight a power-driven vessel on your starboard bow with both its masts in a line. Explain whether this is a head-on situation.
- (b) In day time you sight the starboard side of a power-driven vessel right ahead. Explain whether this is a head-on situation.
- (c) You sight a sailing vessel crossing your path from starboard to port side. Is this a crossing situation under Rule 15? Give reasons for your answer.
- (d) You sight a fishing vessel right ahead on reciprocal course. Are you obliged to alter course to starboard? Give reasons for your answer.
- (e) You sight a power-driven vessel on your port bow coming down on a reciprocal course. What action will you take? Give reasons for your answer.

### 2.5.5 Rule 17: Action by Stand-on Vessel

- Before proceeding with this Rule you should be able to explain the meaning of the terms given below because these are not specifically defined in these Regulations.
- “Give-way vessel” means a vessel which by any of these Rules is directed to take action to avoid collision with another vessel.



- “Stand-on vessel” means a vessel which is not a ‘give way’ vessel, in accordance with these Rules, and hence shall continue to keep her course and speed.

In an overtaking situation as per Rule 13, the overtaking vessel is a ‘give-way’ vessel while the overtaken vessel is a ‘stand-on’ vessel.

In a head-on situation as per Rule 14, both power-driven vessels are ‘give-way’ vessels.

In a crossing situation as per Rule 15, the power-driven vessel which has the other on her own starboard side is the ‘give-way’ vessel while the other vessel is a ‘stand-on’ vessel.

**Para (a) (i) and (ii)**

As stated above, in a crossing situation, if a risk of collision exists between two vessels, the stand-on vessel shall keep her course and speed. However a situation may arise where the give-way vessel does not take appropriate action in compliance with these Rules. When this becomes apparent to the stand-on vessel. She must take action entirely on her own, to avoid collision.

**Para (b)**

If the stand on vessel finds that the give-way vessel has come so close that her action alone will not help in avoiding collision. In such a case the stand-on vessel shall also take such action as will best aid to avoid collision.

**Para (c)**

This para states what action should not be taken by a ‘stand on’ vessel in case ‘give-way’ vessel does not take any action in a crossing situation. ‘Stands on’ vessel which is permitted to take action to avoid collision by her manoeuvre alone must take into account the possibility that the give way vessel may also take simultaneous action, and in all probability. She will alter her course to starboard. Under these circumstances alternation of course to port would be dangerous.

Reduction of speed or reversing the propeller takes a lot of time. The alteration of course away from the direction of the other vessel could be a safe manoeuvre and perhaps the only alternative. This will of course depend on many factors such as presence of other vessels in the vicinity and navigational dangers. However, if the circumstances of the case admit, Para (c) prohibits a vessel in crossing situation to alter her course to port.

## 2.5.6 Rule 18: Responsibilities between Vessels

**Para (a)**

If you are on a power-driven vessel and there is a risk of collision with a NUC vessel, a RAM vessel, a vessel engaged in fishing or a sailing vessel, and it is either a head-on or crossing situation but not an overtaking situation, then you are a give-way vessel and required to take action to avoid collision. This Rule does not specify any particular action and so you can take any of the following actions:

- (i) Alter Course to starboard
- (ii) Alter Course to port
- (iii) Reduce Speed
- (iv) Stop Engines
- (v) Reverse Propulsion

**Para (b)**

As a power-driven vessel you are not supposed to impede the safe passage of a vessel constrained by draught.

Student should note that as per the initial guidance received from the Maritime Safety Committee of the IMO, “not to impede the passage of another vessel” means, so far as practicable to avoid development of risk of collision.

### SAQ 7

- (a) Identify the give-way and stand-on vessels and quote the appropriate Rule, in the following situations:
- (i) Fishing vessel is overtaking a power-driven vessel.
  - (ii) Sailing vessel is right ahead of a power-driven vessel and on a reciprocal course.
  - (iii) RAM vessel is crossing a power-driven vessel from port to starboard side.
  - (iv) NUC vessel is crossing a power-driven vessel from starboard to port side.
  - (v) Power-driven vessel and a vessel constrained by draught.

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## 2.6 PART B SECTION III: CONDUCT OF VESSELS IN RESTRICTED VISIBILITY

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### 2.6.1 Rule 19: Conduct of Vessels in Restricted Visibility

#### Para (a)

This Rule shall apply only when the following conditions are satisfied:

- (i) The vessels are not **in sight of one another** i.e., they cannot see each other visually, as defined in Rule 3.
- (ii) Vessels are **in or near an area of restricted visibility**. This is explained as follows:
  - (a) When your vessel is inside fog or in similar weather condition and the entire horizon around you is obscured, then your vessel is said to be “In an area of restricted visibility”. In this situation there can be two possibilities:
    - (i) If there is another vessel with you in similar situation and you cannot see each other visually, because the visibility inside the fog is very poor, then this rule shall apply, and you shall take actions in accordance with this Rule.
    - (ii) If both the vessels are inside the fog but the visibility is not too bad and you can see each other visually, then this Rule shall not apply, and your actions shall be governed by Rules 13 to 18, as has been explained earlier.
  - (b) When the fog or similar weather condition has obscured only part of your horizon, then your vessel is said to be “Near an area of restricted visibility”. Even here we have two possibilities:
    - (iii) If another vessel is inside the fog and you are outside it, and you cannot see each other visually, then this Rule shall apply, and you shall take actions in accordance with this Rule.
    - (iv) If both you and the other vessel are outside the fog then you will be able to see each other visually. In that case this Rule shall not apply, and your actions shall be governed by Rules 13 to 18.

**Para (b)****Every vessel shall proceed at safe speed as required in restricted visibility.**

The term “**Safe speed**” is explained in detail in Rule 6. For the time being let us define safe speed to mean speed at which we can conveniently take appropriate action to avoid collision with another vessel and also speed at which we can stop our vessel well before she reaches dangerously close to the other vessel.

On a ship if engines are stopped then the ship will continue to move forward for considerable distance before she finally comes to a stop. This distance will depend on the size and type of the ship as well as the speed at which she was moving before the engines were stopped. The data of “stopping distances” for different speeds is specific to every ship and is available on board. Hence the safe speed will depend on this data as well as the situation in which the ship is navigating.

**A power-driven vessel shall have her engines ready for immediate manoeuvre.**

In other words when your vessel is navigating in or near an area of restricted visibility, you should ensure that the speed can be reduced, or the engines can be stopped or reversed without any delay.

In open sea with normal good visibility, the engines are usually operated at maximum speed and the engineer on duty is informed in advance when there is a need to reduce speed, sufficient advance notice will be given to him by the Master so that he can carry out various procedures prior to the reduction of speed. In other words at Sea the engines are not ready for immediate manoeuvre.

In restricted visibility this delay in reduction of speed is not desirable. It would not be possible for the navigator to give any notice to the engineer on watch. Hence, as soon as the vessel is in or near an area of restricted visibility, master should be informed and upon his instructions inform the engineer on duty to prepare the engines so that at any time, if necessary, the speed may be reduced without the need for giving any notice. Engines are then said to be on stand by. Once the prescribed procedures are completed the engines are ready for immediate manoeuvre.

**Para (d)**

- This para prescribes the actions to be taken by two vessels which have detected each other by Radar but have not sighted each other visually due to restricted visibility. In this situation following actions are necessary.
- Determine by Radar if a risk of collision exists with the other vessel.

You will learn how to determine the risk of collision by Radar at a later stage.

If such a risk exists then you shall take action to avoid collision as stated below:

- (a) If the other vessel is forward of your beam and she is crossing your path, then **DO NOT** alter course to port. This means that you may take any of the following actions depending on the actual situation:
  - (i) Alter course to starboard.
  - (ii) Reduce speed, stop or reverse the propulsion.
- (b) If the other vessel is forward of your beam and you are overtaking her, then you may alter course towards any side, i.e. you may take any of the following actions depending on the actual situation:
  - (i) Alter course to port or starboard.
  - (ii) Reduce speed, stop or reverse the propulsion.

(c) If the other vessel is abeam or abaft your beam, then you shall NOT alter course towards the vessel. This means that you may take any of the following actions depending on the actual situation:

(i) If the other vessel is on your port quarter

Alter course to starboard.

Reduce speed, stop or reverse the propulsion.

(ii) If the other vessel is on your starboard quarter

Alter course to port.

Reduce speed, stop or reverse the propulsion.

- All the above steps and actions have to be taken by both the vessels. In other words, in restricted visibility, if risk of collision exists between two vessels of any type which are not in sight of one another, **then both have the responsibility to take action to avoid collision, i.e. both are give way vessels.**

**Para (e)**

- This Para applies to a situation wherein you have heard a fog signal, apparently sounded by a vessel forward of your beam, but you have neither sighted her visually nor detected her by Radar or you have detected her on radar and you are not in a position to avoid close quarters situation. Implications of this situation can be expressed as follows:

(a) You have not sighted her visually, which means the visibility is very poor.

(b) The other vessel is fairly close to you because the sound signal can normally be heard at a distance of two miles only.

(c) You have not detected her by Radar which means either your Radar is not functioning properly or the vessel is small or of a type which cannot be easily detected by Radar.

(d) As you have not sighted her visually nor detected her by Radar, you could not have determined whether a risk of collision exists.

In view of the above, you will realise that this is a very serious situation and that you have to take immediate action.

- The only possible action is to stop the engines immediately.
- After stopping the engines you will notice that the forward movement of the vessel gradually reduces and steering may be adversely affected. If you find that you cannot steer the vessel on the given course, even after turning the helm and rudder to the maximum, then you may re-start the engine at minimum speed just to ensure that the rudder becomes effective and your vessel keeps on her course.

- You will now take immediate steps to ascertain the whereabouts of the other vessel as follows:

(a) Post extra persons or the same persons who are already on Bridge duty, at strategic places to keep a sharp lookout for this vessel in case it comes out of fog.

(b) Monitor the sound signal of the other vessel and check if there is any change in its intensity or the direction from where you first heard it coming. This may give you some idea of the likely movement of the vessel. As per Rules, which you will study in subsequent lessons, the fog signal is supposed to be sounded in restricted visibility by all vessels at fixed time intervals.

(c) Check the working condition of the Radar and ascertain why it did not detect the vessel. Maybe by adjusting certain controls of the Radar, which were probably not set properly, you may detect the vessel and then you can decide your next action as stated in the previous para. Or you may still not detect the vessel.

- If the above steps do not yield any definite result then you shall stop your vessel completely by stopping and reversing the engines.
- If you have detected a vessel forward of your beam on the radar and it is not possible for you to avoid a close quarters situation then the best option could be to take the “way off” as soon as possible. Change in speed or taking the way off is generally very effective when the other vessel is approaching from nearer the beam but otherwise depending on the situation the action of stopping engines or reversal of propulsion can be taken in association with alternation of course.

### SAQ 8

- (a) Explain the statement “In or near an area of restricted visibility” in your own words.
- (b) Explain when and why your vessel’s engines should be “Ready for immediate manoeuvre”.
- (c) In restricted visibility you detect a vessel by Radar as stated below and risk of collision exists. State your action in each case and quote the appropriate Rule:
- (i) Vessel on your port bow, and crossing towards your starboard side.
  - (ii) Vessel on reciprocal course, right ahead of your vessel.
  - (v) You are overtaking a vessel on your starboard bow.
  - (vi) Vessel on your port quarter.
  - (vii) Vessel on your starboard beam.
  - (viii) Vessel right astern.
- (d) In restricted visibility you hear a fog signal as stated below, but you have not detected the vessel either visually or by Radar. State your actions in each case and quote the appropriate Rule:
- (i) Fog signal on your starboard side.
  - (ii) Fog signal on your port side.
  - (iii) Fog signal nearly astern of your vessel.

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## 2.7 SUMMARY

The rules explained in this unit are in parts and sections. While ‘Part A’ deals with the general aspects of the rules, such as applicability, responsibility and definitions, ‘Part B’ consists of sections dealing with the rules to be followed by ships under different conditions of visibility. In any condition of visibility –

- In sight of each other
- In restricted condition of visibility

It is important for the students to note and understand the difference between the rules and the action required to be taken in Section II and Section III. All actions to be taken as

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required under Section III are to be taken by both vessels and hence both are to be considered as 'give way' vessels.