Handbook of the Nautical Rules of the Road

THIRD (ON-LINE) EDITION

Chris Llana and George Wisneskey

Welcome to the new on-line *Handbook of the Nautical Rules of the Road*. This publication first went into print in 1986; a second edition was published in 1991.

The Naval Institute Press for years had two competing navigation rules books in print: this one and Farwell's. In the interest of their bottom line, they have elected to retain only one (Farwell's).

As a result, we the authors have regained full rights to the the *Handbook* and are making it available to mariners everywhere for free. We are now also able to incorporate updates and enhancements that the publisher was unwilling to undertake.

We would like to thank the thousands of mariners who since 1986 bought, used, and recommended the *Handbook of the Nautical Rules of the Road*. We hope you continue to get good use of this on-line edition.

Initially this web-based third edition will include only text, updated to incorporate rule changes through 1998. As time and resources allow, we will further update our text to reflect the current state of the rules, and begin to add illustrations. At some point we may add new sections (for example, analyses of significant historical collisions).

The organization of this web site will initially follow that of the print editions. The table of contents page will contain links to separate web pages for each rule. It has been necessary to re-type everything to put it on the web, and this work is not yet done. Please be patient while we finish entering the rest. We are getting no revenue from this site (although advertisers are welcome) and have other demands on our time.

After all the text has been entered, we will insert internal links to sections of referenced related rules. Later there will be links from the discussion to relevant illustrations.

Text will be black on a white background to facilitate printing. Readers may print any portion of this site for their own personal use, without prior permission. No commercial use of any original material in this web site may be made without express permission from the authors.

We hope you get some benefit from this. May your days see fair weather and your fine vessels never go bump in the night!

Chris Llana & George Wisneskey
October 30, 2006

UPDATE: April 8, 2008

Traffic on the site has been light so I have been working on higher priority needs. I have just added Rule 38 (finally) and am starting on Annex I. I have used new improved software to scan and scale the original illustrations for Rules 10 and 12, and replaced the bad Rule 34 illustration. I've also scanned about 20 illustrations for Annex I, and intend to add navigation light illustrations after finishing keying in the rest of the text (which is quite a bit).

Chris Llana

UPDATE: July 5, 2008

I have posted the first half of the very lengthy Annex I section.

UPDATE: August 6, 2008

I have added a page describing the 2001 amendments to the International Rules. These amendments concern wing-in-ground aircraft -- usually seaplanes that cruise just above the water to gain extra lift (meaning low enough to collide with vessels).

UPDATE: August 13, 2008

I have posted the second half of the Annex I discussion.

Table of Contents
About the Authors

Handbook of the Nautical Rules of the Road by Llana & Wisneskey

Home - Table of Contents

2001 Amendments to the International Rules

This on-line nav rules book is current through 1998. Amendments to the International Rules were enacted in 2001 and came into force in 2003. These amendments deal with WIG craft, or wing-in-ground craft which in my experience I believe are aircraft designed to fly so low over the water that their wing is in "ground-effect." In other words, the lift of the wing is increased because the higher air pressure under the wing is constrained by the water -- a bubble of pressure that pushes up.

Conventional airplanes experience this phenomenon just as they settle down on the runway during landing. The aircraft seems to float just above the runway until speed bleeds off and the wheels then touch down. As a private pilot, I can tell you that beginning pilots landing long or too fast find this ground-effect somewhat disconcerting -- the plane refuses to put its wheels on the gound even as the end of the runway looms ever closer.

Anyway, the advantage of this extra lift is greater carrying capacity with the same power. A plane can carry more stuff more efficiently. The downside is you have to fly close to the ground or water, and the air is more dense there so drag increases prohibitively as speed increases. So you would want to keep speed relatively low, compared to high-flying jets. But it's going to be a lot faster than other forms of ground transportation.

Apparently someone has found a niche market for this type of craft, and so these amendments were enacted.

I don't yet have a copy of these amendments, so I can't give them to you. The International Maritime Organization will sell you a copy (although the link did not work for me). The IMO described these amendments:

The 2001 amendments; Adoption: 29 November 2001; Entry into force: 29 November 2003

"The amendments include new rules relating to Wing-in Ground (WIG) craft. The following are amended:

- General Definitions (Rule 3) - to provide the definition of wing-in-ground (WIG) craft;
- Action to avoid collision (Rule 8 (a)) - to make it clear that any action to avoid collision should be taken in accordance with the relevant rules in the COLREGs and to link Rule 8 with the other steering and sailing rules;
- Responsibilities between vessels (Rule 18) - to include a requirement that a WIG craft, when taking off, landing and in flight near the surface, shall keep clear of all other vessels and avoid impeding their navigation and also that a WIG craft operating on the water surface shall comply with the Rules as for a power-driven vessel;
- Power-driven vessels underway (Rule 23) - to include a requirement that

WIG craft shall, in addition to the lights prescribed in paragraph 23 (a) of the Rule, exhibit a high-intensity all-round flashing red light when taking off, landing and in-flight near the surface;

- Seaplanes (Rule 31) - to include a provision for WIG craft;
- Equipment for sound signals and sound signals in restricted visibility (Rules 33 and 35) - to cater for small vessels;
- Positioning and technical details of lights and shapes (Annex I) - amendments with respect to high-speed craft (relating to the vertical separation of masthead lights); and
- Technical details of sound signal appliances (Annex III) - amendments with respect to whistles and bell or gong to cater for small vessels.

The chances of encountering one of these craft is remote for most everyone, but if you do run into (oops, poor word choice) . . . if you *encounter* an aircraft flying at high speed two meters above the water, you'll probably just hope that he sees you.

Home

Table of Contents

Annex I -- Positioning and Technical Details of Navigation Lights (continued)

This is the continuation of Annex I.

INTERNATIONAL	INLAND
5. Screens for sidelights	**§ 84.09 Screens**
The sidelights of vessels 20 meters or more in length shall be fitted with inboard screens painted matt black, and meeting the requirements of Section 9 of this Annex. On vessels of less than 20 meters in length the sidelights, if necessary to meet the requirements of Section 9 of this Annex, shall be fitted with inboard matt black screens. With a combined lantern, using a single vertical filament and a very narrow division between the green and red sections, external screens need not be fitted.	(a) The sidelights of vessels 20 meters or more in length shall be fitted with mat black inboard screens and meet the requirements of § 84.17. On vessels of less than 20 meters in length, the sidelights, if necessary to meet the requirements of § 84.17, shall be fitted with mat black inboard screens. With a combined lantern, using a single vertical filament and a very narrow division between the green and red sections, external screens need not be fitted.

The sidelights on vessels twenty meters or more long must be fitted with screens, which are used to keep the light from being seen across the bow (or, in other words, to help the sidelights meet the horizontal sector cut-off requirements of Annex I). In practice, some sidelights meet the cut-off requirements (see Section 9/§ 84.17) without screens, but screens must still be fitted. The length of the screens is not specified, so they may be very short if not needed to meet other requirements.

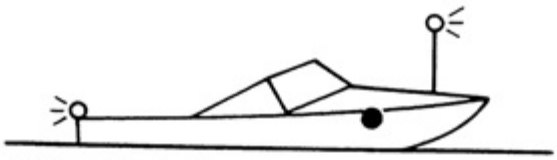
Rule 21 permits vessels less than twenty meters long to combine their sidelights into one lantern using a single filament as the light source. Many of these lights are constructed with the green lens and the red lens butted together (often glued together to keep out moisture and prevent light leaks). Since a vertical filament will be parallel with the lens joint, the transition from green to red will be almost instant rather than gradual, and therefore a screen is not needed.

Technology marches forward, even in the maritime industry, and with the inefficient incandescent lamp giving way to modern light sources such as LED, it is only a matter of time before this rule will have to be re-interpreted.

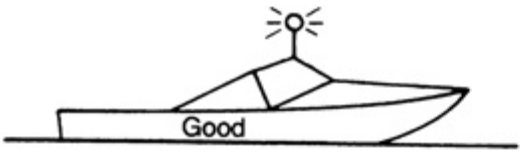
	INLAND
	(b)On power-driven vessels less than 12 meters in length, constructed after July 31, 1983, the masthead light, or the all-round light described in Rule 23(c) shall be screened to prevent direct illumination of the vessel forward of the

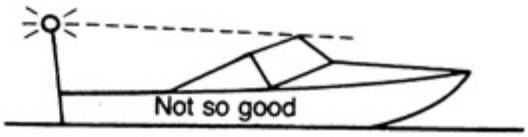
operator's position.

The Inland version of the section on screens also contains a provision for screening navigation lights to prevent them from shining down on the boat where the glare would impair the operator's night vision.



If a masthead light is fitted, placement far forward is best—little or no screening will be necessary.





If an all-round light is fitted, the best placement (on an open boat) is over the operator—only moderate screening would be required. Placement of the all-round light farther forward may result in the light shining back in the operator's eyes; placement of the all-round light near the stern may make it impossible to screen in a way that both prevents glare and satisfies the requirement (Annex I, 10/§84.19) that the light shine down to 7.5 degrees below the horizontal.

Figure 20—Screening of masthead/all-round lights on boats.

INTERNATIONAL	INLAND
6. Shapes	**§ 84.11 Shapes**
(a) Shapes shall be black and of the following sizes:	(a) Shapes shall be black and of the following sizes:
(i) a ball shall have a diameter of not less than 0.6 meter;	(1) A ball shall have a diameter of not less than 0.6 meter;
(ii) a cone shall have a base diameter of not less than 0.6 meter and a height equal to its diameter;	(2) A cone shall have a base diameter of not less than 0.6 meter and a height equal to its diameter;
(iii) a cylinder shall have a diameter of at least 0.6 meter and a height of twice its diameter;	(3) A diamond shape shall consist of two cones (as defined in Paragraph (a)(2) of this section) having a common base.
(iv) a diamond shape shall consist of two cones as defined in (ii) above having a common base.	(b) The vertical distance between shapes shall be at least 1.5 meter.
(b) The vertical distance between shapes shall be at least 1.5 meter.	(c) In a vessel of less than 20 meters in length shapes of lesser dimensions but commensurate with the size of the vessel

(c) In a vessel of less than 20 meters in length shapes of lesser dimensions but commensurate with the size of the vessel may be used and the distance apart may be correspondingly reduced.

may be used and the distance apart may be correspondingly reduced.

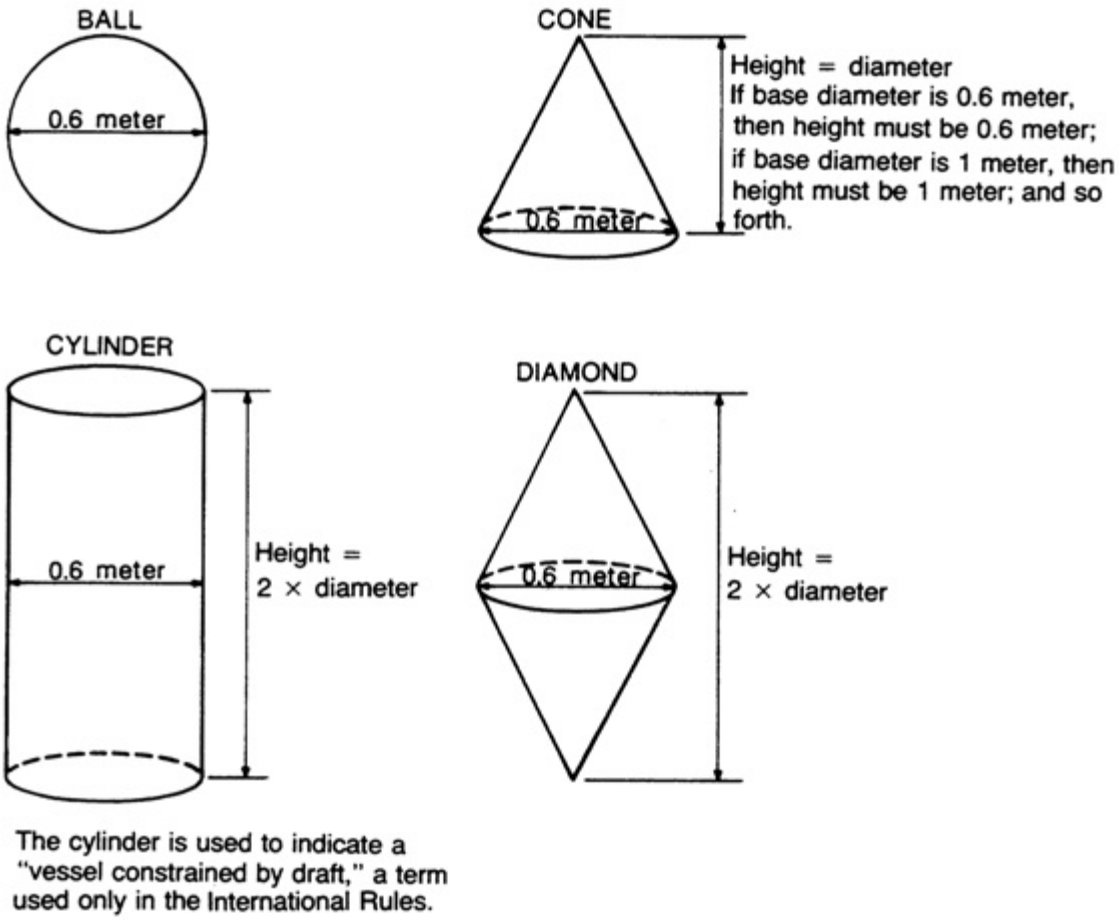


Figure 21—Shapes.

The minimum distance between shapes displayed in a vertical line is one and a half meters. This is measured from the top of one shape to the bottom of the one above it.

The size and spacing of shapes for small vessels may be less than specified in Annex I but not too much less. A vessel nineteen meters long would certainly not be justified in displaying shapes one-half normal size, although an eight meter vessel would.

INTERNATIONAL

7. Color specification of lights

The chromaticity of all navigation lights shall conform to the following standards, which lie within the boundaries of the

INLAND

§ 84.13 Color specification of lights

(a) The chromaticity of all navigation lights shall conform to the following standards, which lie within the

area of the diagram specified for each color by the International Commission on Illumination (CIE).

The boundaries of the area for each color are given by indicating the corner coordinates, which are as follows:

(i) White:

x 0.525 0.525 0.452 0.310 0.310 0.443

y 0.382 0.440 0.440 0.348 0.283 0.382

(ii) Green:

x 0.028 0.009 0.300 0.203

y 0.385 0.723 0.511 0.356

(iii) Red

x 0.680 0.660 0.735 0.721

y 0.320 0.320 0.265 0.259

(iv) Yellow

x 0.612 0.618 0.575 0.575

y 0.382 0.382 0.425 0.406

boundaries of the area of the diagram specified for each color by the International Commission on Illumination (CIE), in the "Colors of Light Signals," which is incorporated by reference. It is Publication CIE No. 2.2. (TC-16), 1975, and is available from the Illumination Engineering Society, 345 East 47th Street, New York, NY 10017. It is also available for inspection at the Office of the Federal Register, Room 8401, 1100 L Street N.W., Washington, DC 20408. This incorporation by reference was approved by the Director of the Federal Register.

(b) The boundaries of the area for each color are given by indicating the corner coordinates, which are as follows:

(1) White:

x 0.525 0.525 0.452 0.310 0.310 0.443

y 0.382 0.440 0.440 0.348 0.283 0.382

(2) Green:

x 0.028 0.009 0.300 0.203

y 0.385 0.723 0.511 0.356

(3) Red

x 0.680 0.660 0.735 0.721

y 0.320 0.320 0.265 0.259

(4) Yellow

x 0.612 0.618 0.575 0.575

y 0.382 0.382 0.425 0.406

This section of Annex I is for the manufacturers of navigation lights and their lenses. The chromaticity of navigation lights is also affected by the lamp used and by the voltage at which it is operated. The numbers given describe the exact shade and hue of green, yellow, red, and white light required. The color measurements are made using the lanp and voltage for which the navigation light is designed.

INTERNATIONAL

8. Intensity of lights

(a) The minimum luminous intensity of lights shall be calculated by using the

INLAND

§ 84.15 Intensity of lights

(a) The minimum luminous intensity of lights shall be calculated by using the

following formula:

$I = 3.43 \times 10^6 \times T \times D^2 \times K^{-D}$

Where I is luminous intensity in candelas under service conditions,

T is threshold factor 2×10^7 lux,

D is range of visibility (luminous range) of the light in nautical miles,

K is atmospheric transmissivity. For prescribed lights the value of K shall be 0.8, corresponding to a meteorological visibility of approximately 13 miles.

(b) A selection of figures derived from the formula is given in the following table:

Range of visibility (luminous range) of light in nautical miles D	Luminous intensity of light in candelas for K = 0.8 I
1	0.9
2	4.3
3	12
4	27
5	52
6	94

Note: The maximum luminous intensity of navigation lights should be limited to avoid undue glare. This shall not be achieved by a variable control of the luminous intensity.

following formula:

$I = 3.43 \times 10^6 \times T \times D^2 \times K^{-D}$

Where I is luminous intensity in candelas under service conditions,

T is threshold factor 2×10^7 lux,

D is range of visibility (luminous range) of the light in nautical miles,

K is atmospheric transmissivity. For prescribed lights the value of K shall be 0.8, corresponding to a meteorological visibility of approximately 13 miles.

(b) A selection of figures derived from the formula is given in Table 84.15(b):

Table 84.15 (b)

Range of visibility (luminous range) of light in nautical miles D	Luminous intensity of light in candelas for K = 0.8 I
1	0.9
2	4.3
3	12
4	27
5	52
6	94

This section gives the minimum required light intensities (measured in candelas) corresponding to ranges of visibility at a standard atmospheric clearness. The required range of visibility for any particular navigation light is given in Rule 22. This section is another used by the manufacturer of navigation lights.

A note at the end of the International version of this section cautions against lights that are so bright that they impair the night vision of the vessel's operator or lookout. Because this is a suggestion ("should") and not a requirement, it is not contained in the regulatory Inland Annex I.

The International Rule proscription against a variable voltage control to vary light intensity is not contained in the Inland version because of a different philosophy: a device that would permit an increase in intensity in open water or when the air is not so clear, but which could not be manipulated to reduce the intensity below the

minimum required, would be an advantage.

INTERNATIONAL	INLAND
9. Horizontal sectors	**§ 84.17 Horizontal sectors**
(a)(i) In the forward direction, sidelights as fitted on the vessel shall show the minimum required intensities. The intensities shall decrease to reach practical cut-off between 1 degree and 3 degrees outside the prescribed sectors.	(a)(1) In the forward direction, sidelights as fitted on the vessel shall show the minimum required intensities. The intensities shall decrease to reach practical cut-off between 1 and 3 degrees outside the prescribed sectors.
(ii) For sternlights and masthead lights and at 22.5 degrees abaft the beam for sidelights, the minimum required intensities shall be maintained over the arc of the horizon up to 5 degrees within the limits of the sectors prescribed in Rule 21. From 5 degrees within the prescribed sectors the intensity may decrease by 50 percent up to the prescribed limits; it shall decrease steadily to reach practical cut-off at not more than 5 degrees outside the prescribed sectors.	(2) For sternlights and masthead lights and at 22.5 degrees abaft the beam for sidelights, the minimum required intensities shall be maintained over the arc of the horizon up to 5 degrees within the limits of the sectors prescribed in Rule 21. From 5 degrees within the prescribed sectors the intensity may decrease by 50 percent up to the prescribed limits; it shall decrease steadily to reach practical cut-off at not more than 5 degrees outside the prescribed sectors.

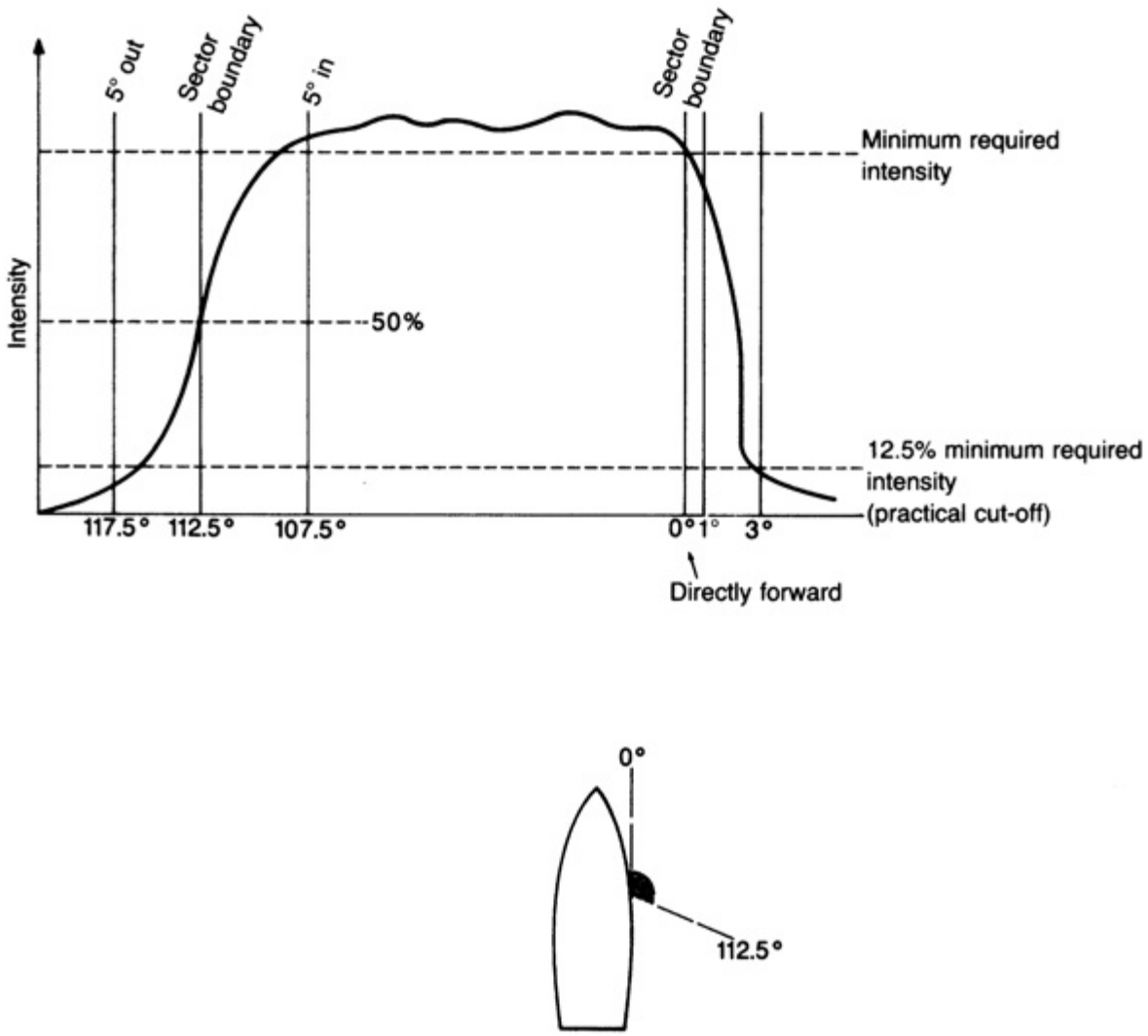


Figure 22—Horizontal sector angles for a sidelight.

INTERNATIONAL	INLAND
(b)(i) All-round lights shall be so located as not to be obscured by masts, topmasts or structures wuthin angular sectors of more tha 6 degrees, except anchor lights prescribed in Rule 30, which need not be placed at an impracticable height above the hull.	(b) All-round lights shall be so located as not to be obscured by masts, topmasts or structures wuthin angular sectors of more tha 6 degrees, except anchor lights prescribed in Rule 30, which need not be placed at an impracticable height above the hull, and the all-round white light described in Rule 23(d), which may not be obscured at all.
(ii) If it is impracticable to comply with paragrph (b)(i) of this section by exhibiting only one all-round light, two all-round lights shall be used suitably positioned or screened so that they appear, as far as practicable, as one light at a distance of one mile.	(c) If it is impracticable to comply with paragrph (b) of this section by exhibiting only one all-round light, two all-round lights shall be used suitably positioned or screened to appear, as far as practicable, as one light at a minimum distance of one nautical mile.
	Note to paragraph (c): Two unscreened

	all-round lights that are 1.28 meters apart or less will appear as one light to the naked eye at a distance of one nautical mile.

This provision accommodates vessels that, for practical reasons (large diameter mast, etc.), cannot mount a single all-round light so that less than six degrees of arc is obstructed.

A "horizontal sector," defined earlier, refers to the arc around the horizon through which each navigation light is supposed to shine. The sectors are described as being part of a circle divided into 360 degrees and having reference points directly ahead, directly aft, and abeam on each side. The theoretical sectors through which each navigation light is to be seen are given in Rule 21.

The actual sectors and corresponding intensities are given here in Annex I. The best way to see how a navigation light conforms to horizontal sector requirements is to plot the light intensity against sector angle. "Practical cut-off" is defined for vessels twenty meters or longer in the first section of the Inland Annex I. The United States uses the same definition for International Rule navigation lights it approves, but other countries may define the term in other ways.

All-round lights do not have sector boundaries, but may in some cases have part of their light cut off by interfering masts, topmasts, or other structures. All-round lights, such as those that indicate a vessel engaged in fishing or a vessel restricted in ability to maneuver, may be obscured for up to a total of 6 degrees. Anchor lights may be mounted relatively low (especially the after one) and be hidden by the vessel's superstructure through more than six degrees of arc. At least one of the two anchor lights should be visible from all around the horizon. If a small vessel displays only one anchor light, you should take care to minimize obscuration, even though you are not limited to six degrees.

Small vessels are permitted to display an all-round light in lieu of masthead light and sternlight. If this all-round light is used, it must be mounted where it will not be obscured at all. This latter requirement is implicit in the International version; the masthead light and sternlight the all-round light replaces may not be obscured. (The International Rules before 1983 did not permit the all-round light substitution, and when the Rules were amended, the corresponding Annex I clarifications were overlooked.)

INTERNATIONAL	INLAND
10. Vertical sectors	**§ 84.19 Vertical sectors**
(a) The vertical sectors of electric lights as fitted, with the exception of lights on sailing vessels underway shall ensure that:	(a) The vertical sectors of electric lights as fitted, with the exception of lights on sailing vessels underway and on unmanned barges, shall ensure that:
(i) at least the required minimum intensity is maintained at all angles from 5 degrees above to 5 degrees below the the horizontal;	(1) At least the required minimum intensity is maintained at all angles from 5 degrees above to 5 degrees below the the horizontal;
(ii) at least 60 percent of the required minimum intensity is maintained from 7.5 degrees above to 7.5 degrees below the	(2) At least 60 percent of the required minimum intensity is maintained from 7.5 degrees above to 7.5 degrees below

horizontal.	the horizontal.
(b) In the case of sailing vessels underway the vertical sectors of electric lights as fitted shall ensure that:	(b) In the case of sailing vessels underway the vertical sectors of electric lights as fitted shall ensure that:
(i) at least the required minimum intensity is maintained at all angles from 5 degrees above to 5 degrees below the horizontal;	(1) At least the required minimum intensity is maintained at all angles from 5 degrees above to 5 degrees below the horizontal;
(ii) at least 50 percent of the required minimum intensity is maintained from 25 degrees above to 25 degrees below the horizontal.	(2) At least 50 percent of the required minimum intensity is maintained from 25 degrees above to 25 degrees below the horizontal.
(c) In the case of lights other than electric these specifications shall be met as closely as possible.	(c) In the case of unmanned barges the minimum required intensity of electric lights as fitted shall be maintained on the horizontal. (d) In the case of lights other than electric these specifications shall be met as closely as possible.

It is possible to design the lens of a navigation light so that all of the light is focused into a narrow band shining out in a horizontal plane. This would be very efficient and effective as long as the navigation light (and attached vessel) stay level. As soon as the vessel heels or pitches, however, a narrow light beam would shine up into the sky on one side and down into the water on the other. For observers on nearby vessels, the light would disappear.

Navigation lights must therefore shine above and below the horizontal. Sailboats normally heel more than power-driven vessels, so lights for sailing vessels have a greater vertical dispersion requirement. This special requirement does not, however, apply to sailing vessels that are anchored, for instance; the paragraph (b) technical specifications for sailing vessels apply only to those lights displayed while underway (Rule 25 lights).

While power-driven vessels do not normally heel as much as sailing vessels, they often pitch up from their at-rest attitude when moving (we're talking about smaller vessels, not tankers). If, for example, the masthead light is mounted parallel to the deck and the deck is angled 15 degrees up from horizontal at an operating speed, the light may be pointed too high to comply with the vertical sector requirement. Care must therefore be taken to mount the navigation lights with respect to what is horizontal at operating trim rather than what is horizontal at the dock.

Barges on inland waterways do not normally heel at all, and if unmanned they typically carry battery-powered navigation lights. So that unwieldy battery packs are not needed this special class of vessel may use navigation lights with special, very efficient lenses that concentrate light in a narrow beam around the horizon.

INTERNATIONAL	INLAND
11. Intensity of non-electric lights	**§ 84.21 Intensity of non-electric lights**
Non-electric lights shall so far as	

practicable comply with the minimum intensities, as specified in the Table given in Section 8 of this Annex.

Non-electric lights shall so far as practicable comply with the minimum intensities, as specified in the Table given in § 84.15.

Lanterns using oil, kerosene, and such for their light source do not have to meet the intensity requirements of Annex I if not "practicable." Operators must adjust the flame to an optimal level, however, and keep the lenses clean.

INTERNATIONAL

12. Maneuvering light

Notwithstanding the provisions of paragraph 2(f) of this Annex the maneuvering light described in Rule 34(b) shall be placed in the same fore and aft vertical plane as the masthead light or lights and, where practicable, at a minimum height of 2 meters vertically above the forward masthead light, provided that it shall be carried not less than 2 meters vertically above or below the after masthead light. On a vessel where only one masthead light is carried the maneuvering light, if fitted, shall be carried where it can best be seen, not less than 2 meters vertically apart from the masthead light.

INLAND

§ 84.23 Maneuvering light

Notwithstanding the provisions of § 84.03(f), the maneuvering light described in Rule 34(b) shall be placed approximately in the same fore and aft vertical plane as the masthead light or lights and, where practicable, at a minimum height of one-half meter vertically above the forward masthead light, provided that it shall be carried not less than one-half meter vertically above or below the after masthead light. On a vessel where only one masthead light is carried the maneuvering light, if fitted, shall be carried where it can best be seen, not less than one-half meter vertically apart from the masthead light.

The maneuvering light is optional and is used to supplement the maneuvering and warning whistle signals of Rule 34. The maneuvering light is an all-round white light (yellow is optional under Inland Rules) having a minimum range of five miles (International) or two miles (Inland). See Rule 34(b)(iii).

INTERNATIONAL

13. High Speed Craft

The masthead light of high speed craft with a length to breadth ratio of less than 3.0 may be placed at a height related to the breadth of the craft lower than that prescribed in paragraph 2(a)(i) of this annex, provided that the base angle of the isosceles trangles formed by the sidelights and masthead light, when seen in end elevation, is not less than 27 degrees.

INLAND

§ 84.27 High-speed craft.

The masthead light of high speed-craft with a length to breadth ratio of less than 3.0 may be placed at a height related to the breadth lower than that prescribed in Sec. 84.03(a)(1), provided that the base angle of the isosceles trangle formed by the sidelights and masthead light when seen in end elevation is not less than 27 degrees as determined by the formula in paragraph (b) of this section.

(b) The minimum height of masthead light above sidelights is to be determined by the following formula: Tan 27 degrees = X/Y; where Y is the

horizontal distance between the sidelights and X is the height of the forward masthead light.

Annex I (section 2 / § 84.03) specifies that for vessels wider than six meters, the masthead light shall be mounted at a height above the hull not less than the beam of the vessel (although maximum limits are given). For certain very wide high speed craft, such as hovercraft, hydrofoils, and some catamarans, this requirement has proved to be inappropriate when compared to vessels with more conventional proportions and performance. This section (13. / § 84.27) sets out a more suitable requirement.

Back to first section of Annex I

Home

Table of Contents

Annex II coming soon

Handbook of the Nautical Rules of the Road by Llana & Wisneskey

Table of Contents

- - -

- - -

Part C - Lights and Shapes

Navigation lights are a critical part of obeying the Steering and Sailing Rules at night. If you have ever passed close by a vessel operating without lights, you have no doubt gained some appreciation for them. But beware; the navigation light arrangements that are so neatly illustrated in books will likely not be nearly so clear in real life. A masthead light will appear before sidelights; dim colored lights may look the same as white lights. A single white light could be a masthead light of one vessel type, a stern light of another, an anchor light, a practical deck light on a fishing trawler, an airplane's landing light, or a motorcycle idling on a dark pier. Don't make assumptions. The ambiguities you recognize as such probably won't kill you, but the ones you don't could very well ruin your evening.

Part C of the Rules defines several types of navigation lights, specifies the minimum ranges, and gives the combination of lights that identifies each vessel by size, type, function, and activity. Annex I to the Rules provides technical details of performance and positioning that are essential for the manufacturers of navigation lights but less useful for the mariner.

Part C also sets out the requirements for shapes, which convey information about a vessel, its situation, or its activity that would not be obvious even by day. The technical details on shape size, color, and spacing are contained in Annex I.

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Part D - Sound and Light Signals

Part D contains the Rules for mandatory and voluntary signals., particularly sound signals--maneuvering signals and "fog" signals--and other signalling means as well.

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Part E - Exemptions

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ANNEXES

- - -

Appendices to This Handbook

About the Authors

Chris Llana is a former Coast Guard officer with a B.S. in naval architecture and marine engineering and advanced degrees in marine affairs (MMA) and law (JD). During his tenure as a civilian at Coast Guard Headquarters, he drafted the annexes to the Inland Navigation Rules and wrote other regulations implementing both International and Inland Navigation Rules. Subsequent to that, he worked for Comsat Corporation on policy issues concerning the International Maritime Satellite Organization. He currently writes novels and maintains a web site on the U.S. transition to the ATSC digital TV standard.

George Wisneskey is a graduate of the Coast Guard Academy and holds a master's degree in education from the George Washington University. As chief of the Coast Guard's Rules of the Road Branch before his retirement in 1982, he oversaw the drafting of the Inland Navigational Rules Act of 1980. He is currently an active player in the Neuse River Foundation from his home base on North Carolina's coast.

You may contact the authors by email with questions or comments about the web site. Please direct any questions or comments about the navigation rules themselves to the appropriate Coast Guard Headquarters or District staff. Thanks!

e-mail Chris Llana

Annex I -- Positioning and Technical Details of Navigation Lights

Annex I tells us how navigation lights have to peform and where they must be located. It doesn't say what lights to display--the Rules do that. Annex I also describes the size, color, and spacing for day shapes.

The International Annex I came first. The Inland Annex I is very similar but many specifications differ to suit the particular conditions of the inland waterways.

The Inland Annex I is a regulation. It is marked with "section" symbols (§) and numbers beginning with "84," because it is Part 84, Title 33 of the Code of Federal Regulations. The other four Inland annexes are Parts 85, 86, 87, and 88.

INTERNATIONAL	INLAND
1. Definition	**§ 84.01 Definitions**
The term "height above the hull" means height above the uppermost continuous deck. This height shall be measured from the position vertically beneath the location of the light.	(a) The term "height above the hull" means height above the uppermost continuous deck. This height shall be measured from the position vertically beneath the location of the light.

Annex I normally expresses the vertical position of lights as "height above the hull." This is measured from the highest deck (directly below the light, in the center of the vessel if the light is in the center) that extends over the length of the ship or nearly so.

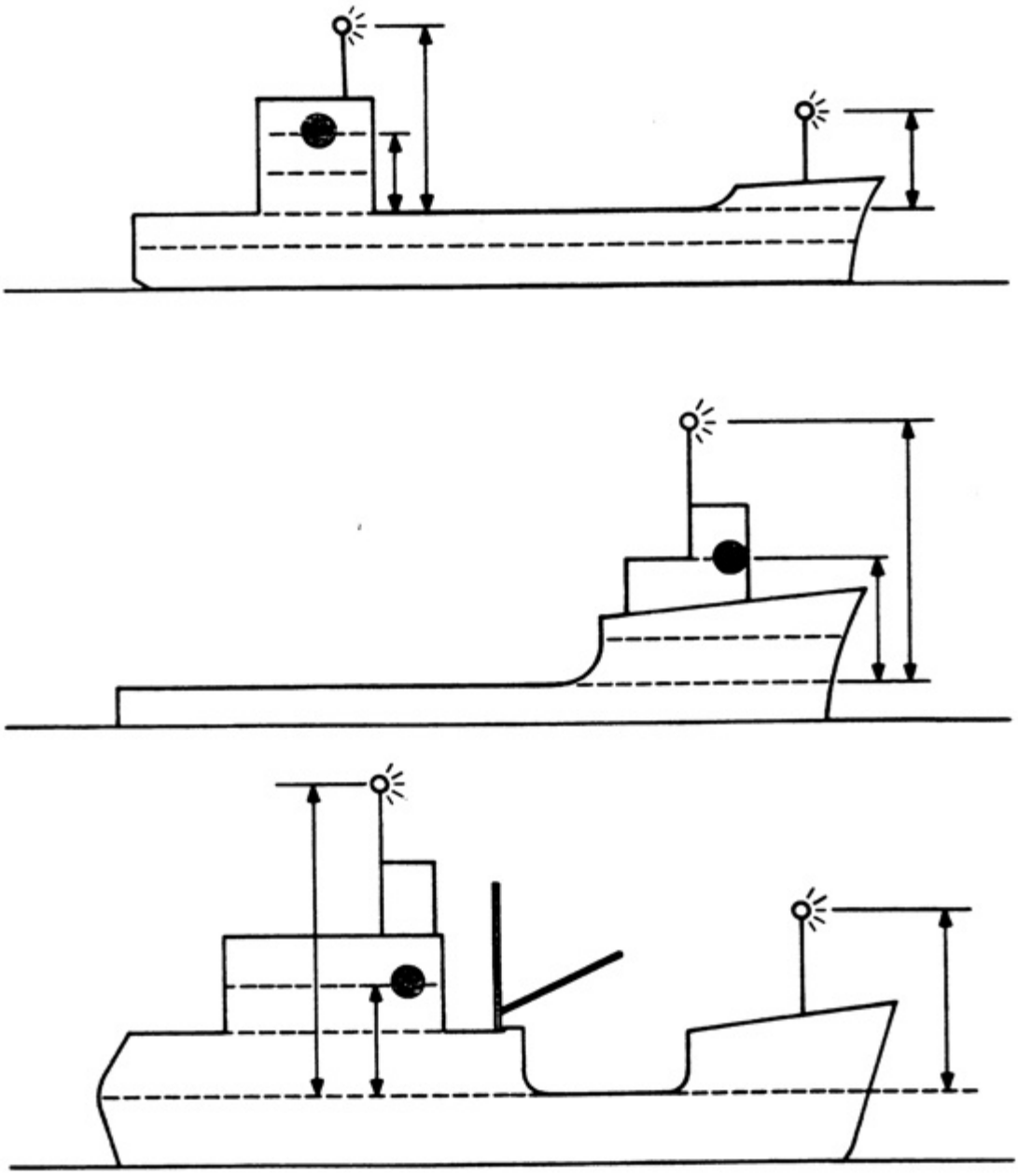


Figure 4—Measurement of "height above the hull."

INLAND

(b) High-speed craft means a craft capable of maximum speed in meters per second (m/s) equal to or exceeding:

$$3{\cdot}7\,\nabla^{0.1667}$$

where ∇ = displacement corresponding to the design waterline (meters^3)

Note to paragraph (b): The same formula expressed in pounds and knots is maximum speed in knots (kts) equal to exceeding 1.98 (lbs) x $\nabla^{0.1667}$; where ∇ = displacement corresponding to design waterline in pounds.

This definition of high-speed craft has been added because of an exception for this class of vessel to the general masthead light vertical positioning requirements. The definition was taken from the International Maritime Organization's "International Code of Safety for High-Speed Craft."

INLAND

(c) The term "practical cut-off" means, for vessels 20 meters or more in length, 12.5 percent of the minimum luminous intensity (Table 84.15(b)) corresponding to the greatest range of visibility for which the requirements of Annex I are met.

Many navigation lights give you a rough idea of the orientation of a vessel, depending on whether you see a green sidelight, a red sidelight, masthead lights, or whatever. In other words, you know that, in relation to the observed vessel, you are within a certain horizontal sector. The term "horizontal sector" refers to the arc around the horizon through which each navigation light is supposed to shine. When you move from the inside to the outside of the sector, the light "cuts off."

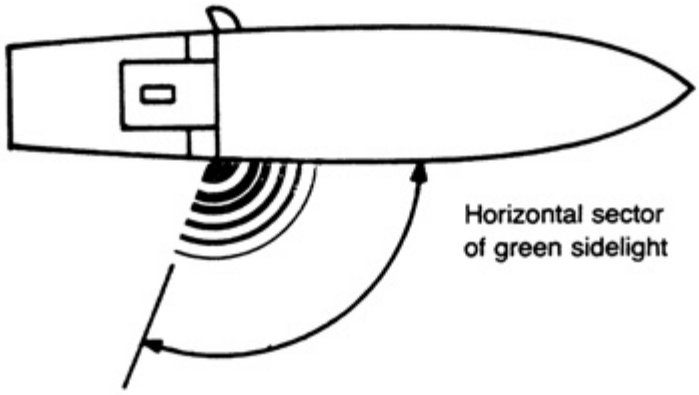


Figure 5—Example of a "horizontal sector."

In theory, a light should have full intensity everywhere inside the sector and be absolutely dark outside the sector. In practice, this level of performance hasn't been achieved using common technology and at a reasonable cost. Cut-off isn't instant and complete. Some light, undesirably because it affects perceptions of orientation, leaks outside of the sector. Annex I requires that "practical cut-off" be a reduction of the light intensity down to below 12.5 percent of what must be shown inside the sector. This is for lights designed for vessels twenty meters and longer.

The term "practical cut-off" is defined only in Inland Annex I, but the U.S. Coast

Guard is using the same definition in its International Rules navigation light approval program for inspected vessels. The United States does not define practical cut-off for lights designed for vessels less than twenty meters, although a number of European countries do. These countries also certify or approve their own small-vessel navigation lights as meeting the International Annex I specifications.

The Inland Rule definition for practical cut-off is worded so that a navigation light may be used on a vessel smaller than the vessel size class for which it was designed. The language "corresponding to the greatest range of visibility for which the requirements of Annex I are met" results in a single practical cut-off for any particular light rather than a different practical cut-off for each class of vessel.

For example, a masthead light designed for vessels twenty to fifty meters long has a minimum required range of five miles (see Rule 22). Annex I requires an intensity of at least fifty-two candelas for a five-mile light (see § 84.15). A six-mile light needs ninety-four candelas, almost twice as bright; a three-mile light, twelve candelas. We'll say in our example that the actual "five-mile" light has an intensity of sixty-three candelas in the sector and is being used on a boat eighteen meters long. The practical cut-off in this case would be 12.5 percent of *fifty-two* candelas or 6.5. We don't base practical cut-off on the sixty-three candela actual intensity or on the twelve-candela minimum required intensity for the size vessel (eighteen meters) on which the light is installed.

INLAND

(d) The term "Rule" or "Rules" means the Inland Navigation Rules contained in Sec. 2 of the Inland Navigational Rules Act of 1980 (Pub. L. 96-591, 94 Stat. 3415, 33 U.S.C. 2001, December 24, 1980) as amended.

The Inland navigation rules were enacted by Congress through legislation, whereas the annexes were enacted by the Coast Guard as regulations.

INTERNATIONAL

2. Vertical positioning and spacing of lights

(a) On a power-driven vessel of 20 meters or more in length the masthead lights shall be placed as follows:

(i) the forward masthead light, or if only one masthead light is carried, then that light, at a height above the hull of not less than 6 meters, and, if the breadth of the vessel exceeds 6 meters, then at a height above the hull not less than such breadth, so however that the light need not be placed at a greater height above the hull than 12 meters.

(ii) when two masthead lights are carried the after one shall be at least 4.5 meters vertically higher than the forward one.

INLAND

§ 84.03 Vertical positioning and spacing of lights

(a) On a power-driven vessel of 20 meters or more in length the masthead lights shall be placed as follows:

(1) The forward masthead light, or if only one masthead light is carried, then that light, at a height above the hull of not less than 5 meters, and, if the breadth of the vessel exceeds 5 meters, then at a height above the hull not less than such breadth, so however that the light need not be placed at a greater height above the hull than 8 meters.

(2) When two masthead lights are carried the after one shall be at least 2 meters vertically higher than the forward

(b) The vertical separation of masthead lights of power-driven vessels shall be such that in all normal conditions of trim the after light will be seen over and separate from the forward light at a distance of 1000 meters from the stem when viewed from sea level.

one.

(b) The vertical separation of masthead lights of power-driven vessels shall be such that in all normal conditions of trim the after light will be seen over and separate from the forward light at a distance of 1000 meters from the stem when viewed from sea level.

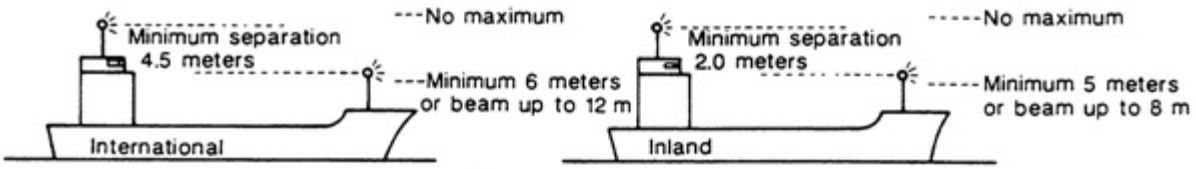


Figure 6—Vertical placement of masthead lights: vessels 20 meters or more in length.

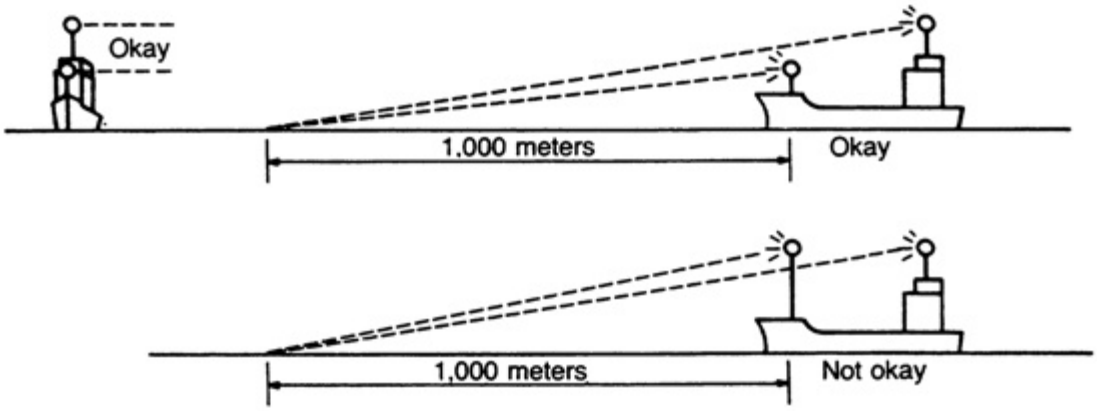


Figure 7—Vertical placement of masthead lights: sight picture.

(c) The masthead light of a power-driven vessel of 12 meters but less than 20 meters in length shall be placed at a height above the gunwale of not less than 2.5 meters.

(d) A power-driven vessel of less than 12 meters in length may carry the uppermost light at a height of less than 2.5 meters above the gunwale. When however, a masthead light is carried in addition to sidelights and a sternlight or the all-round light prescribed in rule 23(c)(i) is carried in addition to sidelights, then such masthead light or all-round

(c) The masthead light of a power-driven vessel of 12 meters but less than 20 meters in length shall be placed at a height above the gunwale of not less than 2.5 meters.

(d) The masthead light, or the all-round light described in Rule 23(c), of a power-driven vessel of less than 12 meters in length shall be carried at least 1 meter higher than the sidelights.

light shall be carried at least 1 meter higher than the sidelights.

Under International Rule 23, power-driven vessels less than twelve meters long may display the following: (1) sidelights, masthead light, and sternlight; (2) sidelights and all-round light; or (3) an all-round light, depending on boat size, speed, and preference of builder or owner. The Inland Rules permit only the first two options.

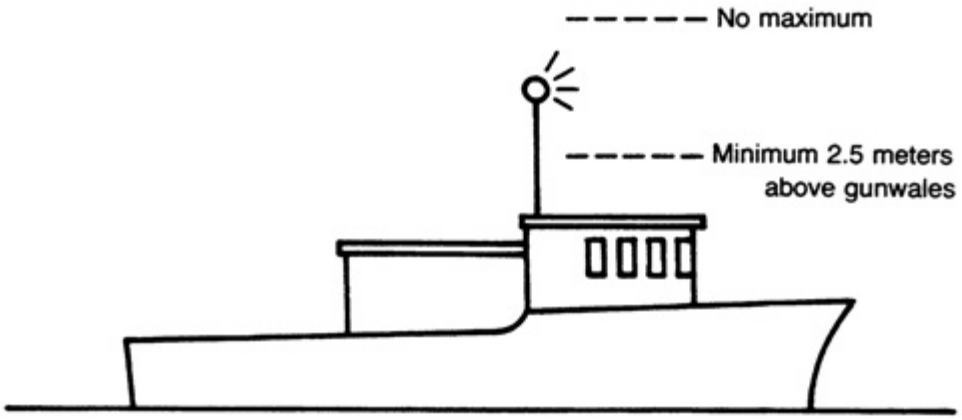


Figure 8—Vertical placement of masthead lights: power-driven vessels 12–20 meters in length.

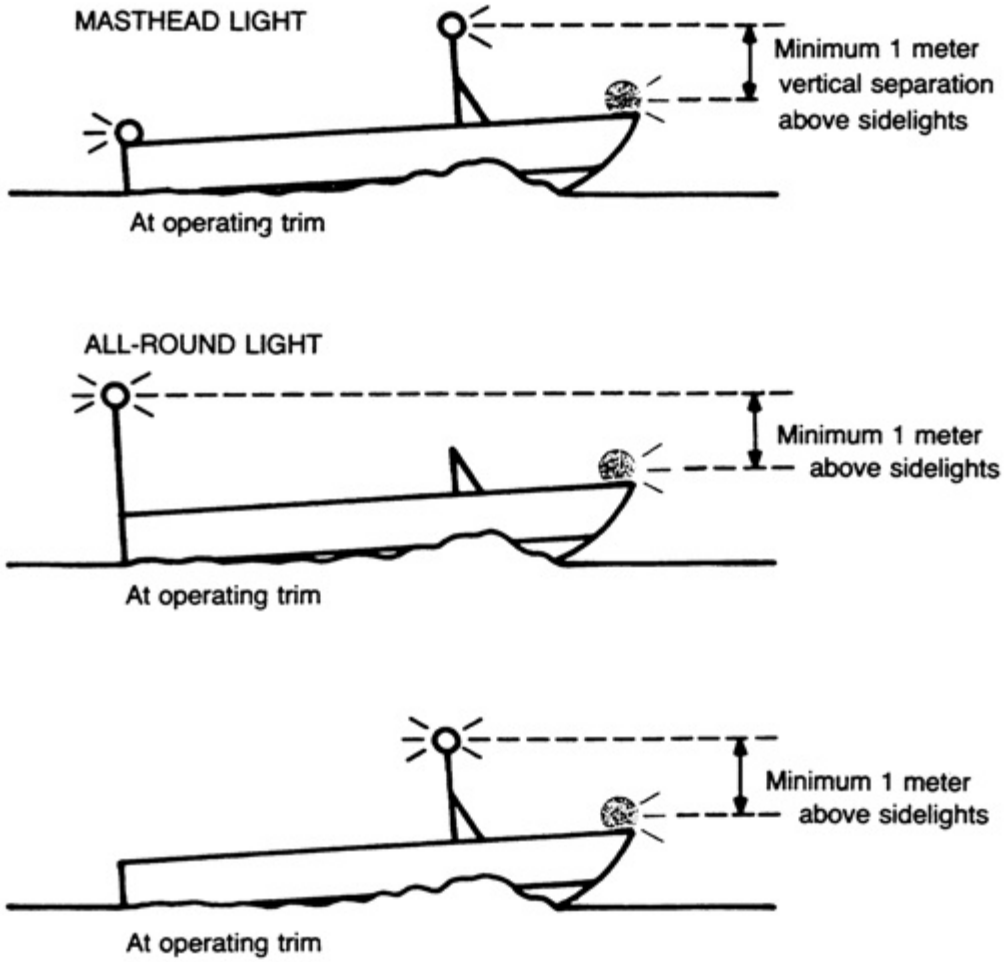


Figure 9—Vertical placement of masthead lights: power-driven vessels less than 12 meters in length.

If sidelights are displayed, the masthead light or all-round light must be at least one meter above the sidelights. The vertical separation is measured at operating trim, which is often different from static trim. Because boat trim may change

significantly with speed changes, vertical separation may be decreased substantially (from what deckline-to-light measurement would indicate) if the masthead/all-round light is mounted very far aft of the sidelights.

This is especially a problem if the all-round light is mounted all the way aft, as was required by the now-repealed Motorboat Act of 1940, and the sidelights are mounted all the way forward. The all-round light (or masthead light) may now be mounted anywhere from stem to stern. Mounting it horizontally close to the sidelights will minimize the adverse effect or trim changes on vertical separation.

INTERNATIONAL	INLAND
(e) One of the two or three masthead lights prescribed for a power-driven vessel when engaged in towing or pushing another vessel shall be placed in the same position as either the forward masthead light or the after masthead light; provided that if carried on the aftermast, the lowest after masthead light shall be at least 4.5 meters vertically higher than the forward masthead light.	(e) One of the two or three masthead lights prescribed for a power-driven vessel when engaged in towing or pushing another vessel shall be placed in the same position as either the forward masthead light or the after masthead light, provided that if carried on the aftermast, the lowest after masthead light shall be at least 2 meters vertically higher than the highest forward masthead light.

In most cases, vessels engaged in towing display either one or two masthead lights in addition to the normal one(s) prescribed for ordinary power-driven vessels (see Rules 23 and 24). Although the language in the Rules says two (or three) masthead lights "instead of" an ordinary masthead light, Annex I 2(e)/§ 84.03(e) makes clear that the Rule 23 masthead light is to be one of the two or three in a vertical column, and paragraph (f)(i) says that of the two or three masthead lights carried in a vertical line for towing, the Rule 23 masthead light must be the highest one.

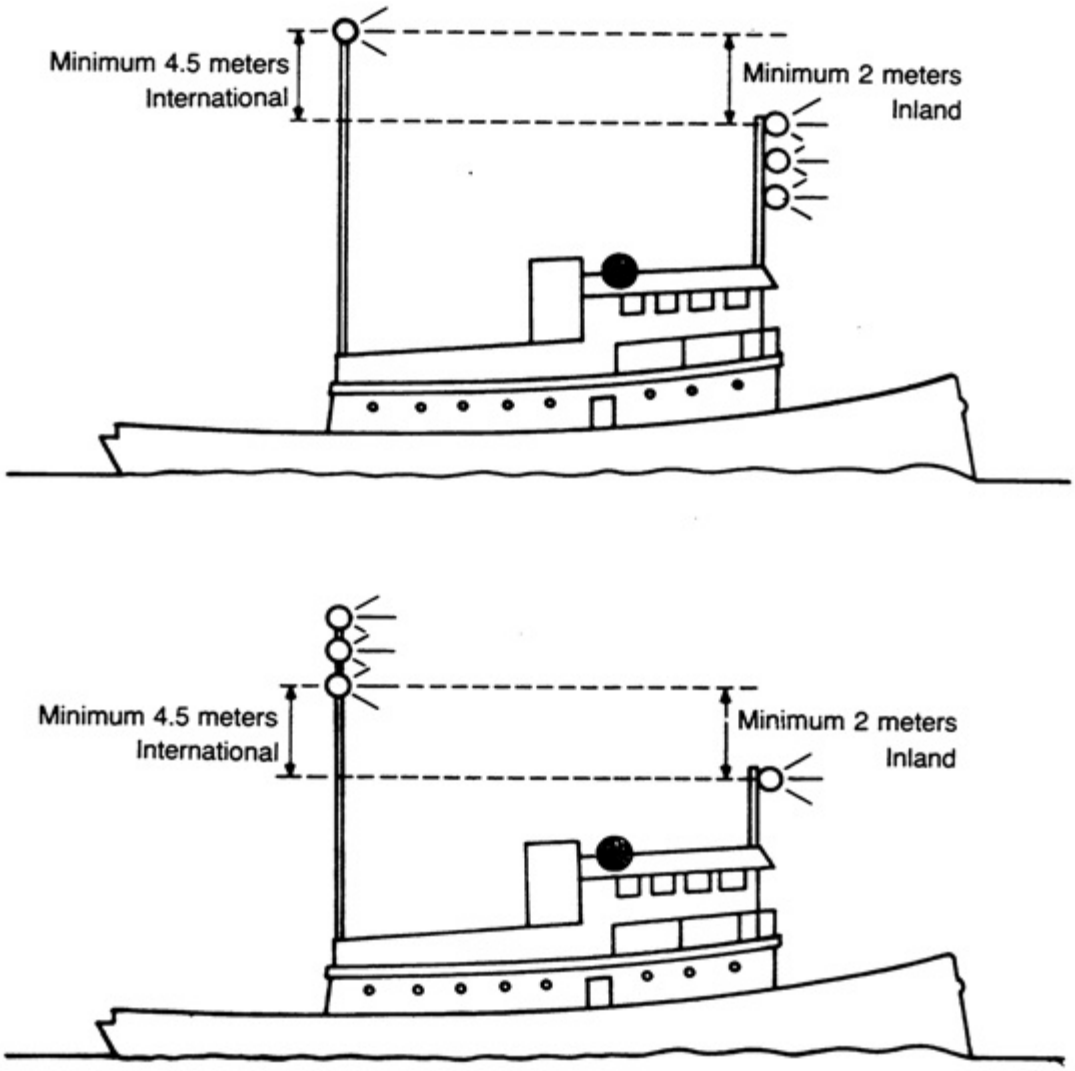


Figure 10—Vertical placement of masthead lights: towing vessels 50 meters or more in length and smaller vessels voluntarily carrying both forward and after masthead lights.

Vessels fifty meters or longer must carry both forward and after masthead lights (smaller vessels may do so). Vessels carrying both forward and after masthead lights (Rule 23(a)) also carry forward and after masthead lights when towing (Rule 24(d)). For towing, the additional masthead lights (one, or two if the tow length exceeds two hundred meters) can be carried under either the forward masthead light or the after masthead light.

If carried under the forward masthead light, the vertical separation between forward and after masthead lights will be unchanged from the non-towing display. If the additional lights are carried under the after masthead light, the vertical separation between masthead lights on forward and after masts will be reduced.

Annex I 2(e)/§ 84.03(e) requires that at least the minimum vertical separation be maintained between the lowest after masthead light and the forward masthead light.

Thus, if you carry your additional masthead lights on the after mast, your ordinary Rule 23 after masthead light must be mounted higher than would otherwise be required by Annex I 2(a)(ii)/§ 84.03(a)(2). The minimum vertical separation differs

between the International (4.5 meters) and Inland (2 meters) Rules.

INTERNATIONAL	INLAND
(f)(i) The masthead light or lights prescribed in Rule 23(a) shall be so placed as to be above and clear of all other lights and obstructions except as described in subparagraph (ii).	(f)(1) The masthead light or lights prescribed in Rule 23(a) shall be so placed as to be above and clear of all other lights and obstructions except as described in paragraph (f)(2) of this section.
(ii) When it is impracticable to carry the all-round lights prescribed by Rule 27(b)(i) or Rule 28 below the masthead lights, they may be carried above the after masthead light(s) or vertically in between the forward masthead light(s) and after masthead light(s), provided that in the latter case the requirement of Section 3(c) of this Annex shall be complied with.	(2) When it is impracticable to carry the all-round lights prescribed by Rule 27(b)(i) below the masthead lights, they may be carried above the after masthead light(s) or vertically in between the forward masthead light(s) and after masthead light(s), provided that in the latter case the requirement of § 84.05(d) shall be complied with.

The Rule 23 masthead lights are considered to be of great importance. As the brightest lights, they function as the reference by which other navigation lights are evaluated. Annex I 2(f)/§ 84.03(f) therefore requires that they be mounted high and be unobstructed.

The exception was added after problems were experienced with all-round lights, which are difficult to see "all-round" if they are mounted below a structure holding up the masthead light. All-round lights may now be placed above masthead lights, but only in the fashion described, which is designed to minimize interference from the masthead lights.

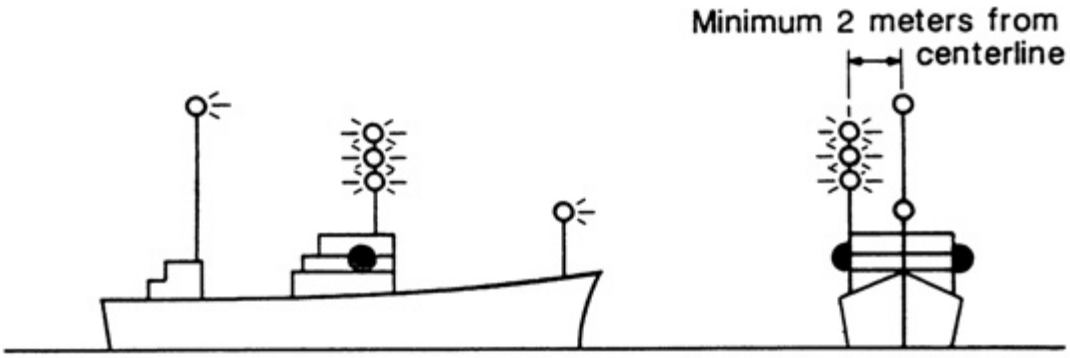


Figure 11—Vertical placement of masthead lights with respect to all-round lights.

The exempted all-round lights are those for vessels restricted in ability to maneuver (Rule 17(b)(i)) and for vessels constrained by draft (Rule 28, International only).

When all-round lights are above the after masthead light, they are usually directly above, not because it is required but because it is practical.

The all-round lights can be mounted on a mast or hung from a yardarm.

The exception permitting display of all-round lights above masthead lights applies only when it is not practicable to mount the all-round lights below the masthead light(s). If practicable, it must be done.

INTERNATIONAL	INLAND
(g) The sidelights of a power-driven vessel shall be placed at a height above the hull not greater than three quarters of that of the forward masthead light. They shall not be so low as to be interfered with by deck lights.	(g) The sidelights of a power-driven vessel shall be placed at least one meter lower than the forward masthead light. They shall not be so low as to be interfered with by deck lights.

The Requirement in the International version of this paragrph is modified or supplemented by paragraphs 2(d) and 2(h) of Annex I for vessels less than twelve and twenty meters, respectively.

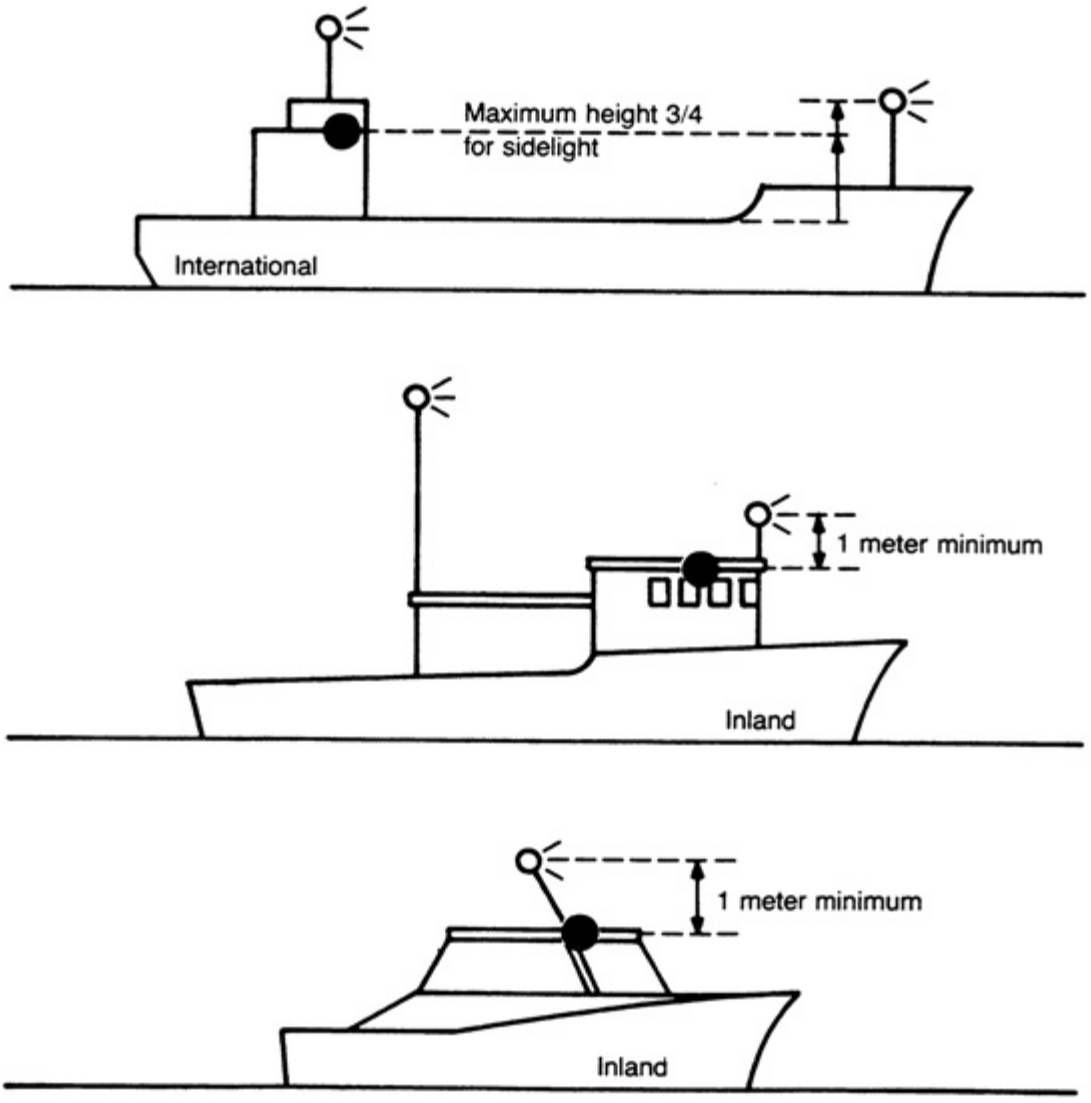


Figure 12—Vertical placement of sidelights.

INTERNATIONAL	INLAND

(h) The sidelights, if in a combination lantern and carried on a power-driven vessel of less than 20 meters in length, shall be placed not less than 1 meter below the masthead light.	(h) [Reserved]

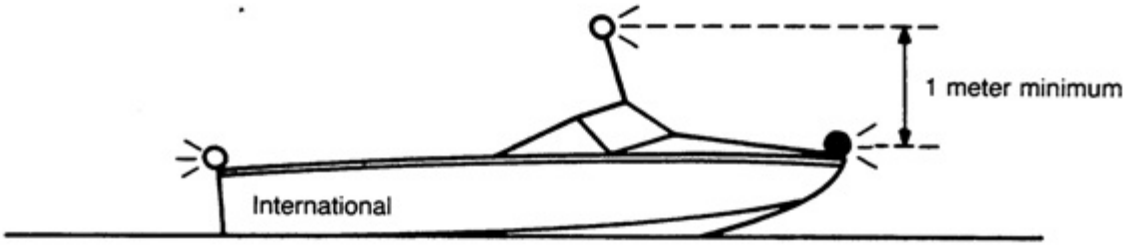


Figure 13—Vertical placement of sidelights on boats.

Only the International version has a paragraph (h). A similar Inland requirement would have duplicated the Inland § 84.03(g) requirement. Inland paragraph (h) was reserved so that corresponding International/Inland paragraphs would be numbered (or lettered) the same.

INTERNATIONAL	INLAND
(i) When the Rules prescribe two or three lights to be carried in a vertical line, they shall be spaced as follows;	(i) When the Rules prescribe two or three lights to be carried in a vertical line, they shall be spaced as follows;
(i) on a vessel of 20 meters in length or more such lights shall be spaced not less than 2 meters apart, and the lowest of these lights shall, except where a towing light is required, be placed at a height of not less than 4 meters above the hull;	(1) On a vessel of 20 meters in length or more such lights shall be spaced not less than 1 meter apart, and the lowest of these lights shall, except where a towing light is required, be placed at a height of not less than 4 meters above the hull;
(ii) on a vessel of less than 20 meters in length such lights shall be spaced not less than 1 meter apart and the lowest of these lights shall, except where a towing light is required, be placed at a height of not less than 2 meters above the gunwale;	(2) On a vessel of less than 20 meters in length such lights shall be spaced not less than 1 meter apart and the lowest of these lights shall, except where a towing light is required, be placed at a height of not less than 2 meters above the gunwale;
(iii) when three lights are carried they shall be equally spaced.	(3) When three lights are carried they shall be equally spaced.

The navigation rules frequently require the display of two or three lights in a vertical line--all-round lights, masthead lights, or lights aimed aft for towing. Annex I prescribes the spacing between the lights and the height above the hull (above the gunwale for smaller vessels) for the lowest light. Vertical height above the "hull" is above the uppermost continuous deck.

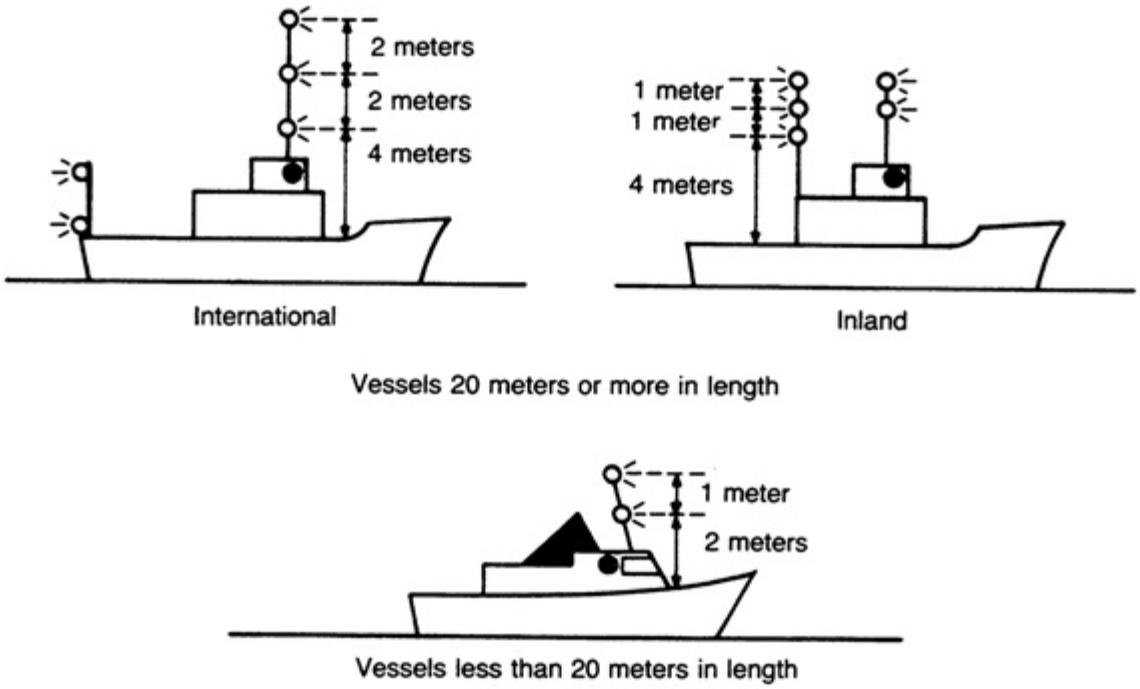
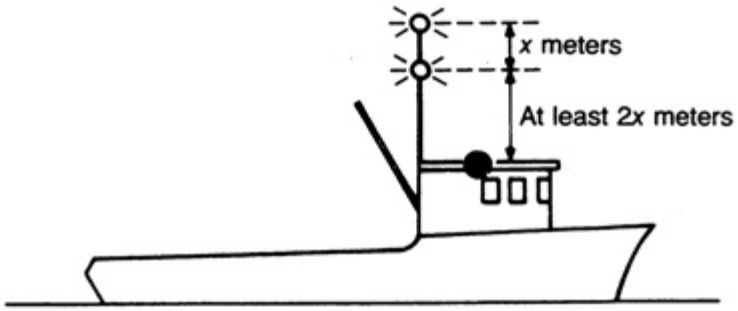


Figure 14—Minimum spacing of lights carried in a vertical line.

When a yellow towing light is displayed above the sternlight or above another towing light, the height-above-the-hull requirements do not apply. The sternlight, of course, is the same one used when not towing and may be placed right on the uppermost continuous deck or even below it. The same principle operates when two towing lights (no sternlight) are displayed in a vertical line (Inland Rules only).

INTERNATIONAL	INLAND
(j) The lower of the two all-round lights prescribed for a vessel when engaged in fishing shall be at a height above the sidelights not less than twice the distance between the two vertical lights.	(j) The lower of the two all-round lights prescribed for a vessel when engaged in fishing shall be at a height above the sidelights not less than twice the distance between the two vertical lights.
(k) The forward anchor light prescribed in Rule 30(a)(i), when two are carried, shall not be less than 4.5 meters above the after one. On a vessel 50 meters or more in length this forward anchor light shall be placed at a height of not less than 6 meters above the hull.	(k) The forward anchor light prescribed in Rule 30(a)(i), when two are carried, shall not be less than 4.5 meters above the after one. On a vessel 50 meters or more in length this forward anchor light shall be placed at a height of not less than 6 meters above the hull.

Rule 30 requires two anchor lights for vessels fifty meters or longer. Smaller vessels may display two anchor lights but are required to display only one (where it can best be seen).



x equals distance between upper and lower all-round lights. For example, if the vertical distance between the two all-round lights is 2 meters, then the lower all-round light must be at least 4 meters above the sidelights.

Figure 15—Vertical spacing of lights on fishing vessels.

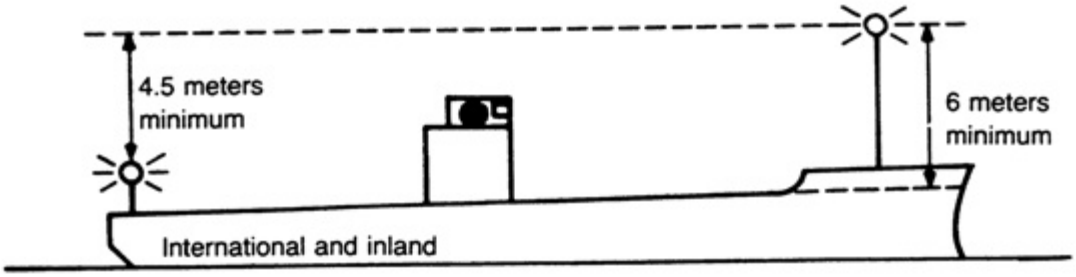


Figure 16—Vertical placement of anchor lights: vessels 50 meters or more in length.

INTERNATIONAL

3. Horizontal positioning and spacing of lights

(a) When two masthead lights are prescribed for a power-driven vessel, the horizontal distance between them shall not be less than one half of the length of the vessel but need not be more than 100 meters. The forward light shall be placed not more than one quarter of the length of the vessel from the stem.

INLAND

§ 84.05 Horizontal positioning and spacing of lights

(a) Except as specified in paragraph (e) of this section, when two masthead lights are prescribed for a power-driven vessel, the horizontal distance between them shall not be less than one-quarter of the length of the vessel but need not be more than 50 meters. The forward light shall be placed not more than one half of the length of the vessel from the stem.

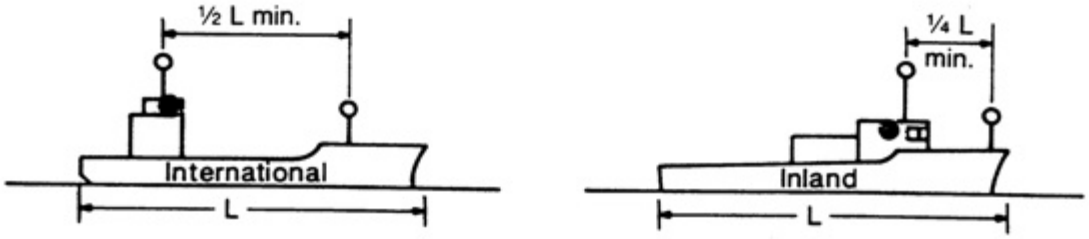


Figure 17—Horizontal spacing of masthead lights.

This provision affects primarily vessels fifty meters or longer because smaller vessels do not have to display both forward and after masthead lights. Both the International and Inland minimum separation is based on the length of the vessel. For power-driven vessels two hundred meters or longer, the minimum horizontal separation is a flat one hundred meters for International and fifty meters for Inland.

INTERNATIONAL	INLAND
(b) On a power-driven vessel of 20 meters or more in length the sidelights shall not be placed in front of the forward masthead lights. They shall be placed at or near the side of the vessel.	(b) On a power-driven vessel of 20 meters or more in length the sidelights shall not be placed in front of the forward masthead lights. They shall be placed at or near the side of the vessel.
(c) When the lights prescribed in 27(b)(i) or Rule 28 are placed vertically between the forward masthead light(s) and the after masthead light(s) these all-round lights shall be placed at a horizontal distance of not less than 2 meters from the fore and aft centerline of the vessel in the athwartship direction.	(c) When the lights prescribed in 27(b)(i) are placed vertically between the forward masthead light(s) and the after masthead light(s) these all-round lights shall be placed at a horizontal distance of not less than 2 meters from the fore and aft centerline of the vessel in the athwartship direction.

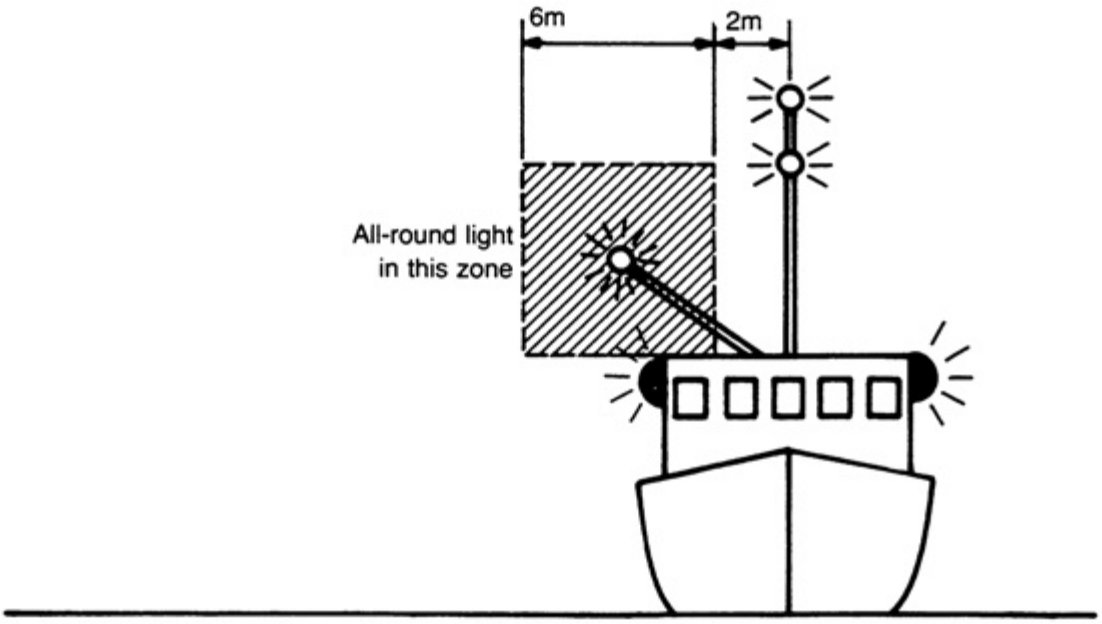
This provision is linked with Annex I (2)(f)/§ 84.03(f) requirement and is illustrated with the discussion of that vertical-positioning requirement.

INTERNATIONAL	INLAND
(d) When only one masthead light is prescribed for a power-driven vessel, this light shall be exhibited forward of amidships; except that a vessel of less than 20 meters in length need not exhibit this light forward of amidships but shall exhibit it as far forward as is practicable.	(d) When only one masthead light is prescribed for a power-driven vessel, this light must be exhibited forward of amidships. For a vessel of less than 20 meters in length, the vessel shall exhibit one masthead light as far forward as is practicable.
	(e) On power-driven vessels 50 meters but less than 60 meters in length operated on Western Rivers, the horizontal distance between masthead lights shall not be less than 10 meters.

Western Rivers towboats fifty to sixty meters long have a slightly relaxed requirement because their typical house arrangement makes meeting the full one-quarter-length separation more costly.

INTERNATIONAL	INLAND
4. Details of location of direction-indicating lights for fishing vessels, dredgers and vessels engaged in underwater operations	**§ 84.07 Details of location of direction-indicating lights for fishing vessels, dredgers and vessels engaged in underwater operations**
(a) The light indicating the direction of the outlying gear from a vessel engaged in fishing as prescribed in Rule 26(c)(ii) shall be placed at a horizontal distance of not less than 2 meters and not more than 6 meters away from the two all-round red and white lights. This light shall be placed not higher than the all-round white light prescribed in Rule 26(c)(i) and not lower than the sidelights.	(a) The light indicating the direction of the outlying gear from a vessel engaged in fishing as prescribed in Rule 26(c)(ii) shall be placed at a horizontal distance of not less than 2 meters and not more than 6 meters away from the two all-round red and white lights. This light shall be placed not higher than the all-round white light prescribed in Rule 26(c)(i) and not lower than the sidelights.

Rule 26(c) applies to vessels engaged in fishing by means other than trawling. The identifying lights are an all-round red in a vertical line over an all-round white. When outlying fishing gear extends more than 150 meters from the vessel, an all-round white light must be displayed in the direction of that gear. This all-round light must be outside a circle with a two-meter radius and inside a circle with a six-meter radius, as viewed from above the vessel and with the center of both circles at the vertical line running through the red and white all-round identifying lights.



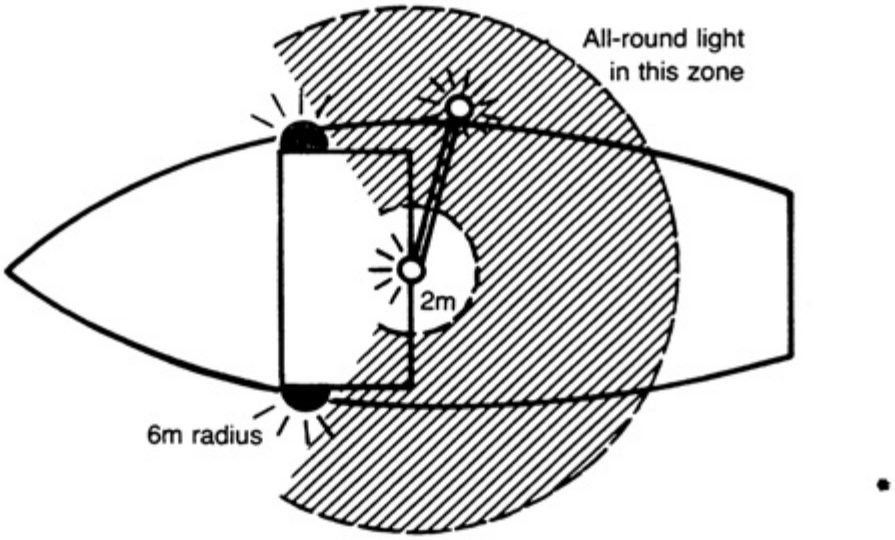
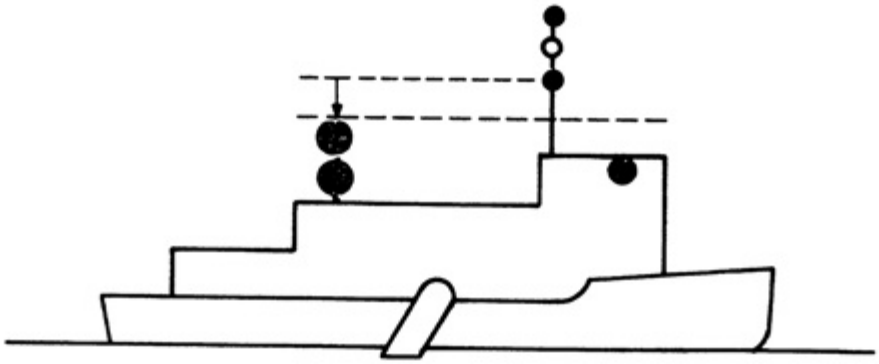


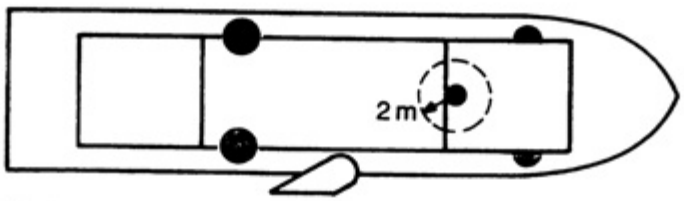
Figure 18—Placement of direction-indicating lights.

INTERNATIONAL	INLAND
(b) The lights and shapes on a vessel engaged in dredging or underwater operations to indicate the obstructed side and/or the side on which it is safe to pass, as prescribed in Rule 27(d)(i) and (ii), shall be placed at the maximum practical horizontal distance, but in no case less than 2 meters, from the lights or shapes prescribed in Rule 27(b)(i) and	(b) The lights and shapes on a vessel engaged in dredging or underwater operations to indicate the obstructed side and/or the side on which it is safe to pass, as prescribed in Rule 27(d)(i) and (ii), shall be placed at the maximum practical horizontal distance, but in no case less than 2 meters, from the lights or shapes prescribed in Rule 27(b)(i) and

(ii). In no case shall the upper of these lights or shapes be at a greater height than the lower of the three lights or shapes prescribed in Rule 27(b)(i) and (ii).

(ii). In no case shall the upper of these lights or shapes be at a greater height than the lower of the three lights or shapes prescribed in Rule 27(b)(i) and (ii).





Red and green pairs must be displayed outside 2-meter-radius circle surrounding red-white-red all-round lights, as far away as "practical."

Figure 19—Lights for vessels engaged in dredging or underwater operations.

Rule 27(d) applies to vessels engaged in dredging or underwater operations when their work involves placing an obstruction to one side of the vessel. The vessel displays the 27(b) red-white-red vertical array to indicate restricted ability to maneuver, the 27(d) red-over-red all-round lights to indicate the side having the obstruction, and green-over-green all-round lights to indicate on which side it is safe to pass.

These Annex I provisions also apply to the corresponding shapes during the day.

Annex I continues - Click Here

Home

Table of Contents

Annex II

Handbook of the Nautical Rules of the Road by Llana & Wisneskey

Home - Table of Contents

Annex I -- Positioning and Technical Details of Navigation Lights

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Annex I tells us how navigation lights have to peform and where they must be located. It doesn't say what lights to display--the Rules do that. Annex I also describes the size, color, and spacing for day shapes.

The International Annex I came first. The Inland Annex I is very similar but many specifications differ to suit the particular conditions of the inland waterways.

The Inland Annex I is a regulation. It is marked with "section" symbols (§) and numbers beginning with "84," because it is Part 84, Title 33 of the Code of Federal Regulations. The other four Inland annexes are Parts 85, 86, 87, and 88.

INTERNATIONAL	INLAND
1. Definition	**§ 84.01 Definitions**
The term "height above the hull" means height above the uppermost continuous deck. This height shall be measured from the position vertically beneath the location of the light.	(a) The term "height above the hull" means height above the uppermost continuous deck. This height shall be measured from the position vertically beneath the location of the light.

Annex I normally expresses the vertical position of lights as "height above the hull." This is measured from the highest deck (directly below the light, in the center of the vessel if the light is in the center) that extends over the length of the ship or nearly so.

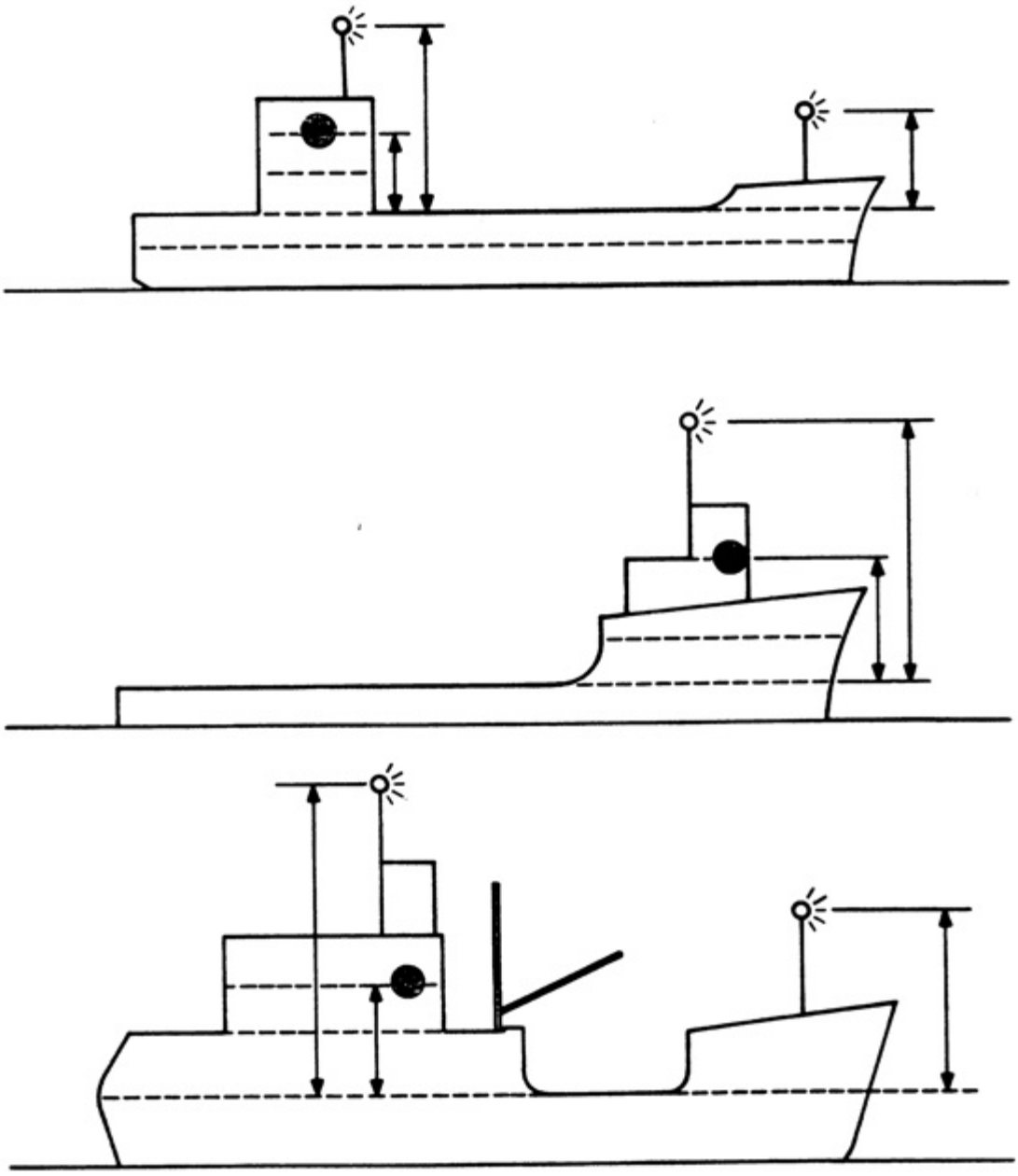


Figure 4—Measurement of "height above the hull."

INLAND

(b) High-speed craft means a craft capable of maximum speed in meters per second (m/s) equal to or exceeding:

$$3{\cdot}7\,\nabla^{0.1667}$$

where ∇ = displacement corresponding to the design waterline (meters^3)

Note to paragraph (b): The same formula expressed in pounds and knots is maximum speed in knots (kts) equal to exceeding 1.98 (lbs) x $\nabla^{0.1667}$; where ∇ = displacement corresponding to design waterline in pounds.

This definition of high-speed craft has been added because of an exception for this class of vessel to the general masthead light vertical positioning requirements. The definition was taken from the International Maritime Organization's "International Code of Safety for High-Speed Craft."

INLAND

(c) The term "practical cut-off" means, for vessels 20 meters or more in length, 12.5 percent of the minimum luminous intensity (Table 84.15(b)) corresponding to the greatest range of visibility for which the requirements of Annex I are met.

Many navigation lights give you a rough idea of the orientation of a vessel, depending on whether you see a green sidelight, a red sidelight, masthead lights, or whatever. In other words, you know that, in relation to the observed vessel, you are within a certain horizontal sector. The term "horizontal sector" refers to the arc around the horizon through which each navigation light is supposed to shine. When you move from the inside to the outside of the sector, the light "cuts off."

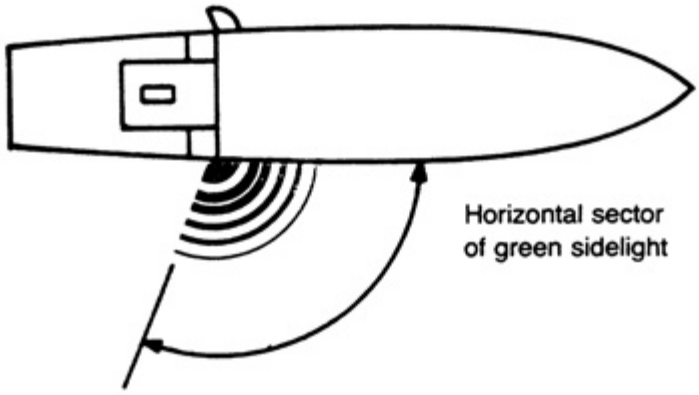


Figure 5—Example of a "horizontal sector."

In theory, a light should have full intensity everywhere inside the sector and be absolutely dark outside the sector. In practice, this level of performance hasn't been achieved using common technology and at a reasonable cost. Cut-off isn't instant and complete. Some light, undesirably because it affects perceptions of orientation, leaks outside of the sector. Annex I requires that "practical cut-off" be a reduction of the light intensity down to below 12.5 percent of what must be shown inside the sector. This is for lights designed for vessels twenty meters and longer.

The term "practical cut-off" is defined only in Inland Annex I, but the U.S. Coast

Guard is using the same definition in its International Rules navigation light approval program for inspected vessels. The United States does not define practical cut-off for lights designed for vessels less than twenty meters, although a number of European countries do. These countries also certify or approve their own small-vessel navigation lights as meeting the International Annex I specifications.

The Inland Rule definition for practical cut-off is worded so that a navigation light may be used on a vessel smaller than the vessel size class for which it was designed. The language "corresponding to the greatest range of visibility for which the requirements of Annex I are met" results in a single practical cut-off for any particular light rather than a different practical cut-off for each class of vessel.

For example, a masthead light designed for vessels twenty to fifty meters long has a minimum required range of five miles (see Rule 22). Annex I requires an intensity of at least fifty-two candelas for a five-mile light (see § 84.15). A six-mile light needs ninety-four candelas, almost twice as bright; a three-mile light, twelve candelas. We'll say in our example that the actual "five-mile" light has an intensity of sixty-three candelas in the sector and is being used on a boat eighteen meters long. The practical cut-off in this case would be 12.5 percent of *fifty-two* candelas or 6.5. We don't base practical cut-off on the sixty-three candela actual intensity or on the twelve-candela minimum required intensity for the size vessel (eighteen meters) on which the light is installed.

INLAND

(d) The term "Rule" or "Rules" means the Inland Navigation Rules contained in Sec. 2 of the Inland Navigational Rules Act of 1980 (Pub. L. 96-591, 94 Stat. 3415, 33 U.S.C. 2001, December 24, 1980) as amended.

The Inland navigation rules were enacted by Congress through legislation, whereas the annexes were enacted by the Coast Guard as regulations.

INTERNATIONAL

2. Vertical positioning and spacing of lights

(a) On a power-driven vessel of 20 meters or more in length the masthead lights shall be placed as follows:

(i) the forward masthead light, or if only one masthead light is carried, then that light, at a height above the hull of not less than 6 meters, and, if the breadth of the vessel exceeds 6 meters, then at a height above the hull not less than such breadth, so however that the light need not be placed at a greater height above the hull than 12 meters.

(ii) when two masthead lights are carried the after one shall be at least 4.5 meters vertically higher than the forward one.

INLAND

§ 84.03 Vertical positioning and spacing of lights

(a) On a power-driven vessel of 20 meters or more in length the masthead lights shall be placed as follows:

(1) The forward masthead light, or if only one masthead light is carried, then that light, at a height above the hull of not less than 5 meters, and, if the breadth of the vessel exceeds 5 meters, then at a height above the hull not less than such breadth, so however that the light need not be placed at a greater height above the hull than 8 meters.

(2) When two masthead lights are carried the after one shall be at least 2 meters vertically higher than the forward

(b) The vertical separation of masthead lights of power-driven vessels shall be such that in all normal conditions of trim the after light will be seen over and separate from the forward light at a distance of 1000 meters from the stem when viewed from sea level.

one.

(b) The vertical separation of masthead lights of power-driven vessels shall be such that in all normal conditions of trim the after light will be seen over and separate from the forward light at a distance of 1000 meters from the stem when viewed from sea level.

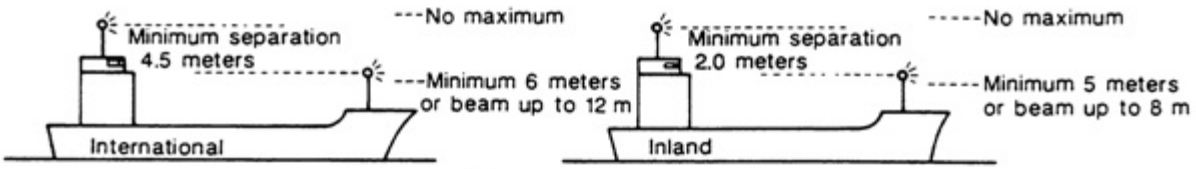


Figure 6—Vertical placement of masthead lights: vessels 20 meters or more in length.

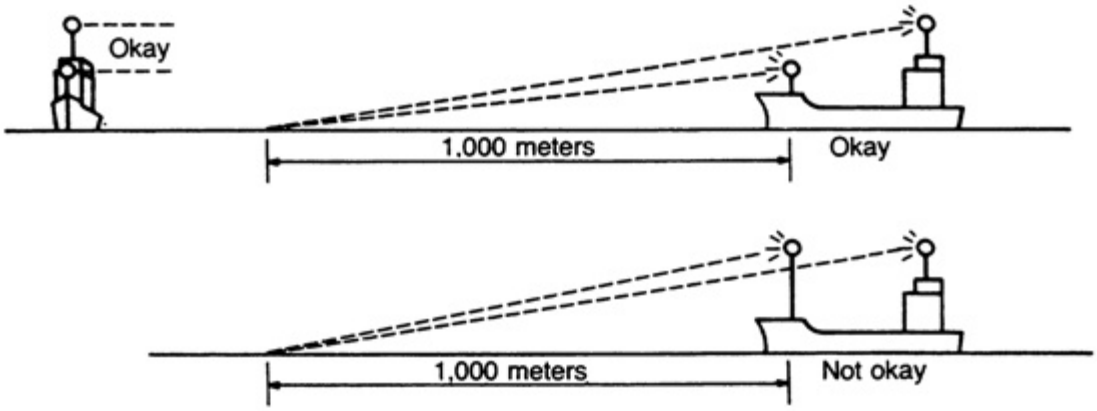


Figure 7—Vertical placement of masthead lights: sight picture.

(c) The masthead light of a power-driven vessel of 12 meters but less than 20 meters in length shall be placed at a height above the gunwale of not less than 2.5 meters.

(d) A power-driven vessel of less than 12 meters in length may carry the uppermost light at a height of less than 2.5 meters above the gunwale. When however, a masthead light is carried in addition to sidelights and a sternlight or the all-round light prescribed in rule 23(c)(i) is carried in addition to sidelights, then such masthead light or all-round

(c) The masthead light of a power-driven vessel of 12 meters but less than 20 meters in length shall be placed at a height above the gunwale of not less than 2.5 meters.

(d) The masthead light, or the all-round light described in Rule 23(c), of a power-driven vessel of less than 12 meters in length shall be carried at least 1 meter higher than the sidelights.

light shall be carried at least 1 meter higher than the sidelights.

Under International Rule 23, power-driven vessels less than twelve meters long may display the following: (1) sidelights, masthead light, and sternlight; (2) sidelights and all-round light; or (3) an all-round light, depending on boat size, speed, and preference of builder or owner. The Inland Rules permit only the first two options.

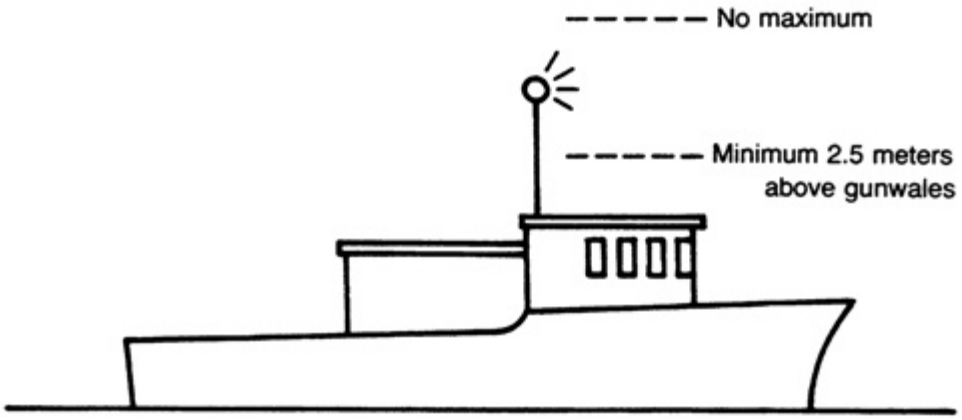


Figure 8—Vertical placement of masthead lights: power-driven vessels 12–20 meters in length.

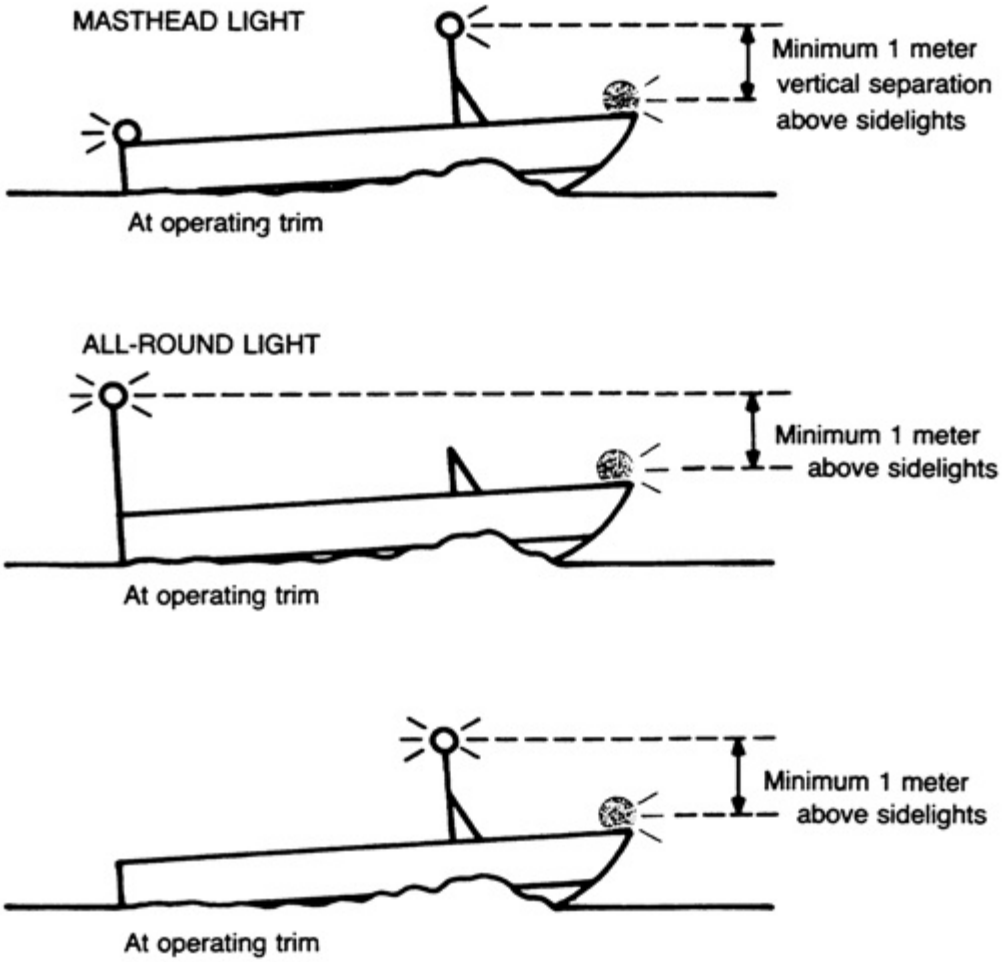


Figure 9—Vertical placement of masthead lights: power-driven vessels less than 12 meters in length.

If sidelights are displayed, the masthead light or all-round light must be at least one meter above the sidelights. The vertical separation is measured at operating trim, which is often different from static trim. Because boat trim may change

significantly with speed changes, vertical separation may be decreased substantially (from what deckline-to-light measurement would indicate) if the masthead/all-round light is mounted very far aft of the sidelights.

This is especially a problem if the all-round light is mounted all the way aft, as was required by the now-repealed Motorboat Act of 1940, and the sidelights are mounted all the way forward. The all-round light (or masthead light) may now be mounted anywhere from stem to stern. Mounting it horizontally close to the sidelights will minimize the adverse effect or trim changes on vertical separation.

INTERNATIONAL	INLAND
(e) One of the two or three masthead lights prescribed for a power-driven vessel when engaged in towing or pushing another vessel shall be placed in the same position as either the forward masthead light or the after masthead light; provided that if carried on the aftermast, the lowest after masthead light shall be at least 4.5 meters vertically higher than the forward masthead light.	(e) One of the two or three masthead lights prescribed for a power-driven vessel when engaged in towing or pushing another vessel shall be placed in the same position as either the forward masthead light or the after masthead light, provided that if carried on the aftermast, the lowest after masthead light shall be at least 2 meters vertically higher than the highest forward masthead light.

In most cases, vessels engaged in towing display either one or two masthead lights in addition to the normal one(s) prescribed for ordinary power-driven vessels (see Rules 23 and 24). Although the language in the Rules says two (or three) masthead lights "instead of" an ordinary masthead light, Annex I 2(e)/§ 84.03(e) makes clear that the Rule 23 masthead light is to be one of the two or three in a vertical column, and paragraph (f)(i) says that of the two or three masthead lights carried in a vertical line for towing, the Rule 23 masthead light must be the highest one.

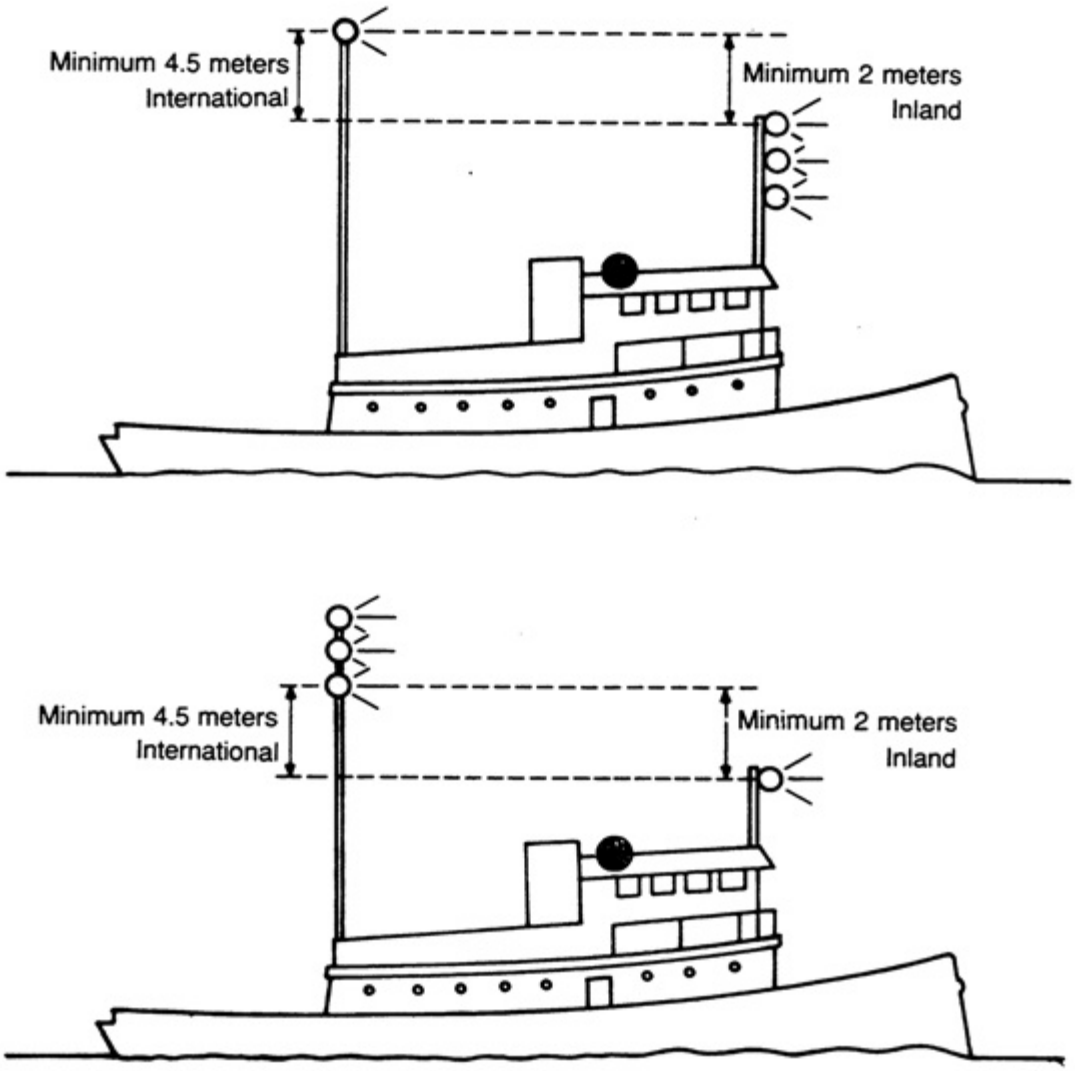


Figure 10—Vertical placement of masthead lights: towing vessels 50 meters or more in length and smaller vessels voluntarily carrying both forward and after masthead lights.

Vessels fifty meters or longer must carry both forward and after masthead lights (smaller vessels may do so). Vessels carrying both forward and after masthead lights (Rule 23(a)) also carry forward and after masthead lights when towing (Rule 24(d)). For towing, the additional masthead lights (one, or two if the tow length exceeds two hundred meters) can be carried under either the forward masthead light or the after masthead light.

If carried under the forward masthead light, the vertical separation between forward and after masthead lights will be unchanged from the non-towing display. If the additional lights are carried under the after masthead light, the vertical separation between masthead lights on forward and after masts will be reduced.

Annex I 2(e)/§ 84.03(e) requires that at least the minimum vertical separation be maintained between the lowest after masthead light and the forward masthead light.

Thus, if you carry your additional masthead lights on the after mast, your ordinary Rule 23 after masthead light must be mounted higher than would otherwise be required by Annex I 2(a)(ii)/§ 84.03(a)(2). The minimum vertical separation differs

between the International (4.5 meters) and Inland (2 meters) Rules.

INTERNATIONAL	INLAND
(f)(i) The masthead light or lights prescribed in Rule 23(a) shall be so placed as to be above and clear of all other lights and obstructions except as described in subparagraph (ii).	(f)(1) The masthead light or lights prescribed in Rule 23(a) shall be so placed as to be above and clear of all other lights and obstructions except as described in paragraph (f)(2) of this section.
(ii) When it is impracticable to carry the all-round lights prescribed by Rule 27(b)(i) or Rule 28 below the masthead lights, they may be carried above the after masthead light(s) or vertically in between the forward masthead light(s) and after masthead light(s), provided that in the latter case the requirement of Section 3(c) of this Annex shall be complied with.	(2) When it is impracticable to carry the all-round lights prescribed by Rule 27(b)(i) below the masthead lights, they may be carried above the after masthead light(s) or vertically in between the forward masthead light(s) and after masthead light(s), provided that in the latter case the requirement of § 84.05(d) shall be complied with.

The Rule 23 masthead lights are considered to be of great importance. As the brightest lights, they function as the reference by which other navigation lights are evaluated. Annex I 2(f)/§ 84.03(f) therefore requires that they be mounted high and be unobstructed.

The exception was added after problems were experienced with all-round lights, which are difficult to see "all-round" if they are mounted below a structure holding up the masthead light. All-round lights may now be placed above masthead lights, but only in the fashion described, which is designed to minimize interference from the masthead lights.

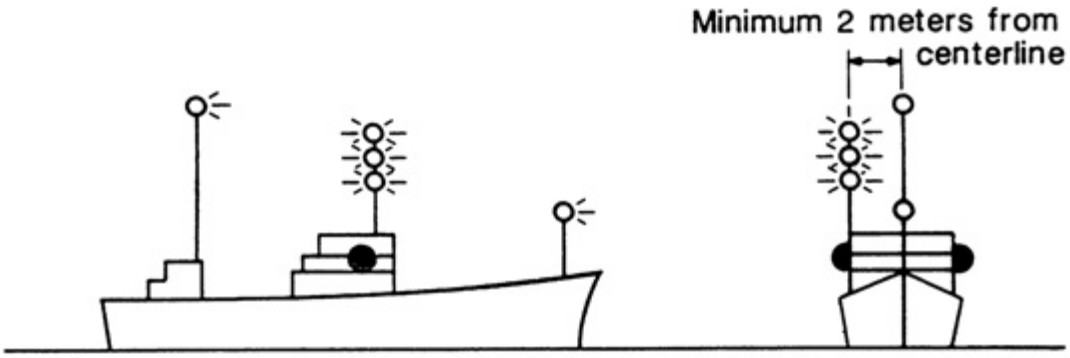


Figure 11—Vertical placement of masthead lights with respect to all-round lights.

The exempted all-round lights are those for vessels restricted in ability to maneuver (Rule 17(b)(i)) and for vessels constrained by draft (Rule 28, International only).

When all-round lights are above the after masthead light, they are usually directly above, not because it is required but because it is practical.

The all-round lights can be mounted on a mast or hung from a yardarm.

The exception permitting display of all-round lights above masthead lights applies only when it is not practicable to mount the all-round lights below the masthead light(s). If practicable, it must be done.

INTERNATIONAL	INLAND
(g) The sidelights of a power-driven vessel shall be placed at a height above the hull not greater than three quarters of that of the forward masthead light. They shall not be so low as to be interfered with by deck lights.	(g) The sidelights of a power-driven vessel shall be placed at least one meter lower than the forward masthead light. They shall not be so low as to be interfered with by deck lights.

The Requirement in the International version of this paragrph is modified or supplemented by paragraphs 2(d) and 2(h) of Annex I for vessels less than twelve and twenty meters, respectively.

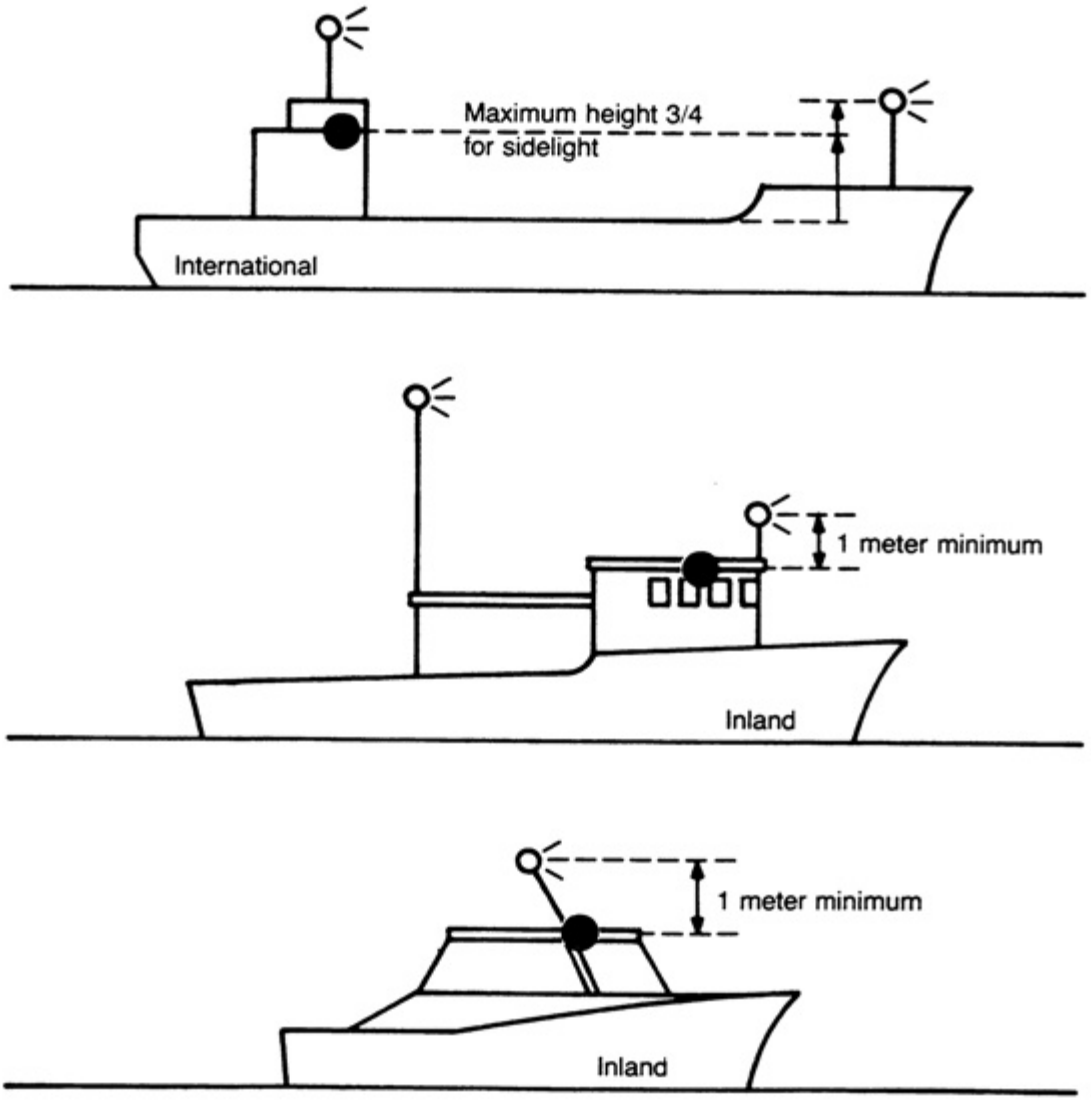


Figure 12—Vertical placement of sidelights.

INTERNATIONAL	INLAND

(h) The sidelights, if in a combination lantern and carried on a power-driven vessel of less than 20 meters in length, shall be placed not less than 1 meter below the masthead light.	(h) [Reserved]

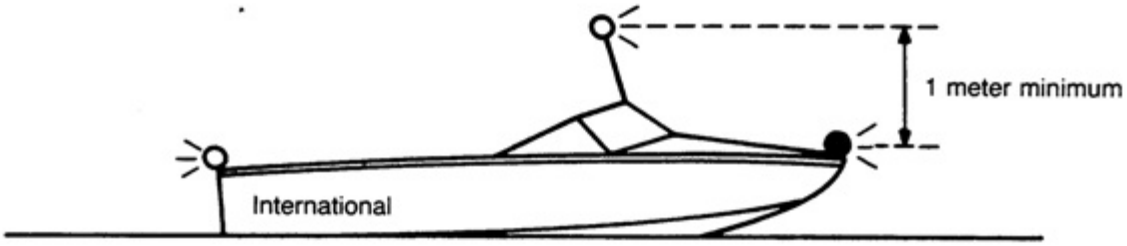


Figure 13—Vertical placement of sidelights on boats.

Only the International version has a paragraph (h). A similar Inland requirement would have duplicated the Inland § 84.03(g) requirement. Inland paragraph (h) was reserved so that corresponding International/Inland paragraphs would be numbered (or lettered) the same.

INTERNATIONAL	INLAND
(i) When the Rules prescribe two or three lights to be carried in a vertical line, they shall be spaced as follows;	(i) When the Rules prescribe two or three lights to be carried in a vertical line, they shall be spaced as follows;
(i) on a vessel of 20 meters in length or more such lights shall be spaced not less than 2 meters apart, and the lowest of these lights shall, except where a towing light is required, be placed at a height of not less than 4 meters above the hull;	(1) On a vessel of 20 meters in length or more such lights shall be spaced not less than 1 meter apart, and the lowest of these lights shall, except where a towing light is required, be placed at a height of not less than 4 meters above the hull;
(ii) on a vessel of less than 20 meters in length such lights shall be spaced not less than 1 meter apart and the lowest of these lights shall, except where a towing light is required, be placed at a height of not less than 2 meters above the gunwale;	(2) On a vessel of less than 20 meters in length such lights shall be spaced not less than 1 meter apart and the lowest of these lights shall, except where a towing light is required, be placed at a height of not less than 2 meters above the gunwale;
(iii) when three lights are carried they shall be equally spaced.	(3) When three lights are carried they shall be equally spaced.

The navigation rules frequently require the display of two or three lights in a vertical line--all-round lights, masthead lights, or lights aimed aft for towing. Annex I prescribes the spacing between the lights and the height above the hull (above the gunwale for smaller vessels) for the lowest light. Vertical height above the "hull" is above the uppermost continuous deck.

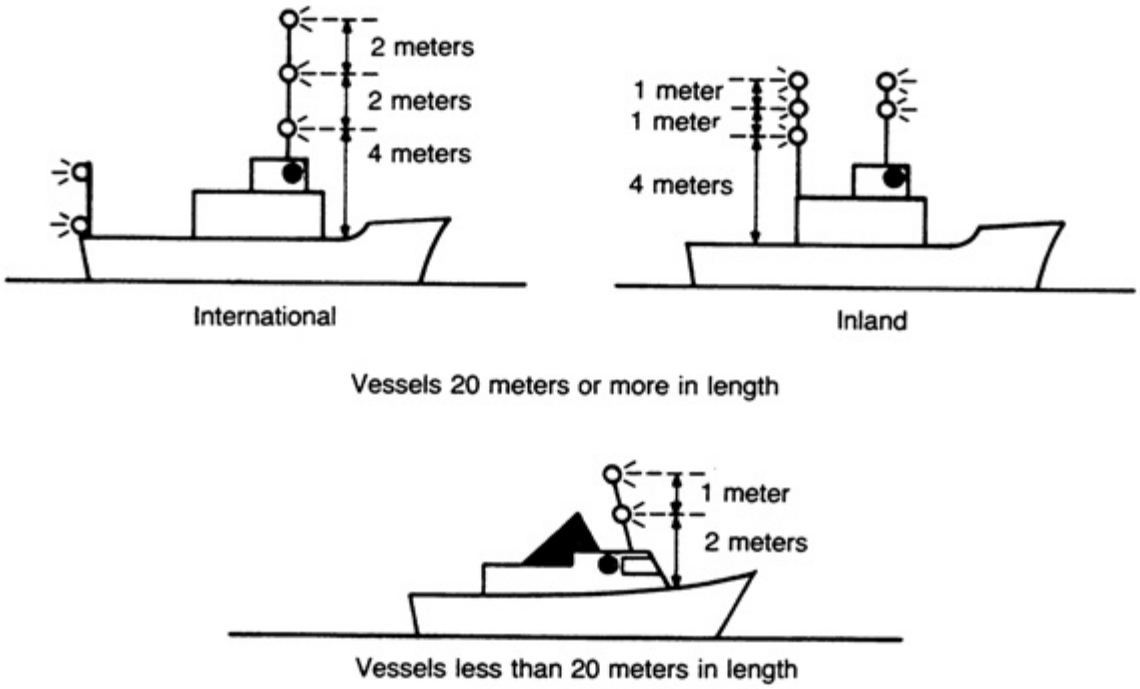
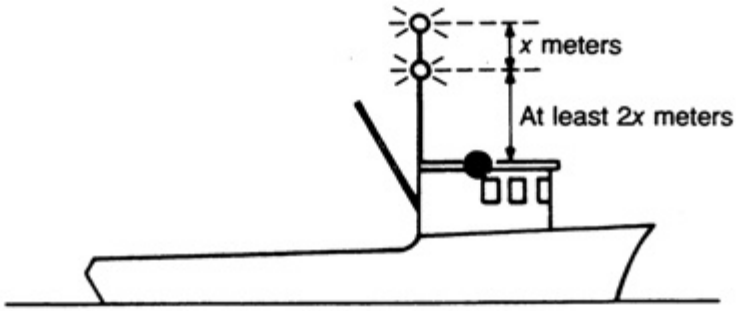


Figure 14—Minimum spacing of lights carried in a vertical line.

When a yellow towing light is displayed above the sternlight or above another towing light, the height-above-the-hull requirements do not apply. The sternlight, of course, is the same one used when not towing and may be placed right on the uppermost continuous deck or even below it. The same principle operates when two towing lights (no sternlight) are displayed in a vertical line (Inland Rules only).

INTERNATIONAL	INLAND
(j) The lower of the two all-round lights prescribed for a vessel when engaged in fishing shall be at a height above the sidelights not less than twice the distance between the two vertical lights.	(j) The lower of the two all-round lights prescribed for a vessel when engaged in fishing shall be at a height above the sidelights not less than twice the distance between the two vertical lights.
(k) The forward anchor light prescribed in Rule 30(a)(i), when two are carried, shall not be less than 4.5 meters above the after one. On a vessel 50 meters or more in length this forward anchor light shall be placed at a height of not less than 6 meters above the hull.	(k) The forward anchor light prescribed in Rule 30(a)(i), when two are carried, shall not be less than 4.5 meters above the after one. On a vessel 50 meters or more in length this forward anchor light shall be placed at a height of not less than 6 meters above the hull.

Rule 30 requires two anchor lights for vessels fifty meters or longer. Smaller vessels may display two anchor lights but are required to display only one (where it can best be seen).



x equals distance between upper and lower all-round lights. For example, if the vertical distance between the two all-round lights is 2 meters, then the lower all-round light must be at least 4 meters above the sidelights.

Figure 15—Vertical spacing of lights on fishing vessels.

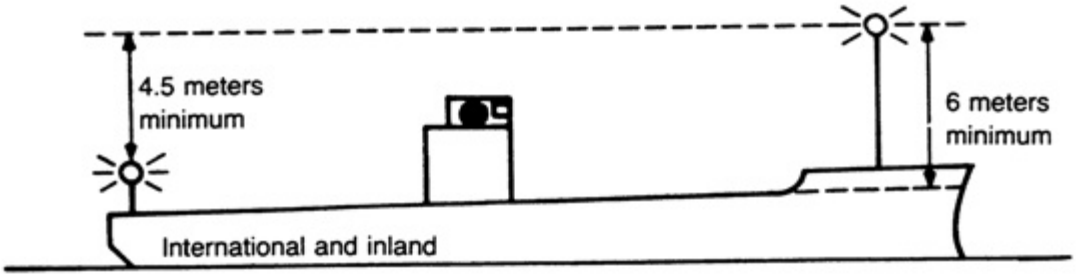


Figure 16—Vertical placement of anchor lights: vessels 50 meters or more in length.

INTERNATIONAL

3. Horizontal positioning and spacing of lights

(a) When two masthead lights are prescribed for a power-driven vessel, the horizontal distance between them shall not be less than one half of the length of the vessel but need not be more than 100 meters. The forward light shall be placed not more than one quarter of the length of the vessel from the stem.

INLAND

§ 84.05 Horizontal positioning and spacing of lights

(a) Except as specified in paragraph (e) of this section, when two masthead lights are prescribed for a power-driven vessel, the horizontal distance between them shall not be less than one-quarter of the length of the vessel but need not be more than 50 meters. The forward light shall be placed not more than one half of the length of the vessel from the stem.

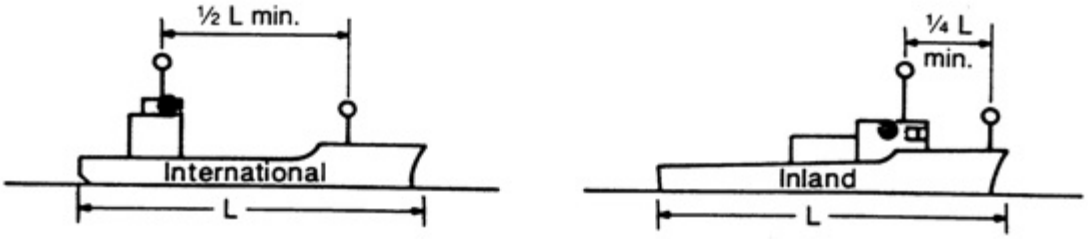


Figure 17—Horizontal spacing of masthead lights.

This provision affects primarily vessels fifty meters or longer because smaller vessels do not have to display both forward and after masthead lights. Both the International and Inland minimum separation is based on the length of the vessel. For power-driven vessels two hundred meters or longer, the minimum horizontal separation is a flat one hundred meters for International and fifty meters for Inland.

INTERNATIONAL	INLAND
(b) On a power-driven vessel of 20 meters or more in length the sidelights shall not be placed in front of the forward masthead lights. They shall be placed at or near the side of the vessel.	(b) On a power-driven vessel of 20 meters or more in length the sidelights shall not be placed in front of the forward masthead lights. They shall be placed at or near the side of the vessel.
(c) When the lights prescribed in 27(b)(i) or Rule 28 are placed vertically between the forward masthead light(s) and the after masthead light(s) these all-round lights shall be placed at a horizontal distance of not less than 2 meters from the fore and aft centerline of the vessel in the athwartship direction.	(c) When the lights prescribed in 27(b)(i) are placed vertically between the forward masthead light(s) and the after masthead light(s) these all-round lights shall be placed at a horizontal distance of not less than 2 meters from the fore and aft centerline of the vessel in the athwartship direction.

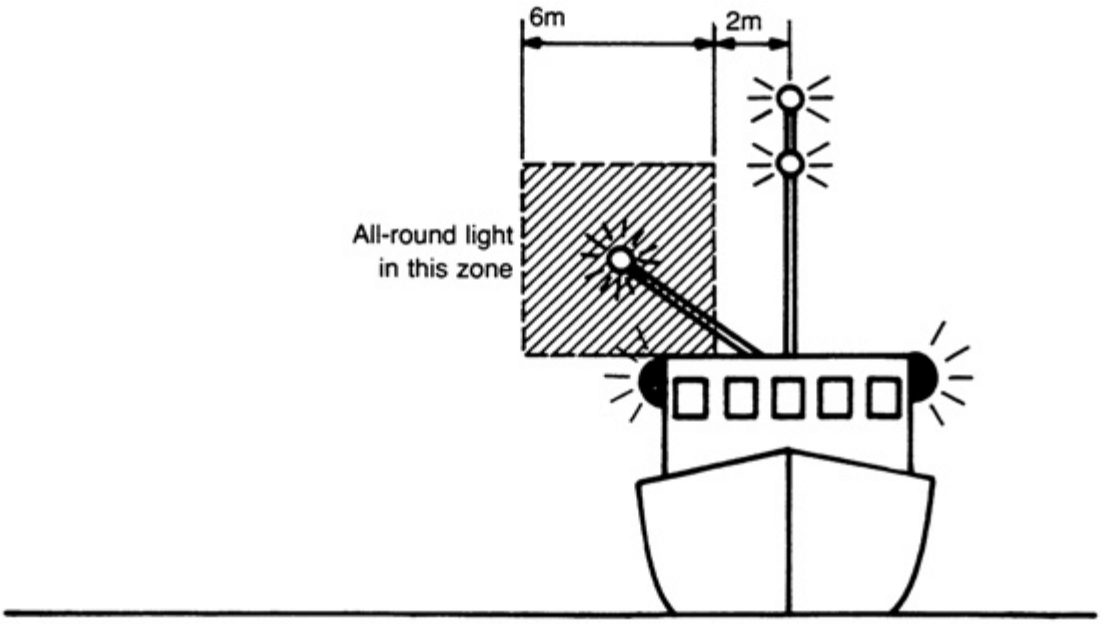
This provision is linked with Annex I (2)(f)/§ 84.03(f) requirement and is illustrated with the discussion of that vertical-positioning requirement.

INTERNATIONAL	INLAND
(d) When only one masthead light is prescribed for a power-driven vessel, this light shall be exhibited forward of amidships; except that a vessel of less than 20 meters in length need not exhibit this light forward of amidships but shall exhibit it as far forward as is practicable.	(d) When only one masthead light is prescribed for a power-driven vessel, this light must be exhibited forward of amidships. For a vessel of less than 20 meters in length, the vessel shall exhibit one masthead light as far forward as is practicable.
	(e) On power-driven vessels 50 meters but less than 60 meters in length operated on Western Rivers, the horizontal distance between masthead lights shall not be less than 10 meters.

Western Rivers towboats fifty to sixty meters long have a slightly relaxed requirement because their typical house arrangement makes meeting the full one-quarter-length separation more costly.

INTERNATIONAL	INLAND
4. Details of location of direction-indicating lights for fishing vessels, dredgers and vessels engaged in underwater operations	**§ 84.07 Details of location of direction-indicating lights for fishing vessels, dredgers and vessels engaged in underwater operations**
(a) The light indicating the direction of the outlying gear from a vessel engaged in fishing as prescribed in Rule 26(c)(ii) shall be placed at a horizontal distance of not less than 2 meters and not more than 6 meters away from the two all-round red and white lights. This light shall be placed not higher than the all-round white light prescribed in Rule 26(c)(i) and not lower than the sidelights.	(a) The light indicating the direction of the outlying gear from a vessel engaged in fishing as prescribed in Rule 26(c)(ii) shall be placed at a horizontal distance of not less than 2 meters and not more than 6 meters away from the two all-round red and white lights. This light shall be placed not higher than the all-round white light prescribed in Rule 26(c)(i) and not lower than the sidelights.

Rule 26(c) applies to vessels engaged in fishing by means other than trawling. The identifying lights are an all-round red in a vertical line over an all-round white. When outlying fishing gear extends more than 150 meters from the vessel, an all-round white light must be displayed in the direction of that gear. This all-round light must be outside a circle with a two-meter radius and inside a circle with a six-meter radius, as viewed from above the vessel and with the center of both circles at the vertical line running through the red and white all-round identifying lights.



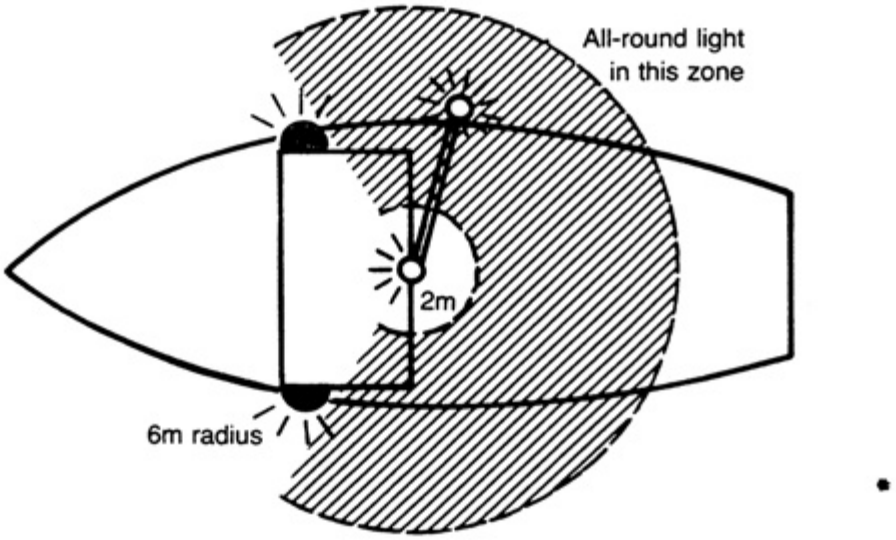
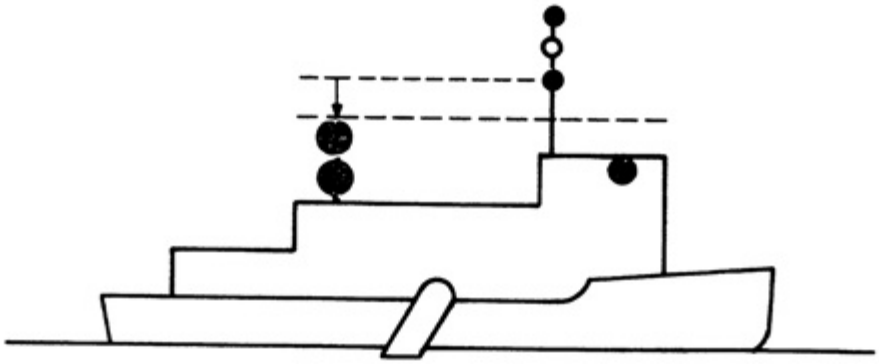


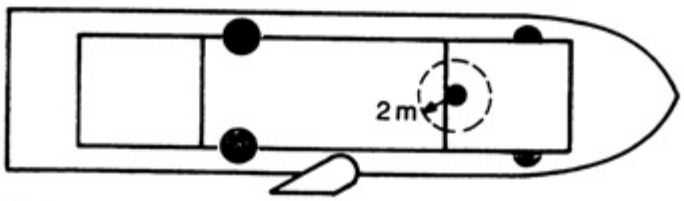
Figure 18—Placement of direction-indicating lights.

INTERNATIONAL	INLAND
(b) The lights and shapes on a vessel engaged in dredging or underwater operations to indicate the obstructed side and/or the side on which it is safe to pass, as prescribed in Rule 27(d)(i) and (ii), shall be placed at the maximum practical horizontal distance, but in no case less than 2 meters, from the lights or shapes prescribed in Rule 27(b)(i) and	(b) The lights and shapes on a vessel engaged in dredging or underwater operations to indicate the obstructed side and/or the side on which it is safe to pass, as prescribed in Rule 27(d)(i) and (ii), shall be placed at the maximum practical horizontal distance, but in no case less than 2 meters, from the lights or shapes prescribed in Rule 27(b)(i) and

(ii). In no case shall the upper of these lights or shapes be at a greater height than the lower of the three lights or shapes prescribed in Rule 27(b)(i) and (ii).

(ii). In no case shall the upper of these lights or shapes be at a greater height than the lower of the three lights or shapes prescribed in Rule 27(b)(i) and (ii).





Red and green pairs must be displayed outside 2-meter-radius circle surrounding red-white-red all-round lights, as far away as "practical."

Figure 19—Lights for vessels engaged in dredging or underwater operations.

Rule 27(d) applies to vessels engaged in dredging or underwater operations when their work involves placing an obstruction to one side of the vessel. The vessel displays the 27(b) red-white-red vertical array to indicate restricted ability to maneuver, the 27(d) red-over-red all-round lights to indicate the side having the obstruction, and green-over-green all-round lights to indicate on which side it is safe to pass.

These Annex I provisions also apply to the corresponding shapes during the day.

Annex I continues - Click Here

Home

Table of Contents

Annex II

Prefaces to Second and First Editions

Preface to the Second Edition

The International Rules have been amended three times since they were completely overhauled in 1972--twice since this book was originally published. Parallel amendments have also been made to the Inland Rules. Virtually all of these amendments can be described as fine-tuning rather than as basic changes. With the last set of amendments adopted, this "teething" process appears to be at an end, and we can look forward to a long period of stability before substantive changes are made again.

This edition of the *Handbook of the Nautical Rules of the Road* incorporates all of the amendments and other revisions to clarify and update the discussion of the Rules. We decided to present the Rules only in their latest form, without the mention of "this recent amendment" or "last year's change" (with a couple of notable exceptions). We felt that such historic detours might confuse and not be of much significance to a mariner encountering another vessel. On the other hand, with the many recent changes and the long existence of the Rules, we felt that a short history would be useful to those who want to know when changes occurred or to those who are simply interested in the histtorical perspective.

To satisfy these purposes, this book now contains a short history of the Rules, starting from the beginnings of modern maritime commerce and proceeding up through the latest amendments. A new Appendix III has also been added, summarizing the new U.S. vessel traffic service regulations being proposed as this edition was going to press.

Preface to the First Edition

This book is intended as an explanatory text or reference work on both the International and Inland navigation rules and is aimed at those who earn their living operating vessels as well as at the serious recreational boater. In addition, designers and builders of vessels, maritime lawyers, and suppliers of nautical equipment will find much of the material, such as technical lighting and signalling-appliance requirements, helpful.

The book follows the organization of the Rules themselves. The Rules are presented paragraph by paragraph, with the International Rule on the left of the page and the corresponding Inland Rule on the right. The succeeding discussion usually covers both the International and Inland requirements, pointing out similarities and differences. Where the requirements are wholly different, each version is discussed separately.

During our time at Coast Guard Headquarters, we saw the need for a book that would do more than simply restate the Rules in other language or analyze court decisions of historic significance. We saw the need for a book whose comments and interpretations would be applicable to real-life situations, a book that presented the Rules not as theoretical abstractions but as practical recommendations for behavior on the water. We have attempted to provide

such a book. Using the expertise we developed through many years of providing, in response to letter and telephone inquiries, the "official" government interpretations of various Rules, we have striven to give as much specific advice here as possible. Specific advice, subject, of course, to whatever limitations apply, can be much more useful in assessing real-life situations than can general comments. Also, we have cross-referenced the Rules and have attempted to make the interpretations consistent with each other.

A word of caution: If we say something is a "requirement," it is because the Rules say it is. Our own interpretations and advice can generally be distinguished by the use of the conditional term "should," rather than "shall" or "must."

Finally, this book is not a scholarly treatise for assigning legal responsibility for a collision after-the-fact; it is, rather, a reference guide for applying the Rules on the water.

A Short History of the Rules

Until the 1800s, wooden sailing ships were so slow that there was no need for much in the way of navigation rules. With the advent of steel vessels propelled by machinery, collisions became more frequent; subsequent loss of life and cargo set the stage for the enactment of such rules.

In the United States the Act of 1838 required steamboats running between sunset and sunrise to carry one or more signal lights; color, visibility, and location were not addressed.

Overseas an effort by London Trinity House prompted Parliament to enact the Steam Navigation Act of 1846, which required that steam vessels pass port-to-port, that crossing vessels make course alterations to the starboard, and that sailing vessels on the port tack give way to vessels on the starboard tack.

In 1848 the United Kingdom further issued regulations requiring steam vessels to display red and green sidelights as well as a white masthead light.

A year later the U.S. Congress extended the light requirements to sailing vessels on U.S. waters.

In 1858, in separate actions, English and U.S. flag vessels were given procedures for the use of whistle and fog signals.

In 1863 the British, in consultation with the French, implemented new and more comprehensive navigation rules. These rules, known as the Articles, were sent to other maritime countries with the idea of establishing consistent and uniform regulations having the force of international maritime law. The U.S. and more than 30 other countries adopted these rules, with President Lincoln signing the new law in 1864.

Some provisions of these first international rules were that the overtaking vessel was required to stay out of the way of the overtaken vessel, that the stand-on vessel was required to maintain its course only, and that the only whistle signal prescribed was for a one-minute interval sounding for fog or poor visibility.

In 1880 the "1863" Articles were supplemented by whistle signals to indicate actions taken to avoid collisions.

In 1884 a new set of international regulations was implemented. There were not many changes to the sailing and steering rules, but their applicability was limited to the high seas and coastal waters. A distinction was now being made between inland rules and international rules.

In 1889 the United States convened the first International Maritime Conference to consider regulations for preventing collisions, held in Washington, D.C. The resulting Washington Conference rules were adopted by the United States in 1890 and became effective in 1897. Significant developments in this new body of rules included a requirement for stand-on vessels to maintain speed as well as course, for steamships to carry a second masthead light, for the give-way vessel not to cross ahead of the stand-on vessel, and for the use of whistle signals to

indicate course changes.

In February of 1894 Congress enacted navigation rules for the Great Lakes. All previously implemented inland navigation and pilot rules were kept in force for waters other than the Great Lakes. The revision also provided the authority for lines to divide the high seas from rivers, harbors, and inland waters.

In June of 1897, just prior to the July 1 effective date for the Washington Conference international rules, Congress excepted the Great Lakes , the Red River of the North, and waters emptying into the Gulf of Mexico from inland waters rules. This meant that there were now four sets of statutory rules and three sets of pilot rules. Each governed a separate area: inland, Great Lakes, western rivers, and international. Only the international rules were not supplemented by separate pilot rules.

Rule change activity slowed after the adoption of the Washington Conference rules. The 1910 Brussels Maritime Conference made some minor changes to the international rules. A 1929 International Conference on Safety of Life at Sea (SOLAS) proposed a few rule changes that were never ratified. The recommendation that the direction of a turn be referenced by the rudder rather than the direction of the helm or tiller was informally agreed by all maritime nations in 1935.

Domestically, the Motorboat Act of 25 April 1940 specified the requirements for lights, whistles, and bells by powered vessels sixty-five feet in length or less, except tug and towboats, on U.S. navigable waters. This act was revised in 1956. In 1948 Public Law 80-544 revised the Inland and Western Rivers rules.

The international 1948 Safety of Life at Sea Conference recommended a mandatory second masthead light for power-driven vessels over 150 feet in length, a fixed sternlight for almost all vessels, the use of five short and rapid blasts as a wake-up signal, and formalized orders for the helmsman. The conference also recognized the use of radar but only to the extent that it did not relieve users from complying with any of the rules. It took four years for the participants to ratify the conference recommendations, and they became effective on 1 January 1954.

In 1960 another SOLAS meeting was held in London. Its recommendations (effective on 1 September 1965) included a paragraph requiring early and substantial action to avoid a close-quarters situation with a vessel detected forward of the beam in restricted visibility.

During this period the U.S. maritime authorities were making a concerted effort to unify our domestic navigation rules. A draft set of unified rules was sent to Congress in 1968; no action was taken, however, because by then preparatory conferences leading to a major revision of the international rules had begun.

The outcome of these conferences was a completely reorganized and substantially modified set of navigation rules. These new rules were called the 1972 International Regulations for the Prevention of Collisions at Sea (COLREGS). The drafters had, in one broad stroke, brought the navigation rules into the twentieth century, applying modern and evolving technology to the best of traditional practices.

During the same year a U.S. Federal advisory committee of twenty members was created to unify and update the several sets of U.S. domestic navigation rules, and to bring them into the closest possible agreement with the new

International Rules.

With the entry into force of the 72 COLREGS on 15 July 1977, this activity increased. In working to find one set of rules that could be applied on high seas as well as on internal U.S. waters, the U.S. Coast Guard took an active role in seeking amendments to the COLREGS that would make the international rules more acceptable for our own internal waters, including the Great Lakes. Canadian authorities participated in our domestic unification efforts as well and were instrumental in unifying the navigation rules used on both sides of the border in the Great Lakes.

On 24 December 1980, the Inland Navigational Rules Act of 1980 was enacted and a year later, fifty-six amendments to the 72 COLREGS were adopted. The Inland Navigational Rules Act superceded the old inland rules, western rivers rules, the Great Lakes rules, their respective pilot rules, and parts of the Motorboat Act of 1940. The new Inland Rules paralleled the International Rules, in great part word-for-word.

The new unified rules became effective on all U.S. inland waters except the Great Lakes on 24 December 1981 and on the Great Lakes on 1 March 1983, to match the effective date of Canada's revised rules.

The amendments to the COLREGS became effective on 1 June 1983 and, with the exception of small-craft lighting provisions, were mostly editorial.

On 28 September 1988, an amendment (Public Law 100-448) to the U.S. Inland Rules was enacted that made Inland Rules 3(g)(v), 27(b), and 27(f) consistent with the first set of International Rules amendments.

Separate changes to the Inland Rules were made on 30 October 1984 by Public Law 98-557 -- primarily the addition of Rules 14(d), a fourth western rivers provision.

The 72 COLREGS were changes a second time by nine amendments that came into force on 19 November 1989. The major change was the addition of new International Rule 8(f) explaining rights and obligations between vessels in "shall not impede" situations. The Coast Guard issued regulatory amendments to the Inland Rule technical annexes early in 1990 to reflect the changes to the International Rule annex.

Congress passed legislation later in 1990 amending Inland Rules 1(e) and 8(f) to match the International Rule changes. The other International Rule amendments (dealing with traffic separation schemes and vessels constrained by draft) had no direct counterpart in the Inland Rules.

In 1989 the International Maritime Organization adopted a third set of amendments to the International Rules. This time there was just one amendment--to Rule 10(d)--which clarified the use of inshore traffic zones. The amendment entered into force on 19 April 1991. In 1992 the change was incorporated into the Inland Rules when the International Rule 10 (Traffic Separation Schemes) language in its entirety replaced the existing Inland Rule 10. Prior to this time, the Inland Rule 10 was a simple incorporation by reference of the U.S. Vessel Traffic Service (VTS) regulations. Adoption of the international language anticipated establishment of traffic separation schemes in U.S. inland waters.

Other minor amendments to the International Rules were adopted during the

early 1990s, the latest becoming effective in November 1995. Most of these concerned technical rules for navigation lights--finding solutions to problems encountered by certain types of vessels; others clarified language; and one accommodated new technology--radar transponders in survival craft.

While 1990s changes made to the International Rules were also adopted for the Inland Rules, there were yet other amendments to the Inland Rules (the latest batch became effective March 1998). These additional Inland amendments, however, also primarily concerned navigation lights and clarifications to ambiguous language.

The 1990s brought essentially no changes to the steering and sailing rules. But as long as technology and commerce continue to evolve (and perhaps as long as there are navigation authorities and advisory committees), the new millenium will probably bring the same kind of minor tinkering to the Rules that we've seen in the last decade of the old millenium.

Rule 1 -- Application

INTERNATIONAL	INLAND
(a) These Rules shall apply to all vessels upon the high seas and in all waters connected therewith navigable by seagoing vessels.	(a) These Rules apply to all vessels upon the inland waters of the United States, and to vessels of the United States on the Canadian waters of the Great Lakes to the extent that there is no conflict with Canadian law.

Where and when do the maritime navigation rules, or "rules of the road," apply? Do the International Rules apply only on international waters (or the "high seas")? Do they apply only to large commercial ships, or to small boats as well? Rule 1 provides the answers.

First, notice that both the International and the Inland versions apply to "all" vessels. If you're not sure what can be called a vessel, you may be surprised to find out that Rule 3(a) gives a very broad definition, which includes large craft, small craft (even sailboards), seaplanes on the water, and military craft.

Older rules that allowed Navy and Coast Guard vessels to operate in violation of these Rules under some circumstances are no longer in effect. Navy and Coast Guard vessels do sometimes operate at night without navigation lights, but the commanding officers of those vessels assume full responsibility for avoiding collisions and are laible for damages resulting from their violation of the Rules.

Now, where do each of the two sets of Rules apply? The International Rules apply on the "high seas" and connecting waters. High seas waters are beyond the limits of a country's territorial sea. The U.S. territorial sea now extends twelve nautical miles beyond the baseline, which runs along the coast and across the mouths of rivers and bays. The width of the territorial sea varies from country to country, but twelve miles is now the internationally accepted standard.

Even though the actual language says that the International Rules also apply to connecting waters "navigable by seagoing vessels," that requirement is often overridden by the application of paragraph (b). In almost all cases the International Rules apply on territorial waters (lying between the coastline and the high seas) and also on some "internal waters" (inside the baseline). Rivers, harbors, bays, and so forth are examples of internal waters. The U.S. internal waters to which the International Rules apply include the rivers and bays of Alaska, Puget Sound, the rivers and bays of most of Maine, and some other waters.

There is no one rule describing the boundary marking the limit of application of the International Rules, but rather the line is set out in detail by regulation. The lines of "demarcation" dividing application of the International Rules and the Inland Rules are described in Part 80 of Title 33 of the Code of Federal Regulations. In most cases the demarcation line follows the shoreline. Where it doesn't, the line is laid out as a series of straight lines connecting prominent points, such as lighthouses or the ends of jetties.

The Inland Rules apply on U.S. navigable waters inside the demarcation lines and on the U.S. side of the Great Lakes. These waters are called "inland waters" and are formally defined in Rule 3. The Inland Rules also apply to U.S. vessels operating on the Canadian side of the Great Lakes except for those provisions that conflict with Canadian navigation rules for the Great Lakes. The U.S. and Canadian navigation rule drafters worked together to minimize the differences between the two countries' rules and to help ensure that the Great Lakes mariner would have little difficulty transiting from one side to the other.

INTERNATIONAL	INLAND
(b) Nothing in these Rules shall interfere with the operation of special rules made by an appropriate authority for roadsteads, harbors, rivers, lakes or inland waterways conneced to the high seas and navigable by seagoing vessels. Such special rules shall conform as closely as possible to these Rules.	(b)(i) These Rules constitute special rules made by an appropriate authority within the meaning of Rules 1(b) of the International Regulations. (ii) All vessels complying with the construction and equipment requirements of the International Regulations are considered to be in compliance with these Rules.

A legal relationship exists between the two sets of Rules, and that relationship is explained, after a fashion, in paragraph (b). The International Rules recognize the existence and usefullness of special (national) rules but admonish the navigation rules authorities to eliminate unnecessary differences between international and national rules. Consistency, of course, minimizes confusion, errors, and the potential for collisions.

Inland Rule 1(b) cites the International Rule 1(b) authority for special rules and incorporates the International Rule constructions and equipment requirements as alternative provisions of the Inland Rules. This allows vessels complying with the International Rule requirements and operating on International Rule waters to enter U.S. inland waters without having to switch over to, for example, a differnt navagation light arrangement. Vessels operating only on inland waters may elect to comply with International Rule navigation light requirements instead of Inland Rule requirements. If they do, however, they must comply exclusively with all International Rule lights. You can;t mix and match the International and Inland requirements to suit your individual style. An important caveat: all vessels entering U.S. inland waters must follow the Inland Rule Steering and Sailing Rules and use Inland Rule sound signals (or radiotelephone).

INTERNATIONAL	INLAND
(c) Nothing in these Rules shall interfere with the operation of any special rules made by the Government of any State with respect to additional station or signal lights, shapes or whistle signals for ships of war and vessels proceeding under convoy, or with respect to additional station or signal lights or shapes for fishing vessels engaged in fishing as a fleet. These additional station or signal lights, shapes or whistle signals shall, so far as possible, be such that they cannot	(c) Nothing in these Rules shall interfere with the operation of any special rules made by the Secretary of the Navy with respect to additional station or signal lights and shapes or whistle signals for ships of war and vessels proceeding under convoy, or by the Secretary with respect to additional station or signal lights or shapes for fishing vessels engaged in fishing as a fleet. These additional station or signal lights and shapes or whistle signals shall, so far as

be mistaken for any light, shape or signal aithorized elsewhere uder these Rules.	possible, be such that they cannot be mistaken fr any light, shape, or signal authorized elsewhere under these Rules. Notice of such special rules shall be published in the Federal Register and , after the effective date specified in such notice, they shall have effect as if they were part of these Rules.

Special *additional* station signal lights, shapes, or whistle signals are explicitly authorized by the International and Inland navigation rules for certain classes of warships, vessels in convoy, and vessels fishing in a fleet. These *supplement* the normal lights, shapes, and signals and are not to be used to replace them.

Additional optional lights for vessels fishing in close proximity (in a fleet) are separately permitted under Rule 26(d) and are listed in Annex II.

Special additional signals for Navy vessels are listed in Part 707 of Title 32 of the Code of Federal Regulations and include the following:

- sec. 707.2 Man overboard lights (two pulsating all-round red lights in a vertical line)
- sec. 707.3 Yardarm signaling lights (flashing all-round white lights)
- sec. 707.4 Aircraft warning lights (one all-round red light)
- sec. 707.5 Underway replenishment contour lights (red or blue lights)
- sec. 707.6 Minesweeping station-keeping lights (two white limited-sector lights)
- sec. 707.7 Submarine identification light (intermittant flashing amber beacon--three flashes, one per second, floowed by three-second off period)
- sec. 707.8 Special operations lights (revolving beam colored red, green, or amber)
- sec. 707.9 Convoy operations sternlight (blue light in lieu of regular sternlight)
- sec. 707.10 Wake illumination light (white spotlight)
- sec. 707.11 Flight operations light (combinations of different colored lights)
- sec. 707.12 Amphibious operations lights (various combinations of colored lights)

INTERNATIONAL	INLAND
(d) Traffic separation schemes may be adopted by the Organization for the purpose of these Rules.	(d) Traffic separation schemes may be established for the purpose of these Rules. Vessel traffic service regulations may be in effect in certain areas.

Rule 10 sets out regulations for vessel operation in traffic separation schemes (TSS) adopted by the Organization in the case of the International Rules, or established by the U.S. government for Inland Rules waters. The Organization is the International Maritime Organization (IMO), a body of the United Nations. Rule 1(d) authorizes IMO to adopt traffic separation schemes to which Rule 10 will apply.

Traffic separation schemes are used to keep apart ships that are proceeding in opposite directions (usually in well-traveled sea lanes) and are most commonly

found in the coast approaches to busy ports around the world. The traffic separation schemes associated with U.S. ports lie, for the most part, in high seas waters where ships are mostly outside of U.S. jurisdictional control. International Rule 10 applies in those cases. This goes for traffic separation schemes off foreign coasts as well. Violations of Rule 10 are reported by the country off whose coast the traffic separation scheme is located to the flag state of the vessel involved. It is then up to the flag state (country of vessel registry) to adjudicate the violation and impose any penalties.

Vessel routing systems in *inland* waters can be in the form of traffic separation schemes (covered by Inland Rule 10), or in the form of Vessel Traffic Services (VTS). Inland Rule 1(d) calls attention to the fact that separate regulations may apply to certain heavily trafficked or hazardous areas. As of this writing, eight VTS areas have been established, but no inland TSSs yet exist. A more complete discussion of this subject appears under Rule 10 and in Appendix III to this book.

INTERNATIONAL	INLAND
(e) Whenever the Government concerned shall have determined that a vessel of special construction or purpose cannot comply fully with the provisions of any of these Rules with respect to the number, position, range or arc of visibility of lights or shapes, as well as to the disposition and characteristics of sound signaling appliances, such vessel shall comply with such other prrovisions in regard to the number, position, range or arc of visibility of lights and shapes, as well as to the disposition and characteristics of sound signaling appliances, as her Government shall have determined to be the closest possible compliance wither these Rules in respect to that vessel.	(e) Whenever the Secretary determines that a vessel or class of vessels of special construction or purpose cannot comply fully with the provisions of any of these Rules with respect to the number, position, range or arc of visibility of lights or shapes, as well as to the disposition and characteristics of sound signally appliances, the vessel shall comply with such other provisions in regard to the number, position, range or arc of visibility of lights or shapes, as well as to the disposition and characteristics of sound signaling applicances, as the Secretary shall have determined to be the closest possible compliance with these Rules. The Secretary may issue a certificate of alternative compliance for a vessel or class of vessels specifying the closest possible compliance with these Rules. The Secretary of the Navy shall make these determinations and issue certificates of alternative compliance for vessels of the Navy.

The navigation rules have set up navigation light, shape, and sound-signal requirements that can be redily applied to almost all vessels used today. Occasionally, however, a vessel that has been designed or modified to perform a particular, perhaps unique function will not be able to comply fully without having its special function impaired. In those cases, Rule 1(e) permits a deviation from the navigation light, shape, or sound-signal requirements but only to the point of preventing interference with the special function. This permitted deviation from the Rules is called "alternative compliance," and the document granting that deviation is the Certificate of Alternative Compliance.

Vessels must fulfill two criteria before receiving a Certificate of Alternative Compliance. First, the vessel must be of special construction or purpose. Ordinary

passenger, cargo, or recreational vessels do not meet this first criterion, but offshore oil and gas facility supply vessels and cable-laying vessels, for example, do.

Second, it must be shown that full compliance would interfere with the special function of the vessel. If this second criterion is also satisfied, the vessel must still comply as closely as possible with the requirement without interfering with its special function.

For example, full compliance by an offshore supply vessel over fifty meters long would require the placement of an after masthead light (and mast) in the middle of its long open cargo deck. However, doing this would interfere with the vessel's cargo-handling function. Instead, the after masthead light is placed at the forward end of the cargo deck, and the forward masthead light is placed at the stem, thereby obtaining the maximum horizontal separation possible (although still less than required by the Rules).

The secretary of the department in which the Coast Guard is operating makes alternative compliance determinations for Coast Guard and private vessels. This authority has been delegated to the Coast Guard. Procedures for obtaining Certificated of Alternative Compliance are found in Title 33 of the Code of Federal Regulations, Part 89 for the Inland Rules and Part 81 for the International Rules. The Secretary of the Navy makes alternative compliance determinations for Navy vessels.

INLAND

(f) The Secretary may accept a certificate of alternative compliance issued by a contracting party to the International Regulations if he determines that the alternative compliance standards of the contracting party are substantially the same as those of the United States.

Only the Inland Rules contain a paragraph (f) in Rule 1, which states that, in determining whether a foreign vessel in U.S. inland waters complies with the navigation rules, U.S. authorities may rely on the determinations of the flag state (the state in which the vessel is registered)

Home

Table of Contents

Rule 2

Rule 2 -- Responsibility

INTERNATIONAL	INLAND
(a) Nothing in these Rules shall exonerate any vessel, or the owner, master or crew thereof, from the consequences of any neglect to comply with these Rules or of the neglect of any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.	(a) Nothing in these Rules shall exonerate any vessel, or the owner, master or crew thereof, from the consequences of any neglect to comply with these Rules or of the neglect of any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.
(b) In construing and complying with these Rules due regard shall be had to all dangers of navigation and collision and to any special circumstances, including the limitations of the vessels involved, which may make a departure from these Rules necessary to avoid immediate danger.	(b) In construing and complying with these Rules due regard shall be had to all dangers of navigation and collision and to any special circumstances, including the limitations of the vessels involved, which may make a departure from these Rules necessary to avoid immediate danger.

Rule 2, worded identically in both the International and Inland versions, says when the Rules shall be followed, when supplemental action is required, and when the Rules are not to be followed. Although a statement warning against failure to comply with the Rules would not seem to be necessary (because the Rules are the law), Rule 2 emphasizes that the navigation rules are not merely statements of customary practice or recommended guidance.

Furthermore, Rule 2 holds the mariner responsible not only for complying with the Rules but for avoiding collisions. Merely complying with the Rules is not enough. If, in fact, strict compliance with the Rules would result in immediate danger, a *departure* from the Rules (to the extent necessary to avoid the danger) is *required*. A mariner who chooses to adhere strictly to the word of the Rules, and thereby causes or fails to avoid a collision that could have been prevented by other action, may not use compliance with the Rules as a defense to liability.

The basis for this apparent catch 22 is that the Rules cannot possibly cover every conceivable situation of vessel encounter. The Rules are written for usual or likely situations; atypical situations are termed "special circumstances." A complete list of special circumstances is, of course, impossible to provide. A number of examples should give some idea of the term's meaning.

During routine operations, almost all vessels engage in maneuvers that are not covered by the Rules. These maneuvers, which normally take a very short time, may occur near other vessels. Vessels entering or leaving a slip, for instance, do not follow the steady course needed for Rule applications. Likewise, vessels proceeding stern-first are considered to be in special circumstances.

Vessels not making way may be in special circumstances. First, a vessel should avoid stopping in a high-traffic area, and when a vessel decides to stop, it should

make its intentions clear to other vessels in the area. As always, a proper lookout should be maintained.

Risk-of-collision situations are a bit tricky. If good conditions exist, and if the stopped vessel can put on maneuvering speed quickly, and if one assumes that its steady course is that indicated by the point of its bow, and if then, by Rule 15, it would be the give-way vessel, the Steering and Sailing Rules would apply and the stopped vessel would be obligated to keep out of the way of the other. But if the vessel is drifting, its course may not be obvious. If the stopped vessel is large, it may not be able to move out of the way of a fast oncoming vessel. Whatever the "if" of the situation, encounters with vessels not making way through the water deserve extra caution.

Another special circumstance occurs when two vessels have managed to get themselves much to close to each other and are headed in unfortunate directions. Collisions about the happen are often called "extremis" situations. The vessels involved are said to be "in extremis."

An extremis situation occurs when a collision can be avoided only by the action of both vessels. Here Rule 17(b) requires the stand-on vessel to maneuver to avoid the collision. In general, however, an extremis situation is one in which a collision is *imminent*, in which there is an *immediate* danger of collision ("in the jaws of a collision"). The collision need not occur for an extremis situation to have existed.

In an extremis situation, the operators on one or both of the vessel have failed to take the first line of preventive actions prescribed by the Rules. The second line of defense comes into play; the parties in extremis are required to do *whatever* is necessary to avoid a collision or at least to minimize the damage.

The physical limitations of the vessels may also impose special circumstances. Draft limitations will prevent some give-way vessels from turning into shallow water; a sluggish craft may preclude a timely maneuver for others.

The presence of more than two vessels may preclude full compliance with the Rules; action required with respect to one vessel may conflict with the action required with respect to one or more of the others. Again, special circumstances exist.

Sometimes vessel masters find it more convenient (as opposed to necessary) to maneuver in conflict with the Rules. This is permitted only after all vessels involved agree to a departure from the Rules. The master proposing to depart must comply with the Rules until agreement is reached by all parties. This means that the master should not begin to line up his or her vessel for a maneuver in conflict with the Rules until *after* agreement on that maneuver has been reached--early planning is a must. The proposal is in no way binding on the other vessel's master until he or she agrees to it. Once agreement is reached, neither vessel is the stand-on vessel, and each should proceed with caution. Agreement to depart from the Rules should not be made under normal circumstances, and an agreement to depart should never be assumed from customary practice or prior agreements.

Home

Table of Contents

Rule 3

Rule 3 -- General Definitions

This rule provides definitions to terms that reappear throughout the Rules. Less frequently used terms are defined where they appear; see Rules 12(b), 13(b), 14(b), 21, and 32.

INTERNATIONAL	INLAND
For the purpose of these Rules, except where the context otherwise requires: (a) The word "vessel" includes every description of water craft, including non-displacement craft and seaplanes, used or capable of being used as a means of transportation of the water.	For the purpose of these Rules and this Act, except where the context otherwise requires: (a) The word "vessel" includes every description of water craft, including non-displacement craft and seaplanes, used or capable of being used as a means of transportation of the water;

All vehicles that operate on the water are vessels, including displacement craft (those that "float" or are supported by the static buoyancy derived fro the water that their hulls displace), non-displacement craft (those that are supported by the dynamic lift of hydrofoils or other lifting surfaces, such as planing hulls), and seaplanes. The phrase "used or capable of being used as a means of transportation" implies the practical transportation of people or cargo. Inner tubes are not included, although sailboards are.

The "Act" in the Inland version refers to the Inland Navigational Rules Act of 1980, which contains the Inland Rules.

INTERNATIONAL	INLAND
(b) The term "power-driven vessel" means any vessel propelled by machinery.	(b) The term "power-driven vessel" means any vessel propelled by machinery;

Vessels propelled by oars, paddles, or other human- or animal-powered means are not included in this definition, nor are they covered in the Steering and Sailing Rules (Rules 4-19)--if you are in a rowboat, canoe, kayak, or the like you must use Rule 2 (in other words, common sense and good judgment). Vessels propelled by machinery *as well as* any other means of propulsion are considered to be power-driven vessels. A day shape is required for most vessels using both sails and machinery for propulsion; see Rule 25(e).

INTERNATIONAL	INLAND
(c) The term "sailing vessel" means any vessel under sail provided that propelling machinery, if fitted, is not being used.	(c) The term "sailing vessel" means any vessel under sail provided that propelling machinery, if fitted, is not being used;

Vessels using only their sails for propulsion are included, even though they may be fitted with an engine. Operation of the engine to generate electricity or to heat water, for example, does not make the sailing vessel a power-driven vessel, so long as the propeller (or paddle wheel) is not engaged. Rule 18 tells us what the responsibilities of sailing vessels are with respect to other types of vessels, and Rule 12 does the same with respect to other sailing vessels.

INTERNATIONAL	INLAND
(d) The term "vessel engaged in fishing" means any vessel fishing with nets, lines, trawls, or other fishing apparatus which restrict maneuverability, but does not include a vessel fishing with trolling lines or other fishing apparatus which do not restict maneuverability.	(d) The term "vessel engaged in fishing" means any vessel fishing with nets, lines, trawls, or other fishing apparatus which restrict maneuverability, but does not include a vessel fishing with trolling lines or other fishing apparatus which do not restict maneuverability;

As a general rule, this definition includes most commercial fishing vessels (while fishing) and excludes most recreational or sport fishing vessels. The term "lines" in the phrase "fishing with nets, lines, trawls" refers to lines such as long-lines which may be miles long and to which are attached at regular intervals many leaders and hooks. The term "trawls" refers to large open-mouthed nets that are towed through the water by one or two specially equipped fishing vessels (trawlers). Not included in the definition are vessels fishing with trolling lines (for example, a sport fisherman's rod and reel with the line towed astern), which do not restrict maneuverability.

The use of nets, lines, or trawls is presumed to restrict maneuverability while the use of trolling lines is presumed not to restrict maneuverability. The master determines whether the fishing apparatus restricts maneuverability; if a collision occurs, the court may subsequently make the determination. In any case, a master electing to take on vessel-engaged-in-fishing status is required to display the day shapes and lights prescribed by Rule 26.

Rule 18 assigns the privileges and obligations of vessels engaged in fishing with respect to other classes of vessels.

INTERNATIONAL	INLAND
(e) The word "seaplane" includes any aircraft designed to maneuver on the water.	(e) The word "seaplane" includes any aircraft designed to maneuver on the water;

When on the water a seaplane is a vessel. Rule 31 gives the navigation light and shape requirements for seaplanes. <

INTERNATIONAL	INLAND
(f) The term "vessel not under command" means a vessel which through some exceptional circumstances is unable to maneuver as required by these Rules and is thereby unable to keep out of the way	(f) The term "vessel not under command" means a vessel which through some exceptional circumstances is unable to maneuver as required by these Rules and is thereby unable to

of another vessel.	keep out of the way of another vessel;

A vessel claiming not-under-command status must (1) find itself in exceptional circumstances, and (2) thereby be unable to maneuver as would ordinarily be required by the Rules. The following are examples of conditions that could result in not-under-command status:

- Vessel with anchor down but not holding
- Vessel riding on anchor chains
- Vessel with inoperative steering gear
- Sailing vessel becalmed or in irons
- Exceptionally bad weather (relative to vessel claiming status)

Vessels claiming not-under-command status are considered to be underway. That is, they re not considered to be at anchor, made fast to the shore, or aground.

Rule 18 assigns the privileges and obligations of not-under-command vessels with respect to other classes of vessels. Rule 27 prescribes the lights and shapes to be displayed by npt-under-command vessels.

INTERNATIONAL	INLAND
(g) The term "vessel restricted in her ability to maneuver" means a vessel which from the nature of her work is restricted in her ability to maneuver as required by these Rules and is therefore unable to keep out of the way of another vessel. The term "vessels restricted in their ability to maneuver" shall include but not be limited to: (i) a vessel engaged in laying, servicing, or picking up a navigation mark, submaine cable or pipeline; (ii) a vessel engaged in dredging, surveying or underwater operations; (iii) a vessel engaged in replenishment or transferring persons, provisions, r cargo while underway; (iv) a vessel engaged in the launching or recovery of aircraft; (v) a vessel engaged in mineclearance operations; (vi) a vessel engaged in a towing operation such as severely restricts the towing vessel and her tow in their ability to deviate from their course.	(g) The term "vessel restricted in her ability to maneuver" means a vessel which from the nature of her work is restricted in her ability to maneuver as required by these Rules and is therefore unable to keep out of the way of another vessel; vessels restricted in their ability to maneuver include, but are not limited to: (i) a vessel engaged in laying, servicing, or picking up a navigation mark, submaine cable or pipeline; (ii) a vessel engaged in dredging, surveying or underwater operations; (iii) a vessel engaged in replenishment or transferring persons, provisions, r cargo while underway; (iv) a vessel engaged in the launching or recovery of aircraft; (v) a vessel engaged in mineclearance operations; and (vi) a vessel engaged in a towing operation such as severely restricts the towing vessel and her tow in their ability to deviate from their course.

Both the International and the Inland version carry the same message, despite slight variations in wording. A vessel restricted in ability to maneuver (1) must be unable to keep out of the way of other vessels (2) *because of the nature of its work*. The status does not apply to vessel that cannot maneuver because they are in a narrow channel or in shallow water or because of strong currents or bad weather.

The definition lists a number of vessel activities that entitle the vessel to restricted-in-ability-to-maneuver status. Note that vessel types are not named, but vessels engaged in certain activities are listed. The distinction: a cable laying vessel is not necessarily entitled to status as a vessel restricted in ability to maneuver, but a vessel *engaged* in cable laying is. The cable-laying vessel may claim the special status only when it ia actually laying cable.

A towing vessel with tow is under some circumstances less able to maneuver than a power-driven vessel alone. However, the master of a vessel engaged in a routine towing operation is not normally justified in claiming restricted-in-ability-to-maneuver status. This is emphasized in the definition by the words "severely restricts." The master must make the determination, and the towing vessel and the two are considered a unit--"restricted in *their* ability to deviate from *their* course."

Vessels restricted in ability to maneuver may or may not be underway.

INTERNATIONAL

(h) The term "vessel constrained by her draft" means a power-driven vessel which, because of her draft in relation to the available depth and width of navigable water, is severly restricted in her ability to deviate from the course she is following.

This term covers such cases as a large vessel passing between islands or a vessel in a channel whose draft exceeds the water depth outside the channel. The depth of water directly underneath the vessel is not the determining factor; rather, the depth (or lack of it) closee to either side of the vessel determines the level of constraint. International Rule 18(d) prescribes the action to be taken by vessels constrained by draft and other vessels in the vicinity. International Rule 28 gives the lights and shapes for vessels constrained by draft.

The Inland Rules do not contain a parallel definition for "vessel constrained by draft" because the term is not used in the Inland Rules. In inland waters almost all vessels will be limited in maneuverability by their drafts at one time or another.

INTERNATIONAL	INLAND
(i) The word "underway" means that a vessel is not at anchor, ,or made fast to the shore, or aground.	(h) The word "underway" means that a vessel is not at anchor, or made fast to the shore, or aground;

"Underway" should be distinguished from the phrases "making way through the water" (used in Rules 26, 27, and 35) and "making no way through the water" (used in Rule 35). A vessel that is "underway" need not be moving through the water but may simply be not anchored, aground, or made fast to the shore. If a vessel is making no way through the water, it is stopped and drifting, unless it is not underway. If it is moving relative to the water, it is making way. For example, if a ship is headed up a river, making five knots through the water, and there is a five-knot current against it, then it is making wat through the water even though it is making no progress relative to the shore. Another ship drifting down the river is

not making way, even though it is moving much faster over the bottom.

It is fairly common for river towboats (pushing ahead) to hold their position by putting the head of their tow against the bank and and applying some forward thrust to prevent movement. In this situation the tow is free to maneuver and not considered to be aground. Therefore, it is considered to be underway.

INTERNATIONAL	INLAND
(j) The words "length" and "breadth" of a vessel mean her length overall and greatest breadth.	(i) The words "length" and "breadth" of a vessel mean her length overall and greatest breadth;

Length overall can be visualized by bringing the bow (excluding bowsprits and so forth) of a vessel's hull up against a vertical wall and then brining another vertical wall up against the stern. Length overall will then be the distance between the two walls. Other lengths commonly referred to, though not in these Rules, include waterline length (measure between points where stem and stern enter the water) and length between perpendiculars (measured from the point the stem intersects the design waterline and the centerline of the rudderpost).

The greatest breadth does not always occur amidships.

INTERNATIONAL	INLAND
(k) Vessels shall be deemed to be in sight of one another only when one can be observed visually from the other.	(j) Vessels shall be deemed to be in sight of one another only when one can be observed visually from the other;

Rules 11 through 18 apply only to vessels in sight of one another. These Rules assign responsibilities as give-way or stand-on vessels for various situations. These eight rules do not apply to two vessels not "in sight of one another." Even though the vessels may know each other's exact course, speed, and position by means of automated radar plotting aids or other devices, Rules 11 through 18 apply only if visual contact is also made.

INTERNATIONAL	INLAND
(l) The term "restricted visibility" means any condition in which visibility is restricted by fog, mist, falling snow, heavy rainstorms, sandstorms or any other similar causes.	(k) The term "restricted visibility" means any condition in which visibility is restricted by fog, mist, falling snow, heavy rainstorms, sandstorms or any other similar causes;

Rules 19 and 35 apply only to vessels in or near an area of restricted visibility. Restricted visibility may be due to any of the listed natural causes or to other factors such as smoke or smog. Visibility need not be restricted all around the vessel, nor does the vessel in question have to be in the fog, mist, or whatever. For example, a vessel must follow the Rules for restricted visibility if it is close to a fogbank, even though it may be in clear air and have clear air on three sides. The vessel in this example would, however, follow the Rules for vessels in sight of one another with respect to vessels also in clear air that it can see.

Rule 20(c) requires the display of navigation lights during periods of restricted

visibility. As a guideline, signals should be given when visbility in any direction falls below the minimum audibility range specified for the whistle on your vessel by Annex III--two miles for the largest vessels, down to one-half mile for the smallest.

INLAND

(l) "Western Rivers" means the Missippi River, its tributaries, South Pass, and Southwest Pass, to the navigational demarcation lines dividing the high seas from harbors, rivers, and other inland waters of the United States, and Port Allen--Morgan City Alternate Route, and that part of the Atchafalaya River above the injunction with the Port Allen--Morgan City Alternate Route including the Old River and the Red River;

Certain provisions in the Inland Rules apply only to vessels operating on the Western Rivers or apply to the Western Rivers and other specially designated waters. These special special references to Western Rivers waters appear in Rules 9(a)(ii), 14(d), 15(b), and 24(i). Supplemental regulations contained in Part 89 of Title 33 of the Code of Federal Regulations clarify the boundary for Western Rivers water in the New Orleans area.

The reference to the "navigational demarcation lines dividing the high seas from harbors, rivers, and other inland waters" is a misnomer. The navigational demarcation lines have no geopolitical significance and do not separate high seas waters from inland waters. "Inland waters" is a term unique to the navigation rules; "internal waters" would be the closest corresponding geopolitical term. The "territorial sea," twelve miles wide, is adjacent to the internal waters, and then outside of the territorial sea are "high seas." The navigational demarcation lines only serve to divide the waters where the International and the Inland navigation rules apply.

INLAND

(m) "Great Lakes" means the Great Lakes and their connecting and tributary waters including the Calumet River as far as the Thomas J. O'Brien Lock and Controlling Works (between mile 326 and 327), the Chicago River as far as the east side of the Ashland Avenue Bridge (between mile 321 and 322), and the Saint Lawrence River as far east as the lower exit of Saint Lambert Lock;

Similarly, the Rules contain some special provisions applicable to vessels operating on the Great Lakes. References to the Great Lakes are made in Rules 9(a)(ii), 14(d), 15(b), and 23(d).

INLAND

(n) "Secretary" means the Secretary of the department in which the Coast Guard is operating;

For a long time the Coast Guard was under the Department of Transportation. In times of war the Coast Guard may be under the Department of Defense. Now the Coast Guard is under the Department of Homeland Security.

INLAND

(o) "Inland Waters" means the navigable waters of the United States shoreward of the navigational demarcation lines dividing the high seas from harbors, rivers, and other inland waters of the United States and the waters of the Great Lakes on the United States sides of the International Boundary;

Non-navigable waters under sole-state jurisdiction are not included. The demarcation lines are set out in Title 33 of the Code of Federal Regulations, Part 80. These lines are used only to indicate whether the International Rules or the Inland Rules apply. They do not mark the boundary between U.S. territorial waters and the high seas (international waters). For a more complete discussion of this subject, see Rule 1(a).

INLAND

(p) "Inland Rules" or "Rules" mean the Inland Navigational Rules and the annexes thereto, which govern the conduct of vessels and specify the lights, shapes, and sound signals that apply on inland waters; and

There are five annexes to the Inland Rules. They are published as regulations and appear in Title 33 of the Code of Federal Regulations, Parts 84 through 88.

INLAND

(q) "International Regulations" means the International Regulations for Preventing Collisions at Sea, 1972, including annexes currently in force for the United States.

These are also known commonly as the International Navigation Rules, International Rules, 72 COLREGS, and COLREGS. The International Regulations for Preventing Collisions at Sea, 1972, is the name of the treaty containing the Rules and is the responsibility of the International Maritime Organization (IMO). The treaty became binding on the United States on 15 July 1977. The first set of 56

amendments to the International Rules went into effect on 1 June 1983, and the second set of nine on 19 November 1991.

Home

Table of Contents

Rule 4

Handbook of the Nautical Rules of the Road by Llana & Wisneskey

Home - Table of Contents

Rule 4 -- Application

INTERNATIONAL	INLAND
Rules in this Section apply to any condition of visibility.	Rules in this Subpart apply to any condition of visibility.

Rule 4 tells us that vessels operating under any and all conditions of visibility are required to follow Rules 5 through 10. In other words, these Rules apply all of the time.

Home

Table of Contents

Rule 5

Rule 5 -- Lookout

INTERNATIONAL	INLAND
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.	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.

Rule 5 is a short rule that places a large responsibility on the mariner. Rather than specific duties, equipment, places, times, and number of persons, Rule 5 requires the master to decide how best to maintain a proper lookout. Instead of giving us precise guidance on the adequacy of the lookout, the Rule uses vague terms such as "proper" and "appropriate." Only in this way could the Rule reasonably provide for all vessels at all times. Requirements covering even the most common situations would have been intolerably detailed and complex.

The lookout requirement of Rule 5 relies heavily on common sense and good seamanship. If you are able to comply with the Steering and Sailing Rules (Part B of the Rules) and with Rule 34--all of which depend on lookout information--you will no doubt have met the demands of Rule 5. A proper lookout, therefore, provides all the information needed to comply with those Rules. If the information collected by the lookout is insufficient, then the master must intensify his or her lookout efforts (for example, by turning on the radar) or reduce the need for information (for example, by slowing a fogbound vessel).

The "information gap" that sometimes opens between the amount of information collected and the amount needed to comply with the other Rules is a leading cause of most collisions. Too often vessels collide because they their masters have either ignored the gap or have filled it with assumptions. An appreciation of the lookout requirement will take the mariner halfway toward avoiding collisions.

Definition and Purpose of the Lookout

What is a "lookout"? Perhaps the most common image that leaps to mind is that of a lone seaman wearing yellow foul-weather gear and a navy watch cap, stationed at the very bow of the ship and peering out into the gloom to catch a flicker of light or the moan of a foghorn. This perception is misleading. The term, as used by the Rules, denotes not a person but rather the systematic collection of information.

Responsibility for maintaining a proper lookout lies with the vessel's operator, not with a subordinate designated as "lookout." The vessel's operator--that is, master, watch officer, or person in charge--is the lookout manager. If the operator can keep a lookout personally, then coordinating the collection and analysis of information is relatively straightforward. But if the operator, that is, the decision-maker, must rely on others to gather the information, then management of a proper lookout becomes more complicated. The operator must ensure that

information on the vessel's surroundings is detected in a timely manner and promptly communicated, so that he or she can correctly analyze the situation.

The purpose of the lookout is simple, so simple that it can easily be overlooked. As the purpose of the navigation rules is to prevent collisions, it follows that the purpose of the lookout is to collect the information needed to avoid collisions. This fundamental reason for maintaining a proper lookout is something to keep in mind.

Duty of the Lookout

Traditionally, the duty of the lookout was to watch out for vessels, lights, and other objects (such as reefs, shoals, and icebergs) by sight and hearing alone and to report their presence to the vessel's operator promptly. The lookout was allowed some discretion on what to report in crowded waters and would be assigned no other duties that would interfere with this important function.

Although the traditional principles of the lookout are still pertinent, today's mariner has tools available that greatly extend the distance over which information can be detected. Today, a proper lookout is a team effort. Yet the master of the vessel is the one held accountable. For this reason, the master must see to it that each member of the lookout team is competent in the use of equipment and diligent in the performance of that duty.

The master, who knows the vessel's needs for information and who has the authority and the Rule 5 responsibility, should determine the duties of each member of the lookout team. It is the master's duty to ensure that a proper lookout is maintained at all times. That duty cannot be delegated.

Tools of the Lookout

Sight, hearing, and "all available means" are tools of the lookout. While not too long ago "all available means" was limited to the spyglass, modern mariners have a wealth of tools with which to extend the human senses.

Human sight and hearing have, of course, their limitations. Near sightedness may be uncorrected or poorly corrected. Even good eyesight is affected by environmental factors such as ambient light, weather conditions, water spray, or wind. Fatigue can also affect vision, as can moving between extremes of light. Similarly, hearing my be impaired. The noise of wind and wave and ship's machinery may mask the sound you want to hear. The blast from a ship's own whistle blocks out other noises and will temporarily, perhaps permanently, reduce the hearing of the lookout. Hearing testing would be advised.

Fortunately, mechanical means for maintaining a lookout are available. "Available" to Rule 5 means "shall be used" in appropriate circumstances. Some of these "other means" are listed below:

- Binoculars
- Radar
- VHF bridge-to-bridge radiotelephone
- Automated radar plotting aids (sometimes called collision avoidance radar)
- Differential GPS (DGPS) satellite navigation equipment
- Automatic Identification Systems (AIS) radio transponders
- Vessel traffic services
- Navigation and piloting instruments

Radar has assumed such importance on modern vessels that Rule 6 (Safe Speed) and Rule 7 (Risk of Collision) discuss it specifically. Most commercial vessels are now fitted with radar, and probably anyone who has seriously ventured out on the water has some concept of what radar is and what it does. Why then are there so many radar-assisted collisions--collisions that occur even though the other vessel was observed on the radar screen? And why are there still night-time collisions when the radar was either not turned on or not observed? As with most tools, radar will not provide any benefit unless used, and used correctly.

A lookout may check an empty radar screen and believe nothing is there because he or she can't see anything. What may have happened, though, is that a weak contact with a small nearby vessel is lost when the radar operator twisted the sensitivity knob to reduce sea-surface clutter. Collisions occur because radar observers rely on capabilities the radar does not have.

A lookout may observe a contact on radar, begin to form a mental pisture of the other vessel, an possibly make a course change. A few minutes later, upon checking the screen, the oberver "confirms" the other vessel's imagined course and speed a not leading to a collision. In making this "confirmation," the radar observer has incorporated a string of assumptions into the process. If the oberver had taken the time to plot the tracks, rether than rely on assumptions, he or she would have seen that the vessels were in fact on a collision course. We cannot emphasize enough how important it is to distinguish between assumption and fact in your decision making. Consciously seek out, do not unconsciously suppress, conflicting evidence. It is very difficult to calculate mentally another vessel's relative course and speed after observing a radar blip two or three times--difficult to the point of impossibility. Assumption making is not one of the "other means" referenced in Rule 5.

If you are fortunate enough to have more advanced (computer-enhanced) radar equipment, your job will be easier; just keep in mind that all aids have their limitations. Do not assume a machine will do your job for you.

Some mariners believe that radar is not necessary on clear nights, yet collisions continue to happen in those conditions. In one such instance, a ship not using its radar ran into a large, newly constructed oil platform in the Gulf of Mexico. The platform was inadequately lighted, but so are many other vessels and objects. Just because you can't see something at night in good visibility doesn't mean it isn't there.

Rule 5 does not require the installation of radar, but if radar is installed it must be used whenever it would contribute to the quality of the lookout. What are your obligations if radar is installed on your vessel but is not working properly? Rule 5 does not require that mafunctioning radar be used. If the problem is temporary, such as signal blockage caused by a heavy rainstorm, the use of radar can be suspended but not abandoned.

Radar can be carried one step further by incorporating a computer to calculate the courses and speeds of other vessels the radar detects. The computer than relates that information to the vessel's own course and speed. The automated radar plotting aid (ARPA) displays position, course, and speed for each target and signals when it detects risk of collision. Some ARPAs will also display the projected future track of each vessel, all against the background of an electronic chart of the area.

Because all of the information on the vessels comes from radar, ARPA's technical limitations are the same as radar's. However easy it is to become overdependent

on radar, it is much easier to relinquish the lookout function, including decision-making, to the magic-box ARPA. A poor understanding of this very useful tool may lead the unwary mariner into extremis.

Automatic Identification Systems (AIS) have been implemented in some areas to advance the state of the art even further. AIS uses radio transponders in much the same way as the mandatory aircraft T-CAS collision avoidance system uses Mode-S radar transponders to transmit encoded information from each aircraft to other aircraft in the area and to air traffic controllers. In the case of the shipborne AIS, this information can include vessel identification, GPS/DGPS position, course, speed, navigation status, dimensions, or cargo. Combined with a display capability, AIS presents critical navigation and vessel traffic information to the bridge team. AIS systems at present are limited and have not been standardized, although an international standard is being actively pursued, and it seems likely that carriage requirements for such equipment will follow adoption of an international standard.

In many situations the best way to find out if other vessels are in the area is to ask. A blind call on the radiotelephone may elicit an answer from an undetected vessel, or a call about traffic to a known vessel may produce useful information, such as any planned course changes. In a number of heavily trafficked areas the mariner can call a vessel traffic service (VTS) for advisory information. The VTS operators keep track of all major vessels' positions, course, and speeds, as well as accumulate information on navigation hazards. This service will be discussed in more detail with Rule 10.

The tools available to aid the mariner in maintaining a lookout will continue to develop. The use of shipboard radar transponders in conjunction with ARPAs and radiotelephones, for example, is being explored. The continued exploitation of microprocessor technology will make available new means for maintaining a proper lookout. Whatever changes the future will bring, Rule 5 will continue to require that the person directing the movement of the vessel know the benefits and limitations of any new devices and be able to use them. Continuing education is part of the navigation rules.

Prevailing Circumstances and Conditions

A proper lookout is that which is sufficient to prevent a collision, without any allowance for good luck, in the prevailing circumstances and conditions. Tp give substance to this definition, we offer more specific observations:

- A lookout in the open ocean can be less intense than one in coastal or inland waters. It cannot, however, be abandoned--midocean collisions do occur.
- A lookout on a vessel at anchor is required, with the level of effort depending upon the location of the anchorage, depth of water, type of ground tackle, wind, currents, waves, and so forth. The lookout should determine whether the anchor is dragging and should warn other vessels of the anchored vessel's presence.
- The means and methods for maintaining a lookout vary with night and day. At night, lookouts should make greater use of binoculars and radar. Masters should post observers away from the vessel's own lights so as not to impair the night vision of the lookout. During the day and in good visibility, a vessel can be seen at a much greater distance , as indicated by the fact that a masthead light for the largest vessel need be visible for only six miles and for the smallest vessel, only two miles. During daylight, and under the most favorable conditions, the watch officer on a large vessel may perform the lookout alone.
- The size and arrangement of a vessel have a direct bearing on the effort

required to maintain a proper lookout. On small vessels where there is an unobstructed all-around view and where there is no impairment of night vision, the craft's operator may both steer and keep the lookout. Unobstructed view, simple controls, no distractions, and high maneuverability are important here.

- Visibility is generally the key factor in maintaining a proper lookout. As the visibility decreases, the level of effort to maintain a proper lookout increases tremendously. Sight needs to be augmented by hearing, radar, and radiotelephone. Unless you are in the open ocean, you should seek precise navigational information. In the case of low-lying fog, at least one person should be positioned high enough to see over the fog.

Full Appraisal of the Situation and Risk of Collision

These last words restate the purpose of Rule 5. It is this broad objective that you should keep in mind when managing the lookout. If there is not enough information to assess the situation, you should tap all your resources to gather more. If you are still unable to acquire the information you need, then you should take steps immediately to reduce your requirement for information--for example, by slowing or stopping. Otherwise, you are violating Rule 5. This is not one of those circumstances where doing more with less is a virtue.

Although it is true that the determination of a proper lookout is left to the mariner, it is also true that courts of law assign as a contributory fault the lack of a proper lookout in a very large proportion of collision cases.

Home

Table of Contents

Rule 6

Rule 6 -- Safe Speed

INTERNATIONAL	INLAND
Every vessel shall at all times proceed at a safe speed so that she can take proper and effective action to avoid collision and be stopped within a distance appropriate to the prevailing circumstances and conditions.	Every vessel shall at all times proceed at a safe speed so that she can take proper and effective action to avoid collision and be stopped within a distance appropriate to the prevailing circumstances and conditions.

Like Rule 5, Rule 6 begins with the words "Every vessel shall at all times," indicating its universal application, in good visibility as well as poor, and like Rule 5, it places a great deal of responsibility on the good judgment of the mariner.

How much does speed affect safety? Even if excessive speed is not the most glaring cause of maritime accidents, there have been very few collisions between stopped vessels; vessels involved in a collision are apt to have been moving too fast.

Some mariners are reluctant to change speeds and so pay more attention to factors that support their cruising speed and less attention to factors that indicate a need to slow down. It is very important that you give due consideration to any factor suggesting a change in speed. Because a closing situation may develop rapidly, the person in charge should feel free to call for a reduction in speed without having first to notify another person (for example, the master or engineer). Some powerplants are capable of quicker speed changes if certain preparatory steps are taken. If a speed change becomes likely (or even a real possibility), the person in charge should provide timely notification to the engineers so that they can prepare the engines. Rule 19(b) specifically requires that power-driven vessels have their engines ready for immediate maneuver when in an area of restricted visibility. (The engines on smaller power-driven vessels, and on larger automated vessels, are normally controlled from the helm position and respond immediately.)

While not directly relevant to collisions between vessels, a vessel's speed also is roughly proportional to its wake. The vessel operator will be liable for damages caused by a wake that is excessively high (for the circumstances).

Safe Speed versus Moderate Speed

The safe speed rule first came into effect in 1977 for the International Rules and was adopted for the Inland Rules in 1980. Older repealed rules called for "moderate speed," but only in restricted visibility. Rule 6 uses the term "safe speed" and applies in all conditions of visibility. The term "moderate speed" was replaced by "safe speed" because for many conditions the term "moderate" was too restrictive.

The Rules now recognize speed as an important factor in preventing collisions in good visibility as well as poor. Newer vessels are bigger and faster and may take longer to stop and maneuver. Smaller vessels are also much faster, some capable

of speeds greater than 50 knots. A vessel's performance limit is often no longer the controlling factor in good visibility; other conditions must be considered.

Proper and Effective Action

The first objective of maintaining a safe speed is to permit the vessel "to take proper and effective action to avoid collision." To be able to maneuver as prescribed by the Rules, the vessel must be moving slowly enough to control its forward motion. In some cases, it must also be moving fast enough for the rudder to effect a turn promptly.

A vessel passing close to a bank (as in a channel) or close to another vessel generates hydrodynamic forces that can pull the vessel off its course. If the speed is great enough, these hydrodynamic forces can overpower the correcting forces of the rudder. Vessel operators are expected to be familiar with these effects and to reduce their speed sufficiently to maintain positive rudder control.

Even vessels to which the Rules assign a right-of-way must proceed at a safe speed, which sometimes involves planning for the unexpected. Because Rule 2 sometimes makes a departure from the Rules madatory, and Rule 17(b) requires action by the stand-on vessel when the risk of collision becomes extreme, a fast-moving stand-on vessel may find the action is expected under the Rules not to be the "proper and effective" action needed to avoid a collision. Rule 17 requires a stand-on vessel to maintain its course and speed after risk of collision has been established. A too-high initial speed will therefore place the stand-on vessel in a dangerously awkward position.

Stopping Distance

The second objective of requirng a safe speed is to enable the vessel to be stopped "within a distance appropriate to the prevailing circumstances and conditions." In most cases where the risk of collision exists, a course change will be the most common action. However, if maneuvering room is limited or if visibility is poor, stopping the vessel (perhaps in conjunction with a turn) could be the best way to avoid or minimize damage.

Before radar was common, an old rule of thumb was that a vessel should be able to stop within half the range of visibility. Thus, two vessels on opposite courses would be able to stop before colliding. This rule of thumb was not widely accepted by the courts, which wisely decided that the many factors involved warranted a case-by-case consideration.

Older rules concerning moderate speed (applied only in restricted visibility) included a statement about stopping or maintaining bare steerageway. Although Rule 6 does not explicitly contain the same provision, Rule 8 requires vessels to slow or stop to avoid collision or to give more time to assess the situation. Rule 19 requires that vessels in areas of restricted visibility encountering vessels forward slow to the bare minimum needed for steering, or stop altogether.

INTERNATIONAL	INLAND
In determining a safe speed the following factors shall be among those taken into account.	In determining a safe speed the following factors shall be among those taken into account.

Most of Rule 6 presents factors that must be considered in determing safe speed.

These factors are not necessarily listed in order of importance, and the list is not exhaustive. Paragraph (a) contains factors to be considered by all vessels; paragraph (b) contains factors that are to be considered by vessels with operational radar.

INTERNATIONAL	INLAND
(a) By all vessels:	(a) By all vessels:
(i) the state of visibility;	(i) the state of visibility;

Visibility has traditionally been the most important consideration in setting the speed. Rule 19 (Conduct of Vessels in Restricted Visibility) restates the necessity for limiting speed and adds that power-driven vessls shall have their engines ready to maneuver. That Rules also mandates further precautions when another vessel is detected ahead.

INTERNATIONAL	INLAND
(ii) the traffic density including concentrations of fishing vessels or any other vessels;	(ii) the traffic density including concentrations of fishing vessels or any other vessels;

Traffic density is important because the probability of a collision increases with the density and because the probability that three or more vessels will share risk of collision also increases. In this latter special circumstance (see Rule 2), some departure from the Rules may be required, leading to unusual and perhaps unexpected action. Areas containing many small vessels require extra caution since those vessels are often difficult to detect either by radar or by sight. In either case, slowing will give extra time to assess the situation. Rule 8(e), on slowing or stopping to avoid a collision or to assess the situation, will probably come into play in these situations.

INTERNATIONAL	INLAND
(iii) the maneuverability of the vessel with special reference to stopping distance and turning ability in the prevailing conditions;	(iii) the maneuverability of the vessel with special reference to stopping distance and turning ability in the prevailing conditions;

The vessel's operator cannot establish a safe speed without knowing how far the vessel will travel before stopping, for any normal loading condition or speed. Stopping distances will vary substantially depending on whether the vessel is turning or proceeding in a straight line. Many vessels will stop most quickly when put into a sharp turn. Large tankers are a good example; because their great bulk dwarfs the propeller, turning their broadsides against the line of travel stops them more efficiently than would running their engines astern alone (doesn't work in a narrow channel, of course).

Tug and towboat operators should be aware of their vessels' stopping characteristics both without barges and with different numbers of barges.

The maneuvering characteristics of most larger vessels are required to be posted on the bridge. Operators should learn the characteristics *before* the information is

needed.

INTERNATIONAL	INLAND
(iv) at night the presence of background light such as from shore lights or from backscatter of her own lights;	(iv) at night the presence of background light such as from shore lights or from backscatter of her own lights;

Background lights and backscatter decrease the effectiveness of a lookout by sight and therefore require a proportional decrease in speed. A small vessel has a particular problem because the vessel's own lights are close to the operator. Careful design of the navigation light arrangement will minimize backscatter and reflection from the vessel itself.

INTERNATIONAL	INLAND
(v) the state of wind, sea and current, and the proximity of navigational hazards;	(v) the state of wind, sea and current, and the proximity of navigational hazards;

The need to reduce speed in the face of mounting adversity is obvious (we hope).

INTERNATIONAL	INLAND
(vi) the draft in relation to the available depth of water.	(vi) the draft in relation to the available depth of water.

Draft restrictions relate to speed in several ways. If there is little underkeel clearance, it is likely that shallower water is nearby. It is easier to avoid running aground from a low speed, and if a grounding cannot be avoided, the damage will be less.

If a vessel's draft exceeds the depth outside a channel, the vessel will be limited to straight-line stopping, which is less effective than a combination of slowing or reversing engines and turning away. Hence a lower speed is usually required. Rule 9 gives further direction for vessels operating in narrow channels.

In shallower water, a vessel's speed introduces hydrodynamic forces that are not present in deeper water. As a vessel moves forward, the water in front moves away and then closes in after the stern passes. In shallow water, especially in channels, the water ahead of the vessel is squeezed quickly through the relatively small space around the hull to the stern, moving fastest where it is squeezed the most. This happens under the bottom of the vessel in shallow water or, if the vessel is near a bank, then along that side. The fast flow of water creates lift, in the same manner that lift is created by a wing or a sail. On an airplane, the lift is directed up; on a sailboat, to the side; and on a vessel moving through shallow water, the lift that is produced is directed down or toward the bank. The force on the moving vessel pushes it closer to whatever it is close to.

The effect on the vessel is called "squat," and it increases as the underkeel clearance decreases and as the vessel's speed increases. Thus, a vessel that has ample clearance when moving slowly through shallow water may at high speed scrape the bottom. The hydrodynamic effect of high speed through a channel may cause a vessel to be pulled toward or into the bank or may pull two vessels

passing close together off course.

INTERNATIONAL	INLAND
(b) Additionally, by vessels with operational radar:	(b) Additionally, by vessels with operational radar:

Radar-equiped vessels are obligated to use their radar in restricted visibility unless there is a compelling reason not to. Rules 5, 6, 7, and 19 together place great emphasis on the effective use of radar.

Vessels using radar in restricted visibility are justified in going somewhat faster than vessels without radar, but not as fast as they would go in good visibility. In open waters a ship using radar may proceed at a relatively high speed, providing the speed is adjusted appropriately upon detection of another vessel.

INTERNATIONAL	INLAND
(i) the characteristics, efficiency and limitations of the radar equipment;	(i) the characteristics, efficiency and limitations of the radar equipment;

Radar equipment varies greatly in power, sophistication, antenna installation, and so forth. The mariner needs to understand these qualities and limitations thoroughly. For instance, a vessel's course might be changed regularly to ensure that any vessel in a blind arc, which may be caused by a vessel's masts or other structures, could be detected early.

There are two basic types of marine radar--navigation and search. Navigation radars transmit short-wavelength radio frequencies, and search radars use long-wavelength transmissions.

Navigation radars send out short high-frequency pulses. These rapid and sharply defined pulses bounce back from surfaces facing the transmitter, yielding a very accurate and detailed image of the surrounding area. Because of their lower power and higher pulse repetition rate, these navigation radars--also called three centimeter (3 cm), X-band, and high frequency radars--have a limited range.

Search radars, on the other hand, pack a lot of power into their low-frequency, long wavelength signals and consequently are able to look into and beyond weather. When they reflect off a target, the signal returns to the receiver with more power, and they can detect objects at further ranges. These radars go by various names--search, ten-centimeter (10 cm), S-band, or low-frequency radars. The name used is a matter or personal preference and does not distinguish variations.

INTERNATIONAL	INLAND
(ii) any constraints imposed by the radar range scale in use;	(ii) any constraints imposed by the radar range scale in use;

No matter how good a radar set might be, the range scale selected determines the nature of the information available to the operator. Short range scales give good resolution and enable the detection of small targets; long range scales sacrifice detail to gain early detection. Radar equipment is most effective if the operator

switches scales regularly, or if the operator has two or more sets and uses a different range scale on each. To the extent that different range scales are not available, speed should be reduced.

INTERNATIONAL	INLAND
(iii) the effect on radar detection of the sea state, weather, and other sources of interference;	(iii) the effect on radar detection of the sea state, weather, and other sources of interference;

Vessel speed should be reduced when interference (caused by large waves, heavy rain or snow, or the like) impairs the performance of the radar.

INTERNATIONAL	INLAND
(iv) the possibility that small vessels, ice and other floating objects may not be detected by radar at an adequate range;	(iv) the possibility that small vessels, ice and other floating objects may not be detected by radar at an adequate range;

The location of the vessel and the season of the year are important in judging whether undetected vessels or ice may be present.

INTERNATIONAL	INLAND
(v) the number, location and movement of vessels detected by radar;	(v) the number, location and movement of vessels detected by radar;

Accurate radar plotting becomes more difficult as the number of vessels increases. Automated radar plotting aids make the task easier.

INTERNATIONAL	INLAND
(vi) the more exact assessment of the visibility that may be possible when radar is used to determine the range of vessels or other objects in the vicinity.	(vi) the more exact assessment of the visibility that may be possible when radar is used to determine the range of vessels or other objects in the vicinity.

The observed radar range of a vessel can be correlated to visibility by noting when the vessel can first be sighted. At night, when the vessel's lights can first be seen, the radar range of the vessel equates the visibility (assuming that the visibility is not so good that masthead light intensity becomes the controlling factor.

Home

Table of Contents

Rule 7

Rule 7 -- Risk of Collision

INTERNATIONAL	INLAND
(a) Every vessel shall use all available means appropriate to the prevailing circumstances and conditions to determine if risk of collision exists. If there is any doubt, such risk shall be deemed to exist.	(a) Every vessel shall use all available means appropriate to the prevailing circumstances and conditions to determine if risk of collision exists. If there is any doubt, such risk shall be deemed to exist.

Nothing grips a mariner's attention so fast as a late determination of risk of collision. The principles commended by this Rule can be taken lightly only at the risk of some very unwanted exciting moments on the water. The determination of risk of collision, timely or otherwise, triggers a number of other Rules on which the mariner must then act.

Rule 12, for instance, requires action by one or two sailing vessels approaching each other on a collision course. Rule 14 requires action in the case of power-driven vessels approaching each other on reciprocal or near-reciprocal course so as to involve the risk of collision. Rule 15 applies to power-driven vessels crossing so as to involve risk of collision. Rule 19 prescribes action by vessels in restricted visibility when risk of collision exists and in certain cases when the degree of risk is unknown. The existence of risk of collision is implicit to the operation of other Rules: Rule 13 (Overtaking), Rule 16 (Action by Give-way Vessel), Rule 17 (Action by Stand-in Vessel), and Rule 18 (Responsibilities between Vessels).

It is not surprising then, that Rule 7, like Rules 5 and 6, begins with the words "Every vessel shall." These three Rules set up the mariner to take the proper and effective action required by the remaining Steering and Sailing Rules. The full responsibility for Rules 5, 6, and 7 is not excused or lessened for any vessel.

Like Rule 5 (Lookout), Rule 7 is an information-collection and analysis rule, although the tracking function of Rule 7 may involve more analysis than does the detection function of Rule 5. Besides the beginning mandate "Every vessel shall," Rule 7 also shares with Rule 5 the phrase "all available means appropriate to the prevailing circumstances and conditions." Rule 5 requires the proper lookout "to make a full appraisal of the situation and of the risk of collision." The transition from Rule 5 detection to Rule 7 tracking is not a sharp one.

The taking of compass bearings is one of the most important means of determining risk of collision. The technique depends on good visibility, on the vessel being tracked maintaining a constant course, and on several observations. Observations may be taken with a simple hand-bearing compass, a pair of binoculars incorporating a magnetic compass in its optics, or on larger vessels, a bearing or azimuth circle or an alidade on a fixed gyro-compass repeater. Compass bearings will be discussed more fully below.

In restricted visibility, the primary tracking instrument is radar, if fitted and operational. Radar should also be used to track a vessel in good visibility in open areas after the vessel has been sighted visually. Paragraph (b) of Rule 7 gives

specific guidance on the use of radar.

Having sighted a vessel, you may contact it by radiotelephone to confirm its intentions. The radiotelephone is especially valuable on U.S. inland waters where several vessels may be involved, maneuvering room is limited, and courses are frequently changed. In the United States, the Vessel Bridge-to-Bridge Radiotelephone Act and implementing regulations require larger vessels to monitor channel 13 (VHF-FM), which is used for broadcasting and exchanging navigation information.

The International Telecommunications Union's Radio Regulations, Appendix 18 (q), now designates channel 13 for use on a worldwide basis as a navigation safety communications channel, primarily for intership communications. The International Maritime Organization's Global Maritime Distress and Safety System (1988 amendments to SOLAS Convention) includes a requirement for all passenger vessels and for cargo vessels 300 gross tons and above to be capable of transmitting bridge-to-bridge (channel 13) communications. No international requirement to guard the channel has been established. Channel 16 can be used if nobody answers on channel 13.

Once you have detected and tracked another vessel in your vicinity, how do you judge whether risk of collision exists? What, in fact, is "risk of collision"? The Rules do not say. Risk of collision certainly exists for two vessels whose paths would take them to the same spot in two minutes. On the other hand, risk of collision would not exist for two slow-moving vessels 20 miles apart heading for the same spot of water, nor would it practically exist for two vessels passing a half mile apart in a busy harbor. What might be the risk of collision for two large ships would probably not be risk of collision for two small vessels in the same situation.

A number of factors are involved in such an assessment:

- Closest distance of approach
- Type of waterway
- Vessel size and maneuverability
- Speed
- Distance out from closest point of approach
- Relative bearings

The closest distance of approach is perhaps the prime element in the risk of collision formula. A collision occurs when the distance of closest approach goes to zero, but a risk of collision may exist when the distance of closest approach is somewhat greater. A passing within one vessel length would certainly involve risk of collision, but how much space is necessary for risk of collision not to exist?

Rule 34 of the Inland (but not International) Rules prescribes whistle signals for power-driven vessels "meeting or crossing at a distance within half a mile of each other." Each vessel indicates whether it intends to leave the other on its port or starboard side. As a general rule then, we can conclude that on inland waters risk of collision exists for vessels whose paths will take them within half a mile and which are within hearing range of each other. What is the hearing range? Annex III prescribes ranges for vessels' sound-signal appliances (horns): one-half mile for vessels less than 20 meters in length, up to two miles for vessels over 200 meters in length.

International Rule 34 prescribes different sorts of maneuvering signals and requires them when vessels are "in sight of one another," although there would be no sense in giving a signal when the nearest vessel in sight is ten miles away,

since the sound signal will be very unlikely to travel as far as five miles. On the open ocean, large vessels traveling at full speed should probably consider that risk of collision exists if their projected paths would bring them within a mile of each other.

The type of waterway plays a part in the calculation of risk. On the open ocean the distance of closest approach triggering risk of collision is greater than in confined waters because on the ocean it is easier to keep well clear.

Vessel size and maneuverability have a substantial impact on risk of collision. A small vessel that can stop or turn in its own length has a much smaller zone of risk than a large vessel that may need a mile or more to stop and only begins to turn after the rudder is put over.

Speed expands the zone in which risk of collision exists. Higher speeds give the mariner less time to refine the accuracy of vessel path predictions (remember Rule 6).

Vessels are at risk of collision when they come within a certain distance of their closest point of approach. For medium-size ships moving at average speeds in open water in good visibility, risk of collision would probably become a concern at about five miles out from the closest point of approach. Keep in mind that risk of collision does not arise suddenly like the light from an on-off switch, but rather increases or decreases gradually, like the light from a dimmer switch. For small boats maneuvering in a boat basin the distance out from closest point of approach could be a stone's throw.

An analysis of the Rules themselves will tell us at what distance from closest point of approach a risk of collision arises. As we noted earlier, risk of collision triggers the operation of a number of other Rules. Specifically, the existence of risk of collision obligates certain actions. In crossing situations, for example, the duties are different for each vessel; in a meeting situation, on the other hand, the duties for each vessel are the same. In all cases, however, risk of collision must be discovered early enough for each vessel to be able to carry out its obligations under the Rules.

When one vessel (give-way vessel) is required to keep out of the way of another (stand-on vessel), the give-way vessel must take "early and substantial action to keep well clear" (Rule 16). That doesn't tell us much except that action should be taken soon after risk of collision is established.

Rule 17 is more helpful. It provides that the stand-on vessel may take action to avoid collision as soon as its operator realizes that the give-way vessel is not moving out of the way. Before the stand-on vessel does this, however, it must hold its course and speed long enough for the give-way vessel to predict its path and maneuver clear. The mariner should have a good idea of how long these events will take for the circumstances and types of vessels involved. Remember that the master of the stand-on vessel probably will be more conservative in judging when the give-way vessel should begin taking action, since he or she must hold on and wait, while the master of the give-way vessel knows better what will happen (use you VHF-FM channel 13).

Finally, the relative bearings of two vessels affect the degree of risk. Two vessels meeting on near-reciprocal courses would close relatively rapidly, because their closing speed would be the sum of the two speeds. The risk of collision would arise while while they were still relatively far apart. On the other hand, where one vessel is overtaking another on nearly the same course, the closing speed would

be the difference between the the individual speeds. Unless one is traveling a great deal faster than the other, it would take a long time for the overtaking vessel to draw abeam of the other. In the overtaking situation, the vessels would be relatively close together before risk of collision arose. Crossing situations would be somewhere between meeting and overtaking.

All of these factors are interdependent and must be considered as a whole and in context of the circumstances. The above examples and distances are merely ballpark figures for good conditions.

Either vessel is, of course, free to act before risk of collision exists in order to avoid it altogether. Also, in some cases where risk of collision exists, the give-way vessel may not have to alter its course or speed to keep "well clear" (Rule 16) of the stand-on vessel, as long as its course and speed will "result in passing at a safe distance" (Rule 8). The closest point of approach may represent a safe passing distance while at the same time triggering a risk-of-collision situation. Two vessels in a narrow channel is an example. Risk of collision and the need to maneuver can be distinguished; risk of collision and the need for extra care cannot.

Our discussion so far has been based on the premise that each vessel involved knows where the other is and generally knows where it is going and how fast. Rule 7 states that if there is any doubt, if the information at hand is not accurate or complete, then risk of collision shall be deemed to exist.

Doubt commonly arises under conditions of restricted visibility. Rule 19(e) implies that in restricted visibility when another vessel is detected ahead, risk of collision shall be deemed to exist until the mariner can positively determine that it doesn't--a guilty-until-proven-innocent standard.

Doubt can also occur because of instrument and measurement errors in tracking another vessel. Know the limitations of your instrument and measurement techniques and include them in the assessment of the situation (much as celestial navigation positions are plotted as circles rather than points).

Many other factors can cause doubt--wind and currents, the movement of another vessel in a busy harbor, and the like. For answers, use your radiotelephone.

INTERNATIONAL	INLAND
(b) Proper use shall be made of radar equipment if fitted and operational, including long-range scanning to obtain early warning of risk of collision and radar plotting or equivalent systematic observation of detected objects.	(b) Proper use shall be made of radar equipment if fitted and operational, including long-range scanning to obtain early warning of risk of collision and radar plotting or equivalent systematic observation of detected objects.

The second paragraph of Rule 7 covers use of radar in assessing risk of collision. The requirements extend Rule 5 and 6 to define further the use of properly operating radar in avoiding collision. Rule 5 introduced the idea of long-range scanning for maintaining lookout, and Rule 6 made specific mention of using different radar range scales.

The value of radar in assessing risk of collision in poor visibility is obvious. Rule 19 (Conduct of Vessels in Restricted Visibility) requires that a vessel in restricted visibility determine whether risk of collision exists when it detects by radar alone

the presence of another vessel. But radar is also valuable in clear weather after a target has been sighted visually, being better able than the human eye to measure range and other distances.

If the vessel's radar is capable of both true-motion/north-up display and relative-motion/head-up display, the operator must select the display better suited to the operating conditions. Because of the adoption of both national and international standards, the accuracy of both displays is the same. In general, true-motion (sea- or ground-stabilized) radars are preferred for navigation and piloting in confined waters as the position of the oberver's own ship moves in accordance with its own path. On the other hand, relative-motion displays allow the observer to assess more quickly the movement of other vessels in relation to his or her own movement. All but the smallest vessels are required to have radars stabilized in azimuth (that is, in the horizontal plane). Radars without compass stabilization are almost useless for determining the actions of other vessels without highly accurate maneuvering board plotting or unless the vessel's heading does not vary by a degree or two at the very most.

Radar plotting (or equivalent systematic observation) is required by Rule 7. It is not enough to just *look* at the radar, unless plotting would not be helpful, as for example, on meandering inland rivers where observations of the vessel's position relative to the channel or banks may be more informative. Plotting is usually appropriate in relatively open water.

Plotting is not required if "equivalent systematic observation" is used. These other observation techniques include manual and automatic (computerized) radar plotting aids or the listing of bearing, range, and time at regular intervals. Plotting by the vessel's operator in congested waters may take so much time that it becomes counterproductive. In such cases automated radar plotting aids (sometimes improperly called collision-avoidance systems) are especially appropriate.

INTERNATIONAL	INLAND
(c) Assumptions shall not be made on the basis of scanty information, especially scanty radar information.	(c) Assumptions shall not be made on the basis of scanty information, especially scanty radar information.

While Rule 7 requires the full and proper use of radar, it also warns against relying on radar for more information than it can realistically give. The mariner who assumes an approaching vessel will pass well clear after making a couple of long-range radar observation is inviting danger and violating Rule 7.

Distances magnify small errors, and errors are almost inevitable because of the imprecision of observations made from a moving vessel. Nor can you assume that the other vessel is maintaining a constant course and speed. Regular and consistent checking of observations is imperative.

Many collisions continue to happen because vessel operators base their actions on faulty assumptions. Rule 7 calls attention to the danger of basing actions on scanty information, requiring that the operator be patient and monitor other vessels in the vicinity until the risk of collision can be determined with a satisfying degree of certainty. (And remember, as long as there is doubt, you must assume that risk of collision does exist!)

INTERNATIONAL	INLAND
(d) In determining if risk of collision exists the following considerations shall be among those taken into account:	(d) In determining if risk of collision exists the following considerations shall be among those taken into account:
(i) such risk shall be deemed to exist if the compass bearing of an approaching vessel does not appreciably change;	(i) such risk shall be deemed to exist if the compass bearing of an approaching vessel does not appreciably change;
(ii) such risk may sometimes exist even when an appreciable bearing change is evident, particularly when approaching a very large vessel or a tow or when approaching a vessel at close range.	(ii) such risk may sometimes exist even when an appreciable bearing change is evident, particularly when approaching a very large vessel or a tow or when approaching a vessel at close range.

The classic test of risk of collision is given special attention in the final paragraph of Rule 7: if your vessel is holding course and speed, and you take several compass bearings on another vessel and those bearings are all about the same, then you will collide with the other vessel if it is also holding course and speed and if one does not take evasive action. Even if the compass bearings do change, there may still be the potential for collision.

If the other vessel is maneuvering, the compass-bearing test doesn't work. Also, the test works only when the size of the vessels is small when compared to the distance between them. If you take compass bearings to the bow of an approaching ship from the bridge wing at the stern of your ship and note that the compass bearings are changing, then all you know is that a collision is probably not set up between your stern and the other vessel's bow--your bow and its stern, however, may have other ideas.

If the vessel does not have a compass suitable or convenient for taking bearings, other reference points on the vessel can be used to sight on approaching vessels. If, as the other vessel approaches, it remains lined up with the chosen reference points, then risk of collision exists. This technique, of course, is simply a tool to aid the mariner. Like all tools, it has its limitations and should not be relied upon as conclusive.

Home

Table of Contents

Rule 8

Rule 8 -- Action to Avoid Collision

The Rules preceding Rule 8 address the correct identification of potential danger. Rule 8 begins a series of Rules that prescribe what to do once the risk of collision has been determined to exist. Rule 8 tells how the avoiding action must be executed, not which vessels are required to take the avoiding action. That is left to later Rules.

The International and the Inland Rule 8 are the same. Each applies to all vessels in all conditions of visibility. In good visibility, one vessel will usually have primary responsibility for taking avoiding action; in restricted visibility, vessels will share equally in that responsibility.

INTERNATIONAL	INLAND
(a) Any action taken to avoid collision shall, if the circumstances of the case admit, be positive, made in ample time and with due regard to the observance of good seamanship.	(a) Any action taken to avoid collision shall, if the circumstances of the case admit, be positive, made in ample time and with due regard to the observance of good seamanship.

Paragraph (a) is a general admonition to use care in avoiding collisions. Although the mandatory word "shall" appears, the paragraph also contains the escape clause "if the circumstances of the case admit." This means that in taking action you are not required to put yourself in a worse condition. You are not required to run aground (although in an extreme situation this may be the best course of action) or enter a collision situation with yet another vessel. Paragraph (a)'s admonition employs indefinite terms--actions are to be "positive," "made in ample time," and "with due regard to the observance of good seamanship."

"Positive" action is a significant change in vessel course or speed; paragraph (b) elaborates. "Ample time" and "with due regard" remind us to act early and do more than is absolutely necessary to avoid the collision, allowing a generous margin of safety both in time and in distance.

INTERNATIONAL	INLAND
(b) Any alteration of course and/or speed to avoid collision shall, if the circumstances of the case admit, be large enough to be readily apparent to another vessel observing visually or by radar; a succession of small alterations of course and/or speed should be avoided.	(b) Any alteration of course and/or speed to avoid collision shall, if the circumstances of the case admit, be large enough to be readily apparent to another vessel observing visually or by radar; a succession of small alterations of course and/or speed should be avoided.

Let the other vessel know what you are doing. Make it obvious by sight in good visibility and obvious on the radar screen in areas of restricted visibility. The give-way vessel in a crossing situation must alter course enough that the stand-on

vessel will know it will pass astern. Give the proper maneuvering signals if operating under the International Rules. Call the other vessel by radiotelephone.

INTERNATIONAL	INLAND
(c) If there is sufficient sea room, alteration of course alone may be the most effective action to avoid a close-quarters situation provided that it is made in good time, is substantial and does not result in another close-quarters situation.	(c) If there is sufficient sea room, alteration of course alone may be the most effective action to avoid a close-quarters situation provided that it is made in good time, is substantial and does not result in another close-quarters situation.

Two variables can be altered to avoid collisions: course and speed. Large commercial vessels often find it easier to change course rather than to change speed, especially in open water when engine room personnel may not have taken the preliminary steps for speed changes. Hence, paragraph (c) allows for a course change alone, which can be made directly and immediately from the bridge. On smaller vessels, on other vessels with direct bridge-controlled engines, or especially on vessels with a controllable-pitch propeller, a speed change may be an equal or more effective action, even when there is ample sea room for a course change.

Paragraph (c) talks about avoiding a "close-quarters" situation. Does that imply a *requirement* to avoid a "close-quarters" situation? Close-quarters situations, of course, should be avoided where possible, but in rivers, harbors, and other inland waterways close-quarters situations are unavoidable.

How does "close-quarters" compare with the closest-point-of-approach distance that triggers risk of collision (see Rule 7 discussion), or with the "safe distance" of paragraph (d) of this Rule, or with the "well-clear" of Rule 16? As was mentioned in the discussion of Rule 7, the projected closest-point-of-approach between two vessels is one factor in assessing risk of collision. The distance between vessels for which "close quarters" would exist will always be less than the closest-point-of-approach distance that would trigger risk of collision; half the distance would almost certainly be "close quarters."

On the other hand, paragraph (d)'s "safe distance" and Rule 16's "well clear" mean much the same thing (the minimum passing distance permitted by the Rules), and both generally represent a smaller distance than "close-quarters." On inland waters especially, a give-way vessel passing well clear of (or at a safe distance from) another may, at the same time, be in a close-quarters/risk-of-collision situation with that vessel. Two vessels meeting in a narrow channel is an example. Extra caution makes such situations safe.

INTERNATIONAL	INLAND
(d) Action taken to avoid collision with another vessel shall be such as to result in passing at a safe distance. The effectiveness of the action shall be carefully checked until the other vessel is finally past and clear.	(d) Action taken to avoid collision with another vessel shall be such as to result in passing at a safe distance. The effectiveness of the action shall be carefully checked until the other vessel is finally past and clear.

Paragraph (d) requires that action taken result in passing at a safe distance. What

distance is safe depends on the circumstances; suffice it to say that if you are obligated to take the action, the person on the other vessel should not feel compelled to act also to increase the distance still further.

Paragraph (d) also imposes the obligation to continue with the Rule 7 assessment of risk of collision until the other vessel is past and clear. You should especially consider the effects of normal maneuvers that the other vessel may begin while still in the vicinity. If in doubt, use your radiotelephone or your whistle signal.

INTERNATIONAL	INLAND
(e) If necessary to avoid collision or allow more time to assess the situation, a vessel shall slacken her speed or take all way off by stopping or reversing her means of propulsion.	(e) If necessary to avoid collision or allow more time to assess the situation, a vessel shall slacken her speed or take all way off by stopping or reversing her means of propulsion.

Paragraph (e) should be read in conjunction with paragraph (c). It directs vessels to slow down or stop to avoid a collision or to give more time in which to determine the best course of action. This prescription is only one of several on speed--see Rule 6 (Safe Speed), and Rule 19, paragraphs (b) and (e), relating to speed in restricted visibility.

The separation within Rule 8 of the requirements for course changes (paragraph (c)) and speed changes (paragraph (e)) should not be taken to mean that one method is preferred over the other. If action is required, the mariner must take effective and readily apparent action, whether it be a course change or a speed change or a combination of the two. A course change works better for meeting situations, whereas for vessels crossing at near-right angles, a speed change (perhaps in combination with a course change) often works better.

INTERNATIONAL	INLAND
(f)(i) A vessel which, by any of these Rules, is required not to impede the passage or safe passage of another vessel shall, when required by the circumstances of the case, take early action to allow sufficient sea room for the safe passage of the other vessel.	(f)(i) A vessel which, by any of these Rules, is required not to impede the passage or safe passage of another vessel shall, when required by the circumstances of the case, take early action to allow sufficient sea room for the safe passage of the other vessel.
(ii) A vessel required not to impede the passage or safe passage of another vessel is not relieved of this obligation if approaching the other vessel so as to involve the risk of collision and shall, when taking action, have full regard to the action which may be required by the Rules of this part.	(ii) A vessel required not to impede the passage or safe passage of another vessel is not relieved of this obligation if approaching the other vessel so as to involve the risk of collision and shall, when taking action, have full regard to the action which may be required by the Rules of this part.
(iii) A vessel the passage of which is not to be impeded remains fully obligated to comply with the Rules of this part when the two vessels are approaching one another so as to involve risk of collision.	(iii) A vessel the passage of which is not to be impeded remains fully obligated to comply with the Rules of this part when the two vessels are approaching one another so as to involve risk of collision.

International Rule 8(f) was added in 1989. (Parallel language was added to the Inland Rules in 1990.) This change puts to test debates that had been ongoing for almost as long as the 72 COLREGS have existed. The "shall not impede" language comes into play in Rule 9 (narrow channels and narrow fairways), in International Rule 10 (traffic separation schemes), and in International Rule 18 (vessels constrained by draft). In each of these cases, usually larger vessels find themselves in situations where they are at a substantial maneuvering disadvantage with respect to smaller vessels in the area--smaller vessels that otherwise might be stand-on vessels.

The IMO Subcommittee on Safety of Navigation for a time had issued guidance on the meaning of the term "shall not impede." That guidance said that the "shall not impede" command meant to maneuver, when practicable, so far out of the way of the other vessel that risk of collision never develops, with the proviso that if risk of collision by some chance does develop, the more general Steering and Sailing Rules would take over (that is, the "shall not impede" rules would no longer be in effect).

The IMO subsequently decided that the guidance, if given at all, should be part of the Rules. During the course of the debate on the actual language, the delegates decided that the vessel that had been originally directed to not impede the other should retain that burden even after risk of collision arose. That does not mean, however, that the (usually larger) vessel that was not to be impeded continues to have the right of way. The new Rule provides that if the not-to-be-impeded vessel would be the give-way vessel under the general rules, it has the duty to stay out of the way of the impeding vessel after risk of collision arises. Under the new Rule, which changed the earlier official guidance in this respect, the impeding vessel *also* continues to have a duty to stay out of the way after risk of collision arises, and does not gain the stand-on status that the general rules might have given it. *Both* vessels would be obligated to stay out of the way.

If on the other hand, the not-to-be-impeded vessel would be the stand-on vessel under the general Steering and Sailing Rules, it would not lose that status. In that case, the impeding vessel would have a double duty to stay out of the way.

The "shall not impede" language in these cases creates an exception to the general rules, making them more practical. Vessels directed "not to impede" other vessels should take *early* action to keep clear by *wide* margins. The other vessel shouldn't become concerned enough to alter its course or speed, or otherwise feel obligated to act differently from the way it would if the would-be impeding vessel weren't there.

Home

Table of Contents

Rule 9

Rule 9 -- Narrow Channels

With Rule 9, the Rules become more specific. Although Rule 9 applies in all conditions of visibility, it applies only on certain waters and to certain vessels. Rule 9 is also the first to contain significant differences between the International and Inland versions.

Two terms are used throughout the Rule that are not defined. They are "narrow channel" (namesake of the Rule) and "(narrow) fairway." We must assume that the drafters of the Rules either believed their meanings to be obvious or else were not able to formulate suitably concise definitions.

Rule 9 applies only on waters described by the two terms. What is "narrow" depends on the type of vessel and the circumstances. A "channel" is a natural or dredged lane restricted on either side by shallow water; it is often marked by buoys. A "fairway" is generally in open water, and the water on either side is not much shallower than within the fairway. Fairways are used to route vessels away from natural hazards, oil platforms, mines, or smaller vessels. Fairways should be differentiated from the lanes in traffic separation schemes; vessels in the latter should follow Rule 10 rather than Rule 9.

INTERNATIONAL	INLAND
(a) A vessel proceeding along the course of a narrow channel or fairway shall keep as near to the outer limit of the channel or fairway which lies on her starboard side as is safe and practicable.	(a)(i) A vessel proceeding along the course of a narrow channel or fairway shall keep as near to the outer limit of the channel or fairway which lies on her starboard side as is safe and practicable.

Just as all cars drive on the right side of the road (in the United States), paragraph (a) requires all vessels to navigate on the far right side of a narrow channel, whether or not traffic is approaching from the other direction. If that is not "safe or practicable," however, the mariner is justified in moving closer to the center or even over the center to the left side (providing the traffic permits such action).

	INLAND
	(ii) Notwithstanding paragraph (a)(i) and Rule 14(a), a power-driven vessel operating in narrow channels or fairways on the Great Lakes, Western Rivers, or waters specified by the Secretary, and proceeding downbound with a following current shall have the right-of-way over an upbound vessel, shall propose the manner and place of passage, and shall initiate the maneuvering signals prescribed by Rule 34 (a)(i), as appropriate. The vessel

	proceeding upbound against the current shall hold as necessary to permit safe passing.

Paragraph (a) of the Inland Rules contains a provision that was added to deal with the control problems experienced by some downboud vessels on rivers. The provision concerns power-driven vessels transiting narrow channels and narrow fairways on the Great Lakes and Western Rivers. In addition, the Coast Guard has specified other bodies of water on which the provision applies: Tennessee-Tombigbee Waterway, Tombigbee River, Black Warrior River, Alabama River, Coosa River, Mobile River above the Cochrane Bridge at St. Louis Point, Flint River, Chattachoochee River, and the Apalachicola River above its confluence with the Jackson River (see Title 33 of the Code of Federal Regulations, Part 89, Subpart B).

The vessel proceeding downbound with a following current has the right-of-way and is given the choice of passing arrangements over an upbound vessel. The downbound vessel is required to contact the upbound vessel and to initiate maneuvering signals. The upbound vessel is required to accept the downbound vessel's proposed manner of passing unless doing so would jeopardize its safety. It is also obligated, if necessary, to hold position until the downbound vessel has passed. Normal port-to-port passing should be the rule except in the area of bends where both sides of the channel may be needed to make the turn.

INTERNATIONAL	INLAND
(b) A vessel of less than 20 meters in length or a sailing vessel shall not impede the passage of a vessel which can safely navigate only within a narrow channel or fairway.	(b) A vessel of less than 20 meters in length or a sailing vessel shall not impede the passage of a vessel which can safely navigate only within a narrow channel or fairway.

Paragraphs (b) and (c) are the same for the International and the Inland Rules and direct certain vessels not to impede other vessels that can safely navigate only within the narrow channel or fairway. Rule 8(f) "shall not impede" language says that vessel directed not to impede shall take early enough action that sufficient sea room exists for safe passage. If risk of collision does arise (ideally it should not), the impeding vessel retains its duty to stay out of the way, notwithstanding any stand-on rights the more general Steering and Sailing Rules may have given it. In other words, the vessel directed not to impede should stay *well clear*!

Paragraph (b) gives rights to non-sailing vessels that are over twenty meters long and that can safely navigate only within the narrow channel or fairway. Both conditions must be met. The Rule does not assign rights between power-driven vessels less than twenty meters long and sailing vessels, as these vessels fall into the same class--for Rule 9(b) purposes.

INTERNATIONAL	INLAND
(c) A vessel engaged in fishing shall not impede the passage of any other vessel navigating within a narrow channel or fairway.	(c) A vessel engaged in fishing shall not impede the passage of any other vessel navigating within a narrow channel or fairway.

Paragraph (c), unlike paragraph (b), gives rights to *any* vessel navigating within a narrow channel or fairway, not just to those that can safely operate *only* within the channel or fairway. Vessels engaged in fishing--defined in Rule 3(d)--must stay out of the way, although they are permitted to fish in the channel or fairway if it is otherwise not being used.

INTERNATIONAL	INLAND
(d) A vessel shall not cross a narrow channel or fairway if such crossing impedes tha passage of a vessel which can safely navigate only within such channel or fairway. The latter vessel may use the sound signal prescribed in Rule 34(d) if in doubt as to the intention of the crossing vessel.	(d) A vessel shall not cross a narrow channel or fairway if such crossing impedes tha passage of a vessel which can safely navigate only within such channel or fairway. The latter vessel may use the danger signal prescribed in Rule 34(d) if in doubt as to the intention of the crossing vessel.

Paragraph (d) of both the International and Inland Rule 9 prohibits all vessels from crossing a narrow channel or fairway in a way that would impede a vessel that could not safely operate outside of the channel or fairway. Rule 8(f) "shall not impede" language is operative here. If your vessel is directed not to impede another, try to avoid causing the other vessel to change its course or speed. If you blunder into a risk-of-collision situation, the general Steering and Sailing Rules will not apply to you--you will continue to be obliged to stay out of the way. Be mindful, however, that Rule 8(f)(iii) says that the general rules will apply to the vessel you are impeding. It may be helpful to contact the other vessel (for example, on channel 13 VHF-FM) to inform the operator or your intentions--early, of course.

The Rule also provides for the vessel constrained to the channel to sound five or more short blasts if in doubt as to the intentions of the vessel sounding the crossing signal. The International version of Rule 9 says that this sound signal "may" be used--although International Rule 34(d) *requires* its use in case of doubt--while the Inland Rule 9 says it "shall" be used.

Note that the Internation version refers to the "sound signal prescribed in Rule 34(d)," while the Inland Rule refers to the "danger signal prescribed in Rule 34(d)." Neither version of Rule 34(d) refers to the five or more short blasts as the "danger" signal, but rather calls for the signal's use when "either vessel fails to understand the intentions or actions of the other, or is in doubt whether sufficient action is being taken by the other to avoid collision."

Thinking of the five-blast signal as a danger signal may cause a vessel operator to delay its use until a situation of *potential* danger has developed into one of *immedite* danger. Its *early* application in the circumstances of doubt described in Rule 34(d) would likely focus the attention of the parties while there is still time to act effectively in a non-crisis environment. Think of the signal as a "doubt" rather than a "danger' signal.

INTERNATIONAL	INLAND
(e)(i) In a narrow channel or fairway when overtaking can take place only if the vessel to be overtaken has to take action to permit safe passing, the vessel intending to overtake shall indicate her	(e)(i) In a narrow channel or fairway when overtaking, the power-driven vessel intending to overtake another power-driven vessel shall indicate her intention by sounding the appropriate

intention by sounding the appropriate signal prescribed in Rule 34(c)(i). The vessel to be overtaken shall, if in agreement, sound the appropriate signal prescribed in Rule 34(c)(ii) and take steps to permit safe passing. If in doubt she may sound the signals prescribed in Rule 34(d).	signal prescribed in Rule 34(c) and take steps to permit safe passing. The power-driven vessel being overtaken, if in agreement, shall sound the same signal and may, if specifically agreed to, take steps to permit safe passing. If in doubt she shall sound the danger signal prescribed in Rule 34(d).
(ii) This Rule does not relieve the overtaking vessel of her obligation under Rule 13.	(ii) This Rule does not relieve the overtaking vessel of her obligation under Rule 13.

Paragraph (e) gives the procedures for overtaking in narrow channels and fairways and should be read in conjuction with Rule 13, the Rule for overtaking in general, and with Rule 34(c), which prescribes the sound signals for overtaking. The requirements for overtaking in narrow channels and fairways and the sound signals for overtaking in general vary substantially between the International Rules and the Inland Rules.

The International Rule 9 requirement for overtaking applies only when the overtaken vessel (in addition to the overtaking vessel) has to take *maneuvering action* to permit a safe passing. If the overtaken vessel agrees with the overtaking vessel's passing proposal, the the overtaken vessel is required to "take steps to permit safe passing." The Inland Rule requirements for overtaking in narrow channels and fairways are the same as the general Inland Rule requirement for overtaking and are therefore redundant.

The sound signals used for overtaking in open water are the same for overtaking in narrow channels, although the International overtaking signals are different from those used on inland waters. The Inland Rule signals used for crossing are also used for overtaking. The International overtaking signals are longer (although perhaps less likely to cause confusion). The sound signals will be more fully discussed with Rule 34.

International Rule 9(e)(i) says that when doubt exists as to the other vessel's intentions, the overtaken vessel "may" sound the Rule 34(d) five short blast doubt signal, while the Inland version requires ("shall sound") the sounding of the signal. Both are legally superfluous and merely act as reminders of the Rule 34(d) requirement ("shall" in both International and Inland) for all vessels to sound the five-blast signal when doubt exists.

INTERNATIONAL	INLAND
(f) A vessel nearing a bend or an area of a narrow channel or fairway where other vessels may be obscured by an intervening obstruction shall navigate with particular alertness and caution and shall sound the appropriate signal prescribed in Rule 34(e).	(f) A vessel nearing a bend or an area of a narrow channel or fairway where other vessels may be obscured by an intervening obstruction shall navigate with particular alertness and caution and shall sound the appropriate signal prescribed in Rule 34(e).

Paragraph (f) cautions vessels nearing a blind bend or other area where an approaching vessel may be obscured and reminds them to obey the Rule 34(e) signal requirement. The requirements in this paragraph (International identical to

Inland) offer nothing new--the requirements for lookout, safe speed, and so forth cover needed precautions and Rule 34(e) covers the signal requirement.

INTERNATIONAL	INLAND
(g) Any vessel shall, if the circumstances of the case admit, avoid anchoring in a narrow channel.	(g) Any vessel shall, if the circumstances of the case admit, avoid anchoring in a narrow channel.

Anchoring in a narrow channel is obviously not a good practice and is prohibited by Rule 9(g) except under pressing circumstances. A separate and older law (Section 409 of Title 33, U.S. Code) repeats the prohibition for U.S. waters; it is unlawful to tie up or anchor barges or other craft in navigable waters in such a manner as to prevent or obstruct the passage of other vessels or craft.

Anchorage regulations cover background, procedures, rules, and a list of special anchorage areas and anchorage grounds. These regulations are contained in Title 33 of the Code of Federal Regulations, Parts 109 and 110.

Home

Table of Contents

Rule 10

Rule 10 -- Traffic Separation Schemes

Rule 10 adds an extra dose of traffic management for a number of specially designated areas having high-density traffic, converging traffic, or some exceptional hazard. In these situations, more conventional navigation rules do not provide a desirable margin of safety. Traffic separation schemes have been established all over the world, and are usually associated with the approaches to busy ports and at turning points in crowded sea lanes. International and Inland Rule 10 are now virtually identical, and although no TSSs have yet been established in Inland Rules waters, there are a few inland rules waters, such as the San Francisco Bay area, where a TSS might be placed.

INTERNATIONAL	INLAND
(a) This Rule applies to traffic separation schemes adopted by the Organization and does not relieve any vessel of her obligation under any other rule.	(a) This Rule applies to traffic separation schemes and does not relieve any vessel of her obligation under any other Rule.

The Organization mentioned in the International Rule paragraph (a) is the International Maritime Organization (IMO), a body of the United Nations headquartered in London. Traffic separation schemes are adopted by the IMO after a country (or countries) submits a traffic separation scheme proposal, which must meet specific IMO guidelines. Normally a scheme will not be shown on charts until it has been formally adopted by the IMO. The IMO publishes *Ships' Routing*, which contains design standards and a list (with diagrams and coordinates) of all adopted traffic separation schemes. Check with your local authorities for an up to date list.

The IMO defines "traffic separation scheme" as a plan that organizes traffic proceeding in opposite or nearly opposite directions by means of a separation zone or line, traffic lane, etc. There may be obstructions within the traffic separation scheme. Efforts, however, are made to keep the lanes clear. For known obstructions, such as an oil rig or wreck, within a traffic separation scheme, notice to mariners will be given. Sometimes a traffic separation scheme will be temporarily modified to skirt a short-term obstruction. In some cases off U.S. coasts "safety fairways," in which obstructions are excluded, are superimposed over a traffic separation scheme. (In most cases safety fairways are used independently, usually in areas having concentrations of offshore petroleum production and exploration platforms.)

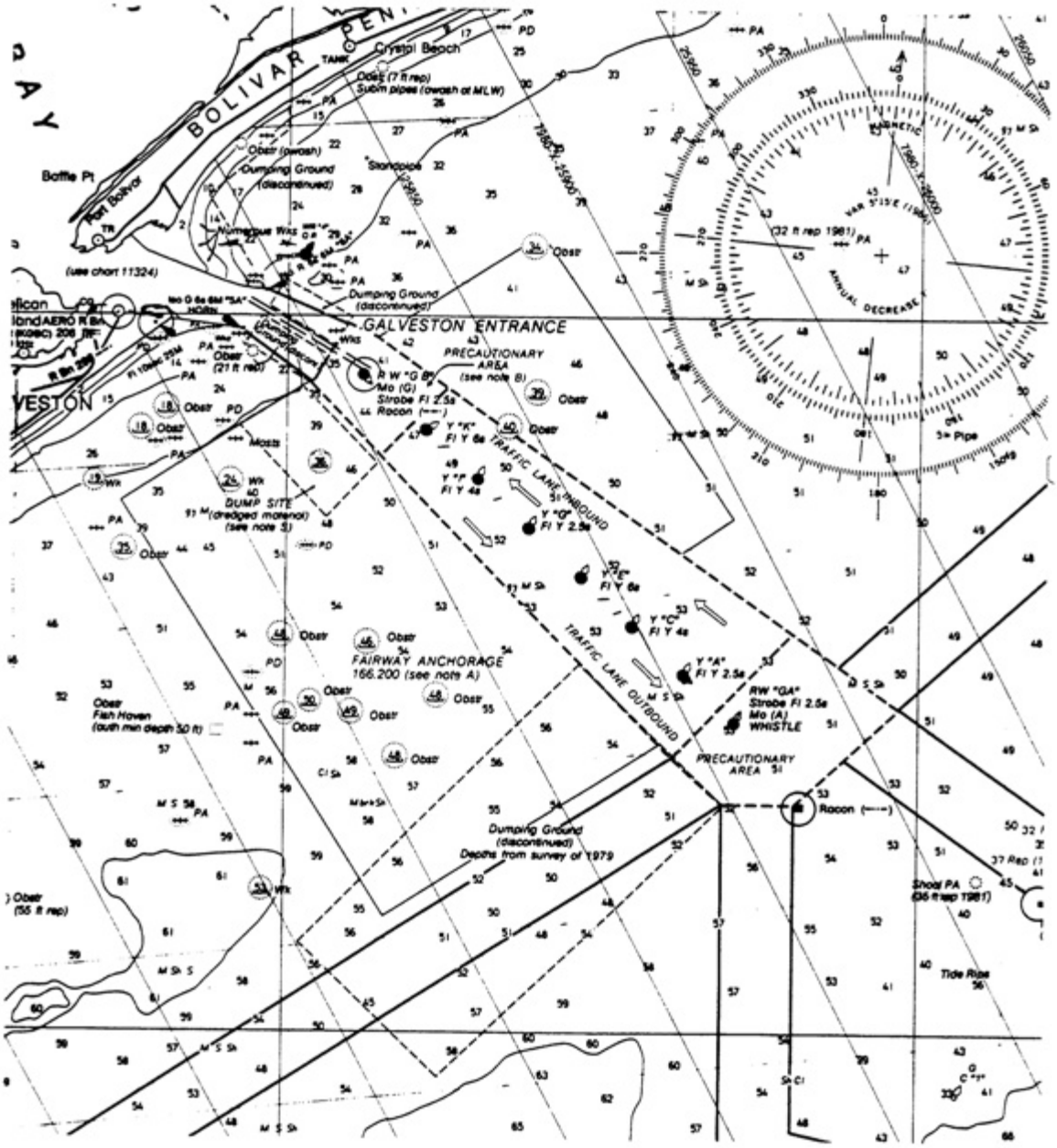


Figure 1—Example of a traffic separation scheme *(dashed lines)* and, in this case, connecting safety fairways *(solid lines)*.

A vessel is said to be "using" a traffic separation scheme when the vessel is within the boundaries of the scheme and is neither crossing the scheme nor fishing within the separation zone. The language on vessel obligations dispels any notion that once in a traffic lane, a vessel acquires absolute rights over vessels outside of the lane. Rule 8(f)(iii) provides an example of where a vessel in a lane would be obligated to stay out of the way of a presumably less privileged crossing vessel.

INTERNATIONAL	INLAND
(b) A vessel using a traffic separation scheme shall:	(b) A vessel using a traffic separation scheme shall:
(i) proceed in the appropriate traffic lane	(i) proceed in the appropriate traffic

in the general direction of traffic flow for that lane;	lane in the general direction of traffic flow for that lane;
(ii) so far as practicable keep clear of a traffic separation line or separation zone;	(ii) so far as practicable keep clear of a traffic separation line or separation zone;
(iii) normally join or leave a traffic lane at the termination of the lane, but when joining or leaving from either side shall do so at as small an angle to the general direction of traffic flow as practicable.	(iii) normally join or leave a traffic lane at the termination of the lane, but when joining or leaving from either side shall do so at as small an angle to the general direction of traffic flow as practicable.

The first rule for using a traffic separation scheme is obvious: go with the flow.

The second rule requires vessels "so far as practicable" not to get too close to a traffic separation line or zone so as not to drift accidentally into the lane of oncoming traffic or create doubt about whether or not it is using the traffic separation scheme. Unlike highways on land, traffic separation schemes do not have double yellow lines down the middle or a white line on its outside boundary.

The third rule, governing vessels entering or leaving a traffic separation lane, requires a small angle of approach or departure to differentiate that vessel from one crossing the scheme. (Crossing instructions are in Rule 10(c).)

INTERNATIONAL	INLAND
(c) A vessel shall, so far as practicable, avoid crossing traffic lanes but if obliged to do so shall cross on a heading as nearly as practicable at right angles to the general direction of traffic flow.	(c) A vessel shall, so far as practicable, avoid crossing traffic lanes but if obliged to do so shall cross on a heading as nearly as practicable at right angles to the general direction of traffic flow.

Many schemes are short, and you can go around, not through them. Crossing long schemes at right angles announces that vessel's intentions and minimizes the time the crossing vessel spends in the scheme. Please note that the angle of crossing is determined by the vessel's heading, not its course (which could be different, usually because of a side current). When a crossing vessel encounters a vessel using a traffic separation scheme, the vessel that is required to stay out of the way is determined by Rule 15 (Crossing Situations).

Fishing vessels, sailing vessels, and power-driven vessels less than twenty meters in length--see paragraphs (i) and (j)--that are crossing shall always stay out of the way of a vessel following a traffic separation lane, but be aware that the larger vessel in the traffic lane does not have absolute rights; see Rule 8(f)(iii).

INTERNATIONAL	INLAND
(d) (i) A vessel shall not use an inshore traffic zone when she can safely use the appropriate traffic lane within the adjacent traffic separation scheme. However, vessels of less than 20 meters in length, sailing vessels, and vessels	(d) (i) A vessel shall not use an inshore traffic zone when she can safely use the appropriate traffic lane within the adjacent traffic separation scheme. However, vessels of less than twenty meters in length, sailing vessels, and

engaged in fishing may use the inshore traffic zone.	vessels engaged in fishing may use the inshore traffic zone.
(ii) Notwithstanding subparagraph (d)(i), a vessel may use an inshore traffic zone when *en route* to or from a port, offshore installation or structure, pilot station, or any other place situated within the inshore traffic zone, or to avoid immediate danger.	(ii) Notwithstanding subparagraph (d)(i), a vessel may use an inshore traffic zone when *en route* to or from a port, offshore installation or structure, pilot station, or any other place situated within the inshore traffic zone, or to avoid immediate danger.

Segregating large fast ships from smaller coastal vessels lessens the anxieties often felt when big and small vessels share a common waterway. Rule 10(d) provides this separation through "inshore traffic zones," defined as designated areas between the landward boundary of a traffic separation scheme and the adjacent coast intended for coastal traffic. The purpose of inshore traffic zones may be, for example, to keep oil tankers away from merchant shipping.

When an inshore traffic zone has been adopted as part of a traffic separation scheme, large through vessels are in effect required to use the traffic lanes or to stay offshore beyond the traffic separation scheme. The Rule recognizes that sailing vessels and small power-driven vessels often depend on being near the coast.

INTERNATIONAL	INLAND
(e) A vessel other than a crossing vessel or a vessel joining or leaving a lane shall not normally enter a separation zone or cross a separation line except:	(e) A vessel other than a crossing vessel or a vessel joining or leaving a lane shall not normally enter a separation zone or cross a separation line except:
(i) in cases of emergency to avoid immediate danger;	(i) in cases of emergency to avoid immediate danger; or
(ii) to engage in fishing within a separation zone.	(ii) to engage in fishing within a separation zone.

The paragraph (e) restriction on crossing a separation line or entering a separation zone is similar to the paragraph (b)(ii) restriction, but it explicitly recognizes a right to fish within separation zones.

INTERNATIONAL	INLAND
(f) A vessel navigating in areas near the terminations of traffic separation schemes shall do so with particular caution.	(f) A vessel navigating in areas near the terminations of traffic separation schemes shall do so with particular caution.

Most traffic separation schemes guiding traffic flow in and out of ports have "precautionary areas" at the inshore end of the scheme. Because of the concentration of meeting and crossing traffic, you should exercise particular care. Paragraph (f) makes it clear that the mariner is also required to proceed with caution near the ends of traffic separation schemes that do not have precautionary areas.

INTERNATIONAL	INLAND
(g) A vessel shall so far as practicable avoid anchoring in a traffic separation scheme or in areas near its terminations.	(g) A vessel shall so far as practicable avoid anchoring in a traffic separation scheme or in areas near its terminations.

Following the reasoning for prohibitions against anchoring in narrow channels, fairways, and the like, paragraph (g) prohibits anchoring in a traffic separation scheme or near its ends.

INTERNATIONAL	INLAND
(h) A vessel not using a traffic separation scheme shall avoid it by as wide a margin as is practicable.	(h) A vessel not using a traffic separation scheme shall avoid it by as wide a margin as is practicable.

The smooth operation of a traffic separation scheme depends on the absence of outside disturbances. A vessel not using a traffic separation scheme must stay far enough away that vessels within the scheme are not obligated, via any other navigation rule--see Rule 8(f)(iii)--to take action inconsistent with the flow of traffic.

INTERNATIONAL	INLAND
(i) A vessel engaged in fishing shall not impede the passage of any vessel following a traffic lane.	(i) A vessel engaged in fishing shall not impede the passage of any vessel following a traffic lane.

Fishing is permitted within a traffic lane so long as the fishing vessel proceeds along the lane with the rest of the traffic and does not "impede" other vessels following the traffic lane. If the vessel engaged in fishing follows a course that obliges a vessel following the traffic lane to alter course or speed, then the fishing vessel had impeded the other vessel and is therefore in violation of this requirement.

INTERNATIONAL	INLAND
(j) A vessel of less than 20 meters in length or a sailing vessel shall not impede the safe passage of a power-driven vessel following a traffic lane.	(j) A vessel of less than twenty meters in length or a sailing vessel shall not impede the safe passage of a power-driven vessel following a traffic lane.

The Rules often distinguish among size and types of vessels. Rule 10 distinguishes between large vessels (power-driven vessels twenty meters and longer) and small (power-driven vessels less than twenty meters and all sailing vessels). Just as paragraph (d) gives priority to small vessels for inshore traffic zones, paragraph (j) gives priority to larger vessels in traffic lanes. Small vessels using traffic separation schemes must stay far away from ships and, whenever possible, should communicate their intentions by radiotelephone. The "shall not impede" language, discussed earlier, operates in this requirement too--see Rule 8(f).

INTERNATIONAL	INLAND
(k) A vessel restricted in her ability to maneuver when engaged in an operation for the maintenance of safety of navigation in a traffic separation scheme is exempted from complying with this Rule to the extent necessary to carry out the operation.	(k) A vessel restricted in her ability to maneuver when engaged in an operation for the maintenance of safety of navigation in a traffic separation scheme is exempted from complying with this Rule to the extent necessary to carry out the operation.
(l) A vessel restricted in her ability to maneuver when engaged in an operation for the laying, servicing, or picking up of a submarine cable, within a traffic separation scheme, is exempted from complying with this Rule to the extent necessary to carry out the operation.	(l) A vessel restricted in her ability to maneuver when engaged in an operation for the laying, servicing, or picking up of a submarine cable, within a traffic separation scheme, is exempted from complying with this Rule to the extent necessary to carry out the operation.

Paragraphs (k) and (l) provide exemptions from Rule 10 requirements for two classes of vessels that, by the nature of their work, cannot always comply with every requirement. Vessels engaged in the maintenance of navigation safety, such as buoy tenders, are exempted *only* while they are restricted in their ability to maneuver and *only* to the extent needed to carry out their work. Vessels laying or maintaining submarine cables must go where the cable goes and while working on cable are normally restricted in their ability to maneuver. Operations likely to interfere with normal separation scheme traffic may be publicized by notices to mariners.

Home

Table of Contents

Rule 11

Rule 11 -- Application

INTERNATIONAL	INLAND
Rules in this Section apply to vessels in sight of one another.	Rules in this subpart apply to vessels in sight of one another.

Rule 11 begins Section/Subpart II and says that Rules 11 through 18 apply to vessels in sight of one another. The International and Inland versions are the same except for the difference in terms ("section" versus "subpart") that is due only to past practices between the treaty drafters and the U.S. Congress. (We will refer to either as "section.")

Rule 3(k) says that vessels shall be deemed to be in sight of one another only when *one* can visually observe the other. If one vessel fails to sight the other only because of an inadequate lookout (Rule 5), then that vessel is not excused from complying with the Rules in this section.

The Rules in this section in most cases assign to one vessel in a two-vessel encounter the primary responsibility for staying out of the way of the other. The vessel obliged to stay out of the way of the other is called the "give-way" vessel; the other vessel is called the "stand-on" vessel. The theory behind these Rules is that the give-way vessel is the one better able to stay out of the way, although in practice this is not always the case.

The execution of these Rules depends on the operator of each vessel being able to assess the other's relative position, course, speed, and intentions. Hence the Rules in this section depend on good visibility (day or night). In restricted visibility when vessels are not in sight of one another (when they cannot visually observe each other), Rules 11-18 do not apply and the vessel operators are required to follow instead Rule 19 (Conduct of Vessels in Restricted Visibility).

What Rules you should use depends on whether you can actually see the other vessel, and only indirectly on the condition of visibility. If you have vessels A and B on your radar screen but can visually see only vessel A, you must follow Rule 12-18 with respect to A and Rule 19 with respect to B. In such a situation you may find that obscured vessel B moves out if its fogbank (or haze or whatever) and become visible. As soon as it does, and when it is clear that it also sees you, Rules 12-18 would then normally apply. If the other vessel, upon becoming visible, is too close or is coming on too fast for you to act effectively under Section II Rules (stand-on / give-way), then Section I and Section III Rules have been violated (by somebody) and you must take whatever action is needed to avoid collision--immediately.

Rule 12 -- Sailing Vessels

INTERNATIONAL	INLAND
(a) When two sailing vessels are approaching one another, so as to involve risk of collision, one of them shall keep out of the way of the other as follows:	(a) When two sailing vessels are approaching one another, so as to involve risk of collision, one of them shall keep out of the way of the other as follows:

Rule 12 tells which of two sailing vessels must stay out of the way of the other and covers all situations except overtaking. Rule 13 outranks Rule 12 and says the overtaking vessel shall stay out of the way of the overtaken vessel, whether it be a sailboat overtaking another sailboat or a sailboat overtaking a power-driven vessel.

INTERNATIONAL	INLAND
(i) when each has the wind on a different side, the vessel which has the wind on the port side shall keep out of the way of the other;	(i) when each has the wind on a different side, the vessel which has the wind on the port side shall keep out of the way of the other;

Paragraph (a)(i) refers to a vessel with "the wind on the port side." In this case the "windward side," as defined in paragraph (b) would be the port side and the vessel would be said to be on the "port tack." A sailing vessel with the wind on the starboard side (that is, starboard side is the windward side) carries its mainsail on the port side and stands on for vessels with the wind on the port side. Or, as more commonly expressed, the starboard-tack boat has the right-of-way over the port-tack boat. This is true even if the port-tack boat is close-hauled and the starboard-tack boat is running downwind.

INTERNATIONAL	INLAND
(ii) when both have the wind on the same side, the vessel which is to windward shall keep out of the way of the vessel which is to leeward;	(ii) when both have the wind on the same side, the vessel which is to windward shall keep out of the way of the vessel which is to leeward;

When both vessels have the wind on the same side, the vessel to windward is required to stay out of the way. If you draw a line through your vessel 90 degrees to the direction of the true wind (not usually the "relative" wind that you feel while your boat is moving), "to windward" is everywhere on the side of the line in the direction from where the wind is blowing (upwind) and "to leeward" is everywhere on the other side of the line (downwind).

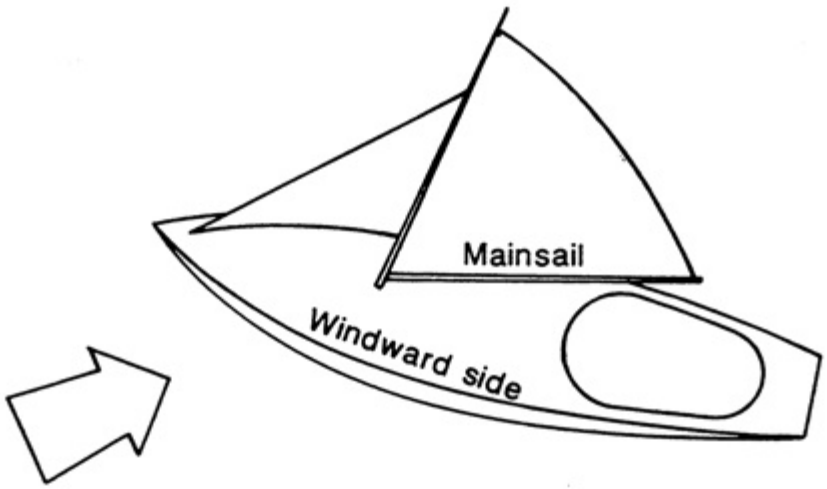


Figure 2—The windward side.

INTERNATIONAL	INLAND
(iii) if a vessel with the wind on the port side sees a vessel to windward and cannot determine with certainty whether the other vessel has the wind on the port side or on the starboard side, she shall keep out of the way of the other.	(iii) if a vessel with the wind on the port side sees a vessel to windward and cannot determine with certainty whether the other vessel has the wind on the port side or on the starboard side, she shall keep out of the way of the other.

If you can't tell on which side the other vessel's sails are carried and you are on port tack, stay out of the way. At night it is especially difficult to determine on which tack another vessel is sailing.

INTERNATIONAL	INLAND
(b) For the purposes of this Rule the windward side shall be deemed to be the side opposite to that on which the mainsail is carried or, in the case of a square-rigged vessel, the side opposite to that on which the largest fore-and-aft sail is carried.	(b) For the purposes of this Rule the windward side shall be deemed to be the side opposite to that on which the mainsail is carried or, in the case of a square-rigged vessel, the side opposite to that on which the largest fore-and-aft sail is carried.

Home

Table of Contents

Rule 13

Rule 13 -- Overtaking

INTERNATIONAL	INLAND
(a) Notwithstanding anything contained in the Rules of Part B, Sections I and II any vessel overtaking any other shall keep out of the way of the vessel being overtaken.	(a) Nothwithstanding anything contained in the Rules 4 through 18, any vessel overtaking any other shall keep out of the way of the vessel being overtaken.

Overtaking on the water is pretty much like overtaking on land: the driver of the faster car is looking forward at the car to be passed and hence is in a better position to plan and execute the maneuver. From the bridge of most larger vessels, the view to the rear is substantially more limited than the view to the front. Should there not be room to pass, the overtaking vessel always has the option of slowing down; the vessel to be overtaken will often be unable to go any faster. Rule 13 therefore requires the overtaking vessel to keep out of the way of the vessel being passed.

Rule 9(e) also has requirements for overtaking in narrow channels and fairways, and the International version of that Rule requires some action by the vessel to be overtaken. Rule 34(c) gives requirements for sounding whistle signals in overtaking situations. Rule 16 requires the give-way (overtaking) vessel to keep well clear of the vessel to be passed. Keeping well clear while overtaking is especially important because the potentially strong hydrodynamic interactive forces may cause one or both vessels to veer off course.

Paragraph (a) of this Rule requires that any vessel overtaking another keep out of the way, even if another rule required otherwise. In overtaking situations, look first to Rule 13. Despite the seemingly absolute language of paragraph (a), there are a few situations where the overtaking vessel would retain the stand-on status given by another Rule.

Rule 9(b) and (c) and Rule 10(i) and (j) say that power-driven vessel less than 20 meters in length, sailing vessels, and vessels engaged in fishing "shall not impede the passage" of larger vessels following a narrow channel, narrow fairway, or traffic lane. Smaller vessels are usually slower and larger, faster vessels commonly overtake them. Rule 13 requires overtaking vessels to put aside the other "shall not impede" requirements and to keep out of the way of the vessel to be overtaken. But requiring, for example, a large and fast commercial vessel operating in a long narrow channel such that it cannot safely leave the channel to trail behind a small slow vessel might be described as an unintended result of a literal and strict following of Rule 13. Certainly the best solution to this troublesome circumstance is for both vessels to be accommodating. The smaller vessel should probably not be in the narrow channel in the first place, if it is wide enough for only one vessel, but of course, the larger vessel would not be justified in running over the smaller vessel, no matter how tempting!

INTERNATIONAL	INLAND
(b) A vessel shall be deemed to be	(b) A vessel shall be deemed to be

overtaking when coming up with another vessel from a direction more than 22.5 degrees abaft her beam, that is, in such a position with reference to the vessel she is overtaking, that at night she would be able to see only the sternlight of that vessel but neither of her sidelights.	overtaking when coming up with another vessel from a direction more than 22.5 degrees abaft her beam; that is, in such a position with reference to the vessel she is overtaking, that at night she would be able to see only the sternlight of that vessel but neither of her sidelights.

Paragraph (b) says what is meant by overtaking. A vessel approaching from a direction more than 22.5 degrees aft of the beam of another vessel--or stated differently, from within a 135-degree horizontal sector centered directly astern (the same as the light from the vessel's sternlight) of that vessel--is overtaking if there is risk of collision. If the approaching vessel is within the sternlight sector of another vessel but their courses will bring them no closer together than , say, three miles, then there is no risk of collision and no overtaking situation exists.

Overtaking continues even as the overtaking vessel moves out of the sternlight sector and pulls abeam of and then ahead of the overtaken vessel. It ends only when the maneuver has been completed.

INTERNATIONAL	INLAND
(c) When a vessel is in any doubt as to whether she is overtaking another, she shall assume that this is the case and act accordingly.	(c) When a vessel is in any doubt as to whether she is overtaking another, she shall assume that this is the case and act accordingly.

At night if you are approaching a white navigation light but can see no sidelights, you may be overtaking another vessel (or perhaps approaching an anchored vessel, or meeting a vessel head-on beyond sidelight range, or . . .) and so you should stay clear until you know better the actual situation. If you see a white light and later a colored sidelight, either you could be overtaking and have come up enough to move into horizontal sector of the sidelight, or you could be crossing or meeting, having first seen the brighter white masthead light and then later the less visible colored sidelight. The arrangement, if discernible, should tell you which is the case (although all colored lights are certainly not sidelights). During daylight it may be difficult to estimate the angle of approach without the navigation lights as a reference. Paragraph (c) says that if you are in doubt, assume that you are overtaking and keep out of the way of the other vessel. If you are in doubt, remember that the radiotelephone and radar are also available.

INTERNATIONAL	INLAND
(d) Any subsequent alteration of the bearing between the two vessels shall not make the overtaking vessel a crossing vessel within the meaning of these Rules or relieve her of the duty of keeping clear of the overtaken vessel until she is finally past and clear.	(d) Any subsequent alteration of the bearing between the two vessels shall not make the overtaking vessel a crossing vessel within the meaning of these Rules or relieve her of the duty of keeping clear of the overtaken vessel until she is finally past and clear.

Paragraph (d) makes clear that the overtaking vessel cannot (by any action of its own) shift its give-way status to the other vessel. The overtaking vessel remains

the give-way vessel until the risk of collision has passed, that is, until the overtaking vessel "is finally past and clear." This requirement is a restatement of the Rule 8 duty of all vessels required to take action to continue their vigilance "until the other vessel is finally past and clear."

Paragraph (d) was included to cover the case of one vessel overtaking on the starboard side of another and then turning left across the other's bow. In an ordinary crossing situation, the vessel on the right would have the right-of-way. If this were also the case of the overtaking vessel crossing the other, the overtaken/stand-on vessel would suddenly become the crossing/give-way vessel and might not have enough maneuvering room.

Home

Table of Contents

Rule 14

Rule 14 -- Head-on Situation

INTERNATIONAL	INLAND
(a) When two power-driven vessels are meeting on reciprocal or nearly reciprocal courses so as to involve risk of collision each shall alter her course to starboard so that each shall pass on the port side of the other.	(a) Unless otherwise agreed, when two power-driven vessels are meeting on reciprocal or nearly reciprocal courses so as to involve risk of collision each shall alter her course to starboard so that each shall pass on the port side of the other.

Two vessels are approaching each other rapidly head-on, and there is no way to distinguish one from the other for the purpose of assigning right-of-way. To ensure quick and predictable action, Rule 14 requires *both* vessels to do the same thing: to turn right. This procedure reduces uncertainty (and delay) and also sets Rule 14 apart from the rules around it. Rules 12, 13, 15, and 18 all assign primary responsibility for taking avoiding action to one vessel, the give-way vessel; Rule 14 assigns responsibility to both.

The Inland version of this Rule has been modified to accommodate the special needs of vessels navigating on meandering rivers, where the downbound vessel may have less ability to maneuver than the vessel it meets head-on traveling upriver. The addition of the words "Unless otherwise agreed" gives the two vessels the option of passing starboard-to-starboard that otherwise would be available only to vessels in narrow channels in certain inland waters [See Rule 9(a)(ii)]

Rule 14 applies only to power-driven vessels meeting head-on with other *power-driven vessels*. It does not apply if one of the power-driven vessels is not an "ordinary" power-driven vessel but rather is one that is made a stand-on vessel with respect to an ordinary power-driven vessel by Rule 18(a). These other special vessels include vessels not under command, restricted in ability to maneuver, or engaged in fishing that are not required to take action (initially) when meeting an ordinary power-driven vessel head-on. Two sailing vessels meeting head-on are governed by Rule 12.

Rule 14 is easy to follow. Each power-driven vessel approaching another head-on is required *to alter her course to starboard* for a port-to-port passing--you must turn right, never left. An Inland rule exception permits alterations to port for a starboard-to-starboard passing if both vessels agree in advance.

INTERNATIONAL	INLAND
(b) Such a situation shall be deemed to exist when a vessel sees the other ahead or nearly ahead and by night she could see the masthead lights of the other in a line or nearly in a line and/or both sidelights and by day she observes the corresponding aspect of the other vessel.	(b) Such a situation shall be deemed to exist when a vessel sees the other ahead or nearly ahead and by night she could see the masthead lights of the other in a line or nearly in a line or both sidelights and by day she observes the corresponding aspect of the other

vessel.

Risk of collision must exist for Rule 14 to apply. In theory, two distant vessels approaching nearly head-on may by the time they near each other be so far apart (to one side or the other) that no action is required . In practice, if you are close enough to another vessel to determine that you are meeting nearly head-on, you most likely will also be in risk of collision.

Deciding whether you are in a head-on situation is also straight-forward (no pun intended). Paragraph (a) describes it as a "meeting on reciprocal or nearly reciprocal courses." Paragraph (b) says what that means. The language is clear--look at the *aspect* of the other vessel. The decision should not depend on the course made good over the bottom, so do not delay your action until the path of the other vessel has been plotted. The leeway angle can be significant with a strong beam wind or current.

The navigation light technical performance requirements contained in Annex I provide for each sidelight to overlap about two degrees into the other light's horizontal sector. As a result, there will be approximately a four degree sector directly ahead of a vessel in which both sidelights may be seen. Because sidelights will not have exactly the same intensities, and because the human eye is not equally sensitive to red and green light, one sidelight may appear before the other, even if you are in a head-on situation. It is also difficult to see colors at low light intensities--a colored light will look the same as a dim white light. Use your binoculars!

INTERNATIONAL	INLAND
(c) When a vessel is in any doubt as to whether such a situation exists she shall assume it does exist and act accordingly.	(c) When a vessel is in any doubt as to whether such a situation exists she shall assume it does exist and act accordingly.

Paragraph (c) poses a warning. If it is not plain to you that a *crossing* situation exists, then take the action required for a *head-on* situation.

	INLAND
	(d) Notwithstanding paragraph (a) of this rule, a power-driven vessel operating on the Great Lakes, Western Rivers, or waters specified by the Secretary, and proceeding downbound with a following current shall have the right-of-way over an upbound vessel, shall propose the manner of passage, and shall initiate the maneuvering signals prescribed by Rule 34(a)(i), as appropriate.

Paragraph (d) extends to all channels the general right-of way given by Inland Rule 9(a)(ii) to vessel in *narrow* channels in the Great Lakes, western rivers, and waters specified by the Secretary (see Title 33 of the Code of Federal Regulations--contained in Appendix I of this website). Although this Rule 14(d) exception

contains most of the language in the Rule 9(a)(ii) narrow-channel exception, 14(d) does not give the downbound vessel as much control as does 9(a)(ii) for the trickier narrow-channel situation. The 14(d) provision does not require the downbound vessel to propose the place of passage and does not require the upbound vessel to "hold as necessary to permit safe passing." Presumably if those two added precautions were needed for a safe passing, the channel would be narrow enough to bring Rule 9 into effect.

Home

Table of Contents

Rule 15

Rule 15 -- Crossing Situation

INTERNATIONAL	INLAND
When two power-driven vessels are crossing so as to involve risk of collision, the vessel which has the other on her own starboard side shall keep out of the way and shall, if the circumstances admit, avoid crossing ahead of the other vessel.	(a) When two power-driven vessels are crossing so as to involve risk of collision, the vessel which has the other on her own starboard side shall keep out of the way and shall, if the circumstances admit, avoid crossing ahead of the other vessel.

Encounters are of three types: overtaking, head-on, and crossing. Rule 15 addresses a crossing situation between two poer-driven vessels. This is another simple rule, and one that is the same for International and Inland, with an exception for the rivers of the Great Lakes and western rivers.

Rule 15 does not apply to power-driven vessels restricted in ability to maneuver, engaged in fishing, or not under command. Remember, towing vessels with their tows are considered to be ordinary power-driven vessels unless they are severely restricted in their ability to deviate from their courses (see Rule 3(g)).

The crossing rule applies only to vessels in visual sight of one another. It soesn;t apply when your radar screen shows perfectly clearly the approach of another vessel in a "crossing situation"; if you can't see the other vessel, Rule 15 does not apply and Rule 19 does.

Like the other Rules in this section/subpart, Rule 15 does not apply until risk of collision exists (see Rule 7). Earlier responsibilities between vessel may exist where "shall not impede" provisions pertain. These provisions apply to small power-driven vessels, sailing vessels, and fishing vessels in narrow channels or fairways, and in traffic lanes. Once risk of collision arises, however, Rule 15 takes over and may change the obligations of the vessels. Thus, if you are operating a large vessel and are in a narrow channel, narrow fairway, or traffic lane, and you encounter a crossing smaller vessel involving risk of collision, you must obey Rule 15, even though the smaller vessel is also required to stay well out of your way. Because of the possible shift of responsibilities, you should resolve any doubts early by using your radiotelephone or, failing that, sounding the signal of five or more short blasts described in Rule 34(d).

Rule 15 requires the vessel that has the other on its starboard side to stay out of the way, and to pass behind. The vessel on the right becomes the stand-on vessel and must follow Rule 17 (Action by Stand-on Vessel). The vessel on the left becomes the give-way vessel and must follow Rule 16 (Action by Give-way Vessel). At night, the stand-on vessel sees the green sidelight of the give-way vessel , and the give-way vessel sees the stand-on vessel's red sidelight. A vessel approaching from the quarter so that it could not see a sidelight would be overtaking and would look to Rule 13. A vessel seeing both sidelights would be meeting head-on and would follow Rule 14.

The give-way vessel is required (if the circumstances of the case admit) to pass

behind teh stand-on vessel and so a turn to starboard would be in order. To keep the area to the left of the stand-on vessel clear for the give-way vessel's maneuvers, Rule 17 directs the stand-on vessel to refrain from turning to port.

There are few situations where application of the crossing rule is not straightforward. Vessels following a winding river or channel may approach each other in what may appear to be a crossing situation. They should, however, follow Rule 9 and stay to the far right of the channel (general rule). Rule 15 does not apply in such cases, and in other cases where the apparent "stand-on" vessel cannot or does not hold a steady course.

A stopped vessel that sees another power-driven vessel appproaching on its starboard side (involving risk of collision) is obligated to get out of the way unless the stopped vessel is not under command, is restricted in its ability to maneuver, or is engaged in fishing, or unless there are special circumstances. Special circumstances may consist of, for example, a stopped large loaded tanker that is physically unable to maneuver out of the way of a fast-approaching "stand-on" vessel or if the stopped vessel is maneuvering and not on any course. Operators of stopped vessels that cannot readily be maneuvered should exhibit the lights and shapes for a hampered vessel (that is, a vessel restricted in ability to maneuver, not under command, or constrained by draft) and should contact approaching vessels by radiotelephone to warn them of the situation.

INLAND

(b) Notwithstanding paragraph (a), on the Great Lakes, Western Rivers, or waters specified by the Secretary, a power-driven vessel crossing a river shall keep out of the way of a power-driven vessel ascending or descending the river.

The Inland Rule 15 differs from the International Rule 15 in that the Inland version contains an exception [paragraph (b)] to the general rule. This exception has been extended beyond the Great Lakes and western rivers to include the Tennessee-Tombigbee Waterway, Tombigbee River, Black Warrior River, Alabama River, Coosa River, Mobile River above the Cochrane Bridge at St. Louis Point, Flint River, Chattachoochee River, and the Apalachicola River above its confluence with the Jackson River.

Home

Table of Contents

Rule 16

Rule 16 -- Action by Give-way Vessel

INTERNATIONAL	INLAND
Every vessel which is directed to keep out of the way of another vessel shall, so far as possible, take early and substantial action to keep well clear.	Every vessel which is directed to keep out of the way of another vessel shall, so far as possible, take early and substantial action to keep well clear.

Rules 12, 13, 15, and 18 (all of which apply to vessels in sight of each other) direct one of two approaching vessels to keep out of the way of the other. Rules 16 and 17 assign respective responsibilities to each vessel. Rule 16 applies to the give-way vessel, the one directed to stay out of the way of the other. Rule 17 assigns more complicated responsibilities and privileges to the other vessel, the stand-on vessel.

Rule 16 commands the give-way vessel to take "early and substantial action to keep well clear," that is, "action to avoid collision," precisely the title of Rule 8.

Rule 8 contains some of the same tenets as Rule 16, but the language differs. Rule 16 says "take early and substantial action"; Rule 8 says take action that is "positive, made in ample time." Rule 16 says take action "to keep well clear"; Rule 8 says take action that will "result in passing at a safe distance." Rule 16 says take the prescribed action "so far as possible"; Rule 8 says take the action "if circumstances of the case admit." Although the language varies, the meaning is essentially the same.

Rule 8 also provides more specific guidance for the give-way (and other) vessels. Maneuvers should be large enough to be readily seen. The maneuver may be by course change alone but slowing or stopping may be necessary. The effectiveness of actions taken shall be observed (and further measures carried out if need be) until risk of collision has passed.

Depending on the situation, the give-way vessel may or may not be allowed to cross ahead of the stand-on vessel. Rule 15 does not permit (under normal circumstances) a power-driven give-way vessel to cross ahead of a power-driven vessel. A give-way vessel can cross ahead of a sailing vessel, hampered vessel, or vessel it is overtaking. If you cross ahead of a stand-on vessel, remember that you must pass "at a safe diatance" (Rule 8) and keep "well clear" (Rule 16).

Rule 17 -- Action by Stand-on Vessel

INTERNATIONAL	INLAND
(a)(i) Where one of two vessels is to keep out of the way the other shall keep her course and speed.	(a)(i) Where one of two vessels is to keep out of the way the other shall keep her course and speed.

Rule 17 assigns responsibilities to the vessel with the "right-of-way"--the stand-on vessel. The text of the Rule does not use the term "stand-on vessel" but instead describes it in paragraph (a) as the "other" vessel, that is, not the give-way vessel, not the vessel required to keep out of the way. When does this Rule apply? It applies only in situations covered by Rules 12, 13 ,15, and 18, which require one vessel to stay out of the way of another.

These four Rules apply only when the two vessels are in sight of one another and only when risk of collision exists. When three or more vessels approach with risk of collision it will likely will be impossible for all of them to act according to all of the Rules; one vessel may be the stand-on vessel with respect to a second and a give-way vessel with respect to a third. Rule 17 would require one action while Rule 16 would require a conflicting action. Such a situation is one of special circumstances and is governed by Rule 2.

Give-way vessels have one obligation--to stay out of the way of stand-on vessels. Stand-on vessels, however, have more complicated responsibilities, but their basic obligation is to hold their course and speed, or to "stand-on." Other actions are required or permitted depending on the circumstances.

Remember that give-way/stand-on situations do not begin until risk of collision (Rule 7) exists. You are free to maneuver before that risk arises no matter what your obligations would be later if you were to continue on your initial course.

Once risk of collision develops, however, paragraph (a)(i) requires the stand-on vessel to hold its course and speed. The purpose of this requirement is to enable the give-way vessel to predict the action of the stand-on vessel and so be able to stay out of its way. In some circumstances, the stand-on vessel's normal maneuver would be to slow down or turn (to pick up a pilot or enter a channel, for example) and such action may be expected of the stand-on vessel by those on the give-way vessel. In that case, the stand-on vessel is obligated to maneuver as expected, even though the action is something other than holding course and speed. Again, a radiotelephone confirmation of intentions is useful.

INTERNATIONAL	INLAND
(ii) The latter vessel may however take action to avoid collision by her maneuver alone, as soon as it becomes apparent to her that the vessel required to keep out of the way is not taking appropriate action in compliance with these Rules.	(ii) The latter vessel may however take action to avoid collision by her maneuver alone, as soon as it becomes apparent to her that the vessel required to keep out of the way is not taking appropriate action in compliance with these Rules.

The operator of a stand-on vessel that is on a collision course with another vessel expects the give-way vessel to take the *prompt* avoiding action required by the Rules. If after time has passed the give-way vessel persists in its impersonation of a stand-on vessel, it is reasonable to expect the stand-on vessel's operator to be somewhat concerned about the competence of the give-way vessel's crew.

As soon as it becomes apparent that the give-way vessel is not taking appropriate action, the stand-on vessel is free to act to avoid a collision. Rule 17(a)(ii) says that the stand-on vessel *may* maneuver at this stage, but it *does not require* the stand-on vessel to maneuver. The stand-on vessel may continue on for awhile before maneuvering. As soon as the stand-on vessel feels entitled to maneuver, however, it is *required* to *immediately* sound the doubt signal of five or more short blasts prescribed by Rule 34(d). *Do not wait* until danger is imminent. *Do not wait* until you are about to crash before sounding this signal!

The stand-on vessel may or may not choose to maneuver after giving the five-blast signal. If it does change direction and is operating under the International Rules, it must also then give the appropriate one- or two-blast signal to indicate that maneuver (see Rule 34(a)).

How long do you have to wait before it becomes "apparent" that the other vessel is not taking appropriate action? You may not take action until the give-way vessel has had time to assess the situation and to begin to take avoiding action. Precipitous action by the stand-on vessel may result on simultaneous action by both vessels, which can greatly increase the danger.

How close must you be to the other vessel before the stand-on vessel may maneuver? The same factors that determined the separation for risk of collision to exist apply here. A two-mile separation for ships crossing at sea would justify a stand-on vessel's maneuver. The particular circumstances in any given situation would, of course, determine the distance at which the stand-on vessel may maneuver to avoid the give-way vessel.

Rule 17(a)(ii) says that the stand-on vessel may act if the give-way vessel does not take "appropriate" action. Inappropriate action is no action at all or *ineffective* action.

If you are the operator of a stand-on vessel and decide to take action when the give-way vessel fails to do so, what action would be best? In a crossing situation (involving power-driven vessels), you normally would not want to slow down because that makes it more difficult for the give-way vessel to pass behind you. Remember that Rule 15 directs the give-way vessel to avoid crossing ahead of you. Rule 8 (Action to Avoid Collision) provides further guidance. For power-driven vessels, paragraph (c) of Rule 17 applies directly to this situation. It says don't turn left when the give-way vessel is on your port side. That means appropriate action is a right turn except when the give-way vessel is overtaking on your starboard side. For situations not involving two power-driven vessels, the appropriate action depends on the circumstances.

INTERNATIONAL	INLAND
(b) When, from any cause, the vessel required to keep her course and speed finds herself so close that collision cannot be avoided by the action of the give-way vessel alone, she shall take such action as will best aid to avoid collision.	(b) When, from any cause, the vessel required to keep her course and speed finds herself so close that collision cannot be avoided by the action of the give-way vessel alone, she shall take such action as will best aid to avoid collision.

You are on the stand-on vessel, and it becomes apparent that the give-way vessel on your port side is not taking appropriate action. You sound the five short blast signal, put your engines on stand-by, but continue holding your course and speed. Thirty seconds pass without any response. You again sound five short blasts. By this time you are much closer and through your binoculars observe a figure on an otherwise empty bridge jumping at what you assume to be the autopilot. The vessel's turn to the right is not fast enough to prevent a collision without your help, and you recall that Rule 17(b) now requires you to "take such action as will best aid to avoid collision." But what action? The right turn recommended for early stand-on avoiding action would at this point swing your stern into the oncoming bow of the give-way vessel. Aha! Hard left rudder. You pass safely.

Rule 17(b) describes the classic "in extremis" situation, one that every mariner wishes never to experience. Such a situation--one in which collision is imminent--is defined by the maneuverability of the give-way vessel alone. But what effect does the maneuverability of the stand-on vessel have? What will be the outcome if the stand-on vessel waits until the give-way vessel can't avoid the collision by itself?

If the two vessels are equally maneuverable, avoiding the collision will depend on the actions of both vessels. If the stand-on vessel is more maneuverable, then its quick action will probably prevent a collision. If, however, the stand-on vessel is less maneuverable than the give-way vessel, then the stand-on vessel can most likely do nothing to prevent the collision.

Therefore, if you are operating a stand-on vessel approaching a more maneuverable give-way vessel, it would behoove you not to wait until the Rules require you to maneuver to avoid collision. By that time it will probably be too late. If the give-way vessel isn't doing its job, take early advantage of Rule 17(a)(ii) and maneuver before the situation becomes more distressing.

You should remember that when the stand-on vessel is required to act to avoid collision (Rule 17(b)), it must take whatever action will best prevent or minimize collision damage. At that point, other requirements saying don't cross ahead, turn right, or whatever no longer apply. Do what has to be done.

INTERNATIONAL	INLAND
(c) A power-driven vessel which takes action in a crossing situation in accordance with subparagraph (a)(ii) of this Rule to avoid collision with another power-driven vessel shall, if the circumstances of the case admit, not alter course to port for a vessel on her own port side.	(c) A power-driven vessel which takes action in a crossing situation in accordance with subparagraph (a)(ii) of this Rule to avoid collision with another power-driven vessel shall, if the circumstances of the case admit, not alter course to port for a vessel on her own port side.

Turning away from the give-way vessel decreases the rate of approach and increases the time each vessel has to take further avoiding action. Turning toward the give-way vessel may well place the stand-on vessel in a much more dangerous situation if the give-way vessel has initiated a turn to starboard just before or simultaneously with the stand-on vessel's maneuver.

INTERNATIONAL	INLAND
(d) This Rule does not relieve the give-way vessel of her obligation to keep out of the way.	(d) This Rule does not relieve the give-way vessel of her obligation to keep out of the way.

Finally, paragraph (d) of Rule 17 makes perfectly clear that the give-way vessel's responsibility to keep out of the way of the stand-on vessel is in no way diminished by the stand-on vessel's voluntary action under Rule 17(a)(ii) or by the stand-on vessel's required action under Rule 17(b). An operator of a give-way vessel is absolutely wrong in assuming he or she doesn't have to worry about staying out of the way (and passing at a safe distance) if the stand-on vessel takes avoiding action.

Home

Table of Contents

Rule 18

Rule 18 -- Responsibilities Between Vessels

Most of the other Rules for vessels in sight of each other deal with encounters between two ordinary power-driven vessels, and Rule 12 covers encounters between sailing vessels. Rule 18 tells you what to do when you encounter a vessel that is fundamentally different from your own.

Rule 18 lists the various classes of vessels in a "pecking order" of privilege. Vessel classes perceived to be more maneuverable are directed to keep out of the way of classes thought to be less maneuverable. Naturally, there are exceptions in the Rule because perceptions do not necessarily hold true in reality. Remember that this Rule applies only to vessels in sight of each other.

The vessel directed to keep out of the way must follow Rule 8 (Action to Avoid Collision) and Rule 16 (Action by Give-way Vessel).

INTERNATIONAL	INLAND
(a) A power-driven vessel underway shall keep out of the way of:	(a) A power-driven vessel underway shall keep out of the way of:
(i) a vessel not under command;	(i) a vessel not under command;
(ii) a vessel restricted in her ability to maneuver;	(ii) a vessel restricted in her ability to maneuver;
(iii) a vessel engaged in fishing;	(iii) a vessel engaged in fishing; and
(iv) a sailing vessel.	(iv) a sailing vessel.

Ordinary power-driven vessels that are underway must stay out of the way of the other types of vessels. Power-driven vessels that are not underway--that is, that are anchored, aground, or made fast to the shore--of course do not have to keep out of the way of other vessels. Vessels that are anchored or aground must display the required lights and shapes for those situations.

INTERNATIONAL	INLAND
(b) A sailing vessel underway shall keep out of the way of:	(b) A sailing vessel underway shall keep out of the way of:
(i) a vessel not under command;	(i) a vessel not under command;
(ii) a vessel restricted in her ability to maneuver;	(ii) a vessel restricted in her ability to maneuver; and
(iii) a vessel engaged in fishing.	(iii) a vessel engaged in fishing.

Sailing vessels that are underway must stay out of the way of vessels not under command, restricted in ability to maneuver, or engaged in fishing. (The definitions of

these vessel classes are contained in Rule 3.)

INTERNATIONAL	INLAND
(c) A vessel engaged in fishing when underway shall, so far as possible, keep out of the way of:	(c) A vessel engaged in fishing when underway shall, so far as possible, keep out of the way of:
(i) a vessel not under command;	(i) a vessel not under command; and
(ii) a vessel restricted in her ability to maneuver.	(ii) a vessel restricted in her ability to maneuver.

Vessels engaged in fishing (when underway) must keep out of the way of vessels not under command or restricted in ability to maneuver, but "only so far as possible." Some fishing operations so severely hamper a vessel's ability to maneuver that it would be physically impossible to keep out of the way of another vessel. For example, a trawler's speed is often limited to a few knots when its trawl is out, and a purse seiner may not be able to move at all while drawing in its net. Rule 18 certainly does not require that a fishing vessel cut loose its gear in order to move out of the way of another hampered vessel.

Vessels restricted in ability to maneuver and vessels not under command are given equal status. All vessels under normal circumstances are required to stay out of the way of these two classes.

What happens when a vessel not under command encounters a vessel restricted in ability to maneuver (or if both belong to the same class)? *Both* should take action to avoid collision.

INTERNATIONAL
(d)(i) Any vessel other than a vessel not under command or a vessel restricted in her ability to maneuver shall, if the circumstances of the case admit, avoid impeding the safe passage of a vessel constrained by her draft, exhibiting the signals in Rule 28.

Paragraph (d) of International Rule 18 concerns vessels constrained by draft to a relatively narrow natural or dredged channel. If a vessel in such a situation turned off its course, it would run aground. Predicting the action the Rule requires of a vessel constrained by draft is uncertain, so the formal concept of a vessel constrained by draft was not adopted in Inland Rule 18.

The International Rule requires that vessels (except those not under command and those restricted in ability to maneuver), if the circumstances of the case admit, avoid impeding the safe passage of a vessel constrained by draft. The general requirement attempts to resolve a situation that varies greatly with particular circumstances. As a result, there are two problems with the requirement.

First, the escape clause "if the circumstances of the case admit" relies on the judgment of the operator of the vessel approaching the vessel constrained by draft. This introduces uncertainty on the part of the constrained vessel because the other operator's judgment can only be guessed.

Second, the "shall not impede the passage" requirement places responsibility on the nonconstrained vessel to stay out of the way while it is at long range. Notwithstanding that obligation, if it gets close enough for risk of collision to arise, the constrained vessel will be obligated to act according to the more general Steering and Sailing Rules, which may make it the give-way vessel. The non-constrained vessel will in all cases continue to be charged with staying out of the way. (Confused? See Rule 8(f) for "shall not impede" guidance.)

INTERNATIONAL
(ii) A vessel constrained by her draft shall navigate with particular caution having full regard to her special condition.

Perhaps because of the uncertainty involved, the Rule commands vessels constained by draft to navigate "with particular caution." This means that the constrained vessel must be ready to take collision-avoiding action at all times, which for a vessel constrained by draft means limiting speed and having engines ready for maneuver.

INTERNATIONAL	INLAND
(e) A seaplane on the water shall, in general, keep well clear of all vessels and avoid impeding their navigation. In circumstances, however, where risk of collision exists, she shall comply with the Rules of this Part.	(e) A seaplane on the water shall, in general, keep well clear of all vessels and avoid impeding their navigation. In circumstances, however, where risk of collision exists, she shall comply with the Rules of this Part.

The last paragraph in Rule 18 covers seaplanes, an encounter with which is probably a rarity for most mariners. Rule 18 directs seaplanes to stay well clear of other vessels if possible. Otherwise, a seaplane is to follow the Rules as would a comparable power-driven vessel. While landing and taking off, seaplanes cannot effectively turn, but they can maneuver when taxiing. Vessels operating in the vicinity of a seaplane taking off or landing should note, as a precaution, the pilot's forward visibility may become completely blocked by the aircraft's raised nose.

Home

Table of Contents

Rule 19

Rule 19 -- Conduct of Vessels in Restricted Visibility

Section/Subpart III (Conduct of Vessels in Restricted Visibility) contains but one Rule--Rule 19. Section I specified Conduct of Vessels in Any Condition of Visibility, and Section II specified Conduct of Vessels in Sight of One Another. The title of Section III is the same as that of Rule 19. International Rule 19 is identical to Inland Rule 19 except for a few minor style changes that do not affect substance.

INTERNATIONAL	INLAND
(a) This Rule applies to vessels not in sight of one another when navigating in or near an area of restricted visibility.	(a) This Rule applies to vessels not in sight of one another when navigating in or near an area of restricted visibility.

How poor must visibility be in order to be called "restricted?" The Rule 3 definition does not explain that but does give examples of natural phenomena that can impair visibility: fog, mist, falling snow, heavy rainstorms, sandstorms, and so on. Obviously, if visibility is restricted by haze to ten miles, you would not be in an area of restricted visibility. What would be called restricted visibility naturally depends on the circumstances. In open water if you cannot see five miles in all directions you are operating in or near restricted visibility. In more confined bodies of water the distance may be less.

Why is it that only one Steering and Sailing Rule is devoted exclusively to conditions of restricted visibility while there are eight Rules for much better conditions? The reason is that when a situation can be better perceived it merits more detailed and specific recommendations and requirements. There are simply more options available.

In restricted visibility, on the other hand, you can't see if there are vessels around you, where they are, how big they are, what kind they are, or what their courses and speeds are. Radar helps, but not enough.

Without the benefit of good visibility, Rules 4 through 10, which apply to the conduct of vessels in any condition of visibility, become that much more important. Indeed, much of Rule 19 repeats and emphasizes the contents of Rules 4-10, and it essentially says to be extra careful.

It is important to remember that the navigation rules contain two rather distinct sets of rules: one for when you can see the other vessel, and one when you can't. The Rules for vessels in sight of one another (11 through 18) naturally predominate and may become so second nature that they may be difficult to put aside in conditions of restricted visibility. When the visibility is so poor that you cannot see the vessels around you, you must forget about Rules 11 through 18. There will be no "stand-on vessel." There will be no holding course and speed. The overtaken as well as the overtaking vessel are equally obligated to act to avoid collision. Restricted visibility is the great equalizer.

Paragraph (a) cites two conditions that make Rule 19 applicable. Both conditions must be present. The first is that the vessels must not be in sight of one another. If they

are, then Rules 11 through 18 apply instead of 19. Remember that "in sight" means "observed visually."

The second is that the vessel must be in or near an area of restricted visibility. Your vessel may be in an area of good visibility but may also be close to a fogbank or thundershower that could be concealing one or more vessels. Even though you are in the clear, you must follow Rule 19 (and sound the signal required by Rule 35).

However, with respect to another vessel in your area of good visibility or a vessel that emerges (early enough) from the fogbank, you must follow Rules 11 through 18 (and sound any signals required by Rule 34). It is therefore possible for you to be following at the same time rules for good visibility and the rules for restricted visibility.

INTERNATIONAL	INLAND
(b) Every vessel shall proceed at a safe speed adapted to the prevailing circumstances and conditions of restricted visibility. A power-driven vessel shall have her engines ready for immediate maneuver.	(b) Every vessel shall proceed at a safe speed adapted to the prevailing circumstances and conditions of restricted visibility. A power-driven vessel shall have her engines ready for immediate maneuver.

Paragraph (b) repeats the mandate of Rule 6 to proceed at a safe speed, making explicit the requirement to have engines ready for immediate maneuvering when in or near areas of restricted visibility. This applies to open waters as well as more confined waters.

Safe speed does not necessarily mean slow speed. Sometimes it is better to proceed fast enough for effective rudder action.

INTERNATIONAL	INLAND
(c) Every vessel shall have due regard to the prevailing circumstnces and conditions of restricted visibility when complying with the Rules of Section I of this part.	(c) Every vessel shall have due regard to the prevailing circumstnces and conditions of restricted visibility when complying with the Rules 4 through 10.

Paragraph (c) adds no new requirement but does push mariners into closer scrutiny of Rules 4 through 10. Rules 5, 6, and 7 are particularly important for vessels navigating in restricted visibility.

INTERNATIONAL	INLAND
(d) A vessel which detects by radar alone the presence of another vessel shall determine if a close-quarters situation is developing and/or risk of collision exists. If so, she shall take avoiding action in ample time, provided that when such action consists of an alteration of course, so far as possible the following shall be avoided:	(d) A vessel which detects by radar alone the presence of another vessel shall determine if a close-quarters situation is developing and/or risk of collision exists. If so, she shall take avoiding action in ample time, provided that when such action consists of an alteration of course, so far as possible the following shall be avoided:
(i) an alteration of course to port for a vessel forward of the beam, other than for a vessel being overtaken;	(i) an alteration of course to port for a vessel forward of the beam, other than for a vessel being overtaken; and

(ii) an alteration of course towards a vessel abeam or abaft the beam.	(ii) an alteration of course towards a vessel abeam or abaft the beam.

Paragraph (d) summarizes the more detailed provisions in Rules 7 and 8 and adds specific guidance on evasive maneuvering. The recommended course changes are intended to prevent ships from turning into each other. Not surprisingly, this provision works only if both vessels follow it. What is surprising is the number of collisions that result because one operator thought turning the other way would work better. In any case, nothing in this paragraph suggests that course changes could be made in lieu of a speed reduction in areas of restricted visibility.

INTERNATIONAL	INLAND
(e) Except where it has been determined that a risk of collision does not exist, every vessel which hears apparently forward of her beam the fog signal of another vessel, or which cannot avoid a close-quarters situation with another vessel forward of her beam, shall reduce her speed to the minimum at which she can be kept on her course. She shall if necessary take all her way off and in any event navigate with extreme caution until danger of collision is over.	(e) Except where it has been determined that a risk of collision does not exist, every vessel which hears apparently forward of her beam the fog signal of another vessel, or which cannot avoid a close-quarters situation with another vessel forward of her beam, shall reduce her speed to the minimum at which she can be kept on her course. She shall if necessary take all her way off and in any event navigate with extreme caution until danger of collision is over.

Paragraph (e) directs *every* vessel to slow down or stop when it hears the fog signal of another vessel forward of the beam or knows another vessel lies ahead. This requirement no longer applies once the vessel *knows for sure* that risk of collision does not exist and will not develop. Paragraph (e) adds to Rule 6 (Safe Speed) and relies on the proper execution of Rule 7 (Risk of Collision). This provision applies to every vessel, not just the *other* vessel.

After detecting another vessel forward of the beam, a vessel must reduce its speed to the point of bare steerageway. Stopping engines will slow the vessel and may make it easier to hear the other vessel's signals. Do not change course until you know the other vessel's position, course, and speed. The other vessel's signals should indicate whether it is making way, stopped, or anchored, but do not rely on signals alone. Use all other means available for collecting information, including radar and radiotelephone. If you cannot quickly clarify the situation, do not continue blindly into the great unknown. Stop your vessel until you establish the location and intentions of the vessel(s) ahead.

Home

Table of Contents

Rule 20

Handbook of the Nautical Rules of the Road by Llana & Wisneskey

Home - Table of Contents

Rule 20 -- Application

The International and Inland versions of the Rule are the same.

INTERNATIONAL	INLAND
(a) Rules in this Part shall be complied with in all weathers.	(a) Rules in this Part shall be complied with in all weathers.

Paragraph (a) assures us that bad weather is not an excuse for not displaying the required navigation lights. In the era of electric navigation lights, this perhaps is directed at those vessels still using oil and wicks to show their presence, but it also applies to those operators who would prefer to wait for a nice day to change a burned-out electric lamp.

INTERNATIONAL	INLAND
(b) The Rules concerning lights shall be complied with from sunset to sunrise, and during such times no other lights shall be exhibited, except such lights as cannot be mistaken for the lights specified in these Rules or do not impair their visibility or distinctive character, or interfere with the keeping of a proper look-out.	(b) The Rules concerning lights shall be complied with from sunset to sunrise, and during such times no other lights shall be exhibited, except such lights as cannot be mistaken for the lights specified in these Rules or do not impair their visibility or distinctive character, or interfere with the keeping of a proper look-out.

Paragraph (b) begins by saying that navigation lights are to be displayed between sunset and sunrise. This part of the paragraph is generally adhered to, but the rest is often ignored. When your navigation lights are on, the display of other colored or bright white lights may be mistaken for navigation lights, may impair the visibility or character of the navigation lights, or may interfere with the lookout. Such displays would put you in violation of the navigation rules and could lead to an accident.

INTERNATIONAL	INLAND
(c) The lights prescribed by these Rules shall, if carried, also be exhibited from sunrise to sunset in restricted visibility and may be exhibited in all other circumstances when it is deemed necessary.	(c) The lights prescribed by these Rules shall, if carried, also be exhibited from sunrise to sunset in restricted visibility and may be exhibited in all other circumstances when it is deemed necessary.

Navigation lights must be turned on when you are operating in restricted visibility unless your vessel is used only during the day and does not have navigation lights. Navigation lights *may* be displayed at other times at the option of the operator.

INTERNATIONAL	INLAND
(d) The Rules concerning shapes shall be complied with by day.	(d) The Rules concerning shapes shall be complied with by day.

Shapes are displayed during the day, that is, from sunrise to sunset. Because the transition from light to dark and back again is gradual, it is a good idea to display both lights and shapes at dawn and dusk.

INTERNATIONAL	INLAND
(e) The lights and shapes specified in these Rules shall comply with the provisions of Annex I to these Regulations.	(e) The lights and shapes specified in these Rules shall comply with the provisions of Annex I to these Rules.

Paragraph (e) contains the formal reference in the Rules to the Annex I technical requirements for lights and shapes. All mariners should read the annex at least once, to garner an idea of the requirements all designers and manufacturers should meet.

Home

Table of Contents

Rule 21

Rule 21 -- Definitions

Rule 21 lists the types of navigation lights making up the various arrays specified in Rules 23 to 31. There are no other types of navigation lights and each one has only one name. Other navigation light terms, such as "steaming light" or "bow light" are from popular slang or from old rules no longer in effect.

INTERNATIONAL	INLAND
(a) "Masthead light" means a white light placed over the fore and aft centerline of the vessel showing an unbroken light over an arc of the horizon of 225 degrees and so fixed as to show the light from right ahead to 22.5 degrees abaft the beam on either side of the vessel.	(a) "Masthead light" means a white light placed over the fore and aft centerline of the vessel showing an unbroken light over an arc of the horizon of 225 degrees and so fixed as to show the light from right ahead to 22.5 degrees abaft the beam on either side of the vessel, except that on a vessel of less than 12 meters in length the masthead light shall be placed as nearly as practicable to the fore and aft centerline of the vessel.

The masthead light is used in a number of ways but always has the same characteristics and orientation. It points forward and is normally the highest navigation light on the vessel. There may be only one masthead light (on smaller vessels), or two may be carried -- one on a forward mast and another further aft and higher on another mast. Two or three may be carried in a vertical line on a single mast (for towing) with perhaps another single masthead light carried on another mast.

On sailing vessels, on rowboats, and with some optional lighting configurations on smaller power-driven vessels, there may be no masthead light at all.

The Inland Rule definition of masthead light permits it to be mounted on one side on small vessels, while a similar provision in Rule 23 of the International Rules permits the same offset for power-driven vessels only. Otherwise, the light must be placed on the centerline.

INTERNATIONAL	INLAND
(b) "Sidelights" means a green light on the starboard side and a red light on the port side each showing an unbroken light over an arc of the horizon of 112.5 degrees and so fixed as to show the light from right ahead to 22.5 degrees abaft the beam on its respective side. In a vessel of less than 20 meters in length the sidelights may be combined in one lantern carried on the fore and aft centerline of the vessel.	(b) "Sidelights" means a green light on the starboard side and a red light on the port side each showing an unbroken light over an arc of the horizon of 112.5 degrees and so fixed as to show the light from right ahead to 22.5 degrees abaft the beam on its respective side. In a vessel of less than 20 meters in length the sidelights may be combined in one lantern carried on the fore and aft centerline of the vessel, except that on a vessel of less than 12 meters in length the sidelights when combined in one lantern shall be placed as nearly as practicable to the fore and aft centerline of the vessel.

Sidelights are the green and red lights mounted on either side of a vessel. If you are a power-driven vessel and see another power-driven vessel (recognized by its "picture" of navigation lights) with its green light showing, then your vessel is the stand-on vessel and you should hold your course and speed. If you see the red light, then you should stay out of the way.

Under the Inland Rules, combined sidelights on small vessels may be mounted off the centerline. (A comparable International Rule provision for power-driven vessels only is in Rule 23.) Otherwise the International and Inland sidelights are the same.

INTERNATIONAL	INLAND
(c) "Sternlight" means a white light placed as nearly as practicable at the stern showing an unbroken light over an arc of the horizon of 135 degrees and so fixed as to show the light 67.5 degrees from right aft on each side of the vessel.	(c) "Sternlight" means a white light placed as nearly as practicable at the stern showing an unbroken light over an arc of the horizon of 135 degrees and so fixed as to show the light 67.5 degrees from right aft on each side of the vessel.

The sternlight is pointed directly aft and is normally mounted right on the very stern, often on the centerline. It does not have to be on the centerline and it does not have to be at the stern, but "as nearly as practicable" at the stern. It is not unusual for it to be quite some distance from the stern on vessels where the stern is perhaps low and exposed to rough use, as on a stern trawler or an offshore oil-platform supply vessel.

INTERNATIONAL	INLAND
(d) "Towing light" means a yellow light having the same characteristics as the "sternlight" defined in paragraph (c) of this Rule.	(d) "Towing light" means a yellow light having the same characteristics as the "sternlight" defined in paragraph (c) of this Rule.

Towing lights may be used either with or without stern lights, depending on whether you are using the International or Inland Rules.

INTERNATIONAL	INLAND
(e) "All-round light" means a light showing an unbroken light over an arc of 360 degrees.	(e) "All-round light" means a light showing an unbroken light over an arc of 360 degrees.

All-round lights have many applications and come in red, green, yellow, and white.

INTERNATIONAL	INLAND
(f) "Flashing light" means a light flashing at regular intervals at a frequency of 120 flashes or more per minute.	(f) "Flashing light" means a light flashing at regular intervals at a frequency of 120 flashes or more per minute.

A flashing light is used only on air-cushion vehicles and is yellow. The flash charcteristic was chosen to distinguish the light from the slower flashing of many lighted aids to navigation (buoys and markers).

INLAND

(g) "Special flashing light" means a yellow light flashing at regular intervals at a frequency of 50 to 70 flashes per minute, placed as far forward and as nearly as practicable on the fore and aft centerline of the tow and showing an unbroken light over an arc of the horizon of not less than 180 degrees nor more than 225 degrees and so fixed as to show the light from right ahead to abeam and no more than 22.5 degrees abaft the beam on either side of the vessel.

The special flashing light is also yellow but exists only in the Inland Rules. It is used at the head of barges being pushed ahead.

The light can have the 225-degree horizontal arc characteristic of a masthead light or anything down to 180 degrees. If a 225-degree light is mounted on top of the front of a barge, it could be seen through the full 225-degree arc, but if mounted on the front face of the barge, it would only be seen through a 180-degree horizontal arc. The flexibility in the requirement permits different light construction and mounting techniques.

Home

Table of Contents

Rule 22

Rule 22 -- Visibility of Lights

INTERNATIONAL	INLAND
The lights prescribed in these Rules shall have an intensity as specified in Section 8 of Annex I to these Regulations so as to be visible at the following minimum ranges:	The lights prescribed in these Rules shall have an intensity as specified in Annex I to these Rules, so as to be visible at the following minimum ranges:
(a) In vessels of 50 meters or more in length:	(a) In vessels of 50 meters or more in length:
--a masthead light, 6 miles;	--a masthead light, 6 miles;
--a sidelight, 3 miles;	--a sidelight, 3 miles;
--a sternlight, 3 miles;	--a sternlight, 3 miles;
--a towing light, 3 miles;	--a towing light, 3 miles;
--a white, red, green or yellow all-round light, 3 miles.	--a white, red, green or yellow all-round light, 3 miles; and
	--a special flashing light, 2 miles.
(b) In vessels of 12 meters or more in length but less than 50 meters in length:	(b) In vessels of 12 meters or more in length but less than 50 meters in length:
--a masthead light, 5 miles; except that where the length of the vessel is less than 20 meters, 3 miles;	--a masthead light, 5 miles; except that where the length of the vessel is less than 20 meters, 3 miles;
--a sidelight, 2 miles;	--a sidelight, 2 miles;
--a sternlight, 2 miles;	--a sternlight, 2 miles;
--a towing light, 2 miles;	--a towing light, 2 miles;
--a white, red, green or yellow all-round light, 2 miles.	--a white, red, green or yellow all-round light, 2 miles; and
	--a special flashing light, 2 miles.
(c) In vessels of lesss than 12 meters in length:	(c) In vessels of lesss than 12 meters in length:
--a masthead light, 2 miles;	--a masthead light, 2 miles;
--a sidelight, 1 mile;	--a sidelight, 1 mile;

--a sternlight, 2 miles; --a towing light, 2 miles; --a white, red, green or yellow all-round light, 2 miles.	--a sternlight, 2 miles; --a towing light, 2 miles; --a white, red, green or yellow all-round light, 2 miles; and --a special flashing light, 2 miles.
(d) In inconspicuous, partly submerged vessels or objects being towed: --a white all-round light, 3 miles.	(d) In an inconspicuous, partly submerged vessel or object being towed: --a white all-round light, 3 miles.

Almost all of Rule 22 informs, but does not require. Only the first sentence requires anything, which is that navigation lights be as bright as the technical specifications of Annex I say they must be. Rule 22 does not say that navigation lights be visible at the distances given.

If a navigation light meets the minimum Annex I intensity requirement, but is no brighter than required, and if the visibility is good, then that navigation light could first be seen at the distance given in Rule 22. Keeping those conditions in mind, the list of minimum ranges gives you a good idea of the relative performances of navigation lights. You will know, for example, that the masthead light can be seen long before the sidelights appear.

How far away a navigation light will project varies greatly. A light may be twice as bright as required, and therefore could be seen farther away. A light is more visible on a clear dark night in mid-ocean than on a muggy night near a big city. The distances given by Rule 22 were based on a somewhat arbitrarily chosen value for atmospheric light transmissivity--one that represents "good" visibility. The mathematical formula used to determine visibility (in nautical miles) from the laboratory-measured light intensity is given in Annex I.

Home

Table of Contents

Rule 23

Rule 23 -- Power-driven Vessels Underway

This Rule is the first of those Rules that describe the navigation light "picture" displayed by each vessel. Rule 23 covers power-driven vessels and gives the basic array of navigation lights--masthead light, sidelights, and sternlight--from which the arrays for other vessel types are derived.

You will note that significant differences exist between the International Rules and the Inland Rules with regard to navigation lights. The Inland Rules allow more optional displays and are less stringent in the positioning requirements. (These more relaxed provisions were often concessions to special-interest groups who wished to retain their traditional light configurations.)

Rule 23 applies to ordinary power-driven vessels of all sizes--from the recreational boat to the supertanker. It applies to power-driven fishing vessels when they are not engaged in fishing. It applies to tugboats *assisting* in ship maneuvering either not connected to the ship or connected with a short line or cable. It does not apply to power-driven vessels that are anchored, aground, or tied to a dock.

INTERNATIONAL	INLAND
(a) A power-driven vessel underway shall exhibit:	(a) A power-driven vessel underway shall exhibit:
(i) a masthead light forward;	(i) a masthead light forward;
(ii) a second masthead light abaft of and higher than the forward one; except that a vessel of less than 50 meters in length shall not be obliged to exhibit such light but may do so;	(ii) a second masthead light abaft of and higher than the forward one; except that a vessel of less than 50 meters in length shall not be obliged to exhibit such light but may do so;
(iii) sidelights;	(iii) sidelights; and
(iv) a sternlight.	(iv) a sternlight.

Paragraph (a) lists the navigation lights for ordinary power-driven vessels. Two masthead lights are required--one forward and one aft--except that small vessels only need one forward. The forward masthead light is placed in the forward half of the vessel, except that under Inland Rules this light does not have to be forward of amidships on small vessels. Sidelights and a sternlight are also required.

Details on the orientation and positioning of these navigation lights are in Rule 21 and in Annex I. Alternative navigation light configurations for vessels less than twelve meters in length are contained in paragraph (c).

INTERNATIONAL	INLAND
(b) An air-cushion vehicle when operating in the nondisplacement mode shall, in addition to the lights prescribed in	(b) An air-cushion vehicle when operating in the nondisplacement mode shall, in addition to the lights prescribed

paragraph (a) of this Rule, exhibit an all-round flashing yellow light.	in paragraph (a) of this Rule, exhibit an all-round flashing yellow light where it can best be seen.

Air-cushion vehicles are given a distinctive yellow flashing light in paragraph (b). The flashing (120 regular flashes per minute) all-round light is displayed only when the vessel is operating on its cushion of air. Air-cushion vehicles may operate at high speeds, may tend to travel a little sideways in a crosswind, and may not be able to turn quickly, depending on the design of the vessel.

A U.S. Navy regulation (Title 32 of the Code of Federal Regulations, section 707.7) permits the use of a flashing yellow light on submarines, but the flash characteristic is not the same. Also, submarines tend to be much quieter, do not generally travel sideways, and on occasion vanish.

INTERNATIONAL	INLAND
(c)(i) A power-driven vessel of less than 12 meters in length may in lieu of the lights prescribed in paragraph (a) of this Rule exhibit an all-round white light and sidelights;	(c) A power-driven vessel of less than 12 meters in length may in lieu of the lights prescribed in paragraph (a) of this Rule, exhibit an all-round white light and sidelights;

Some owners, operators, or builders of power-driven vessels under twelve meters in length feel that the conventional masthead light, sidelights, and sternlight array is too complicated, consumes too much power, or just costs too much. For them, paragraph (c) provides one or two alternatives.

Vessels less than twelve meters long may display an all-round white light and sidelights. The all-round white light is commonly mounted at the stern on the starboard side, but that location is a carry-over from superseded navigation rules. Under the current Rules, the all-round white light can be placed anywhere, so long as it is on a level at least one meter higher than the sidelights.

Putting the all-round light above the operator lessens interference with his or her night vision. In addition, carrying the all-round light in the forward part of the boat closer to the sidelights minimizes the decrease in vertical separation (all-round light / sidelights) when the boat assumes a bow-high trim (e.g. in the case of a planing boat traveling below planing speed).

INTERNATIONAL
(ii) a power-driven vessel of less than 7 meters in length whose maximum speed does not exceed 7 knots may in lieu of the lights prescribed in paragraph (a) of this Rule exhibit an all-round white light and shall, if practicable, also exhibit sidelights;

Under the International Rules, but not the Inland Rules, a power-driven vessel less than seven meters long may dispense with the sidelights, displaying only an all-round light, providing that its "maximum speed does not exceed seven knots." This means that its maximum speed during the time it is operating at night does not exceed seven knots.

One school of thought interprets "maximum speed does not exceed seven knots" to mean "maximum speed could not exceed seven knots" or "which is not capable of exceeding seven knots," but that is not what the Rule says. The Rule says "does not," present tense. If a single white light is safe for a five-knot boat going five knots, then it should also be safe for a twenty-five knot boat going five knots.

INTERNATIONAL

(iii) the masthead light or all-round white light on a power-driven vessel of less than 12 meters in length may be displaced from the fore and aft centerline of the vessel if centerline fitting is not practicable, provided that the sidelights are combined in one lantern which shall be carried on the fore and aft centerline of the vessel or located as nearly as practicable in the same fore and aft line as the masthead light or the all-round white light.

Both the International and Inland Rules allow for the off-centerline positioning of masthead or substitute all-round white light. The International Rule provision in Rule 23(c)(iii) is more restrictive than the Inland Rule provisions contained in Rule 21.

INLAND

(d) A power-driven vessel when operating on the Great Lakes may carry an all-round white light in lieu of the second masthead light and sternlight prescribed in paragraph (a) of this Rule. The light shall be carried in the position of the second masthead light and be visible at the same minimum range.

Paragraph (d) of Inland Rule 23 contains an alternative light configuration for Great Lakes vessels, in which an all-round white light replaces the after masthead light and sternlight. This provision is in the Rules not because the conditions or vessels on the Great Lakes are unique, but rather because when the Rules were rewritten, some Great Lakes mariners did not wish to give up their traditional navigation light arrangement.

Home

Table of Contents

Rule 24

Rule 24 -- Towing and Pushing

Rule 24 tells us which navigation lights towing vessels must display as well as those the towed vessel (or object) must display. Some of the Inland provisions are the same as the International in this Rule, but others, particularly for pushing ahead or towing alongside, are different. The first four paragraphs, (a) through (d), apply to towing vessels, while paragraphs (e) through (h) apply to towed vessels. Paragraph (i), found only in the Inland Rules, exempts Western Rivers towboats from the general requirements.

INTERNATIONAL	INLAND
(a) A power-driven vessel when towing shall exhibit:	(a) A power-driven vessel when towing astern shall exhibit:
(i) instead of the light prescribed in Rule 23 (a)(i) or (a)(ii), two masthead lights in a vertical line. When the length of the tow, measuring from the stern of the towing vessel to the after end of the tow exceeds 200 meters, three such lights in a vertical line;	(i) instead of the light prescribed in Rule 23 (a)(i) or (a)(ii), two masthead lights in a vertical line. When the length of the tow, measuring from the stern of the towing vessel to the after end of the tow exceeds 200 meters, three such lights in a vertical line;
(ii) sidelights;	(ii) sidelights;
(iii) a sternlight;	(iii) a sternlight;
(iv) a towing light in a vertical line above the sternlight;	(iv) a towing light in a vertical line above the sternlight; and
(v) when the length of the tow exceeds 200 meters, a diamond shape where it can best be seen.	(v) when the length of the tow exceeds 200 meters, a diamond shape where it can best be seen.

Paragraph (a) presents the lighting requirements for vessels towing astern. Although the International version says "when towing" and does not employ the explicit Inland language "when towing astern," the International requirement nevertheless applies only to vessels towing astern.

Subparagraph (i) needs special comment. Here the length of the vessel and tow determines the arrangement of masthead lights. Vessels less than 50 meters in length (those that have to display only one masthead light when underway without a tow) are required to display two masthead lights in a vertical line or, if the tow length is over 200 meters, three in a vertical line.

Vessels over fifty meters when underway without a tow must display both a forward and, mounted higher, an after masthead light. The masthead lights, forward and aft, thus act as a range, giving others an idea of the vessel's orientation or relative course.

When underway *with* a tow, these larger vessels are required to replace either

(not both) the forward or the after masthead light with a vertical array of of either two or three masthead lights, depending on the length of the tow. A vessel over 50 meters long with a tow less than two hundred meters long must display two masthead lights on its forward mast and one on its after mast. Alternatively, it could display two two lights on its after mast and one on its forward mast. Such a vessel would also of course display the requisite sidelights, a sternlight, and yellow towing light.

INTERNATIONAL	INLAND
(b) When a pushing vessel and a vessel being pushed ahead are rigidly connected in a composite unit they shall be regarded as a power-driven vessel and exhibit the lights prescribed in Rule 23.	(b) When a pushing vessel and a vessel being pushed ahead are rigidly connected in a composite unit they shall be regarded as a power-driven vessel and exhibit the lights prescribed in Rule 23.

Paragraph (b) of Rule 24 is less of a requirement than a statement that certain specialized tug-barge combinations do not fall under Rule 24 but rather under the rules governing lighting of ordinary power-driven vessels. This provision applies only to pushing ahead.

Described as being "rigidly connected in a composite unit," these vessels are usually designed so that the pushing vessel's bow fits in a matching notch in the stern of the "barge." A locking device holds them so rigidly together that little or no independent motion is permitted. These rigid tug-barge combinations do not need to be certified or classified in order to display the navigation lights of a power-driven vessel. (See also the interpretative rules in Title 33, Code of Federal Regulations, section 82.3/International, and section 90.3/Inland.)

INTERNATIONAL	INLAND
(c) A power-driven vessel when pushing ahead or towing alongside, except in the case of a composite unit, shall exhibit: (i) instead of the light prescribed in Rule 23 (a)(i) or (a)(ii), two masthead lights in a vertical line; (ii) sidelights; (iii) a sternlight.	(c) A power-driven vessel when pushing ahead or towing alongside, except as required by paragraphs (b) and (i) of this Rule, shall exhibit: (i) instead of the light prescribed either in Rule 23 (a)(i) or 23 (a)(ii), two masthead lights in a vertical line; (ii) sidelights; and (iii) two towing lights in a vertical line.

Paragraph (c) specifies the lights for vessels pushing ahead or towing alongside. Significant differences exist between the International and Inland versions. Both require sidelights. Both require two masthead lights carried in a vertical line. But the Inland Rule exempts, in paragraph (i), towboats on Western Rivers from having to display masthead lights. In lieu of the sternlight required by the International version, two yellow towing lights are required by the Inland Rules.

INTERNATIONAL	INLAND
(d) A power-driven vessel to which paragraphs (a) or (c) of this Rule apply shall also comply with Rule 23 (a)(ii).	(d) A power-driven vessel to which paragraphs (a) or (c) of this Rule apply shall also comply with Rule 23 (a)(i) and

23 (a)(ii).

The wording in paragraphs (a) and (c) did not make clear the requirement for larger towing vessels to display both forward and after masthead lights, so paragraph (d) was added. Yet its inclusion seems only to have made the requirement more confusing. Paragraph (d) is aimed at vessels over fifty meters in length and says if you elect to display your two or three masthead lights (in a vertical line) for towing on the forward mast, then you must also display another masthead light on the after mast. If the two or three masthead light towing array is mounted on the after mast, a single masthead light must be displayed on the forward mast. Whether to display the vertical array masthead lights on the forward mast or on the after mast is the decision of the builder and operator.

Because towing vessels under 50 meters need carry masthead lights on only one mast, they can ignore paragraph (d), although they may voluntarily carry both forward and after masthead lights.

INTERNATIONAL	INLAND
(e) A vessel or object being towed, other than those mentioned in paragraph (g) of this Rule, shall exhibit:	(e) A vessel or object other than those referred to in paragraph (g) of this Rule being towed shall exhibit:
(i) sidelights;	(i) sidelights;
(ii) a sternlight;	(ii) a sternlight; and
(iii) when the length of the tow exceeds 200 meters, a diamond shape where it can best be seen.	(iii) when the length of the tow exceeds 200 meters, a diamond shape where it can best be seen.

Paragraph (e) of both the International and Inland Rules begins the lighting requirements for vessels *being towed*, stipulating that vessels being towed astern have sidelights and a sternlight. The intensity of the lights is based on the length of the towed vessel, excluding towline and towing vessel.

Annex I to the Inland Rules contains a special provision affecting the intensity of battery-powered navigation lights on unmanned barges. A diamond shape is displayed by day when the length of the tow, including towed vessel and towing line, exceeds 200 meters.

INTERNATIONAL	INLAND
(f) Provided that any number of vessels being towed alongside or pushed in a group shall be lighted as one vessel,	(f) Provided that any number of vessels being towed alongside or pushed in a group shall be lighted as one vessel:
(i) a vessel being pushed ahead, not being part of a composite unit, shall exhibit at the forward end, sidelights;	(i) a vessel being pushed ahead, not being part of a composite unit, shall exhibit at the forward end, sidelights, and a special flashing light; and
(ii) a vessel being towed alongside shall exhibit a sternlight and at the forward end, sidelights.	(ii) a vessel being towed alongside shall exhibit a sternlight and at the forward end sidelights.

Paragraph (f) specifies the navigation lights for vessels being pushed ahead or towed alongside. If several barges are tied together and towed as a unit, then they must be lighted as though a single vessel. The light must be intense enough to meet the requirement for the length of the group, not the length of a single barge within the group (see Rule 22).

Vessels being *towed alongside* have the same requirement under both International and Inland Rules: sidelights and a sternlight.

Vessels being *pushed ahead* carry sidelights, as required by both sets of Rules, but the Inland Rules also demand a special flashing light at the front of the tow. Inland Rule 21 (g) describes this flashing yellow light, whose display is not allowed on vessels being towed alongside.

INTERNATIONAL	INLAND
(g) An inconspicuous, partly submerged vessel or object, or combination of such vessels or objects being towed, shall exhibit:	(g) An inconspicuous, partly submerged vessel or object being towed shall exhibit:
(i) if it is less than 25 meters in breadth, one all-round white light at or near the forward end and one at or near the after end except that dracones need not exhibit a light at or near the forward end;	(i) if it is less than 25 meters in breadth, one all-round white light at or near each end;
(ii) if it is 25 meters or more in breadth, two additional all-round white lights at or near the extremities of its breadth;	(ii) if it is 25 meters or more in breadth, four all-round white lights to mark its length and breadth;
(iii) if it exceeds 100 meters in length, additional all-round white lights between the lights prescribed in subparagraphs (i) and (ii) so that the distance between the lights shall not exceed 100 meters;	(iii) if it exceeds 100 meters in length, additional all-round white lights between the lights prescribed in subparagraphs (i) and (ii) so that the distance between the lights shall not exceed 100 meters; *Provided*, That any vessels or objects being towed alongside each other shall be lighted as one vessel or object;
(iv) a diamond shape at or near the aftermost extremity of the last vessel or object being towed and if the length of the tow exceeds 200 meters and additional diamond shape where it can best be seen and located as far forward as is practicable.	(iv) a diamond shape at or near the aftermost extremity of the last vessel or object being towed; and
	(v) the towing vessel may direct a searchlight in the direction of the tow to indicate its presence to an approaching vessel.

Paragraph (g) provides for lighting "inconspicuous, partly submerged" vessels or objects that, by their every nature, cannot be provided with conventional sidelights and sternlights. This "vessel" class includes dracones, which are large flexible bags used for transporting liquids.

The International and Inland versions differ in language and detail. Both require an all-round white light at each end of the towed vessel, although the International version exempts dracones from the forward light stipulation. Both require two additional white lights to mark the beam on wide (twenty-five meters or more) tows. For long tows, subparagraph (g)(iii) provides for extra lights so

that there will not be an unlighted span of more than 100 meters. These intermediate lights on long tows should be mounted singly if the tow is less than 25 meters wide or in pairs for wider tows.

The Inland subparagraph (g)(iii) says sthat when several vessels are being towed alongside one another, the extra intermediate lights for very long tows shall be displayed as though the several vessels were one.

The International version does not contain a similar caveat because all of the International paragraph (g) requirements are applied to combinations of inconspicuous, partly submerged vessels or objects as if they were one. In the Inland version, however, only the (g)(iii) requirement applies to combinations.

By day both the International and Inland Rules demand a diamond shape at the "aftermost extremity" of the tow. For tows exceeding two hundred meters in length (including towline) the International Rules (but not the Inland) require an additional diamond shape displayed on the towed vessel or object "where it can best be seen and located as far forward as is practicable."

The Inland paragraph (g) includes a statement permitting but not mandating the use of a searchlight aimed toward the tow for the benefit of an approaching vessel. Although the International version of paragraph (g) does not explicitly state that such a searchlight is permitted, its use for the purpose of illuminating a tow would be allowed under International Rules 2 and 36.

INTERNATIONAL	INLAND
(h) Where from any sufficient cause it is impracticable for a vessel or object being towed to exhibit the lights or shapes prescribed in paragraph (e) or (g) of this Rule, all possible measures shall be taken to light the vessel or object towed or at least to indicate the presence of such vessel or object.	(h) Where from any sufficient cause it is impracticable for a vessel or object being towed to exhibit the lights or shapes prescribed in paragraph (e) or (g) of this Rule, all possible measures shall be taken to light the vessel or object towed or at least to indicate the presence of the unlighted vessel or object.

In some situations a vessel being towed astern cannot be fitted with proper navigation lights. For example, a vessel disabled by storm or accident may be without power and the urgency or rescue efforts may prevent the fitting of emergency lighting. In such a case, paragraph (h) excuses compliance with conventional lighting requirements but says every effort must be made to indicate to other vessels in the area that a vessel (or object) is being towed. Searchlights, the towed vessel's deck lighting, illumination flares, radar, radiotelephone, or whatever else is available should be used.

	INLAND
	(i) Notwithstanding paragraph (c), on the Western Rivers (except below the Huey P. Long Bridge on the Mississippi River) and on waters specified by the Secretary, a power-driven vessel when pushing ahead or towing alongside, except as paragraph (b) applies, shall exhibit:

(i) sidelights; and

(ii) two towing lights in a vertical line.

Towing vessels pushing barges ahead need not display masthead lights when on certain inland waters, including the Western Rivers above the Huey P. Long Bridge, the Tennessee-Tombigbee Waterway, Tombigbee River, Black Warrior River, Alabama River, Coosa River, Mobile River above the Cochrane Bridge at St. Louis Point, Flint River, Chattachoochee River, and the Apalachicola River above its confluence with the Jackson River (see section 89.27, Title 33 of the Code of Federal Regulations for a listing of waters on which Inland Rule 24 (i) applies.)

This Inland Rule provision was added not because the absence of masthead lights contributed to safety but rather because their height made passing under low bridges more difficult. If towing vessels operating on these waters wish to have the higher visibility that masthead lights afford, they may display masthead lights according to the paragraph (c) general requirements for inland waters. The display of masthead lights on Western Rivers while pushing ahead should not cause confusion because such display is permitted (and required) in the case of towboats complying with the International Rules and operating on Western Rivers, and their display is required for all towing vessels on Western Rivers below the Huey P. Long Bridge.

INTERNATIONAL	INLAND
(i) Where from any sufficient cause it is impracticable for a vessel not normally engaged in towing operations to display the lights prescribed in paragraph (a) or (c) of this Rule, such vessel shall not be required to exhibit those lights when engaged in towing another vessel in distress or otherwise in need of assistance. All possible measures shall be taken to indicate the nature of the relationship between the towing vessel and the vessel being towed as authorized by Rule 36, in particular by illuminating the towline.	(j) Where from any sufficient cause it is impracticable for a vessel not normally engaged in towing operations to display the lights prescribed by paragraph (a), (c) or (i) of this Rule, such vessel shall not be required to exhibit those lights when engaged in towing another vessel in distress or otherwise in need of assistance. All possible measures shall be taken to indicate the nature of the relationship between the towing vessel and the vessel being assisted. The searchlight authorized by Rule 36 may be used to illuminate the tow.

The final provision in Rule 24 concerns so-called good Samaritan towing. International paragraph (i) and Inland paragraph (j), which are essentially the same, permit a vessel to tow another without displaying the navigation lights of a towing vessel. The towing vessel must not have expected to become involved in towing, having only fortuitously encountered another vessel "in distress or otherwise in need of assistance." Good Samaritans must indicate to others, by whatever means available, that they are engaged in towing.

Obviously, commercial towing operations do not qualify under this provision. Nor do vessels whose normal activities include the towing (or expectation of towing) of disabled vessels, regardless of whether a fee is collected.

Home

Table of Contents

Rule 25

Rule 25 -- Sailing Vessels Underway and Vessels Under Oars

The International and Inland versions of this Rule are identical but for one Inland provision exempting small vessels from having to carry a day shape. The navigation light rules for sailing vessels have one basic lighting configuration (sidelights and sternlight) and several optional configurations.

INTERNATIONAL	INLAND
(a) A sailing vessel underway shall exhibit:	(a) A sailing vessel underway shall exhibit:
(i) sidelights;	(i) sidelights; and
(ii) a sternlight.	(ii) a sternlight.

Paragraph (a) presents the fundamental requirement for sidelights and sternlight. Remember that the definition of sidelights for vessels less than 20 meters long allows them to be either separate or combined in a single fixture. The combined sidelights reduce power consumption, as they use one lamp instead of two.

INTERNATIONAL	INLAND
(b) In a sailing vessel of less than 20 meters in length the lights prescribed in paragraph (a) of this Rule may be combined in one lantern carried at or near the top of the mast where it can best be seen.	(b) In a sailing vessel of less than 20 meters in length the lights prescribed in paragraph (a) of this Rule may be combined in one lantern carried at or near the top of the mast where it can best be seen.

Paragraph (b) carries this power savings even further for sailing vessels under 20 meters by allowing sidelights and sternlight to be combined into a single fixture and carried at the masthead. This combined navigation light is often called a "tricolor" light. It cannot be used, however, while an auxiliary engine propels the boat, so a sailing vessel equipped with an engine must be fitted with regular sidelight and sternlight even if a "tricolor" light is used when under sail alone. The "tricolor" light may not be used when the regular sidelights are on. Display one or the other but not both.

INTERNATIONAL	INLAND
(c) A sailing vessel underway may, in addition to the lights prescribed in paragraph (a) of this Rule, exhibit at or near the top of the mast, where they can best be seen, two all-round lights in a vertical line, the upper being red and the lower green, but these lights shall not be exhibited in conjunction with the	(c) A sailing vessel underway may, in addition to the lights prescribed in paragraph (a) of this Rule, exhibit at or near the top of the mast, where they can best be seen, two all-round lights in a vertical line, the upper being red and the lower green, but these lights shall not be exhibited in conjunction with the

combined lantern permitted by paragraph (b) of this Rule.	combined lantern permitted by paragraph (b) of this Rule.

Paragraph (c) presents an optional display that is much less popular that the "tricolor" light but that can be employed on sailing vessels over (as well as under) twenty meters. The all-round red over all-round green light are to be used with the regular sidelights and sternlight. Annex I requires that the red and green lights be mounted vertically two meters apart for vessels over 20 meters and one meter apart for smaller vessels. This arrangement makes it difficult not to obstruct the arc of visibility of the lower green all-round light, so this option will probably rarely be seen.

INTERNATIONAL	INLAND
(d)(i) A sailing vessel of less than 7 meters in length shall, if practicable, exhibit the lights prescribed in paragraph (a) or (b) of this Rule, but if she does not, she shall have ready at hand an electric torch or lighted lantern showing a white light which shall be exhibited in sufficient time to prevent collision.	(d)(i) A sailing vessel of less than 7 meters in length shall, if practicable, exhibit the lights prescribed in paragraph (a) or (b) of this Rule, but if she does not, she shall have ready at hand an electric torch or lighted lantern showing a white light which shall be exhibited in sufficient time to prevent collision.
(ii) A vessel under oars may exhibit the lights prescribed in this Rule for sailing vessels, but if she does not, she shall have ready at hand an electric torch or lighted lantern showing a white light which shall be exhibited in sufficient time to prevent collision.	(ii) A vessel under oars may exhibit the lights prescribed in this Rule for sailing vessels, but if she does not, she shall have ready at hand an electric torch or lighted lantern showing a white light which shall be exhibited in sufficient time to prevent collision.

Paragraph (d) deals with small sailboats and rowboats. You can expect to see either sidelights and sternlight or a flashlight when approaching these vessels at night. Sailboats under seven meters are to display sidelights and sternlight "if practicable." If the boat has a motor equipped with a battery, then it is probably practicable, not to mention wise, to display sidelights and sternlight.

INTERNATIONAL	INLAND
(e) A vessel proceeding under sail when also being propelled by machinery shall exhibit forward where it can best be seen a conical shape, apex downwards.	(e) A vessel proceeding under sail when also being propelled by machinery shall exhibit forward where it can best be seen a conical shape, apex downwards. A vessel of less than 12 meters in length is not required to exhibit this shape, but may do so.

The final paragraph requires that a conical shape (point down) be displayed on a sailing vessel propelled by both sail and machinery. The conical shape indicates to other vessels that the "sailing" vessel is a power-driven vessel for purposes of the navigation rules. The Inland Rule version says that sailing vessels less than twelve meters long do not have to display this shape when motorsailing. Annex I to both sets of Rules permits vessels less than twenty meters long to display shapes smaller than full size.

Home

Table of Contents

Rule 26

Rule 26 -- Navigation Lights for Fishing Vessels

INTERNATIONAL	INLAND
(a) A vessel engaged in fishing, whether underway or at anchor, shall exhibit only the lights and shapes prescribed in this Rule.	(a) A vessel engaged in fishing, whether underway or at anchor, shall exhibit only the lights and shapes prescribed in this Rule.

The rules for navigation lights on fishing vessels are relatively straightforward. There are no exceptions for particular geographic areas, and the International and Inland versions are the same. The navigation lights in this Rule are for those vessels "engaged in fishing" as defined in Rule 3 whose maneuverability is restricted by their fishing apparatus.

INTERNATIONAL	INLAND
(b) A vessel when engaged in trawling, by which is meant the dragging through the water of a dredge net or other apparatus used as a fishing appliance, shall exhibit:	(b) A vessel when engaged in trawling, by which is meant the dragging through the water of a dredge net or other apparatus used as a fishing appliance, shall exhibit:
(i) two all-round lights in a vertical line, the upper being green and the lower white, or a shape consisting of two cones with their apexes together in a vertical line one above the other;	(i) two all-round lights in a vertical line, the upper being green and the lower white, or a shape consisting of two cones with their apexes together in a vertical line one above the other;
(ii) a masthead light abaft of and higher than the all-round green light; a vessel of less than 50 meters in length shall not be obliged to exhibit such a light but may do so;	(ii) a masthead light abaft of and higher than the all-round green light; a vessel of less than 50 meters in length shall not be obliged to exhibit such a light but may do so; and
(iii) when making way through the water, in addition to the lights prescribed in this paragraph, sidelights and a sternlight.	(iii) when making way through the water, in addition to the lights prescribed in this paragraph, sidelights and a sternlight.
(c) A vessel engaged in fishing, other than trawling, shall exhibit:	(c) A vessel engaged in fishing, other than trawling, shall exhibit:
(i) two all-round lights in a vertical line, the upper being red and the lower white, or a shape consisting of two cones with apexes together in a vertical line one above the other;	(i) two all-round lights in a vertical line, the upper being red and the lower white, or a shape consisting of two cones with apexes together in a vertical line one above the other;
(ii) when there is outlying gear extending more than 150 meters horizontally from the vessel, an all-round white light or a	(ii) when there is outlying gear extending more than 150 meters

cone apex upwards in the direction of the gear; (iii) when making way through the water, in addition to the lights prescribed in this paragraph, sidelights and a sternlight.	horizontally from the vessel, an all-round white light or a cone apex upward in the direction of the gear; and (iii) when making way through the water, in addition to the lights prescribed in this paragraph, sidelights and a sternlight.

Rule 26 separates vessels engaged in fishing into two classes: vessels trawling, and all others. The basic lighting rules are the same for the two classes except that trawlers use a green all-round light while others use a red one.

The lighting requirements for vessels engaged in fishing distinguish between vessels making way through the water and those that are stopped, that is, drifting or anchored. Also related to that is the provision that anchored vessels engaged in fishing be lighted as would a drifting fishing vessel. Hence, those anchored vessels should ignore the Rule 30 lighting requirements. (See paragraph (a) of this Rule)

INTERNATIONAL	INLAND
(d) The additional signals described in Annex II to these regulations apply to a vessel engaged in fishing in close proximity to other vessels engaged in fishing.	(d) The additional signals described in Annex II to these Rules apply to a vessel engaged in fishing in close proximity to other vessels engaged in fishing.

Paragraph (d) refers the reader to the Annex II optional lights for vessels fishing in a "fleet." These Annex II lights, which provide close-by fishing vessels information, can only be displayed in the company of other vessels engaged in fishing.

One of the Annex II displays, a white light over a red light for a trawler hauling its nets, could be mistaken for the lights of a pilot vessel. While Rule 29 requires a pilot vessel to display a white over a red light. with either sidelights and sternlight if underway or anchor light if anchored, Rule 26 requires a trawler to display green over white lights. Note that the optional white-over-red Annex II lights will be displayed at a lower level than the green-over-white and that they will not be as bright.

INTERNATIONAL	INLAND
(e) A vessel when not engaged in fishing shall not exhibit the lights or shapes prescribed in this Rule, but only those prescribed for a vessel of her length.	(e) A vessel when not engaged in fishing shall not exhibit the lights or shapes prescribed in this Rule, but only those prescribed for a vessel of her length.

Fishing vessels not "engaged in fishing" must display the lights for an ordinary power-driven or sailing vessel, whichever is appropriate, in lieu of Rule 26 lights.

Home

Table of Contents

Rule 27

Rule 27 -- Vessels Not Under Command or Restricted in Their Ability to Maneuver

Vessels not under command and vessels restricted in their ability to maneuver are treated similarly under the Rules, as their combined status under Rule 27 reflects. The Rule 3 definition of a "vessel not under command" is that of a vessel "unable to maneuver as required" of ordinary vessels because of "exceptional circumstance." Rule 3 defines a "vessel restricted in her ability to maneuver" as one unable to keep out of the way because of "the nature of her work." In both cases, the vessel cannot physically comply with the Rules for ordinary vessels, and so they are granted special privileges. Rule 18 requires all other vessels to keep out of the way of these two classes of vessels.

INTERNATIONAL	INLAND
(a) A vessel not under command shall exhibit:	(a) A vessel not under command shall exhibit:
(i) two all-round red lights in a vertical line where they can best be seen;	(i) two all-round red lights in a vertical line where they can best be seen;
(ii) two balls or similar shapes in a vertical line where they can best be seen;	(ii) two balls or similar shapes in a vertical line where they can best be seen; and
(iii) when making way through the water, in addition to the lights prescribed in this paragraph, sidelights and a sternlight.	(iii) when making way through the water, in addition to the lights prescribed in this paragraph, sidelights and a sternlight.

A vessel not under command has usually suffered a disability, which is not easy to predict or classify. An example would be a vessel with a disabled rudder. The navigation light requirement is, therefore, brief and general.

INTERNATIONAL	INLAND
(b) A vessel restricted in her ability to maneuver, except a vessel engaged in mineclearance operations, shall exhibit:	(b) A vessel restricted in her ability to maneuver, except a vessel engaged in mineclearance operations, shall exhibit:
(i) three all-round lights in a vertical line where they can best be seen. The highest and lowest of these lights shall be red and the middle light shall be white;	(i) three all-round lights in a vertical line where they can best be seen. The highest and lowest of these lights shall be red and the middle light shall be white;
(ii) three shapes in a vertical line where they can best be seen. The highest and lowest of these shapes shall be balls and the middle one a diamond;	(ii) three shapes in a vertical line where they can best be seen. The highest and lowest of these shapes shall be balls and the middle one a diamond;

(iii) when making way through the water, a masthead light or lights, sidelights and a sternlight, in addition to the lights prescribed in subparagraph (i);	(iii) when making way through the water, masthead lights, sidelights and a sternlight, in addition to the lights prescribed in subparagraph (b)(i); and
(iv) when at anchor, in addition to the lights or shapes prescribed in subparagraphs (i) and (ii), the light, lights, or shape prescribed in Rule 30.	(iv) when at anchor, in addition to the lights or shapes prescribed in subparagraphs (b)(i) and (ii), the light, lights, or shape prescribed in Rule 30.

Unlike the not-under-command category, vessel classifications within the restricted-in-ability-to-maneuver category are predictable and are listed in the Rule 3 definition. Rule 27, starting with paragraph (b), gives general navigation light requirements and then more specific requirements for several vessel activities that restrict maneuverability.

The lights described in paragraph (b) are not to be displayed by a vessel engaged in mineclearance, even though the mineclearing vessel is regarded as being restricted in its ability to maneuver. Separate lighting requirements for mineclearance are given in paragraph (f).

As is also the case with vessels engaged in fishing, vessels restricted in ability to maneuver are required to display additional lights when making way through the water. Anchor lights, as described in Rule 30, are to be displayed while at anchor in addition to the lights indicating restricted ability to maneuver, except that vessels restricted in ability to maneuver because of dredging or underwater operations, *and* when an obstruction exists, *do not* display Rule 30 anchor lights when anchored (see paragraph (d)).

INTERNATIONAL	INLAND
(c) A power-driven vessel engaged in a towing operation such as severely restricts the towing vessel and her tow in their ability to deviate from their course shall, in addition to the lights or shapes prescribed in Rule 24(a), exhibit the lights and shapes prescribed in sub-paragraphs (b)(i) and (ii) of this Rule.	(c) A vessel engaged in a towing operation which severely restricts the towing vessel and her tow in their ability to deviate from their course shall, in addition to the lights or shapes prescribed in sub-paragraphs (b)(i) and (ii) of this Rule, exhibit the lights or shape prescribed in Rule 24.

Under most circumstances, vessels engaged in towing do not have any privileges over ordinary power-driven vessels. In cases where a towing operation "severely restricts the towing vessel and her tow in their ability to deviate from their course," the towing vessel is considered to be restricted in its ability to maneuver and is accorded special status.

In such situations Rule 27(c) requires the display of *both* Rule 24 towing lights and Rule 27(b) restricted-in-ability-to-maneuver lights. The latter lights are to be displayed where they can best be seen. They should be at a lower level than the masthead lights if practicable, but they may be higher; see Annex I - 2(f)(ii) / Section 84.03(f)(2).

The red-white-red all-round lights do not have to be in a vertical line with the masthead lights and may be off the centerline. Only the towing vessel displays the lights for a vessel restricted in ability to maneuver, not the vessel being towed.

INTERNATIONAL	INLAND
(d) A vessel engaged in dredging or underwater operations, when restricted in her ability to maneuver, shall exhibit the lights and shapes prescribed in subparagraphs (b)(i), (ii) and (iii) of this Rule and shall in addition, when an obstruction exists, exhibit:	(d) A vessel engaged in dredging or underwater operations, when restricted in her ability to maneuver, shall exhibit the lights and shapes prescribed in subparagraphs (b)(i), (ii), and (iii) of this Rule and shall in addition, when an obstruction exists, exhibit:
(i) Two all-round red lights or two balls in a vertical line to indicate the side on which the obstruction exists;	(i) two all-round red lights or two balls in a vertical line to indicate the side on which the obstruction exists;
(ii) Two all-round green lights or two diamonds in a vertical line to indicate the side on which another vessel may pass;	(ii) two all-round green lights or two diamonds in a vertical line to indicate the side on which another vessel may pass; and
(iii) When at anchor, the lights or shapes prescribed in this paragraph instead of the lights or shape prescribed in Rule 30.	(iii) when at anchor, the lights or shapes prescribed by this paragraph, instead of the lights or shapes prescribed in Rule 30 for anchored vessels.

Paragraphs (d) and (e) give further details for vessels restricted in ability to maneuver because they are engaged in dredging or underwater operations, including diving. Paragraph (d) gives requirements only for hampered vessels having an obstruction projecting out from one side of the vessel. The obstruction could be a dredging arm or a float or other equipment used to support underwater operations. (Separate requirements for special lighting of dredge pipelines are contained in Annex V to the Inland Rules.)

Vessels displaying the obstruction lights required by this paragraph do not also display Rule 30 anchor lights, when anchored, but vessels engaged in dredging and underwater operations when no obstruction exists are required to comply with Rule 30 when anchored.

INTERNATIONAL	INLAND
(e) Whenever the size of a vessel engaged in diving operations makes it impracticable to exhibit all lights and shapes prescribed in paragraph (d) of this Rule, the following shall be exhibited:	(e) Whenever the size of a vessel engaged in diving operations makes it impracticable to exhibit all lights and shapes prescribed in paragraph (d) of this Rule, the following shall instead be exhibited:
(i) Three all-round lights in a vertical line where they can best be seen. The highest and lowest of these lights shall be red and the middle light shall be white;	(i) Three all-round lights in a vertical line where they can best be seen. The highest and lowest of these lights shall be red and the middle light shall be white.
(ii) A rigid replica of the International Code flag "A" not less than 1 meter in height. Measures shall be taken to ensure its all-round visibility.	(ii) A rigid replica of the International Code flag "A" not less than 1 meter in height. Measures shall be taken to ensure its all-round visibility.

Paragraph (e) provides for vessels too small to comply with the requirements of paragraph (d) for vessels engaged in diving operations. Paragraph (e) is clearly aimed at the small vessel conducting diving operations, regardless of whether an obstruction on one side of the vessel exists. The paragraph (b) requirements for sidelights and sternlight when making way cannot be disregarded for small vessels engaged in diving operations, nor can the Rule 30 requirement to display an anchor light when anchored. Paragraph (g) of Rule 27 makes clear the intent.

Paragraph (e) excuses the display of obstruction lights and shapes and excuses the display of the ball-diamond-ball day shape array if the proper-size International Code flag "A" is displayed instead. Flags smaller than one meter are not permitted for small vessels, even though shapes of reduced size are permitted on vessels less than twenty meters long. Although a flag that big will seem large to people on a relatively small dive boat, a smaller flag would probably go unnoticed by a larger vessel approaching the area.

INTERNATIONAL	INLAND
(f) A vessel engaged in mineclearance operations shall in addition to the lights prescribed for a power-driven vessel in Rule 23 or to the lights and shape prescribed for a vessel at anchor in Rule 30 as appropriate, exhibit three all-round green lights or three balls. One of these lights or shapes shall be exhibited near the foremast head and one at each end of the fore yard. These lights or shapes indicate that it is dangerous for another vessel to approach within 1000 meters of the mineclearance vessel.	(f) A vessel engaged in mineclearance operations shall, in addition to the lights prescribed for a power-driven vessel in Rule 23 or to the lights and shape prescribed for a vessel at anchor in Rule 30 as appropriate, exhibit three all-round green lights or three balls. One of these lights or shapes shall be exhibited near the foremast head and one at each end of the fore yard. These lights or shapes indicate that it is dangerous for another vessel to approach within 1000 meters of the mineclearance vessel.

Vessels engaged in clearing mines (or the old term "minesweeping") display a unique combination of navigation lights to warn others of their dangerous operations. These lights are carried in addition to the lights carried by an ordinary vessel.

INTERNATIONAL	INLAND
(g) Vessels of less than 12 meters in length, except those engaged in diving operations, shall not be required to exhibit the lights and shapes prescribed in this Rule.	(g) A vessel of less than 12 meters in length, except when engaged in diving operations, is not required to exhibit the lights or shapes prescribed in this Rule.

Paragraph (g) exempts small vessels from the light and shape requirements for vessels not under command and restricted in ability to maneuver. Such small vessels presumably could not then claim the status of vessels in such situations and would not be given the privileges accompanying such status unless the small vessel's predicament were recognized by other means.

Small vessels engaged in diving operations do not have this blanket exemption but may comply with the alternative requirements of paragraph (e).

INTERNATIONAL	INLAND
(h) The signals prescribed in this Rule are	(h) The signals prescribed in this Rule

not signals of vessels in distress and needing assistance. Such signals are contained in Annex IV to these Regulations.	are not signals of vessels in distress and needing assistance. Such signals are contained in Annex IV to these Rules.

The final paragraph in Rule 27 makes clear that even though a vessel not under command (or less likely, a vessel restricted in ability to maneuver) may actually be in distress, the lights and shapes required by this Rule do *not* indicate distress and need of assistance. If you do in fact need assistance, use one or more of the signals listed in Annex IV. A vessel may be not under command for any number of reasons, and many of those would not require outside assistance.

Home

Table of Contents

Rule 28

Handbook of the Nautical Rules of the Road by Llana & Wisneskey

Home - Table of Contents

Rule 28 -- Vessels Constrained by Their Draft

INTERNATIONAL

A vessel constrained by her draft may, in addition to the lights prescribed for power-driven vessels in Rule 23, exhibit where they can best be seen three all-round red lights in a vertical line, or a cylinder.

International Rule 18(d) provides for vessels constrained by their draft and attempts to favor them with regard to other vessels because of restrictions on their movement. This Rule gives the special navigation lights and shape that mark a vessel constrained by draft.

The Inland Rules did not adopt the concept of "vessel constrained by draft," and there is, therefore, no Inland Rule 28.

Home

Table of Contents

Rule 29

Handbook of the Nautical Rules of the Road by Llana & Wisneskey

Home - Table of Contents

Rule 29 -- Pilot Vessels

INTERNATIONAL	INLAND
(a) A vessel engaged on pilotage duty shall exhibit:	(a) A vessel engaged on pilotage duty shall exhibit:
(i) at or near the masthead, two all-round lights in a vertical line, the upper being white and the lower red;	(i) at or near the masthead, two all-round lights in a vertical line, the upper being white and the lower red;
(ii) when underway, in addition, sidelights and a sternlight;	(ii) when underway, in addition, sidelights and a sternlight; and
(iii) when at anchor, in addition to the lights prescribed in subparagraph (i), the light, lights or shape prescribed in Rule 30 for vessels at anchor.	(iii) when at anchor, in addition to the lights prescribed in subparagraph (i), the anchor light, lights or shape prescribed in Rule 30 for anchored vessels.
(b) A pilot vessel when not engaged on pilotage duty shall exhibit the lights or shapes prescribed for a similar vessel of her length.	(b) A pilot vessel when not engaged on pilotage duty shall exhibit the lights or shapes prescribed for a vessel of her length.

The International and Inland Rule 29 requirements are the same. Rule 29 is simple and straightforward. The white-over-red all-round lights are also used as an optional display on trawlers hauling in their nets, but the white-over-red lights in that application are used in combination with a green-over-white all-round light display and then only when close to other fishing vessels. There is very little chance, then, that a pilot vessel would be confused with a vessel engaged in fishing.

Home

Table of Contents

Rule 30

Rule 30 -- Anchored Vessels and Vessels Aground

INTERNATIONAL	INLAND
(a) A vessel at anchor shall exhibit where it can best be seen:	(a) A vessel at anchor shall exhibit where it can best be seen:
(i) in the fore part, an all-round white light or one ball;	(i) in the fore part, an all-round white light or one ball; and
(ii) at or near the stern and at a lower level than the light prescribed in subparagraph (i), an all-round white light.	(ii) at or near the stern and at a lower level than the light prescribed in subparagraph (i), an all-round white light.
(b) A vessel of less than 50 meters in length may exhibit an all-round white light where it can best be seen instead of the lights prescribed in paragraph (a) of this Rule.	(b) A vessel of less than 50 meters in length may exhibit an all-round white light where it can best be seen instead of the lights prescribed in paragraph (a) of this Rule.
(c) A vessel at anchor may, and a vessel of 100 meters and more in length shall, also use the available working or equivalent lights to illuminate her decks.	(c) A vessel at anchor may, and a vessel of 100 meters or more in length shall, also use the available working or equivalent lights to illuminate her decks.

The basic lighting requirements for anchoring are given in the first three paragraphs: two white lights for vessels 50 meters or more in length; one white light for vessels less than 50 meters long; and deck lights for vessels 100 meters or more in length. Smaller vessels may at their option show the extra lights required for larger vessels. These requirements are the same for the International and Inland Rules.

A vessel is anchored when its anchor touches bottom; a vessel is no longer anchored when the anchor is lifted off the bottom. A vessel dragging it anchor is underway and therefore not "anchored." A vessel fastened to its mooring is "at anchor."

INTERNATIONAL	INLAND
(d) A vessel aground shall exhibit the lights prescribed in paragraph (a) or (b) of this Rule and in addition, where they can best be seen:	(d) A vessel aground shall exhibit the lights prescribed in paragraph (a) or (b) of this Rule and in addition, if practicable, where they can best be seen:
(i) two all-round red lights in a vertical line;	(i) two all-round red lights in a vertical line; and
(ii) three balls in a vertical line.	(ii) three balls in a vertical line.

Paragraph (d) tells you what lights to display when you run aground. You are not considered to be "aground" for purposes of the navigation rules if you have intentionally moved your vessel against the bottom or bank of a river or other body of water to hold your position. If you have to keep your engines engaged to maintain your position, or if you are free to move away from your holding position at any time, then you are not considered to be "aground." You would be underway but not making way through the water.

The Inland and International versions of paragraph (d) vary slightly. Both require that vessels aground display the navigation lights and shapes for a vessel at anchor. The International version also requires the display of two all-round red lights (or three balls), whereas the Inland version requires the display of these extra lights and shapes only "if practicable."

INTERNATIONAL	INLAND
(e) A vessel of less than 7 meters in length, when at anchor, not in or near a narrow channel, fairway or anchorage, or where others vessels normally navigate, shall not be required to exhibit the lights or shape prescribed in paragraphs (a) and (b) of this Rule.	(e) A vessel of less than 7 meters in length, when at anchor, not in or near a narrow channel, fairway or anchorage, or where others vessels normally navigate, shall not be required to exhibit the lights or shape prescribed in paragraphs (a) and (b) of this Rule.
(f) A vessel of less than 12 meters in length, when aground, shall not be required to exhibit the lights or shapes prescribed in subparagraphs (d)(i) and (ii) of this Rule.	(f) A vessel of less than 12 meters in length when aground shall not be required to exhibit the lights or shapes prescribed in subparagraphs (d)(i) and (ii) of this Rule.

Paragraphs (e) and (f) excuse small vessels from the display of anchor lights and shapes under certain circumstances, and from the display of aground lights and shapes.

	INLAND
	(g) A vessel of less than 20 meters in length, when at anchor in a special anchorage area designated by the Secretary, shall not be required to exhibit the anchor lights and shapes required by this Rule.

Inland Rule 30 alone contains a paragraph (g). This provision allows small vessels to anchor without displaying lights if they are in a "special anchorage area." These special areas are listed in Title 33 of the Code of Federal Regulations, Part 110, and can also be found in the *Coast Pilot*.

Home

Table of Contents

Rule 31

Rule 31 -- Seaplanes

INTERNATIONAL	INLAND
Where it is impracticable for a seaplane to exhibit lights and shapes of the characteristics or in the positions prescribed in the Rules of this Part she shall exhibit lights and shapes as closely similar in characteristics and position as is possible.	Where it is impracticable for a seaplane to exhibit lights and shapes of the characteristics or in the positions prescribed in the Rules of this Part she shall exhibit lights and shapes as closely similar in characteristics and position as is possible.

The International and Inland versions of this short Rule are the same. For obvious reasons, airplanes may have difficulty complying with navigation light requirements that were written for ships.

Airplanes of all sorts (not just seaplanes) display a green "sidelight" on the right wingtip, a red "sidelight" on the left, and a white "sternlight" aft. Most aircraft also have provisions to make these lights blink when they are on the ground. This blinking mode, if available on a seaplane, should not be used on the water.

Seaplane manufacturers often provide an all-round white light on a portable mast primarily intended for use when the seaplane is anchored. The mast usually has provisions for displaying a shape. This mast is often difficult to mount and dismount, and requires the seaplane to be stopped before mounting. In short, seaplanes in sea-air transition should not be expected to conform to the light and shape requirements as closely as when they are anchored.

Handbook of the Nautical Rules of the Road by Llana & Wisneskey

Home - Table of Contents

Rule 32 -- Definitions

INTERNATIONAL	INLAND
(a) The word "whistle" means any sound signal appliance capable of producing the prescribed blasts and which complies with the specifications in Annex III to these Regulations.	(a) The word "whistle" means any sound signal appliance capable of producing the prescribed blasts and which complies with specifications in Annex III to these Rules.

The term "whistle" is used for devices that sound like whistles or horns, no matter what the frequency or tonal quality. There are no references to "foghorns" in the navigation rules.

INTERNATIONAL	INLAND
(b) The term "short blast" means a blast of about one second's duration.	(b) The term "short blast" means a blast of about 1 second's duration.
(c) The term "prolonged blast" means a blast of from four to six seconds' duration.	(c) The term "prolonged blast" means a blast of from 4 to 6 seconds' duration.

Whistles give coded signals that are made up of one or more "blasts," each of which will last either about one second (short blast) or from four to six seconds (prolonged blast). There are no "long" blasts in the navigation rules.

Home

Table of Contents

Rule 33

Rule 33 -- Equipment for Sound Signals

INTERNATIONAL	INLAND
(a) A vessel of 12 meters or more in length shall be provided with a whistle and a bell and a vessel of 100 meters or more in length shall, in addition, be provided with a gong, the tone and sound of which cannot be confused with that of the bell. The whistle, bell and gong shall comply with the specifications in Annex III to these Regulations. The bell or gong or both may be replaced by other equipment having the same respective sound characteristics, provided that manual sounding of the prescribed signals shall always be possible.	(a) A vessel of 12 meters or more in length shall be provided with a whistle and a bell and a vessel of 100 meters or more in length shall, in addition, be provided with a gong, the tone and sound of which cannot be confused with that of the bell. The whistle, bell and gong shall comply with the specifications in Annex III to these Rules. The bell or gong or both may be replaced by other equipment having the same respective sound characteristics, provided that manual sounding of the prescribed signals shall always be possible.

From the mariner's perspective, the sound-signal equipment requirement is simple for vessels twelve meters or more in length. From the vessel's builder or marine supplier, the requirements become more technical and more complex. Annex III to the Rules contains the technical requirements, and although the International and Inland versions of Rule 33 are substantively identical, the respective versions of Annex III are not. The Inland Annex III was developed from the International Annex III and corrected many of its shortcomings. The mariner should be familiar enough with the basic principles of Annex III to be able to distinguish between the sounds coming from different sizes of vessels.

Today's electronics can reproduce any sound to any level of amplification, and this, of course, includes the sounds of bells and gongs. These synthesized sounds, often more convenient than the real thing, are preferred by many vessel operators. Rule 33 permits the use of these electronic bells and gongs, but also imposes the requirement of manual sounding. If you hit a transistor with a hammer, you won't produce a very satisfying sound. Therefore, real bells and gongs must be installed for emergency use.

INTERNATIONAL	INLAND
(b) A vessel of less than 12 meters in length shall not be obliged to carry the sound signalling appliances prescribed in paragraph (a) of this Rule but if she does not, she shall be provided with some other means of making an efficient sound signal.	(b) A vessel of less than 12 meters in length shall not be obliged to carry the sound signalling appliances prescribed in paragraph (a) of this Rule but if she does not, she shall be provided with some other means of making an efficient sound signal.

Boats less than twelve meters long do not have to carry a specific sound-signal

appliance. The old Inland Rules (in force through 1981) contained a specific requirement for small boats, and some authorities may erroneously continue to press those repealed requirements. The current requirement is contained in paragraph (b) of Rule 33 and is for some "means of making an efficient sound signal." An efficient signal is one that can be heard and understood by other vessels in ample time for proper operation of the Steering and Sailing Rules. Clearly, the signal applicance needed for a twelve-meter boat in New York Harbor would not be needed on a three-meter outboard dinghy operated on a small inland lake or in a yacht club's moorings. Depending on the circumstances, the requirement could be met by a lung-powered horn, a portable compressed-gas "air horn," a police whistle, or the enthusiastic use of one's own vocal cords.

Home

Table of Contents

Rule 34

Rule 34 -- Maneuvering and Warning Signals

Rule 34 provides the mariner with coded signals for communicating essential navigation information with other vessels in sight. To adhere to this Rule, therefore, you must maintain a proper lookout. If you did not give a required signal because you did not see another vessel, be sure the reason you did not see it was not that you did not look.

One provision in the Inland (only) Rule 34 applies all the time, whether in sight of another vessel or not. That provision requires power-driven vessels to signal when leaving a berth or dock.

Rule 34 is one of the few areas in the navigation rules where the requirements in the International Rules and Inland Rules are so different that each version must be discussed separately. Maneuvering signals are one of the major areas of difference between the two sets of Rules and may well be the most significant difference. Although the basic International and Inland maneuvering signals bear no resemblance to each other, several Rule 34 provisions are the same. Paragraph (d)/doubt signal, (e)/bend signal, and (f)/whistle separation, are identical.

What is the basic difference between the two? The International Rule maneuvering signals are often said to be signals of action: I *am turning* right. The Inland Rule signals, on the other hand, communicate not what you are doing now but what you intend to do. They are signals of *intent*: I *plan* to leave you to port.

Your Inland maneuvering signal is not a statement, but rather a question, or perhaps more exactly a proposition. You propose your intention to the other vessel--"I intend such-and-such a maneuver, unless you have an objection." You wait for a definite response before acting, because the other vessel has veto power. More on this later.

INTERNATIONAL

(a) When vessels are in sight of one another, a power-driven vessel underway, when maneuvering as authorized or required by these Rules, shall indicate that maneuver by the following signals on her whistle:

--one short blast to mean "I am altering my course to starboard";

--two short blasts to mean "I am altering my course to port";

--three short blasts to mean "I am operating astern propulsion".

Paragraphs (a) and (b) present the basic maneuvering signals: paragraph (a) the whistle signals, and paragraph (b) the corresponding light signals.

The International Rules requirements apply to power-driven vessels in sight of another vessel (power-driven or not) when maneuvering as authorized or required by the Rules. In good visibility you may be able to see another vessel ten to twenty miles away, but you need not give signals for such long ranges because the other vessel wouldn't hear your signals. On even the largest vessels, the required range of whistles is only two miles. On smaller vessels, the required range is much less (see Annex III).

Second, a maneuver made at very long range will not likely be one "authorized or required" by the Rules. A maneuver made to get you to your destination or to avoid a buoy or other hazard, for example, is not one that need be signaled to others in sight. When vessels get close enough together to be thinking of risk of collision, then signals must be given. When a "shall not impede" situation exists, whistle signals should be given even earlier because the vessel required not to impede the passage of a larger power-driven vessel needs to know the large vessel's course changes in order to keep well clear *before* risk of collision arises.

If you are relatively close to another vessel and find that you must execute a maneuver not explicitly "authorized or required" by the Rules (say, to avoid running aground or into a buoy), then you would go ahead and signal that maneuver so as not to catch the other vessel by surprise.

International paragraph (a) requires signals for three maneuvers: right turn, left turn, and astern propulsion. The right or left turns may be maneuvers used by a give-way vessel to keep out of the way or by a stand-on vessel when it becomes apparent that the give-way vessel is not taking appropriate action or when collision cannot be avoided by the action of the give-way vessel alone.

The turns may be made by two vessels, both of which are directed to keep out of the way, for example, in head-on situations. Remember that Rule 8 normally requires course changes to be large enough to be readily apparent.

The third maneuver is "operating astern propulsion." This is not the same as "proceeding astern." You may of course be moving forward or astern or stopped when your astern propulsion is engaged. The state of the machinery, not motion through the water, constitutes the distinction here.

INTERNATIONAL

(b) Any vessel may supplement the whistle signals prescribed in paragraph (a) of this Rule by light signals, repeated as appropriate, whilst the maneuver is being carried out:

(i) these light signals shall have the following significance:

--one flash to mean "I am altering my course to starboard";

--two flashes to mean "I am altering my course to port";

--three flashes to mean "I am altering astern propulsion";

(ii) the duration of each flash shall be about one second, the interval between flashes shall be about one second, and the interval between successive signals shall be not less than ten seconds;

(iii) the light used for this signal shall, if fitted, be an all-round white light, visible at a minimum range of 5 miles, and shall comply with the provisions of Annex I to these Regulations.

The International version of paragraph (b) adds supplemental light signals to the paragraph (a) sound signals. They are the same as the sound signals, except they are given with light, and although the sound signals *must* be made, the light signals are optional. The sound signals are given only once per maneuver, but the light signals may be repeated. The light and whistle need not be synchronized. Light signals may also be used to supplement the paragraph (d) doubt signal but not the paragraph (c) overtaking signals.

INTERNATIONAL

(c) When in sight of one another in a narrow channel or fairway:

(i) a vessel intending to overtake another shall in compliance with Rule 9(e)(i) indicate her intention by the following signals on her whistle:

--two prolonged blasts followed by one short blast to mean "I intend to overtake you on your starboard side";

--two prolonged blasts followed by two short blasts to mean "I intend to overtake you on your port side."

(ii) the vessel about to be overtaken when acting in accordance with Rule 9(e)(i) shall indicate her agreement by the following signal on her whistle:

--one prolonged, one short, one prolonged and one short blast, in that order.

Whistle signals are sounded in overtaking maneuvers, by both the overtaking and overtaken vessels. The International paragraph (c) requirements for these signals, however, apply only in those situations where one vessel is overtaking another in a narrow channel *and* the overtaken vessel must maneuver to allow the other to pass. All of the requirements for this overtaking action are in Rule 9(e), but the

description of the signals is in Rule 34. Both must be read together.

The signal of agreement for the overtaken vessel vessel is provided in Rule 34(c), which gives no signal for disagreement. Rule 9(e), however, says such disagreement (or doubt) may be signaled by the Rule 34(d) doubt signal, five or more short blasts.

INLAND

(a) When power-driven vessels are in sight of one another and meeting or crossing at a distance within half a mile of each other, each vessel underway, when maneuvering as authorized or required by these Rules:

(i) shall indicate that maneuver by the following signals on her whistle: one short blast to mean "I intend to leave you on my port side"; two short blasts to mean "I intend to leave you on my starboard side"; and three short blasts to mean "I am operating astern propulsion."

(ii) upon hearing the one or two blast signal of the other shall, if in agreement, sound the same whistle signal and take the steps necessary to effect a safe passing. If, however, from any cause, the vessel doubts the safety of the proposed maneuver, she shall sound the danger signal specified in paragraph (d) of this Rule and each vessel shall take appropriate precautionary action until a safe passing agreement is made.

We have been talking about the first three paragraphs of the International Rule 34. The Inland versions are quite different. The Inland signals of "intent and reply" represent a *discussion* between two vessels that must result in agreement on a course of action before the maneuver can begin.

The maneuver agreed upon will normally conform with action required by the Rules. You should avoid any agreement that involves a departure from the Rules because chances of a misunderstanding are great, especially if only whistle signals are used. Nor does local custom justify a departure from the Rules. What is "custom" for one person may be foolishness to another and news to yet another.

The first two paragraphs of Inland Rule 34 apply only to power-driven vessels meeting or crossing *another* power-driven vessel. Power-drivn vessels do not give signals if they are in meeting or crossing situations with vessels that are not power-driven.

Inland signals are given only for vessels that are in sight, but not for all vessels with which risk of collision exists. Signals are given only if the two vessels will meet or cross so that their closest distance of approach is less than one-half mile. For larger vessels, the signals are given well before the half-mile distance is reached,

when the vessels are close enough to hear each other, in ample time for agreement to be reached before the meeting or crossing maneuver begins. The Inland Annex III audibility requirements are the same as the International: two miles for the largest vessels down to one-half mile for vessels twelve to twenty meters long.

The size and speed of a vessel, the type of waterway, and the amount of traffic will affect the distance at which maneuvering signals should be started. Smaller and slower vessels will signal at closer distances than larger and faster ones. Vessels approaching each other on open waters or from opposite directions in a river should signal earlier than vessels maneuvering in confined waters.

Vessels maneuvering in areas of heavy congestion have to take special care in signalling. If more than one vessel is close by, there may be confusion as to which is the intended recipient, especially as the signals for meeting and crossing are also those for overtaking. Other vessels, not knowing for whom the signal was intended, may signal an erroneous reply or not reply when they should.

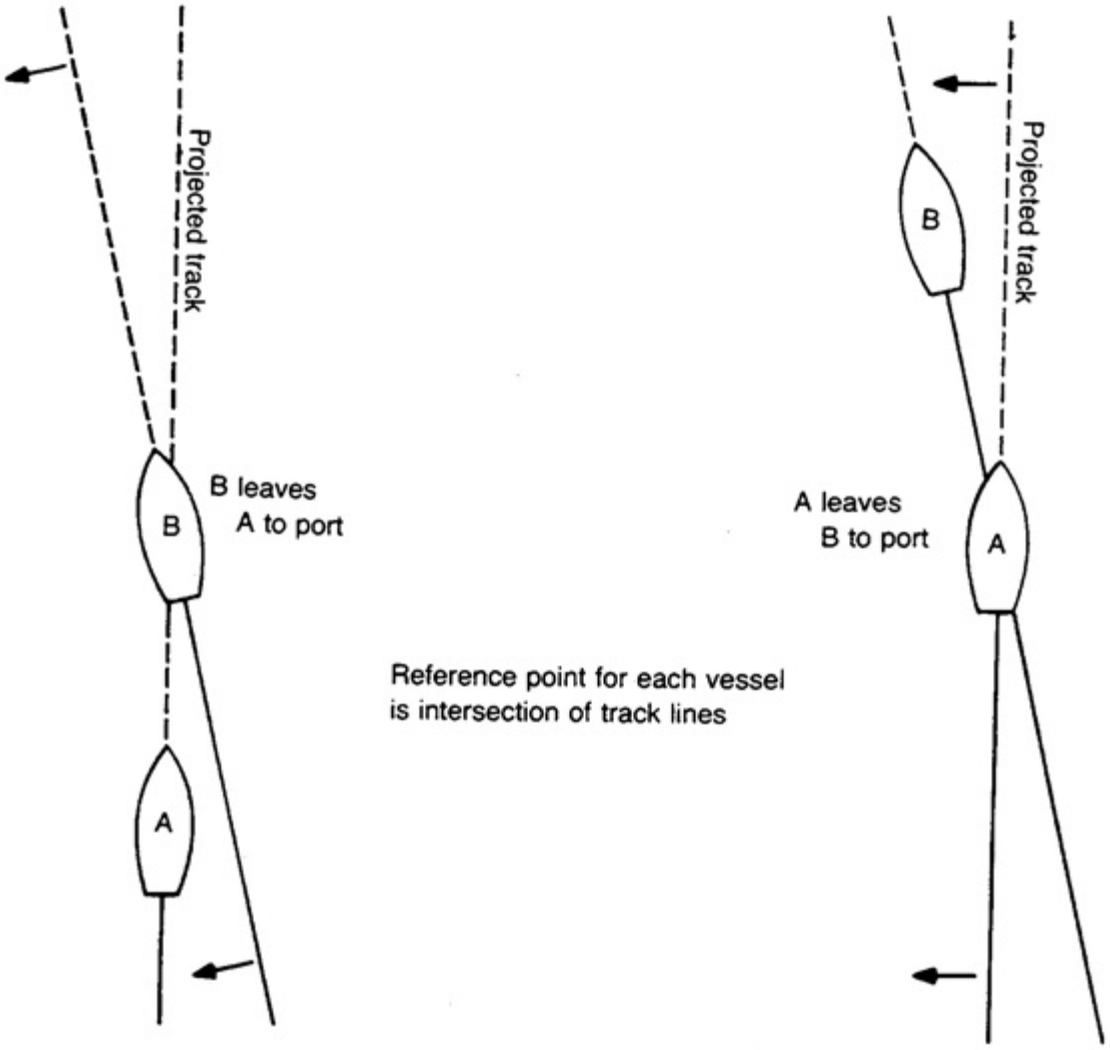
To avoid such confusion in congested waters many mariners simply do not give whistle signals. This is illegal, unless such departure from the Rules is justified by the Rule 2 caveat allowing a departure when "necessary to avoid immediate danger." Pargraph (h) of Inland Rule 34 exuses whistle signals when agreement has been reached over the radiotelephone.

The Inland whistle signals themselves indicate an intention to leave the other vessel on one side or the other, or agreement with the proposed maneuver, or that astern propulsion is being used.

What does the phrase "I intend to leave you on my port (or starboard) side" mean? To leave another vessel means to go away from that vessel. Leaving a vessel on your port side means that the other vessel is on your port side as you go away.

In meeting situations the other vessel will be on one side before, during, and after the "meeting" and and the proper signal will be obvious. When crossing at close to right angles the side on which you leave the other vessel will also be obvious even though the vessel starts out on the opposite side. When two vessels proceeding in the same direction cross at a small angle, however, the side on which each "leaves" the other may not seem clear.

Figure 3 may make some sense of the wording of Inland Rule 34(a)(i) as applied to vessels converging on near-parallel courses. First, the term "leave" can be understood to mean when one vessel starts to draw away from the path of another vessel. This happens when the vessel crosses the projected path of the other vessel. Before it reaches this point, it is converging on the track of the other vessel, and hence is not yet "leaving" it. After it reaches this point, it leaves the other vessel on whatever side (port or starboard) the other vessel happens to be on at that time. The reference point is the intersection of the two vessels' track lines; the time for determination is the respective time that each vessel reaches the reference point. Each vessel leaves the other on the same side--that is, the passing is a port-to-port or starboard-to-starboard, never a port-to-starboard. Each vessel gives the same signal, either one blast or two.



As mentioned, the Inland Rule passing signal is a proposition for a maneuver. The other vessel must answer agreement before the maneuver can proceed. If in agreement, the other vessel responds with the same signal. If not in agreement, the other vessel sounds a signal of five or more short blasts and each vessel then takes "appropriate precautionary action." This would normally mean to slow or stop and communicate with the other vessel to identify the problem and work out a solution. You may not simply ignore a negative response to your maneuvering signal. Neither may you charge ahead if you get no response at all. You should not assume that the other vessel will always be in agreement. The lack of a reply does not indicate agreement. When you are in doubt, slow down and use your radiotelephone.

INLAND

(b) A vessel may supplement the whistle signals prescribed in paragraph (a) of this Rule by light signals:

(i) These signals shall have the following significance: one flash to mean "I intend to leave you on my port side"; two flashes to mean "I intend to leave you on my starboard side"; three flashes to

mean "I am operating astern propulsion";

(ii) The duration of each flash shall be about one second; and

(iii) The light used for this signal shall, if fitted, be one all-round white or yellow light, visible at a minimum range of 2 miles, synchronized with the whistle, and shall comply with the provisions of Annex I to these Rules.

As with the International Rules, the Inland Rules maneuvering signals may be supplemented by light signals. The Inland light signals, which may be either white or yellow, must be synchronized with the sound signals.

INLAND

(c) When in sight of one another:

(i) a power-driven vessel intending to overtake another power-driven vessel shall indicate her intention by the following signals on her whistle: one short blast to mean "I intend to overtake you on your starboard side"; two short blasts to mean "I intend to overtake you on your port side"; and

(ii) the power-driven vessel about to be overtaken shall, if in agreement, sound a similar sound signal. If in doubt she shall sound the danger signal prescribed in paragraph (d).

Paragraph (c) gives the Inland Rule for overtaking signals. These signals must be given in all overtaking situations involving two power-driven vessels, whether in open waters or confined. The signals are given whether or not the overtaken vessel must act to permit a safe overtaking.

The signals for overtaking are the same as for passing--one or two short blasts. Although simpler than the International signals, they are more ambiguous when more than two vessels are in the area.

The overtaken vessel signals its disagreement to the overtaking vessel by giving five or more short blasts. The overtaken vessel may not answer a two-blast signal with a one-blast (or vice versa) to indicate that the overtaking vessel should pass on the other side. If the overtaking vessel hears a doubt signal response, it should propose passing on the other side, wait until later to overtake, or contact the vessel to be overtaken on the radiotelephone.

INTERNTIONAL	INLAND
(d) When vessels in sight of one another are approaching each other and from any	(d) When vessels in sight of one another are approaching each other and from any

cause either vessel fails to understand the intentions or actions of the other, or is in doubt whether sufficient action is being taken by the other to avoid collision, the vessel in doubt shall immediately indicate such doubt by giving at least five short and rapid blasts on the whistle. Such signal may be supplemented by a light signal of at least five short and rapid flashes.	cause either vessel fails to understand the intentions or actions of the other, or is in doubt whether sufficient action is being taken by the other to avoid collision, the vessel in doubt shall immediately indicate such doubt by giving at least five short and rapid blasts on the whistle. This signal may be supplemented by a light signal of at least five short and rapid flashes.

Paragraph (d), (e), and (f) of the International and Inland Rule 34 are the same. Paragraph (d) describes the "doubt" signal, also referred to in the Inland Rules as the "danger" signal. The signal is five or more short and rapid blasts, which may be supplemented by a light signal. Give the signal as soon as you are in doubt about the action of another approaching vessel--when you don't know what the other vessel is doing or when you think it is doing the wrong thing.

The signal is designed to give the operators a chance to resolve any confusion or disagreement early. Do not wait until you think you are about to crash. It is not intended as a signal to alert crew members to don their life jackets.

INTERNTIONAL	INLAND
(e) A vessel nearing a bend or an area of a channel or fairway where other vessels may be obscured by an intervening obstruction shall sound one prolonged blast. Such signal shall be answered with a prolonged blast by any approaching vessel that may be within hearing around the bend or behind the intervening obstruction.	(e) A vessel nearing a bend or an area of a channel or fairway where other vessels may be obscured by an intervening obstruction shall sound one prolonged blast. Such signal shall be answered with a prolonged blast by any approaching vessel that may be within hearing around the bend or behind the intervening obstruction.

Paragraph (e) in both versions of the Rule gives a "blind bend" signal, which you sound when you are about to come around a corner to alert other vessels to watch out for you. Listen for a reply from another vessel that may indeed be approaching from just around the bend.

INTERNTIONAL	INLAND
(f) If whistles are fitted on a vessel at a distance apart of more than 100 meters, one whistle only shall be used for giving maneuvering and warning signals.	(f) If whistles are fitted on a vessel at a distance apart of more than 100 meters, one whistle only shall be used for giving maneuvering and warning signals.

Paragraph (f) of both sets of the Rules seeks to avoid double signals. Because sound travels relatively slowly, a single blast sounded simultaneously on two widely separated whistles could sound like two blasts to someone ahead or astern of the signalling vessel.

International Rule 34 ends here; the Inland version has two more paragraphs.

INLAND

(g) When a power-driven vessel is leaving a dock or berth, she shall sound one prolonged blast.

Paragraph (g) provides a signal (the same as paragraph (e)'s blind-bend signal) for vessels getting underway from a dock or berth.

INLAND

(h) A vessel that reaches agreement with another vessel in a head-on, crossing, or overtaking situation, as for example, by using the radiotelephone as prescribed by the Vessel Bridge-to-Bridge Radiotelephone Act (85 Stat. 164; 33 U.S.C. 1201 et seq.) is not obliged to sound the whistle signals prescribed by this Rule, but may do so. If agreement is not reached, then whistle signals shall be exchanged in a timely manner and shall prevail.

Paragraph (h) says that if you reach a passing agreement on channel 13 of your radiotelephone, you don't have to give whistle signals. It is very important that you speak over the radio with the right vessel, the one you intend to move in relation to. If you're not sure you have reached the right vessel, then you still have to sound whistle signals before executing the maneuver.

Home

Table of Contents

Rule 35

Handbook of the Nautical Rules of the Road by Llana & Wisneskey

Home - Table of Contents

Rule 35 -- Sound Signals in Restricted Visibility

Rule 35 tells us about what are colloquially called "fog signals." The Rules themselves do not use the term because restricted visibility can be caused by conditions other than fog. Rule 3 attributes restricted visibility to "fog, mist, falling snow, heavy rainstorms, sandstorms or any other similar causes."

In the rest of the discussion, we will refer to the signals as "restricted-visibility signals," but when people mention "fog" signals, this is what they are talking about. There are only small differences between the International and Inland versions of the Rule.

INTERNATIONAL	INLAND
In or near an area of restricted visibility, whether by day or night, the signals prescribed in this Rule shall be used as follows:	In or near an area of restricted visibility, whether by day or night, the signals prescribed in this Rule shall be used as follows:

The signals in Rule 35 are used in conjuction with Rule 19 (Conduct of Vessels in Restricted Visibility) and as in that Rule, apply both in or near an area of restricted visibility, and by day or night. How bad must the visibility become before you have to give the signals?

Giving the signals when nobody is close enough to hear them will only dull your hearing and deprive the off-watch of their sleep. Use the signals when you can't see as far as your whistle can be heard. Minimum audibility range is two miles for large ships, but they may be heard three or four miles away depending on the particular whistle and the atmospheric conditions.

INTERNATIONAL	INLAND
(a) A power-driven vessel making way through the water shall sound at intervals of not more than 2 minutes one prolonged blast.	(a) A power-driven vessel making way through the water shall sound at intervals of not more than 2 minutes one prolonged blast.
(b) A power-driven vessel underway but stopped and making no way through the water shall sound at intervals of not more than 2 minutes two prolonged blasts in succession with an interval of about 2 seconds between them.	(b) A power-driven vessel underway but stopped and making no way through the water shall sound at intervals of not more than 2 minutes two prolonged blasts in succession with an interval of about 2 seconds between them.

Paragraphs (a) and (b) give the most common signals, those for ordinary power-driven vessels underway. The signal is one prolonged blast or two, depending on whether the vessel is making way or stopped. If you hear a two-blast signal, don't

assume that the vessel making it will stay stopped.

Rule 32 defines a prolonged blast as one lasting from four to six seconds. The required interval between signals is two minutes or less. Don't let a signal repeated every thirty seconds or every minute confuse you. Shorter intervals are desirable when other vessels are near.

INTERNATIONAL	INLAND
(c) A vessel not under command, a vessel restricted in her ability to maneuver, a vessel constrained by her draft, a sailing vessel, a vessel engaged in fishing and a vessel engaged in towing or pushing another vessel shall, instead of the signals prescribed in paragraphs (a) or (b) of this Rule, sound at intervals of not more than 2 minutes three blasts in succession, namely one prolonged followed by two short blasts.	(c) A vessel not under command; a vessel restricted in her ability to maneuver, whether underway or at anchor; a sailing vessel; a vessel engaged in fishing, whether underway or at anchor; and a vessel engaged in towing or pushing another vessel shall, instead of the signals prescribed in paragraphs (a) or (b) of this Rule, sound at intervals of not more than 2 minutes, three blasts in succession: namely, one prolonged followed by two short blasts.

Paragraph (c) gives a third signal for vessels that are likely to be less maneuverable than ordinary power-driven vessels, although Rule 19 does not treat them any differently from ordinary power-driven vessels. Nevertheless, the special signal--one prolonged blast followed by two short--does give other vessels more information. If and when the impaired vessels finally do loom into view, however, the Rules in force change and they may become stand-on vessels.

The impaired vessels covered by paragraph (c) include those not under command, restricted in ability to maneuver, sailing, and engaged in towing or pushing another vessel. The International version also includes vessels constrained by draft (a concept rejected in the Inland Rules).

INTERNATIONAL
(d) A vessel engaged in fishing, when at anchor, and a vessel restricted in her ability to maneuver when carrying out her work at anchor, shall instead of the signals prescribed in paragraph (g) of this Rule sound the signal prescribed in paragraph (c) of this Rule.

Vessels engaged in fishing while anchored and vessels restricted in ability to maneuver while anchored must also sound one prolonged plus two short blasts. This requirement, treated differently in the two versions, is more successful in the International version. The issue is whether the hampered and anchored vessels give both the signal for hampered vessels *and* the paragraph (g)/International or (f)/Inland signal for anchored vessels.

International paragraph (d) tells us to give the paragraph (c) signal instead of the signal for anchored vessels. The Inland version attempts to treat the special case of vessels fishing or restricted in ability to maneuver while also anchored within paragraph (c) rather than adding a separate paragraph.

Inland paragraph (c) (like the International version) says to use the one-long, two-short signal, instead of the paragraph (a) and (b) signals, and *also* paragraph (f) signals for anchored vessels. The Inland Rule would seem, then, to require anchored vessels engaged in fishing or restricted in ability to maneuver to give both the paragraph (c) and paragraph (f) signals.

To be on the safe side, you had better follow the wording, even though the drafters of the Inland Rules probably intended much the same message as the International version. Few vessels will be affected by this particular provision.

INTERNATIONAL	INLAND
(e) A vessel towed or if more than one vessel is towed the last vessel of the tow, if manned, shall at intervals of not more than 2 minutes sound four blasts in succession, namely one prolonged followed by three short blasts. When practicable, this signal shall be made immediately after the signal made by the towing vessel.	(d) A vessel towed or if more than one vessel is towed the last vessel of the tow, if manned, shall at intervals of not more than 2 minutes sound four blasts in succession: namely, one prolonged followed by three short blasts. When practicable, this signal shall be made immediately after the signal made by the towing vessel.

These identical paragraphs address the signals to be given by barges and other vessels towed astern. Unmanned towed vessels do not have to give signals nor would a manned barge if it was not the last vessel in the tow. Nevertheless, the prudent mariner would arrange, if possible, for automatic signals to be given on the last barge of any long tow.

INTERNATIONAL	INLAND
(f) When a pushing vessel and a vessel being pushed ahead are rigidly connected in a composite unit they shall be regarded as a power-driven vessel and shall give the signals prescribed in paragraphs (a) or (b) of this Rule.	(e) When a pushing vessel and a vessel being pushed ahead are rigidly connected in a composite unit they shall be regarded as a power-driven vessel and shall give the signals prescribed in paragraphs (a) or (b) of this Rule.

Paragraph (f/e) is the sound-signal counterpart of Rule 24(b), which requires rigidly connected tug-barge composites to be lighted as a single power-driven vessel. The corresponding Rule 35 provision similarly treats these composite units as ordinary power-driven vessels. Towing vessels that push ahead but are not rigidly connected use the sound signals in paragraph (c), and the barges being pushed ahead do not sound any signals.

INTERNTIONAL	INLAND
(g) A vessel at anchor shall at intervals of not more than one minute ring the bell rapidly for about 5 seconds. In a vessel of 100 meters or more in length the bell shall be sounded in the forepart of the vessel and immediately after the ringing of the bell the gong shall be sounded rapidly for about 5 seconds in	(f) A vessel at anchor shall at intervals of not more than one minute ring the bell rapidly for about 5 seconds. In a vessel of 100 meters or more in length the bell shall be sounded in the forepart of the vessel and immediately after the ringing of the bell the gong shall be sounded rapidly for about 5 seconds in the after

the after part of the vessel. A vessel at anchor may in addition sound three blasts in succession, namely one short, one prolonged and one short blast, to give warning of her position and of the possibility of collision to an approaching vessel.	part of the vessel. A vessel at anchor may in addition sound three blasts in succession: namely one short, one prolonged and one short blast, to give warning of her position and of the possibility of collision to an approaching vessel.

The sound signals for anchored vessels in or near restricted visibility are relatively straighforward. All vessels sound their bells, after which larger vessels sound their gongs. Any vessel may also use a whistle signal. The whistle signal can be heard farther away than the bell and should be used when background noise is high or when another vessel is approaching too rapidly. The whistle signal also gives better indication of your position.

INTERNTIONAL	INLAND
(h) A vessel aground shall give the bell signal and if required the gong signal prescribed in paragraph (g) of this Rule and shall, in addition, give three separate and distinct strokes on the bell immediately before and after the rapid ringing of the bell. A vessel aground may in addition sound an appropriate whistle signal.	(g) A vessel aground shall give the bell signal and if required the gong signal prescribed in paragraph (f) of this Rule and shall, in addition, give three separate and distinct strokes on the bell immediately before and after the rapid ringing of the bell. A vessel aground may in addition sound an appropriate whistle signal.

The bell and gong signals required for anchored vessels are also required for vessels aground (another form of anchoring), except that the bell signal is modified by the distinctive three rings before and after the usual five seconds of rapid ringing. You are also permitted to give an "appropriate whistle signal."

The Defense Mapping Agency's *H.O. 102 International Code of Signals* is full of signals. For example, if you were on a coral reef and knew other vessels were headed your way, you might want to send the Morse code for "U" -- two short plus one prolonged blast -- to signal "You are running into danger."

INTERNTIONAL	INLAND
(i) A vessel of less than 12 meters in length shall not be obliged to give the above-mentioned signals, but, if she does not, shall make some other efficient sound signal at intervals of not more than 2 minutes.	(h) A vessel of less than 12 meters in length shall not be obliged to give the above-mentioned signals, but, if she does not, shall make some other efficient sound signal at intervals of not more than 2 minutes.

International paragraph (i) and Inland paragraph (h) exempt small vessels from making Rule 35 sound signals, but only on the condition that they give some other signal that can be understood (as coming from a small vessel) and heard early enough to prevent a collision. Any alternative signal must be repeated every two minutes or less, the same as for the prescribed signals. Note that this exemption dovetails with the Rule 33(b) provision saying that vessels less than twelve meters need not carry sound-signal appliances meeting the technical specifications of Annex III.

INTERNATIONAL	INLAND
(j) A pilot vessel when engaged on pilotage duty may in addition to the signals prescribed in paragraphs (a), (b), or (g) of this Rule sound an identity signal consisting of four short blasts.	(i) A pilot vessel when engaged on pilotage duty may in addition to the signals prescribed in paragraphs (a), (b), or (f) of this Rule sound an identity signal consisting of four short blasts.

Pilot vessels have their own whistle signal for restricted visibility. It is *four* short blasts. Count them. The doubt signal described in Rule 34(d) is *five* or more short blasts and is only for use between vessels in sight of each other.

It is possible, however, for both signals to be heard in the same area; Rule 35 requirements apply in or near an area of of restricted visibility, and unless the visibility is zero, vessels will come into sight of each other as they get closer. Remember, four shorts blasts signal a pilot vessel.

	INLAND
	(j) The following vessels shall not be required to sound signals as prescribed in paragraph (f) of this Rule when anchored in a special anchorage area designated by the Secretary: (i) a vessel of less than 20 meters in length; and (ii) a barge, canal boat, scow, or other non-descript craft.

The Inland version of Rule 35 contains this additional paragraph covering signals in designated "special anchorage areas." A list of these areas is contained in Title 33 of the Code of Federal Regulations, Part 110. About a hundred of these areas are scattered around the country. Small vessels and unpowered vessels normally towed need not give signals if they are anchored in one of these places.

Home

Table of Contents

Rule 36

Rule 36 -- Signals to Attract Attention

INTERNATIONAL	INLAND
If necessary to attract the attention of another vessel, any vessel may make light or sound signals that cannot be mistaken for any signal authorized elsewhere in these Rules, or may direct the beam of her searchlight in the direction of the danger, in such a way as not to embarrass any vessel. Any light to attract the attention of another vessel shall be such that it cannot be mistaken for any aid to navigation. For the purpose of this Rule the use of high intensity intermittent or revolving lights, such as strobe lights, shall be avoided.	If necessary to attract the attention of another vessel, any vessel may make light or sound signals that cannot be mistaken for any signal authorized elsewhere in these Rules, or may direct the beam of her searchlight in the direction of the danger, in such a way as not to embarrass any vessel.

What do you do when your radio is broken or the other vessel doesn't have a radio (or may not be listening)? Rule 36 makes one suggestion, but mostly it tells you what you can't do to attract attention.

If you want to warn another vessel about danger, if you have a searchlight, , and it is dark, then you can direct your beam toward the dangerous area, being careful not to shine your light in others' faces (or you will embarrass them, not to mention making it difficult for them to see anything but spots).

The International version adds that you must not use a signal that could be mistaken for an aid to navigation. This prohibition aims to stop the use of flash tubes or "strobe lights" to attract attention. These lights have often been used by commercial fishing vessels and some recreational vessels to warn other vessels away. Such use is not legal on International Rules waters except under Rule 2 when a need to avoid *immediate* danger would justify a departure from Rule 36.

Even under Inland Rule 36, which does not explicitly prohibit strobe lights, you may not use to attract attention a strobe light that has the flash characteristic described for distress in Rule 37, that is, 50 to 70 flashes per minute.

Home

Table of Contents

Rule 37

Handbook of the Nautical Rules of the Road by Llana & Wisneskey

Home - Table of Contents

Rule 37 -- Distress Signals

INTERNATIONAL	INLAND
When a vessel is in distress and requires assistance she shall use or exhibit the signals described in Annex IV to these Regulations.	When a vessel is in distress and requires assistance she shall use or exhibit the signals described in Annex IV to these Rules.

If your vessel is in distress and in need of assistance, you must use one or more of the signals listed in Annex IV. The distress signals themselves are not contained in Rule 37 because they do not prevent collisions.

All of the distress signals in the International Annex IV are in the Inland Annex IV. The Inland version adds one more distress signal--a high-intensity (about one flash per second) white flashing light or "strobe light."

Annex IV contains more rules relating to distress signals, and these will be discussed with that annex.

Home

Table of Contents

Rule 38

Rule 38 -- Exemptions

INTERNATIONAL

Any vessel (or class of vessels) provided that she complies with the requirements of the International Regulations for Preventing Collisions at Sea, 1960, the keel of which is laid or which is at a corresponding stage of construction before the entry into force of these Regulations may be exempted from compliance therewith as follows:

(a) The installation of lights with ranges prescribed in Rule 22, until four years after the date of entry into force of these Regulations.

(b) The installation of lights with color specifications as prescribed in Section 7 of Annex I to these Regulations, until four years after the date of entry into force of these Regulations.

(c) The repositioning of lights as a result of conversion from Imperial to metric units and rounding off measurement figures, permanent exemption.

(d)(i) The repositioning of masthead lights on vessels of less than 150 meters in length, resulting from the prescriptions of Section 3(a) of Annex I to these Regulations, permanent exemption.

(ii) The repositioning of masthead lights on vessels of 150 meters or more in length, resulting from the prescriptions of Section 3(a) of Annex I to these Regulations, until nine years after the date of entry into force of these Regulations.

(e) The repositioning of masthead lights resulting from the prescriptions of Section 2(b) of Annex I to these Regulations, until nine years after the date of entry into force of these Regulations.

(f) The repositioning of sidelights

INLAND

Any vessel or class of vessels, the keel of which is laid or which is at a corresponding stage of construction before the date of enactment of this Act, provided that she complies with the requirements of--

(a) The Act of June 7, 1897 (30 Stat. 96), as amended (33 U.S.C. 154-232) for vessels navigating the waters subject to that statute;

(b) Section 4233 of the Revised Statutes (33 U.S.C. 301-356) for vessels navigating the waters subject to that statute;

(c) The Act of February 8, 1895 (28 Stat. 645), as amended (33 U.S.C. 241-295) for vessels navigating the waters subject to that statute; or

(d) Sections 3, 4, and 5 of the Act of April 25, 1940 (54 Stat. 163), as amended (46 U.S.C. 526 b, c, and d) for motorboats navigating the waters subject to that statute;

shall be exempted from compliance with the technical Annexes to these Rules as follows:

(i) the installation of lights with ranges prescribed in Rule 22, until 4 years after the effective date of these Rules, except that vessels of less than 20 meters in length are permanently exempt;

(ii) the installation of lights with color specifications as prescribed in Annex I to these Rules, until 4 years after the effective date of these Rules, except that vessels of less than 20 meters in length are permanently exempt;

(iii) the repositioning of lights as a result of conversion to metric units and rounding off measurement figures, are

resulting from the prescriptions of Section 2(g) and 3(b) of Annex I to these Regulations, until nine years after the date of entry into force of these Regulations.

(g) The requirements for sound signal appliances prescribed in Annex III to these Regulations, until nine years after the date of entry into force of these Regulations.

(h) The repositioning of all-round lights resulting from the prescription of Section 9(b) of Annex I to these Regulations, permanent exemption.

permanently exempt; and

(iv) the horizontal repositioning of masthead lights prescribed by Annex I to these Rules:

(1) on vessels of less than 150 meters in length, permanent exemption.

(2) on vessels of 150 meters or more in length, until 9 years after the effective date of these Rules.

(v) the restructuring or repositioning of all lights to meet the prescriptions of Annex I to these Rules, until 9 years after the effective date of these Rules;

(vi) power-driven vessels of 12 meters or more but less than 20 meters in length are permanently exempt from the provisions of Rule 23(a)(i) and 23(a)(iv) provided that, in place of these lights, the vessel exhibits a white light aft visible all round the horizon; and

(vii) the requirements for sound signal appliances prescribed in Annex III to these Rules, until 9 years after the effective date of these Rules.

The International and Inland Rules now in effect are relative new, historically speaking. The International Rules (International Regulations for Preventing Collisions at Sea, 1972) became effective on 15 July 1977, and the Inland Rules went into effect (except on the Great Lakes) on 24 December 1981. Each set contains specifications for the performance and positioning of navigation lights and sound signal appliances, technical details that were not in the previous rules. Because it would have been unreasonable to require vessel owners to replace navigation lights, sound signal appliances, and perhaps even supporting structures as soon as the new rules came into effect, Rule 38 allowed mariners to make changes over time and excused them from some changes entirely.

Rule 38 begins by explaining which vessels are eligible for exemptions. For a vessel to be exempt, its construction must have been started before 15 July 1977 (International) or 24 December 1980 (the date of enactment of the Inland Rules was one year before the *effective* date). In addition, the vessel must have been in compliance with the 1960 International Regulations or with the old Inland, Western Rivers, or Great Lakes rules, or the Motorboat Act of 1940. Vessels built since 15 July 1977 (International) and 24 December 1980 (Inland) are not eligible for any exemptions.

The numbering of paragraphs in Inland Rule 38 is somewhat confusing. The paragraphs labeled (i), (ii), (iii), and so forth are not subsections of the paragraph labeled (d), but rather follow from and are on equal footing with the unnumbered introductory paragraph that contains (a), (b), (c), and (d). For clarity, in the above presentation of the rule, I have detached the final sentence of the introductory

paragraph from its official place embedded in subparagraph (d).

The final sentence of the introductory paragraph (that is, the sentence in (d)), which ends with "shall be exempted from compliance with the technical Annexes to these Rules as follows," is also misleading because it mentions only exemptions from the "technical Annexes." Paragraph (i) of Rule 38 gives exemptions to provisions of Rule 22, and paragraph (vi) gives exemptions to provisions of Rule 23.

The permanent exemption for conversion to metric units refers to old requirements that were retained but were converted to the metric system of measurement. For example, an old requirement might have called for six feet of spacing between lights. The new requirement would round off the measurement to two meters, a little more than six feet. If your lights were separated by six feet, you would be exempt from having to adjust them to meet the exact metric requirement.

There are other differences between the International and Inland versions of Rule 38 besides the date from which the clock begins to run. The Inland exemptions are broader in scope, for example, and small vessels with Inland Rule lighting are permanently exempt from virtually all changes.

Note that the Inland Rule date of eligibility for exemption is keel laid before the date of "enactment" (when the Inland Rules were signed into law) rather than the date the Rules became effective. This is probably another quirk in the drafting of those rules rather than the intent. Relaxed enforcement may be used to ease the burden on affected vessels (built between the two dates), since the technical annexes were not published before the effective date.

Rule 38 is addressed more to the vessel owner than the crew, as it is the owner who exercises control over vessel modifications and equipment. Rule 38 also implies a warning for the mariner, though. Not everything on the water will conform exactly to the new requirements, and the mariner should be alert for the unusual.

Home

Table of Contents

Annex I

Handbook of the Nautical Rules of the Road by Llana & Wisneskey

Home - Table of Contents

Annex I -- Positioning and Technical Details of Navigation Lights

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Annex I tells us how navigation lights have to peform and where they must be located. It doesn't say what lights to display--the Rules do that. Annex I also describes the size, color, and spacing for day shapes.

The International Annex I came first. The Inland Annex I is very similar but many specifications differ to suit the particular conditions of the inland waterways.

The Inland Annex I is a regulation. It is marked with "section" symbols (§) and numbers beginning with "84," because it is Part 84, Title 33 of the Code of Federal Regulations. The other four Inland annexes are Parts 85, 86, 87, and 88.

INTERNATIONAL	INLAND
1. Definition	**§ 84.01 Definitions**
The term "height above the hull" means height above the uppermost continuous deck. This height shall be measured from the position vertically beneath the location of the light.	(a) The term "height above the hull" means height above the uppermost continuous deck. This height shall be measured from the position vertically beneath the location of the light.

Annex I normally expresses the vertical position of lights as "height above the hull." This is measured from the highest deck (directly below the light, in the center of the vessel if the light is in the center) that extends over the length of the ship or nearly so.

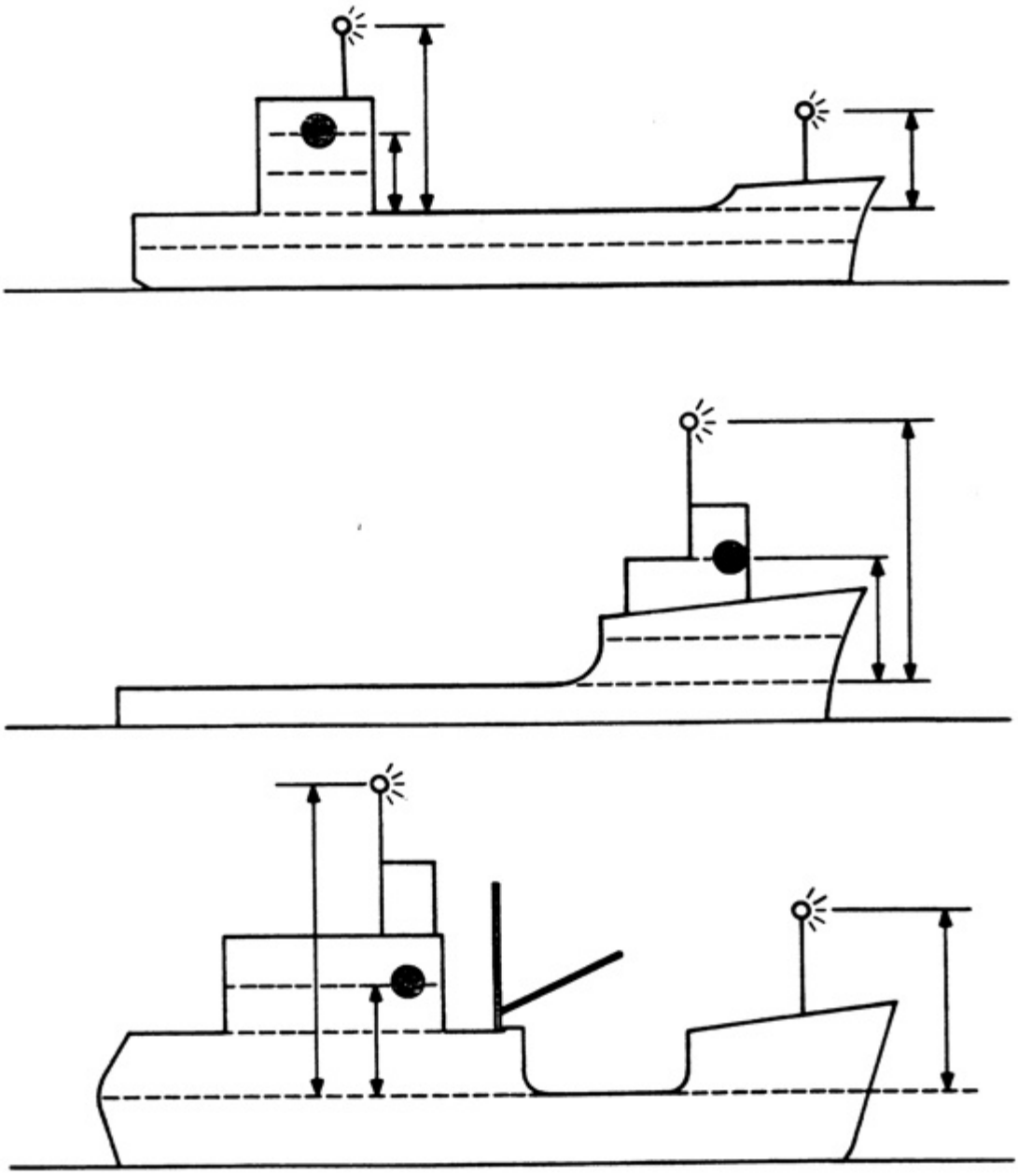


Figure 4—Measurement of "height above the hull."

INLAND

(b) High-speed craft means a craft capable of maximum speed in meters per second (m/s) equal to or exceeding:

$$3.7 \nabla^{0.1667}$$

where ∇ = displacement corresponding to the design waterline (meters^3)

Note to paragraph (b): The same formula expressed in pounds and knots is maximum speed in knots (kts) equal to exceeding 1.98 (lbs) x $\nabla^{0.1667}$; where ∇ = displacement corresponding to design waterline in pounds.

This definition of high-speed craft has been added because of an exception for this class of vessel to the general masthead light vertical positioning requirements. The definition was taken from the International Maritime Organization's "International Code of Safety for High-Speed Craft."

INLAND

(c) The term "practical cut-off" means, for vessels 20 meters or more in length, 12.5 percent of the minimum luminous intensity (Table 84.15(b)) corresponding to the greatest range of visibility for which the requirements of Annex I are met.

Many navigation lights give you a rough idea of the orientation of a vessel, depending on whether you see a green sidelight, a red sidelight, masthead lights, or whatever. In other words, you know that, in relation to the observed vessel, you are within a certain horizontal sector. The term "horizontal sector" refers to the arc around the horizon through which each navigation light is supposed to shine. When you move from the inside to the outside of the sector, the light "cuts off."

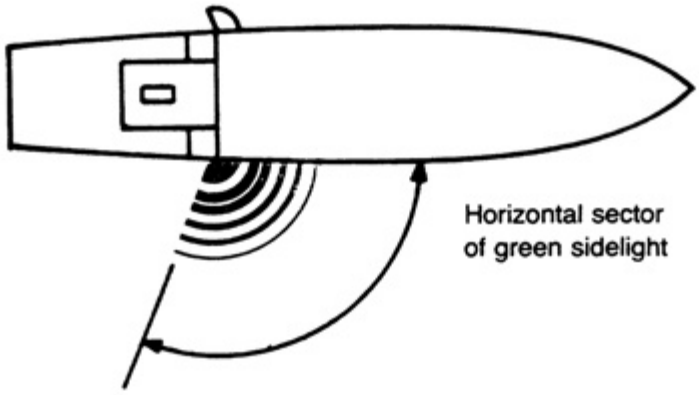


Figure 5—Example of a "horizontal sector."

In theory, a light should have full intensity everywhere inside the sector and be absolutely dark outside the sector. In practice, this level of performance hasn't been achieved using common technology and at a reasonable cost. Cut-off isn't instant and complete. Some light, undesirably because it affects perceptions of orientation, leaks outside of the sector. Annex I requires that "practical cut-off" be a reduction of the light intensity down to below 12.5 percent of what must be shown inside the sector. This is for lights designed for vessels twenty meters and longer.

The term "practical cut-off" is defined only in Inland Annex I, but the U.S. Coast

Guard is using the same definition in its International Rules navigation light approval program for inspected vessels. The United States does not define practical cut-off for lights designed for vessels less than twenty meters, although a number of European countries do. These countries also certify or approve their own small-vessel navigation lights as meeting the International Annex I specifications.

The Inland Rule definition for practical cut-off is worded so that a navigation light may be used on a vessel smaller than the vessel size class for which it was designed. The language "corresponding to the greatest range of visibility for which the requirements of Annex I are met" results in a single practical cut-off for any particular light rather than a different practical cut-off for each class of vessel.

For example, a masthead light designed for vessels twenty to fifty meters long has a minimum required range of five miles (see Rule 22). Annex I requires an intensity of at least fifty-two candelas for a five-mile light (see § 84.15). A six-mile light needs ninety-four candelas, almost twice as bright; a three-mile light, twelve candelas. We'll say in our example that the actual "five-mile" light has an intensity of sixty-three candelas in the sector and is being used on a boat eighteen meters long. The practical cut-off in this case would be 12.5 percent of *fifty-two* candelas or 6.5. We don't base practical cut-off on the sixty-three candela actual intensity or on the twelve-candela minimum required intensity for the size vessel (eighteen meters) on which the light is installed.

INLAND

(d) The term "Rule" or "Rules" means the Inland Navigation Rules contained in Sec. 2 of the Inland Navigational Rules Act of 1980 (Pub. L. 96-591, 94 Stat. 3415, 33 U.S.C. 2001, December 24, 1980) as amended.

The Inland navigation rules were enacted by Congress through legislation, whereas the annexes were enacted by the Coast Guard as regulations.

INTERNATIONAL	INLAND
2. Vertical positioning and spacing of lights	**§ 84.03 Vertical positioning and spacing of lights**
(a) On a power-driven vessel of 20 meters or more in length the masthead lights shall be placed as follows:	(a) On a power-driven vessel of 20 meters or more in length the masthead lights shall be placed as follows:
(i) the forward masthead light, or if only one masthead light is carried, then that light, at a height above the hull of not less than 6 meters, and, if the breadth of the vessel exceeds 6 meters, then at a height above the hull not less than such breadth, so however that the light need not be placed at a greater height above the hull than 12 meters.	(1) The forward masthead light, or if only one masthead light is carried, then that light, at a height above the hull of not less than 5 meters, and, if the breadth of the vessel exceeds 5 meters, then at a height above the hull not less than such breadth, so however that the light need not be placed at a greater height above the hull than 8 meters.
(ii) when two masthead lights are carried the after one shall be at least 4.5 meters vertically higher than the forward one.	(2) When two masthead lights are carried the after one shall be at least 2 meters vertically higher than the forward

(b) The vertical separation of masthead lights of power-driven vessels shall be such that in all normal conditions of trim the after light will be seen over and separate from the forward light at a distance of 1000 meters from the stem when viewed from sea level.

one.

(b) The vertical separation of masthead lights of power-driven vessels shall be such that in all normal conditions of trim the after light will be seen over and separate from the forward light at a distance of 1000 meters from the stem when viewed from sea level.

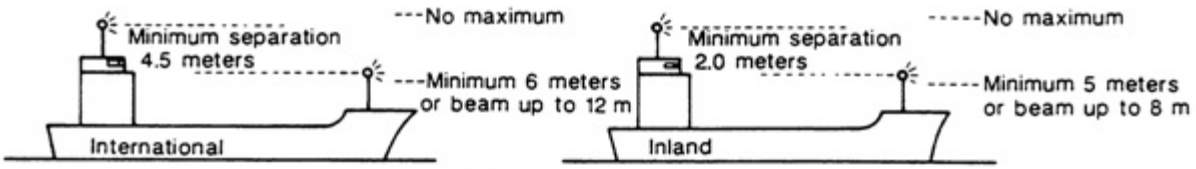


Figure 6—Vertical placement of masthead lights: vessels 20 meters or more in length.

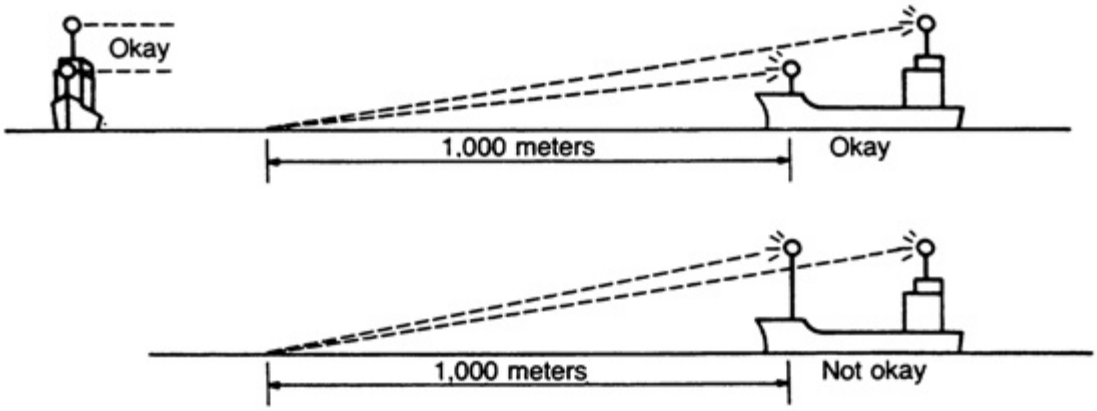


Figure 7—Vertical placement of masthead lights: sight picture.

(c) The masthead light of a power-driven vessel of 12 meters but less than 20 meters in length shall be placed at a height above the gunwale of not less than 2.5 meters.

(c) The masthead light of a power-driven vessel of 12 meters but less than 20 meters in length shall be placed at a height above the gunwale of not less than 2.5 meters.

(d) A power-driven vessel of less than 12 meters in length may carry the uppermost light at a height of less than 2.5 meters above the gunwale. When however, a masthead light is carried in addition to sidelights and a sternlight or the all-round light prescribed in rule 23(c)(i) is carried in addition to sidelights, then such masthead light or all-round

(d) The masthead light, or the all-round light described in Rule 23(c), of a power-driven vessel of less than 12 meters in length shall be carried at least 1 meter higher than the sidelights.

light shall be carried at least 1 meter higher than the sidelights.

Under International Rule 23, power-driven vessels less than twelve meters long may display the following: (1) sidelights, masthead light, and sternlight; (2) sidelights and all-round light; or (3) an all-round light, depending on boat size, speed, and preference of builder or owner. The Inland Rules permit only the first two options.

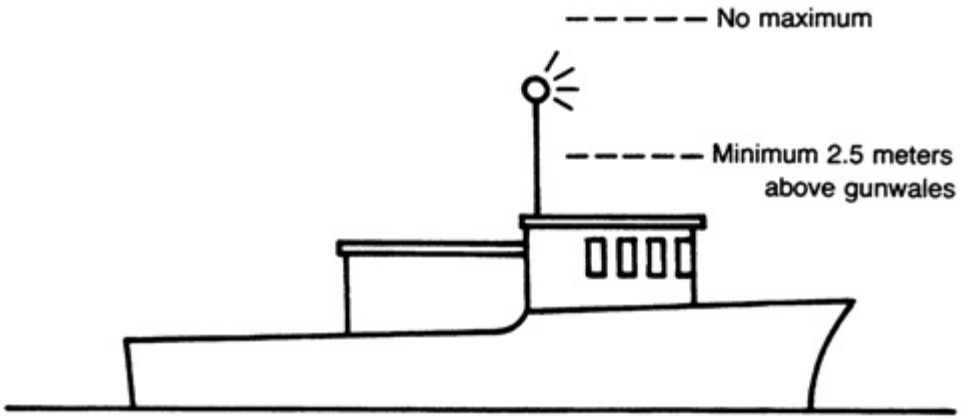


Figure 8—Vertical placement of masthead lights: power-driven vessels 12–20 meters in length.

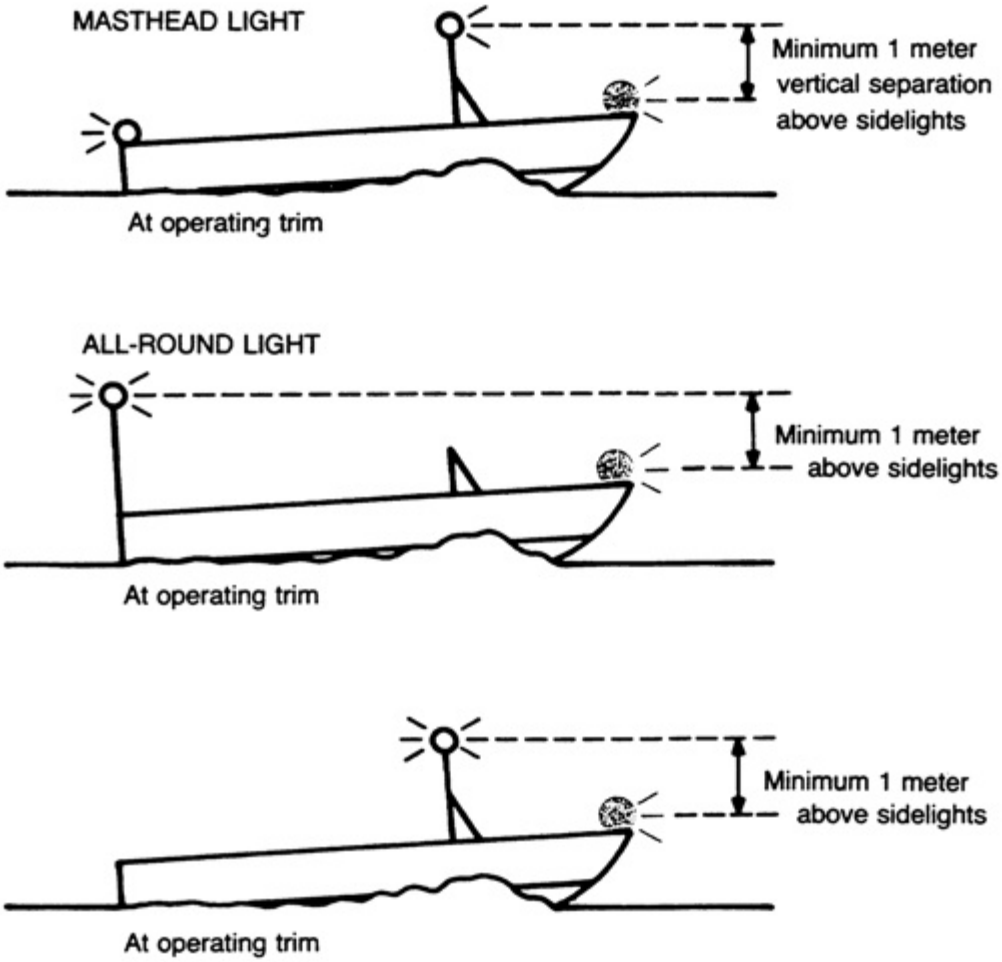


Figure 9—Vertical placement of masthead lights: power-driven vessels less than 12 meters in length.

If sidelights are displayed, the masthead light or all-round light must be at least one meter above the sidelights. The vertical separation is measured at operating trim, which is often different from static trim. Because boat trim may change

significantly with speed changes, vertical separation may be decreased substantially (from what deckline-to-light measurement would indicate) if the masthead/all-round light is mounted very far aft of the sidelights.

This is especially a problem if the all-round light is mounted all the way aft, as was required by the now-repealed Motorboat Act of 1940, and the sidelights are mounted all the way forward. The all-round light (or masthead light) may now be mounted anywhere from stem to stern. Mounting it horizontally close to the sidelights will minimize the adverse effect or trim changes on vertical separation.

INTERNATIONAL	INLAND
(e) One of the two or three masthead lights prescribed for a power-driven vessel when engaged in towing or pushing another vessel shall be placed in the same position as either the forward masthead light or the after masthead light; provided that if carried on the aftermast, the lowest after masthead light shall be at least 4.5 meters vertically higher than the forward masthead light.	(e) One of the two or three masthead lights prescribed for a power-driven vessel when engaged in towing or pushing another vessel shall be placed in the same position as either the forward masthead light or the after masthead light, provided that if carried on the aftermast, the lowest after masthead light shall be at least 2 meters vertically higher than the highest forward masthead light.

In most cases, vessels engaged in towing display either one or two masthead lights in addition to the normal one(s) prescribed for ordinary power-driven vessels (see Rules 23 and 24). Although the language in the Rules says two (or three) masthead lights "instead of" an ordinary masthead light, Annex I 2(e)/§ 84.03(e) makes clear that the Rule 23 masthead light is to be one of the two or three in a vertical column, and paragraph (f)(i) says that of the two or three masthead lights carried in a vertical line for towing, the Rule 23 masthead light must be the highest one.

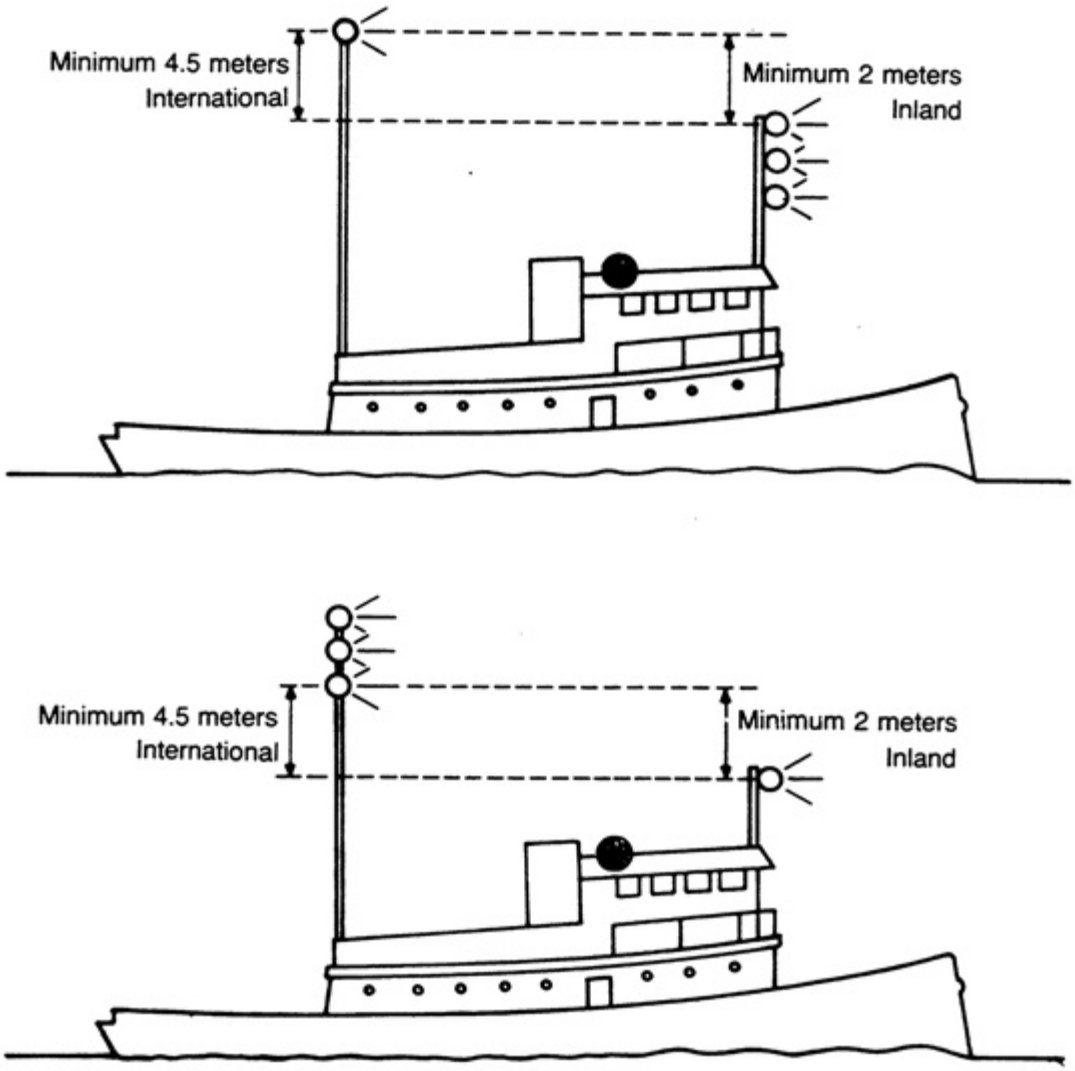


Figure 10—Vertical placement of masthead lights: towing vessels 50 meters or more in length and smaller vessels voluntarily carrying both forward and after masthead lights.

Vessels fifty meters or longer must carry both forward and after masthead lights (smaller vessels may do so). Vessels carrying both forward and after masthead lights (Rule 23(a)) also carry forward and after masthead lights when towing (Rule 24(d)). For towing, the additional masthead lights (one, or two if the tow length exceeds two hundred meters) can be carried under either the forward masthead light or the after masthead light.

If carried under the forward masthead light, the vertical separation between forward and after masthead lights will be unchanged from the non-towing display. If the additional lights are carried under the after masthead light, the vertical separation between masthead lights on forward and after masts will be reduced.

Annex I 2(e)/§ 84.03(e) requires that at least the minimum vertical separation be maintained between the lowest after masthead light and the forward masthead light.

Thus, if you carry your additional masthead lights on the after mast, your ordinary Rule 23 after masthead light must be mounted higher than would otherwise be required by Annex I 2(a)(ii)/§ 84.03(a)(2). The minimum vertical separation differs

between the International (4.5 meters) and Inland (2 meters) Rules.

INTERNATIONAL	INLAND
(f)(i) The masthead light or lights prescribed in Rule 23(a) shall be so placed as to be above and clear of all other lights and obstructions except as described in subparagraph (ii).	(f)(1) The masthead light or lights prescribed in Rule 23(a) shall be so placed as to be above and clear of all other lights and obstructions except as described in paragraph (f)(2) of this section.
(ii) When it is impracticable to carry the all-round lights prescribed by Rule 27(b)(i) or Rule 28 below the masthead lights, they may be carried above the after masthead light(s) or vertically in between the forward masthead light(s) and after masthead light(s), provided that in the latter case the requirement of Section 3(c) of this Annex shall be complied with.	(2) When it is impracticable to carry the all-round lights prescribed by Rule 27(b)(i) below the masthead lights, they may be carried above the after masthead light(s) or vertically in between the forward masthead light(s) and after masthead light(s), provided that in the latter case the requirement of § 84.05(d) shall be complied with.

The Rule 23 masthead lights are considered to be of great importance. As the brightest lights, they function as the reference by which other navigation lights are evaluated. Annex I 2(f)/§ 84.03(f) therefore requires that they be mounted high and be unobstructed.

The exception was added after problems were experienced with all-round lights, which are difficult to see "all-round" if they are mounted below a structure holding up the masthead light. All-round lights may now be placed above masthead lights, but only in the fashion described, which is designed to minimize interference from the masthead lights.

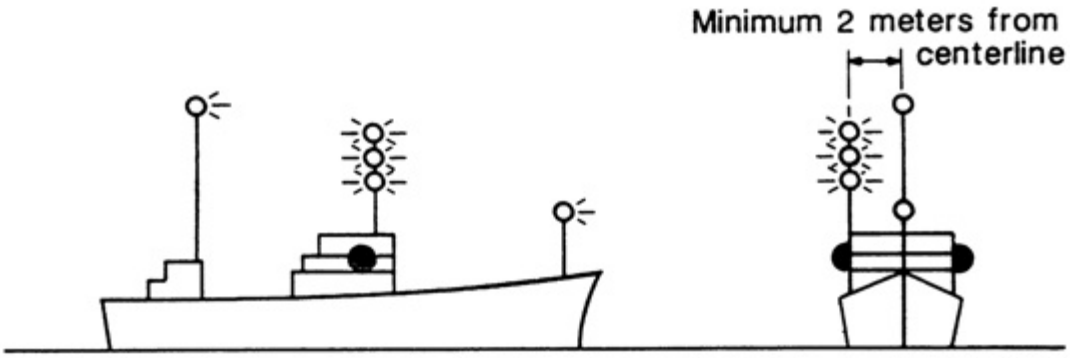


Figure 11—Vertical placement of masthead lights with respect to all-round lights.

The exempted all-round lights are those for vessels restricted in ability to maneuver (Rule 17(b)(i)) and for vessels constrained by draft (Rule 28, International only).

When all-round lights are above the after masthead light, they are usually directly above, not because it is required but because it is practical.

The all-round lights can be mounted on a mast or hung from a yardarm.

The exception permitting display of all-round lights above masthead lights applies only when it is not practicable to mount the all-round lights below the masthead light(s). If practicable, it must be done.

INTERNATIONAL	INLAND
(g) The sidelights of a power-driven vessel shall be placed at a height above the hull not greater than three quarters of that of the forward masthead light. They shall not be so low as to be interfered with by deck lights.	(g) The sidelights of a power-driven vessel shall be placed at least one meter lower than the forward masthead light. They shall not be so low as to be interfered with by deck lights.

The Requirement in the International version of this paragrph is modified or supplemented by paragraphs 2(d) and 2(h) of Annex I for vessels less than twelve and twenty meters, respectively.

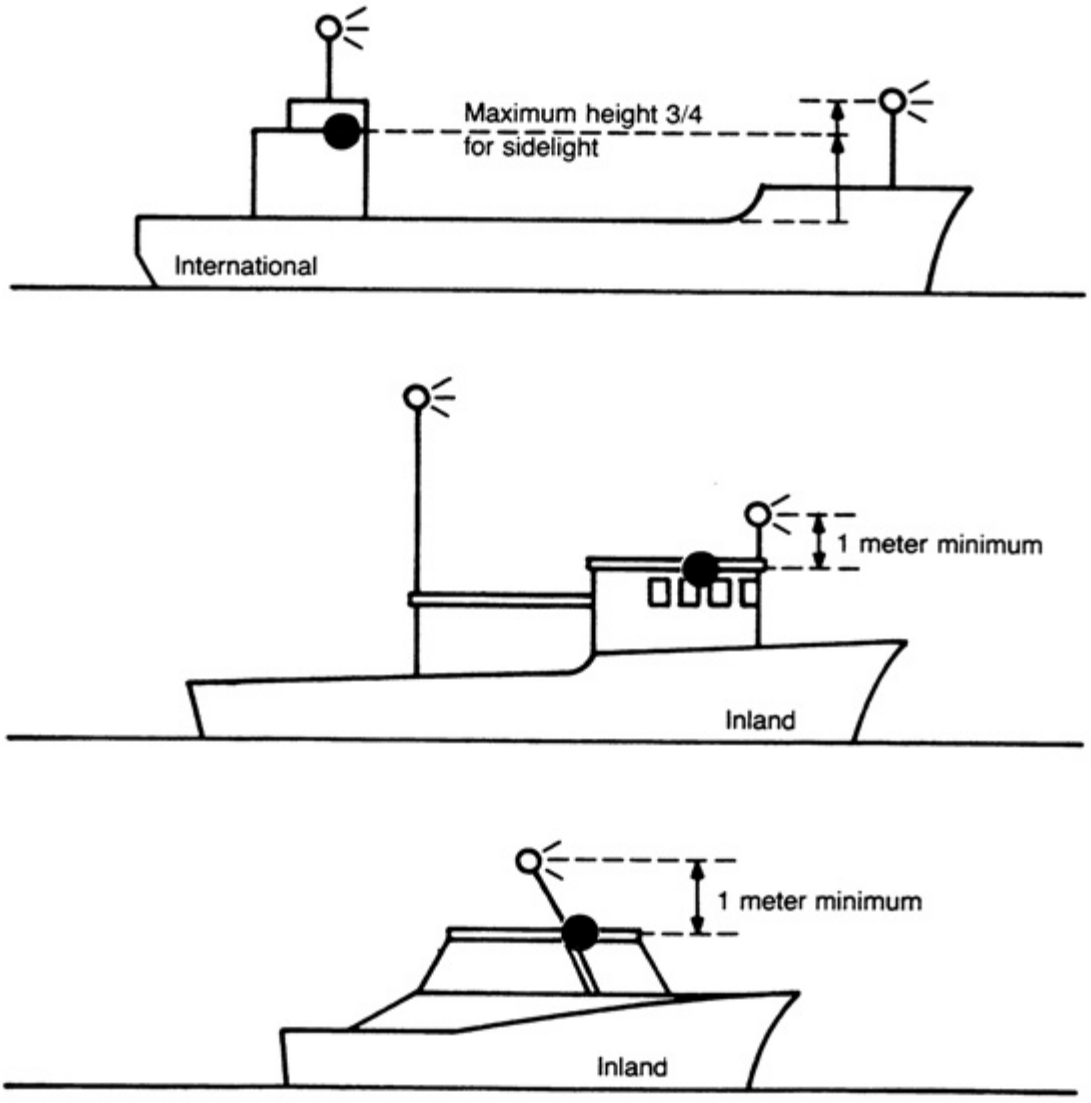


Figure 12—Vertical placement of sidelights.

INTERNATIONAL INLAND

(h) The sidelights, if in a combination lantern and carried on a power-driven vessel of less than 20 meters in length, shall be placed not less than 1 meter below the masthead light.	(h) [Reserved]

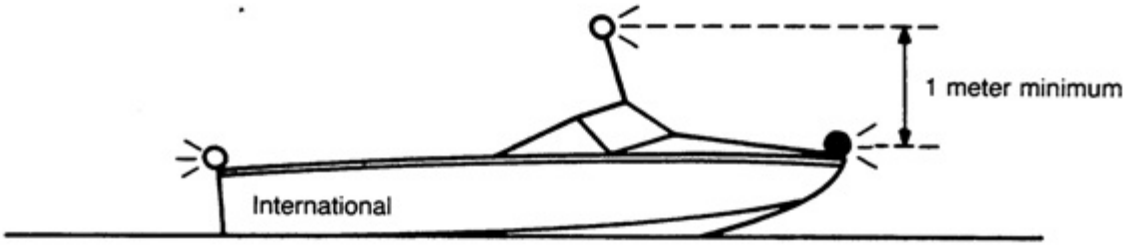


Figure 13—Vertical placement of sidelights on boats.

Only the International version has a paragraph (h). A similar Inland requirement would have duplicated the Inland § 84.03(g) requirement. Inland paragraph (h) was reserved so that corresponding International/Inland paragraphs would be numbered (or lettered) the same.

INTERNATIONAL	INLAND
(i) When the Rules prescribe two or three lights to be carried in a vertical line, they shall be spaced as follows;	(i) When the Rules prescribe two or three lights to be carried in a vertical line, they shall be spaced as follows;
(i) on a vessel of 20 meters in length or more such lights shall be spaced not less than 2 meters apart, and the lowest of these lights shall, except where a towing light is required, be placed at a height of not less than 4 meters above the hull;	(1) On a vessel of 20 meters in length or more such lights shall be spaced not less than 1 meter apart, and the lowest of these lights shall, except where a towing light is required, be placed at a height of not less than 4 meters above the hull;
(ii) on a vessel of less than 20 meters in length such lights shall be spaced not less than 1 meter apart and the lowest of these lights shall, except where a towing light is required, be placed at a height of not less than 2 meters above the gunwale;	(2) On a vessel of less than 20 meters in length such lights shall be spaced not less than 1 meter apart and the lowest of these lights shall, except where a towing light is required, be placed at a height of not less than 2 meters above the gunwale;
(iii) when three lights are carried they shall be equally spaced.	(3) When three lights are carried they shall be equally spaced.

The navigation rules frequently require the display of two or three lights in a vertical line--all-round lights, masthead lights, or lights aimed aft for towing. Annex I prescribes the spacing between the lights and the height above the hull (above the gunwale for smaller vessels) for the lowest light. Vertical height above the "hull" is above the uppermost continuous deck.

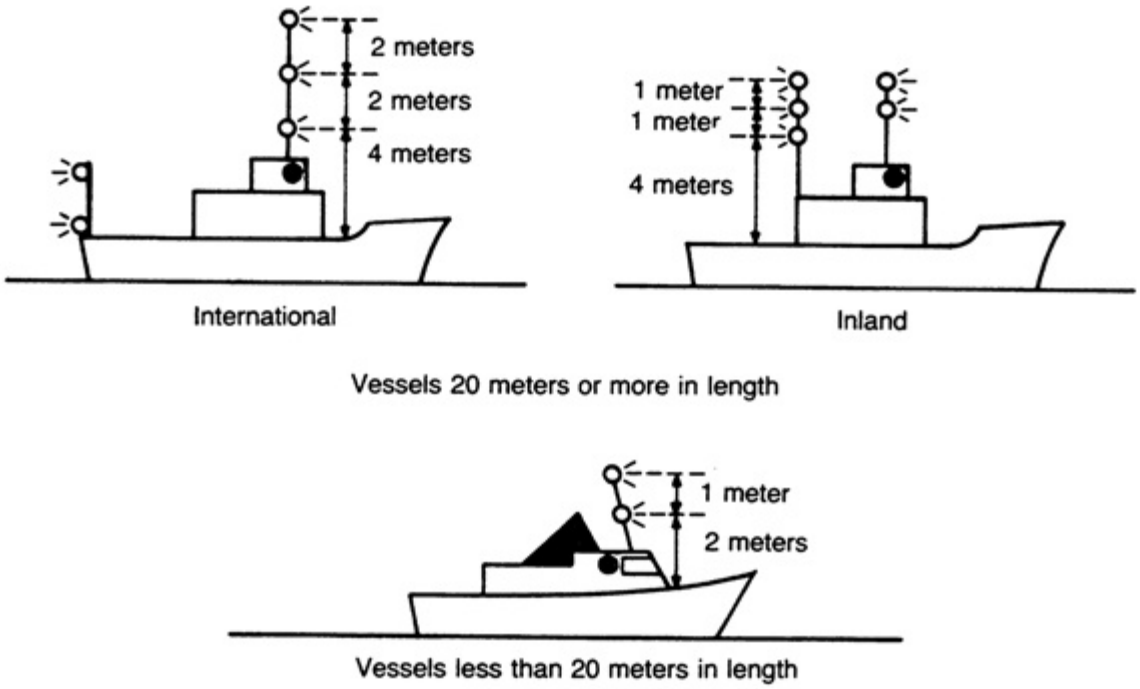
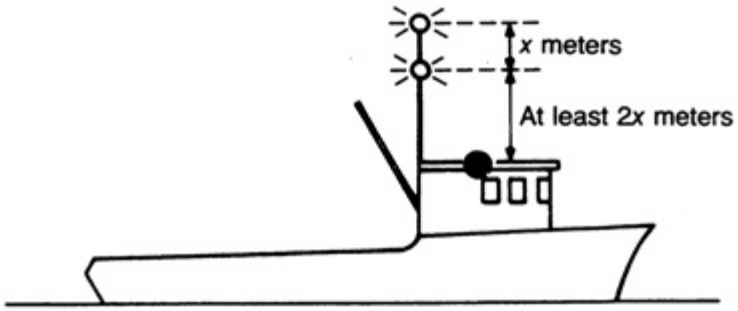


Figure 14—Minimum spacing of lights carried in a vertical line.

When a yellow towing light is displayed above the sternlight or above another towing light, the height-above-the-hull requirements do not apply. The sternlight, of course, is the same one used when not towing and may be placed right on the uppermost continuous deck or even below it. The same principle operates when two towing lights (no sternlight) are displayed in a vertical line (Inland Rules only).

INTERNATIONAL	INLAND
(j) The lower of the two all-round lights prescribed for a vessel when engaged in fishing shall be at a height above the sidelights not less than twice the distance between the two vertical lights.	(j) The lower of the two all-round lights prescribed for a vessel when engaged in fishing shall be at a height above the sidelights not less than twice the distance between the two vertical lights.
(k) The forward anchor light prescribed in Rule 30(a)(i), when two are carried, shall not be less than 4.5 meters above the after one. On a vessel 50 meters or more in length this forward anchor light shall be placed at a height of not less than 6 meters above the hull.	(k) The forward anchor light prescribed in Rule 30(a)(i), when two are carried, shall not be less than 4.5 meters above the after one. On a vessel 50 meters or more in length this forward anchor light shall be placed at a height of not less than 6 meters above the hull.

Rule 30 requires two anchor lights for vessels fifty meters or longer. Smaller vessels may display two anchor lights but are required to display only one (where it can best be seen).



x equals distance between upper and lower all-round lights. For example, if the vertical distance between the two all-round lights is 2 meters, then the lower all-round light must be at least 4 meters above the sidelights.

Figure 15—Vertical spacing of lights on fishing vessels.

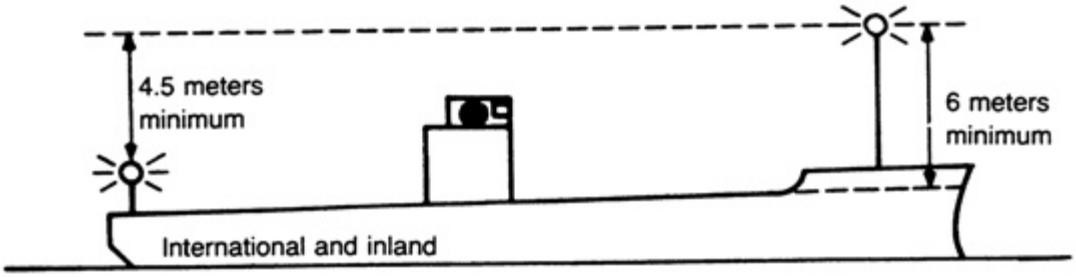


Figure 16—Vertical placement of anchor lights: vessels 50 meters or more in length.

INTERNATIONAL

3. Horizontal positioning and spacing of lights

(a) When two masthead lights are prescribed for a power-driven vessel, the horizontal distance between them shall not be less than one half of the length of the vessel but need not be more than 100 meters. The forward light shall be placed not more than one quarter of the length of the vessel from the stem.

INLAND

§ 84.05 Horizontal positioning and spacing of lights

(a) Except as specified in paragraph (e) of this section, when two masthead lights are prescribed for a power-driven vessel, the horizontal distance between them shall not be less than one-quarter of the length of the vessel but need not be more than 50 meters. The forward light shall be placed not more than one half of the length of the vessel from the stem.

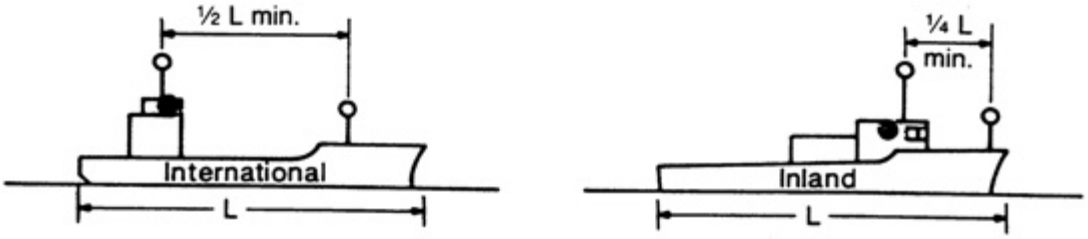


Figure 17—Horizontal spacing of masthead lights.

This provision affects primarily vessels fifty meters or longer because smaller vessels do not have to display both forward and after masthead lights. Both the International and Inland minimum separation is based on the length of the vessel. For power-driven vessels two hundred meters or longer, the minimum horizontal separation is a flat one hundred meters for International and fifty meters for Inland.

INTERNATIONAL	INLAND
(b) On a power-driven vessel of 20 meters or more in length the sidelights shall not be placed in front of the forward masthead lights. They shall be placed at or near the side of the vessel.	(b) On a power-driven vessel of 20 meters or more in length the sidelights shall not be placed in front of the forward masthead lights. They shall be placed at or near the side of the vessel.
(c) When the lights prescribed in 27(b)(i) or Rule 28 are placed vertically between the forward masthead light(s) and the after masthead light(s) these all-round lights shall be placed at a horizontal distance of not less than 2 meters from the fore and aft centerline of the vessel in the athwartship direction.	(c) When the lights prescribed in 27(b)(i) are placed vertically between the forward masthead light(s) and the after masthead light(s) these all-round lights shall be placed at a horizontal distance of not less than 2 meters from the fore and aft centerline of the vessel in the athwartship direction.

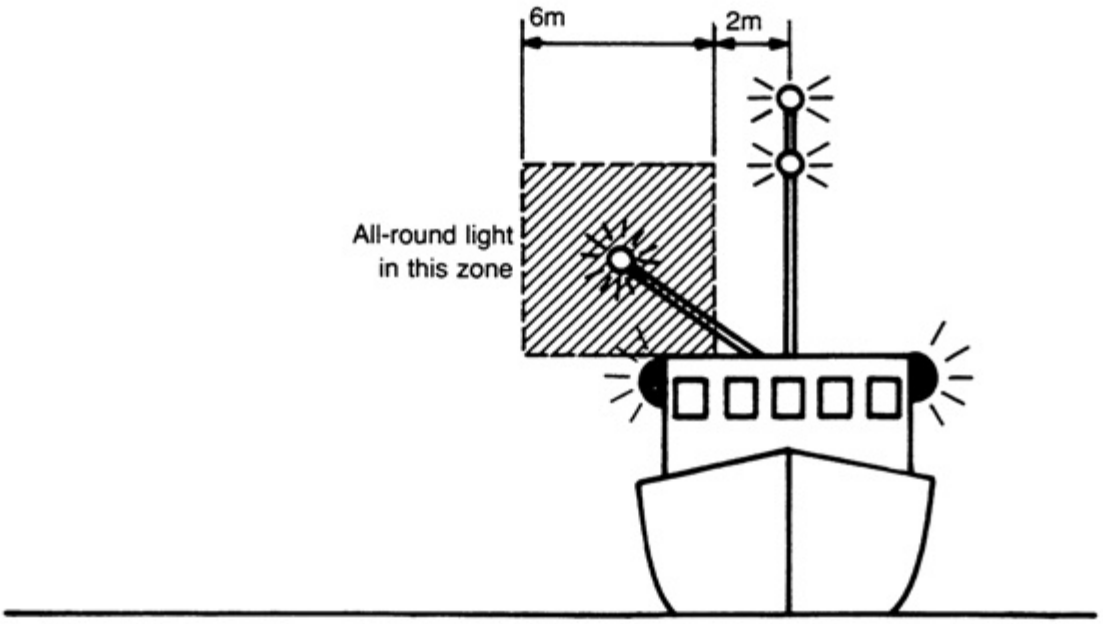
This provision is linked with Annex I (2)(f)/§ 84.03(f) requirement and is illustrated with the discussion of that vertical-positioning requirement.

INTERNATIONAL	INLAND
(d) When only one masthead light is prescribed for a power-driven vessel, this light shall be exhibited forward of amidships; except that a vessel of less than 20 meters in length need not exhibit this light forward of amidships but shall exhibit it as far forward as is practicable.	(d) When only one masthead light is prescribed for a power-driven vessel, this light must be exhibited forward of amidships. For a vessel of less than 20 meters in length, the vessel shall exhibit one masthead light as far forward as is practicable.
	(e) On power-driven vessels 50 meters but less than 60 meters in length operated on Western Rivers, the horizontal distance between masthead lights shall not be less than 10 meters.

Western Rivers towboats fifty to sixty meters long have a slightly relaxed requirement because their typical house arrangement makes meeting the full one-quarter-length separation more costly.

INTERNATIONAL	INLAND
4. Details of location of direction-indicating lights for fishing vessels, dredgers and vessels engaged in underwater operations	**§ 84.07 Details of location of direction-indicating lights for fishing vessels, dredgers and vessels engaged in underwater operations**
(a) The light indicating the direction of the outlying gear from a vessel engaged in fishing as prescribed in Rule 26(c)(ii) shall be placed at a horizontal distance of not less than 2 meters and not more than 6 meters away from the two all-round red and white lights. This light shall be placed not higher than the all-round white light prescribed in Rule 26(c)(i) and not lower than the sidelights.	(a) The light indicating the direction of the outlying gear from a vessel engaged in fishing as prescribed in Rule 26(c)(ii) shall be placed at a horizontal distance of not less than 2 meters and not more than 6 meters away from the two all-round red and white lights. This light shall be placed not higher than the all-round white light prescribed in Rule 26(c)(i) and not lower than the sidelights.

Rule 26(c) applies to vessels engaged in fishing by means other than trawling. The identifying lights are an all-round red in a vertical line over an all-round white. When outlying fishing gear extends more than 150 meters from the vessel, an all-round white light must be displayed in the direction of that gear. This all-round light must be outside a circle with a two-meter radius and inside a circle with a six-meter radius, as viewed from above the vessel and with the center of both circles at the vertical line running through the red and white all-round identifying lights.



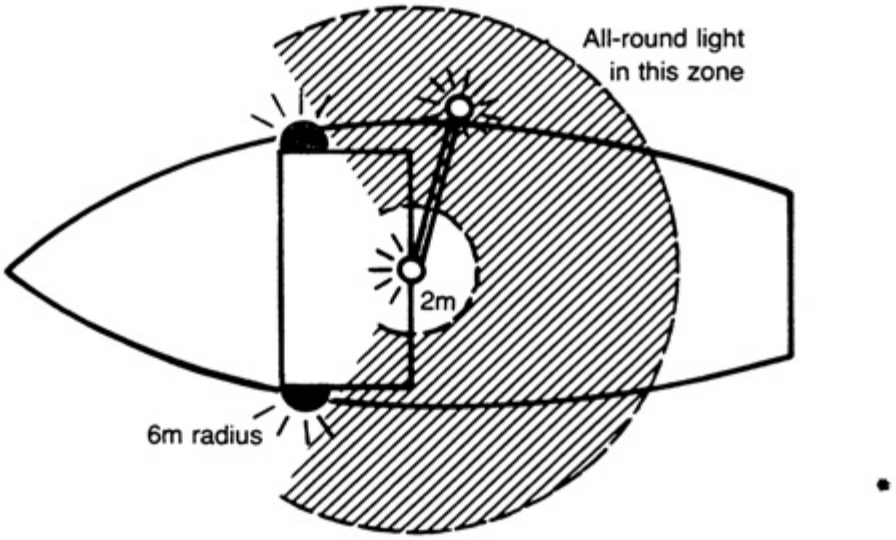
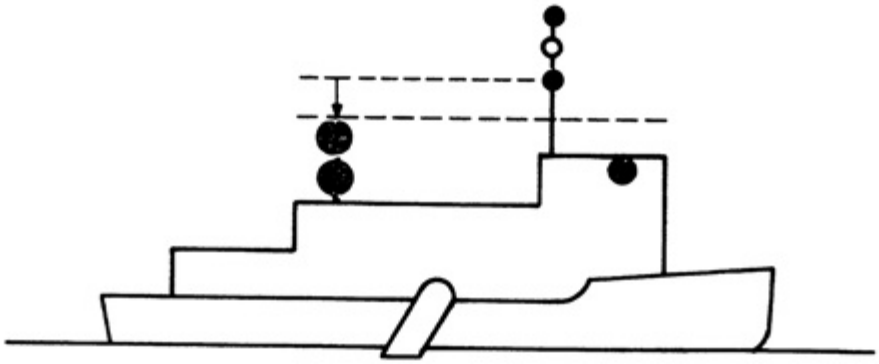


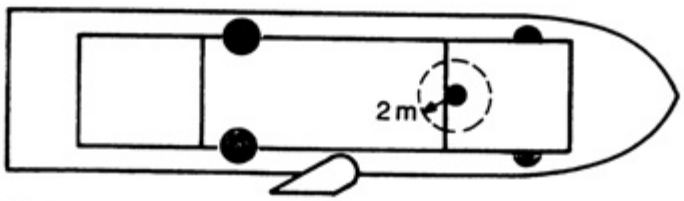
Figure 18—Placement of direction-indicating lights.

INTERNATIONAL	INLAND
(b) The lights and shapes on a vessel engaged in dredging or underwater operations to indicate the obstructed side and/or the side on which it is safe to pass, as prescribed in Rule 27(d)(i) and (ii), shall be placed at the maximum practical horizontal distance, but in no case less than 2 meters, from the lights or shapes prescribed in Rule 27(b)(i) and	(b) The lights and shapes on a vessel engaged in dredging or underwater operations to indicate the obstructed side and/or the side on which it is safe to pass, as prescribed in Rule 27(d)(i) and (ii), shall be placed at the maximum practical horizontal distance, but in no case less than 2 meters, from the lights or shapes prescribed in Rule 27(b)(i) and

(ii). In no case shall the upper of these lights or shapes be at a greater height than the lower of the three lights or shapes prescribed in Rule 27(b)(i) and (ii).

(ii). In no case shall the upper of these lights or shapes be at a greater height than the lower of the three lights or shapes prescribed in Rule 27(b)(i) and (ii).





Red and green pairs must be displayed outside 2-meter-radius circle surrounding red-white-red all-round lights, as far away as "practical."

Figure 19—Lights for vessels engaged in dredging or underwater operations.

Rule 27(d) applies to vessels engaged in dredging or underwater operations when their work involves placing an obstruction to one side of the vessel. The vessel displays the 27(b) red-white-red vertical array to indicate restricted ability to maneuver, the 27(d) red-over-red all-round lights to indicate the side having the obstruction, and green-over-green all-round lights to indicate on which side it is safe to pass.

These Annex I provisions also apply to the corresponding shapes during the day.

Annex I continues - Click Here

Home

Table of Contents

Annex II

Annex I -- Positioning and Technical Details of Navigation Lights

Annex I tells us how navigation lights have to peform and where they must be located. It doesn't say what lights to display--the Rules do that. Annex I also describes the size, color, and spacing for day shapes.

The International Annex I came first. The Inland Annex I is very similar but many specifications differ to suit the particular conditions of the inland waterways.

The Inland Annex I is a regulation. It is marked with "section" symbols (§) and numbers beginning with "84," because it is Part 84, Title 33 of the Code of Federal Regulations. The other four Inland annexes are Parts 85, 86, 87, and 88.

INTERNATIONAL	INLAND
1. Definition	**§ 84.01 Definitions**
The term "height above the hull" means height above the uppermost continuous deck. This height shall be measured from the position vertically beneath the location of the light.	(a) The term "height above the hull" means height above the uppermost continuous deck. This height shall be measured from the position vertically beneath the location of the light.

Annex I normally expresses the vertical position of lights as "height above the hull." This is measured from the highest deck (directly below the light, in the center of the vessel if the light is in the center) that extends over the length of the ship or nearly so.

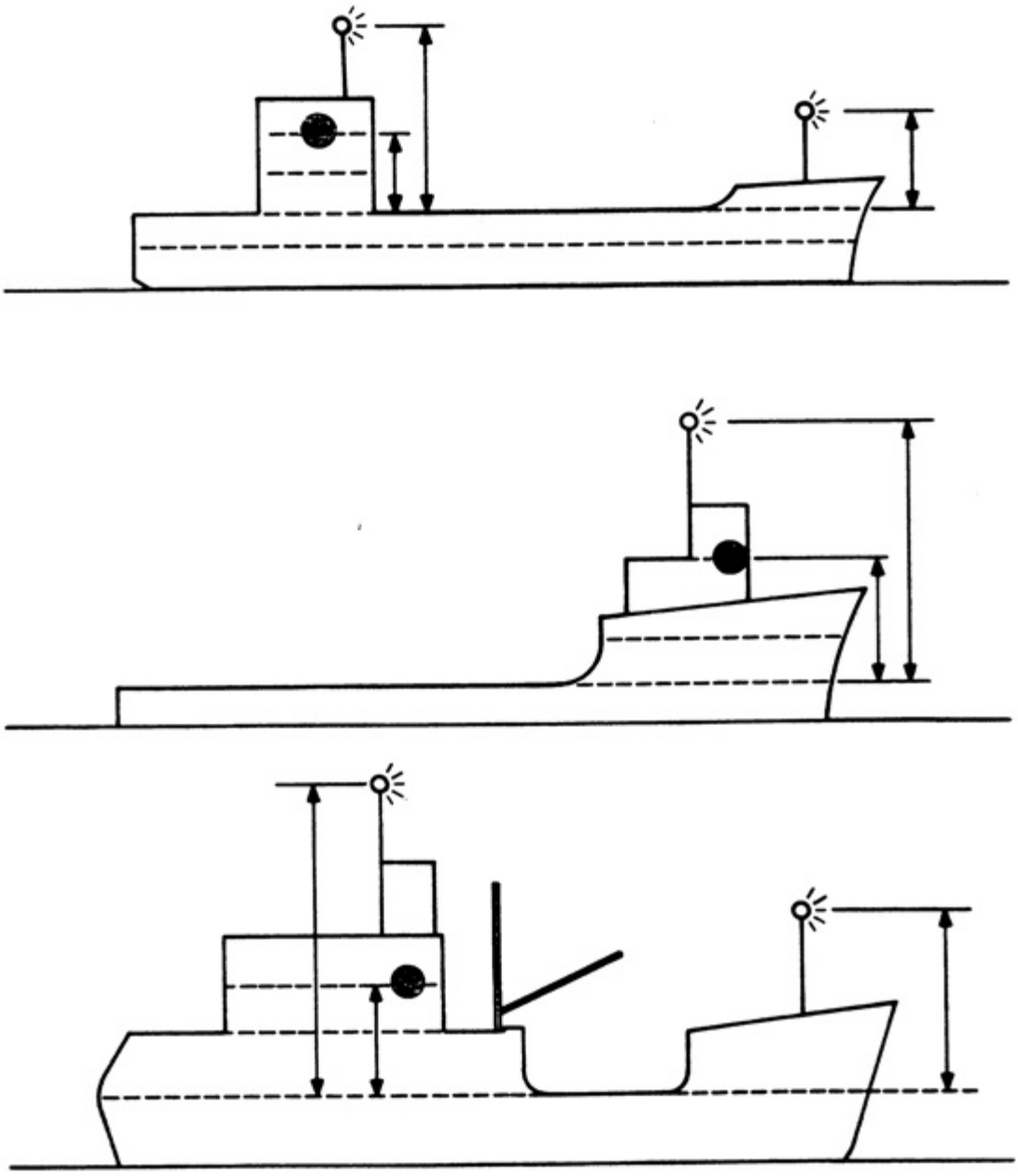


Figure 4—Measurement of "height above the hull."

INLAND

(b) High-speed craft means a craft capable of maximum speed in meters per second (m/s) equal to or exceeding:

$$3.7 \nabla^{0.1667}$$

where ∇ = displacement corresponding to the design waterline (meters^3)

Note to paragraph (b): The same formula expressed in pounds and knots is maximum speed in knots (kts) equal to exceeding 1.98 (lbs) x $\nabla^{0.1667}$; where ∇ = displacement corresponding to design waterline in pounds.

This definition of high-speed craft has been added because of an exception for this class of vessel to the general masthead light vertical positioning requirements. The definition was taken from the International Maritime Organization's "International Code of Safety for High-Speed Craft."

INLAND

(c) The term "practical cut-off" means, for vessels 20 meters or more in length, 12.5 percent of the minimum luminous intensity (Table 84.15(b)) corresponding to the greatest range of visibility for which the requirements of Annex I are met.

Many navigation lights give you a rough idea of the orientation of a vessel, depending on whether you see a green sidelight, a red sidelight, masthead lights, or whatever. In other words, you know that, in relation to the observed vessel, you are within a certain horizontal sector. The term "horizontal sector" refers to the arc around the horizon through which each navigation light is supposed to shine. When you move from the inside to the outside of the sector, the light "cuts off."

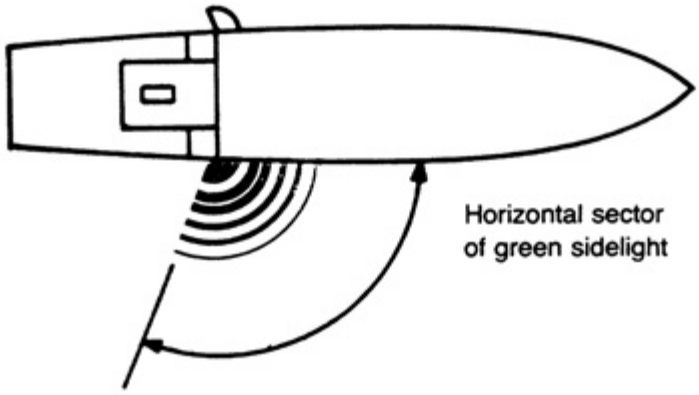


Figure 5—Example of a "horizontal sector."

In theory, a light should have full intensity everywhere inside the sector and be absolutely dark outside the sector. In practice, this level of performance hasn't been achieved using common technology and at a reasonable cost. Cut-off isn't instant and complete. Some light, undesirably because it affects perceptions of orientation, leaks outside of the sector. Annex I requires that "practical cut-off" be a reduction of the light intensity down to below 12.5 percent of what must be shown inside the sector. This is for lights designed for vessels twenty meters and longer.

The term "practical cut-off" is defined only in Inland Annex I, but the U.S. Coast

Guard is using the same definition in its International Rules navigation light approval program for inspected vessels. The United States does not define practical cut-off for lights designed for vessels less than twenty meters, although a number of European countries do. These countries also certify or approve their own small-vessel navigation lights as meeting the International Annex I specifications.

The Inland Rule definition for practical cut-off is worded so that a navigation light may be used on a vessel smaller than the vessel size class for which it was designed. The language "corresponding to the greatest range of visibility for which the requirements of Annex I are met" results in a single practical cut-off for any particular light rather than a different practical cut-off for each class of vessel.

For example, a masthead light designed for vessels twenty to fifty meters long has a minimum required range of five miles (see Rule 22). Annex I requires an intensity of at least fifty-two candelas for a five-mile light (see § 84.15). A six-mile light needs ninety-four candelas, almost twice as bright; a three-mile light, twelve candelas. We'll say in our example that the actual "five-mile" light has an intensity of sixty-three candelas in the sector and is being used on a boat eighteen meters long. The practical cut-off in this case would be 12.5 percent of *fifty-two* candelas or 6.5. We don't base practical cut-off on the sixty-three candela actual intensity or on the twelve-candela minimum required intensity for the size vessel (eighteen meters) on which the light is installed.

INLAND

(d) The term "Rule" or "Rules" means the Inland Navigation Rules contained in Sec. 2 of the Inland Navigational Rules Act of 1980 (Pub. L. 96-591, 94 Stat. 3415, 33 U.S.C. 2001, December 24, 1980) as amended.

The Inland navigation rules were enacted by Congress through legislation, whereas the annexes were enacted by the Coast Guard as regulations.

INTERNATIONAL

2. Vertical positioning and spacing of lights

(a) On a power-driven vessel of 20 meters or more in length the masthead lights shall be placed as follows:

(i) the forward masthead light, or if only one masthead light is carried, then that light, at a height above the hull of not less than 6 meters, and, if the breadth of the vessel exceeds 6 meters, then at a height above the hull not less than such breadth, so however that the light need not be placed at a greater height above the hull than 12 meters.

(ii) when two masthead lights are carried the after one shall be at least 4.5 meters vertically higher than the forward one.

INLAND

§ 84.03 Vertical positioning and spacing of lights

(a) On a power-driven vessel of 20 meters or more in length the masthead lights shall be placed as follows:

(1) The forward masthead light, or if only one masthead light is carried, then that light, at a height above the hull of not less than 5 meters, and, if the breadth of the vessel exceeds 5 meters, then at a height above the hull not less than such breadth, so however that the light need not be placed at a greater height above the hull than 8 meters.

(2) When two masthead lights are carried the after one shall be at least 2 meters vertically higher than the forward

(b) The vertical separation of masthead lights of power-driven vessels shall be such that in all normal conditions of trim the after light will be seen over and separate from the forward light at a distance of 1000 meters from the stem when viewed from sea level.

one.

(b) The vertical separation of masthead lights of power-driven vessels shall be such that in all normal conditions of trim the after light will be seen over and separate from the forward light at a distance of 1000 meters from the stem when viewed from sea level.

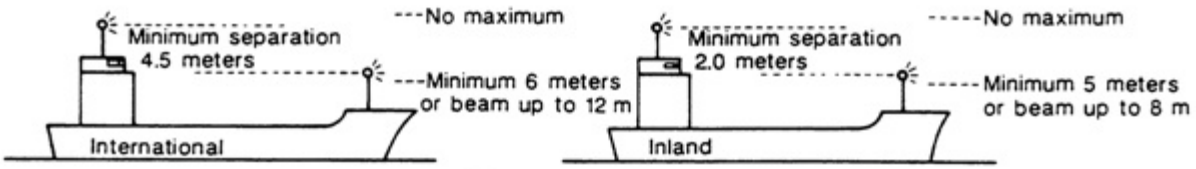


Figure 6—Vertical placement of masthead lights: vessels 20 meters or more in length.

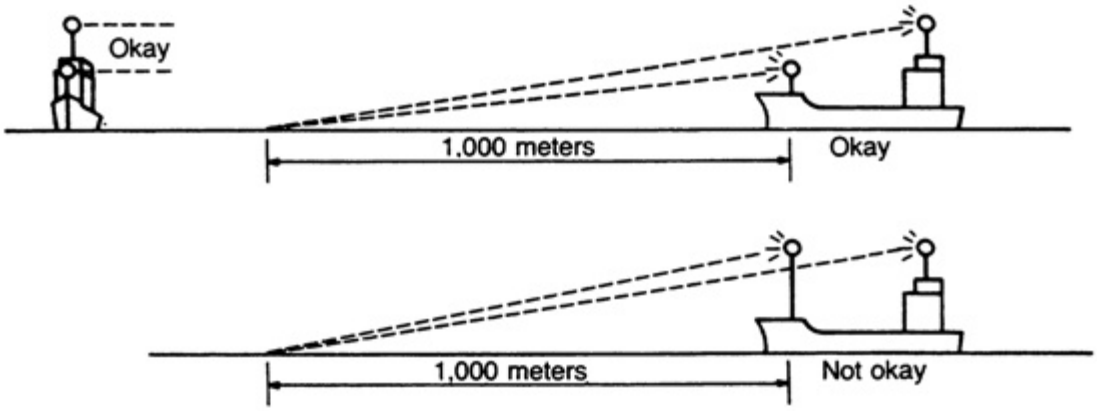


Figure 7—Vertical placement of masthead lights: sight picture.

(c) The masthead light of a power-driven vessel of 12 meters but less than 20 meters in length shall be placed at a height above the gunwale of not less than 2.5 meters.

(d) A power-driven vessel of less than 12 meters in length may carry the uppermost light at a height of less than 2.5 meters above the gunwale. When however, a masthead light is carried in addition to sidelights and a sternlight or the all-round light prescribed in rule 23(c)(i) is carried in addition to sidelights, then such masthead light or all-round

(c) The masthead light of a power-driven vessel of 12 meters but less than 20 meters in length shall be placed at a height above the gunwale of not less than 2.5 meters.

(d) The masthead light, or the all-round light described in Rule 23(c), of a power-driven vessel of less than 12 meters in length shall be carried at least 1 meter higher than the sidelights.

light shall be carried at least 1 meter higher than the sidelights.

Under International Rule 23, power-driven vessels less than twelve meters long may display the following: (1) sidelights, masthead light, and sternlight; (2) sidelights and all-round light; or (3) an all-round light, depending on boat size, speed, and preference of builder or owner. The Inland Rules permit only the first two options.

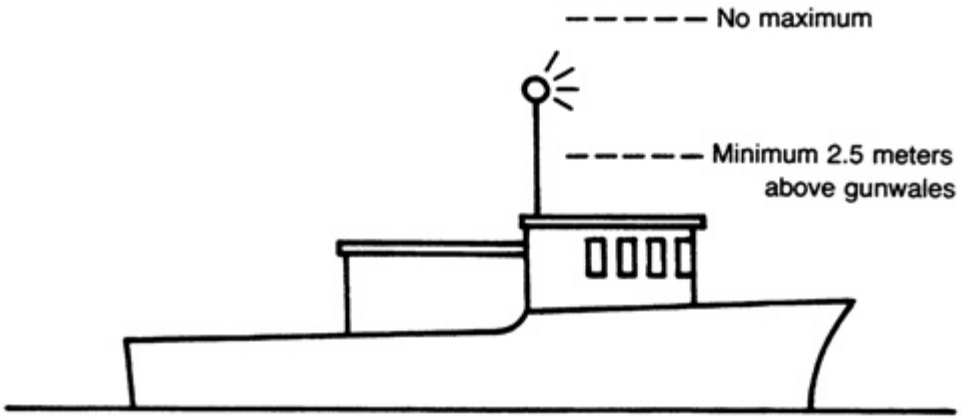


Figure 8—Vertical placement of masthead lights: power-driven vessels 12–20 meters in length.

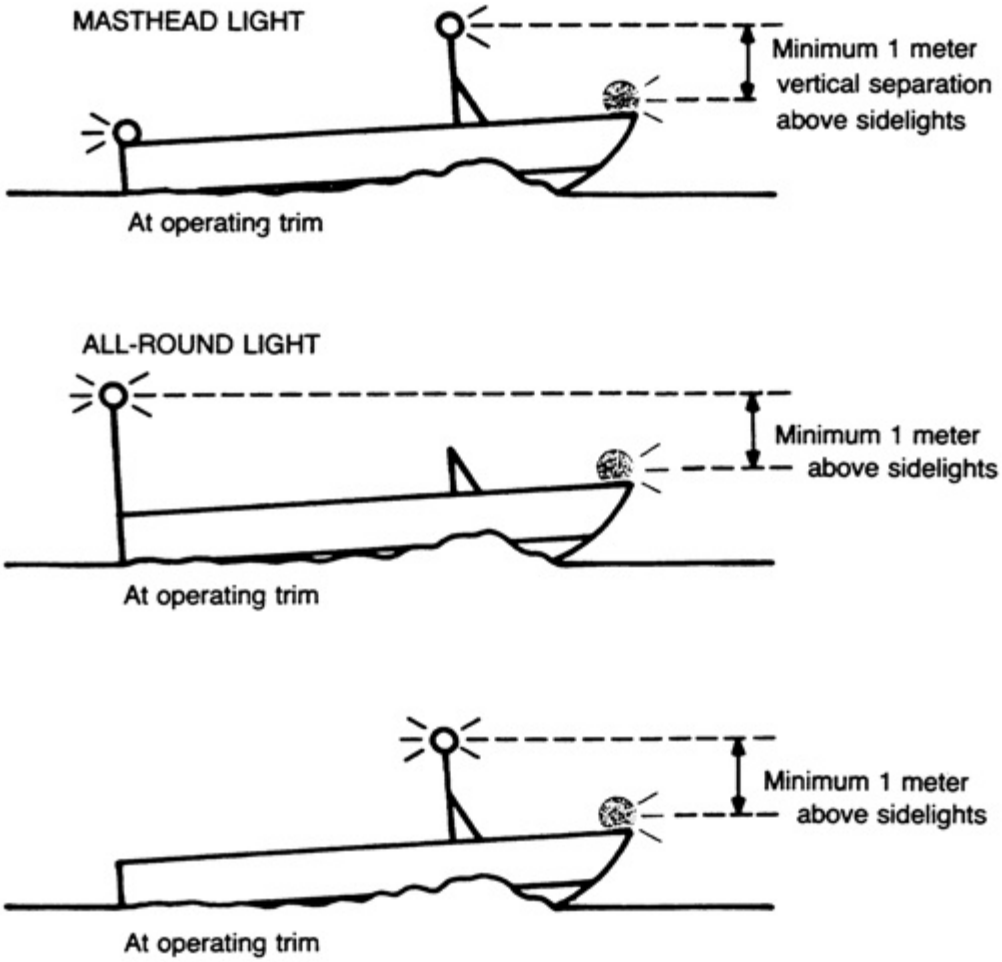


Figure 9—Vertical placement of masthead lights: power-driven vessels less than 12 meters in length.

If sidelights are displayed, the masthead light or all-round light must be at least one meter above the sidelights. The vertical separation is measured at operating trim, which is often different from static trim. Because boat trim may change

significantly with speed changes, vertical separation may be decreased substantially (from what deckline-to-light measurement would indicate) if the masthead/all-round light is mounted very far aft of the sidelights.

This is especially a problem if the all-round light is mounted all the way aft, as was required by the now-repealed Motorboat Act of 1940, and the sidelights are mounted all the way forward. The all-round light (or masthead light) may now be mounted anywhere from stem to stern. Mounting it horizontally close to the sidelights will minimize the adverse effect or trim changes on vertical separation.

INTERNATIONAL	INLAND
(e) One of the two or three masthead lights prescribed for a power-driven vessel when engaged in towing or pushing another vessel shall be placed in the same position as either the forward masthead light or the after masthead light; provided that if carried on the aftermast, the lowest after masthead light shall be at least 4.5 meters vertically higher than the forward masthead light.	(e) One of the two or three masthead lights prescribed for a power-driven vessel when engaged in towing or pushing another vessel shall be placed in the same position as either the forward masthead light or the after masthead light, provided that if carried on the aftermast, the lowest after masthead light shall be at least 2 meters vertically higher than the highest forward masthead light.

In most cases, vessels engaged in towing display either one or two masthead lights in addition to the normal one(s) prescribed for ordinary power-driven vessels (see Rules 23 and 24). Although the language in the Rules says two (or three) masthead lights "instead of" an ordinary masthead light, Annex I 2(e)/§ 84.03(e) makes clear that the Rule 23 masthead light is to be one of the two or three in a vertical column, and paragraph (f)(i) says that of the two or three masthead lights carried in a vertical line for towing, the Rule 23 masthead light must be the highest one.

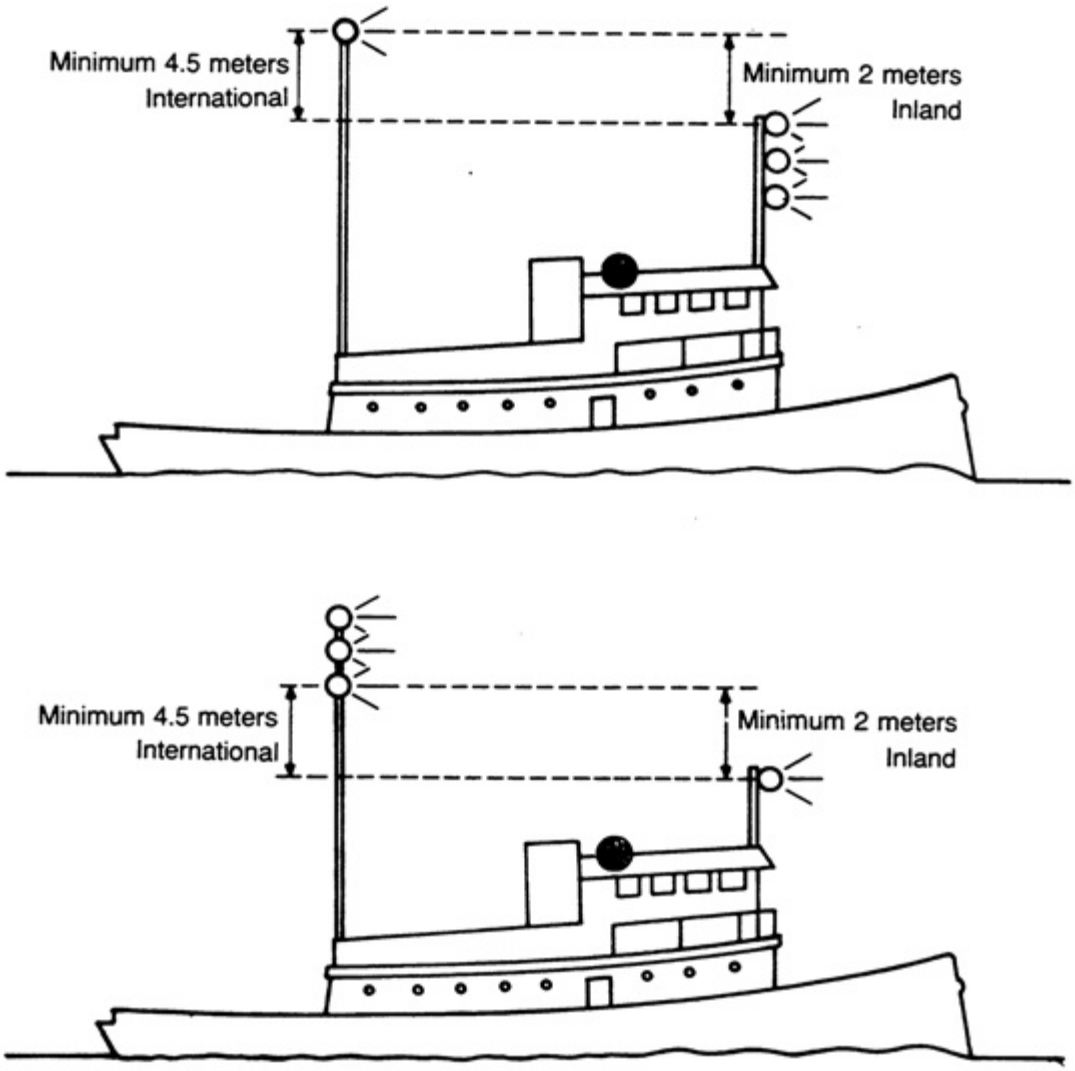


Figure 10—Vertical placement of masthead lights: towing vessels 50 meters or more in length and smaller vessels voluntarily carrying both forward and after masthead lights.

Vessels fifty meters or longer must carry both forward and after masthead lights (smaller vessels may do so). Vessels carrying both forward and after masthead lights (Rule 23(a)) also carry forward and after masthead lights when towing (Rule 24(d)). For towing, the additional masthead lights (one, or two if the tow length exceeds two hundred meters) can be carried under either the forward masthead light or the after masthead light.

If carried under the forward masthead light, the vertical separation between forward and after masthead lights will be unchanged from the non-towing display. If the additional lights are carried under the after masthead light, the vertical separation between masthead lights on forward and after masts will be reduced.

Annex I 2(e)/§ 84.03(e) requires that at least the minimum vertical separation be maintained between the lowest after masthead light and the forward masthead light.

Thus, if you carry your additional masthead lights on the after mast, your ordinary Rule 23 after masthead light must be mounted higher than would otherwise be required by Annex I 2(a)(ii)/§ 84.03(a)(2). The minimum vertical separation differs

between the International (4.5 meters) and Inland (2 meters) Rules.

INTERNATIONAL	INLAND
(f)(i) The masthead light or lights prescribed in Rule 23(a) shall be so placed as to be above and clear of all other lights and obstructions except as described in subparagraph (ii).	(f)(1) The masthead light or lights prescribed in Rule 23(a) shall be so placed as to be above and clear of all other lights and obstructions except as described in paragraph (f)(2) of this section.
(ii) When it is impracticable to carry the all-round lights prescribed by Rule 27(b)(i) or Rule 28 below the masthead lights, they may be carried above the after masthead light(s) or vertically in between the forward masthead light(s) and after masthead light(s), provided that in the latter case the requirement of Section 3(c) of this Annex shall be complied with.	(2) When it is impracticable to carry the all-round lights prescribed by Rule 27(b)(i) below the masthead lights, they may be carried above the after masthead light(s) or vertically in between the forward masthead light(s) and after masthead light(s), provided that in the latter case the requirement of § 84.05(d) shall be complied with.

The Rule 23 masthead lights are considered to be of great importance. As the brightest lights, they function as the reference by which other navigation lights are evaluated. Annex I 2(f)/§ 84.03(f) therefore requires that they be mounted high and be unobstructed.

The exception was added after problems were experienced with all-round lights, which are difficult to see "all-round" if they are mounted below a structure holding up the masthead light. All-round lights may now be placed above masthead lights, but only in the fashion described, which is designed to minimize interference from the masthead lights.

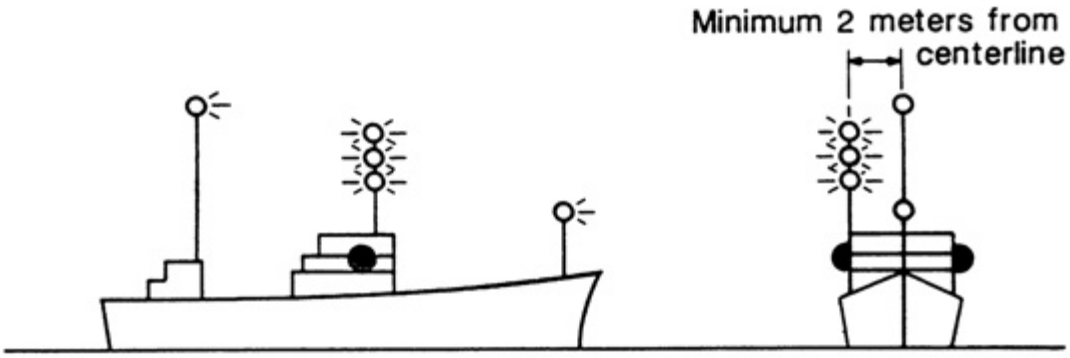


Figure 11—Vertical placement of masthead lights with respect to all-round lights.

The exempted all-round lights are those for vessels restricted in ability to maneuver (Rule 17(b)(i)) and for vessels constrained by draft (Rule 28, International only).

When all-round lights are above the after masthead light, they are usually directly above, not because it is required but because it is practical.

The all-round lights can be mounted on a mast or hung from a yardarm.

The exception permitting display of all-round lights above masthead lights applies only when it is not practicable to mount the all-round lights below the masthead light(s). If practicable, it must be done.

INTERNATIONAL	INLAND
(g) The sidelights of a power-driven vessel shall be placed at a height above the hull not greater than three quarters of that of the forward masthead light. They shall not be so low as to be interfered with by deck lights.	(g) The sidelights of a power-driven vessel shall be placed at least one meter lower than the forward masthead light. They shall not be so low as to be interfered with by deck lights.

The Requirement in the International version of this paragrph is modified or supplemented by paragraphs 2(d) and 2(h) of Annex I for vessels less than twelve and twenty meters, respectively.

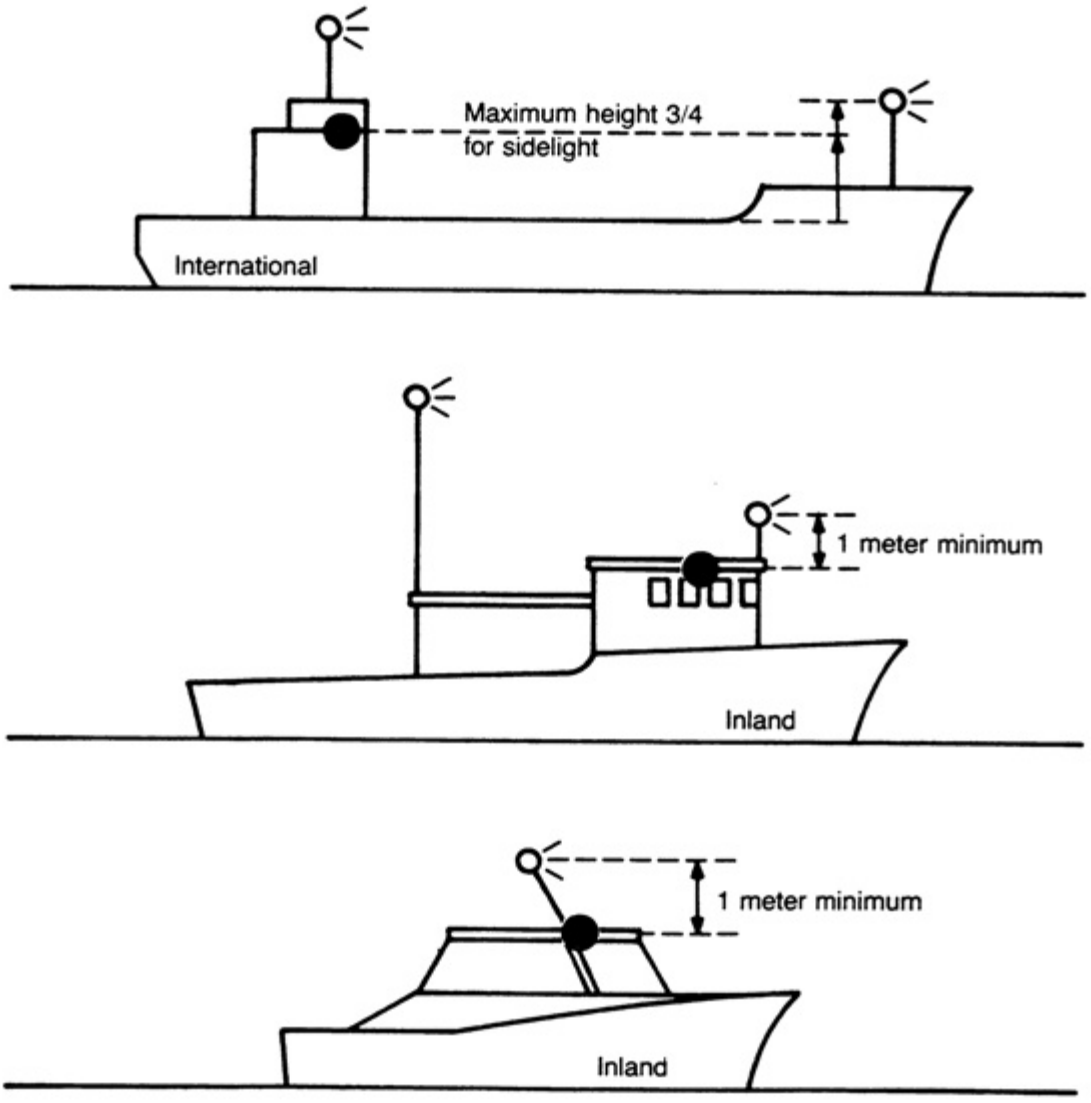


Figure 12—Vertical placement of sidelights.

INTERNATIONAL INLAND

(h) The sidelights, if in a combination lantern and carried on a power-driven vessel of less than 20 meters in length, shall be placed not less than 1 meter below the masthead light.	(h) [Reserved]

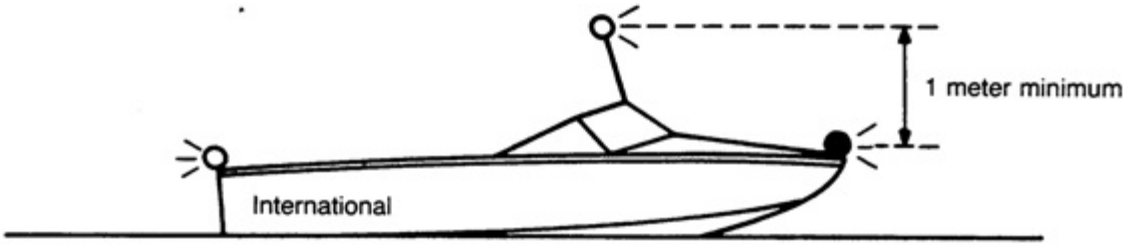


Figure 13—Vertical placement of sidelights on boats.

Only the International version has a paragraph (h). A similar Inland requirement would have duplicated the Inland § 84.03(g) requirement. Inland paragraph (h) was reserved so that corresponding International/Inland paragraphs would be numbered (or lettered) the same.

INTERNATIONAL	INLAND
(i) When the Rules prescribe two or three lights to be carried in a vertical line, they shall be spaced as follows;	(i) When the Rules prescribe two or three lights to be carried in a vertical line, they shall be spaced as follows;
(i) on a vessel of 20 meters in length or more such lights shall be spaced not less than 2 meters apart, and the lowest of these lights shall, except where a towing light is required, be placed at a height of not less than 4 meters above the hull;	(1) On a vessel of 20 meters in length or more such lights shall be spaced not less than 1 meter apart, and the lowest of these lights shall, except where a towing light is required, be placed at a height of not less than 4 meters above the hull;
(ii) on a vessel of less than 20 meters in length such lights shall be spaced not less than 1 meter apart and the lowest of these lights shall, except where a towing light is required, be placed at a height of not less than 2 meters above the gunwale;	(2) On a vessel of less than 20 meters in length such lights shall be spaced not less than 1 meter apart and the lowest of these lights shall, except where a towing light is required, be placed at a height of not less than 2 meters above the gunwale;
(iii) when three lights are carried they shall be equally spaced.	(3) When three lights are carried they shall be equally spaced.

The navigation rules frequently require the display of two or three lights in a vertical line--all-round lights, masthead lights, or lights aimed aft for towing. Annex I prescribes the spacing between the lights and the height above the hull (above the gunwale for smaller vessels) for the lowest light. Vertical height above the "hull" is above the uppermost continuous deck.

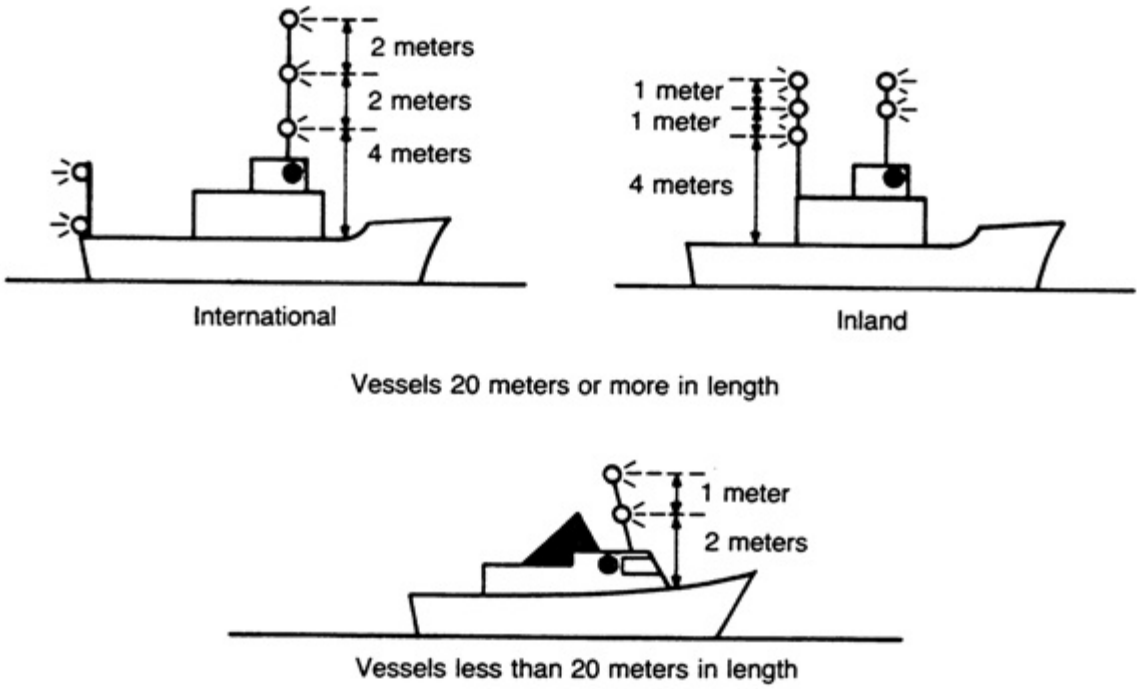
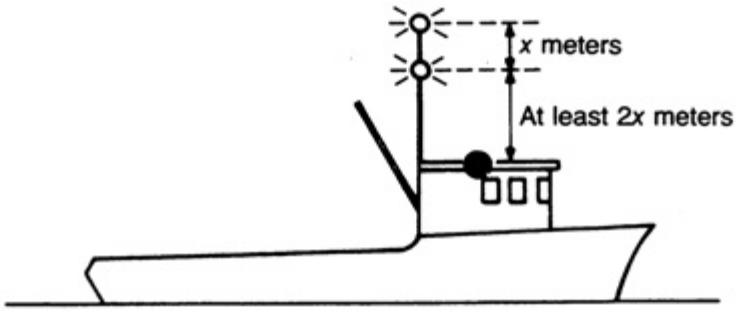


Figure 14—Minimum spacing of lights carried in a vertical line.

When a yellow towing light is displayed above the sternlight or above another towing light, the height-above-the-hull requirements do not apply. The sternlight, of course, is the same one used when not towing and may be placed right on the uppermost continuous deck or even below it. The same principle operates when two towing lights (no sternlight) are displayed in a vertical line (Inland Rules only).

INTERNATIONAL	INLAND
(j) The lower of the two all-round lights prescribed for a vessel when engaged in fishing shall be at a height above the sidelights not less than twice the distance between the two vertical lights.	(j) The lower of the two all-round lights prescribed for a vessel when engaged in fishing shall be at a height above the sidelights not less than twice the distance between the two vertical lights.
(k) The forward anchor light prescribed in Rule 30(a)(i), when two are carried, shall not be less than 4.5 meters above the after one. On a vessel 50 meters or more in length this forward anchor light shall be placed at a height of not less than 6 meters above the hull.	(k) The forward anchor light prescribed in Rule 30(a)(i), when two are carried, shall not be less than 4.5 meters above the after one. On a vessel 50 meters or more in length this forward anchor light shall be placed at a height of not less than 6 meters above the hull.

Rule 30 requires two anchor lights for vessels fifty meters or longer. Smaller vessels may display two anchor lights but are required to display only one (where it can best be seen).



x equals distance between upper and lower all-round lights. For example, if the vertical distance between the two all-round lights is 2 meters, then the lower all-round light must be at least 4 meters above the sidelights.

Figure 15—Vertical spacing of lights on fishing vessels.

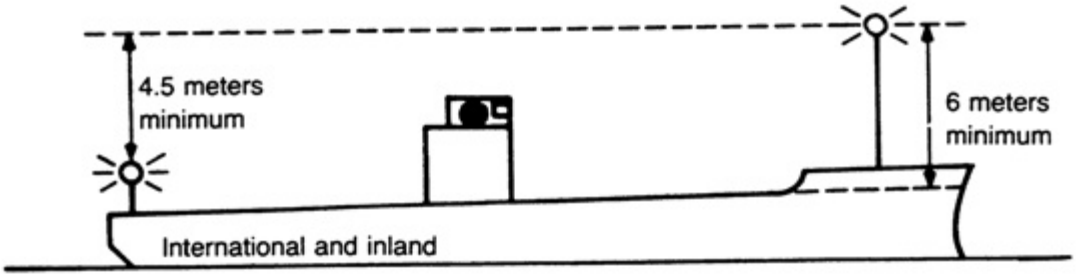


Figure 16—Vertical placement of anchor lights: vessels 50 meters or more in length.

INTERNATIONAL

3. Horizontal positioning and spacing of lights

(a) When two masthead lights are prescribed for a power-driven vessel, the horizontal distance between them shall not be less than one half of the length of the vessel but need not be more than 100 meters. The forward light shall be placed not more than one quarter of the length of the vessel from the stem.

INLAND

§ 84.05 Horizontal positioning and spacing of lights

(a) Except as specified in paragraph (e) of this section, when two masthead lights are prescribed for a power-driven vessel, the horizontal distance between them shall not be less than one-quarter of the length of the vessel but need not be more than 50 meters. The forward light shall be placed not more than one half of the length of the vessel from the stem.

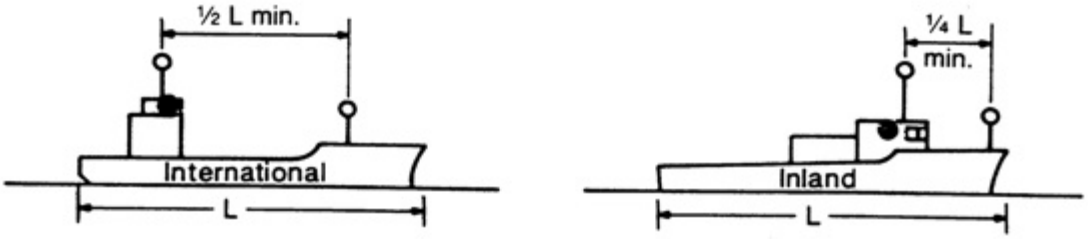


Figure 17—Horizontal spacing of masthead lights.

This provision affects primarily vessels fifty meters or longer because smaller vessels do not have to display both forward and after masthead lights. Both the International and Inland minimum separation is based on the length of the vessel. For power-driven vessels two hundred meters or longer, the minimum horizontal separation is a flat one hundred meters for International and fifty meters for Inland.

INTERNATIONAL	INLAND
(b) On a power-driven vessel of 20 meters or more in length the sidelights shall not be placed in front of the forward masthead lights. They shall be placed at or near the side of the vessel.	(b) On a power-driven vessel of 20 meters or more in length the sidelights shall not be placed in front of the forward masthead lights. They shall be placed at or near the side of the vessel.
(c) When the lights prescribed in 27(b)(i) or Rule 28 are placed vertically between the forward masthead light(s) and the after masthead light(s) these all-round lights shall be placed at a horizontal distance of not less than 2 meters from the fore and aft centerline of the vessel in the athwartship direction.	(c) When the lights prescribed in 27(b)(i) are placed vertically between the forward masthead light(s) and the after masthead light(s) these all-round lights shall be placed at a horizontal distance of not less than 2 meters from the fore and aft centerline of the vessel in the athwartship direction.

This provision is linked with Annex I (2)(f)/§ 84.03(f) requirement and is illustrated with the discussion of that vertical-positioning requirement.

INTERNATIONAL	INLAND
(d) When only one masthead light is prescribed for a power-driven vessel, this light shall be exhibited forward of amidships; except that a vessel of less than 20 meters in length need not exhibit this light forward of amidships but shall exhibit it as far forward as is practicable.	(d) When only one masthead light is prescribed for a power-driven vessel, this light must be exhibited forward of amidships. For a vessel of less than 20 meters in length, the vessel shall exhibit one masthead light as far forward as is practicable.
	(e) On power-driven vessels 50 meters but less than 60 meters in length operated on Western Rivers, the horizontal distance between masthead lights shall not be less than 10 meters.

Western Rivers towboats fifty to sixty meters long have a slightly relaxed requirement because their typical house arrangement makes meeting the full one-quarter-length separation more costly.

INTERNATIONAL	INLAND
4. Details of location of direction-indicating lights for fishing vessels, dredgers and vessels engaged in underwater operations	**§ 84.07 Details of location of direction-indicating lights for fishing vessels, dredgers and vessels engaged in underwater operations**
(a) The light indicating the direction of the outlying gear from a vessel engaged in fishing as prescribed in Rule 26(c)(ii) shall be placed at a horizontal distance of not less than 2 meters and not more than 6 meters away from the two all-round red and white lights. This light shall be placed not higher than the all-round white light prescribed in Rule 26(c)(i) and not lower than the sidelights.	(a) The light indicating the direction of the outlying gear from a vessel engaged in fishing as prescribed in Rule 26(c)(ii) shall be placed at a horizontal distance of not less than 2 meters and not more than 6 meters away from the two all-round red and white lights. This light shall be placed not higher than the all-round white light prescribed in Rule 26(c)(i) and not lower than the sidelights.

Rule 26(c) applies to vessels engaged in fishing by means other than trawling. The identifying lights are an all-round red in a vertical line over an all-round white. When outlying fishing gear extends more than 150 meters from the vessel, an all-round white light must be displayed in the direction of that gear. This all-round light must be outside a circle with a two-meter radius and inside a circle with a six-meter radius, as viewed from above the vessel and with the center of both circles at the vertical line running through the red and white all-round identifying lights.

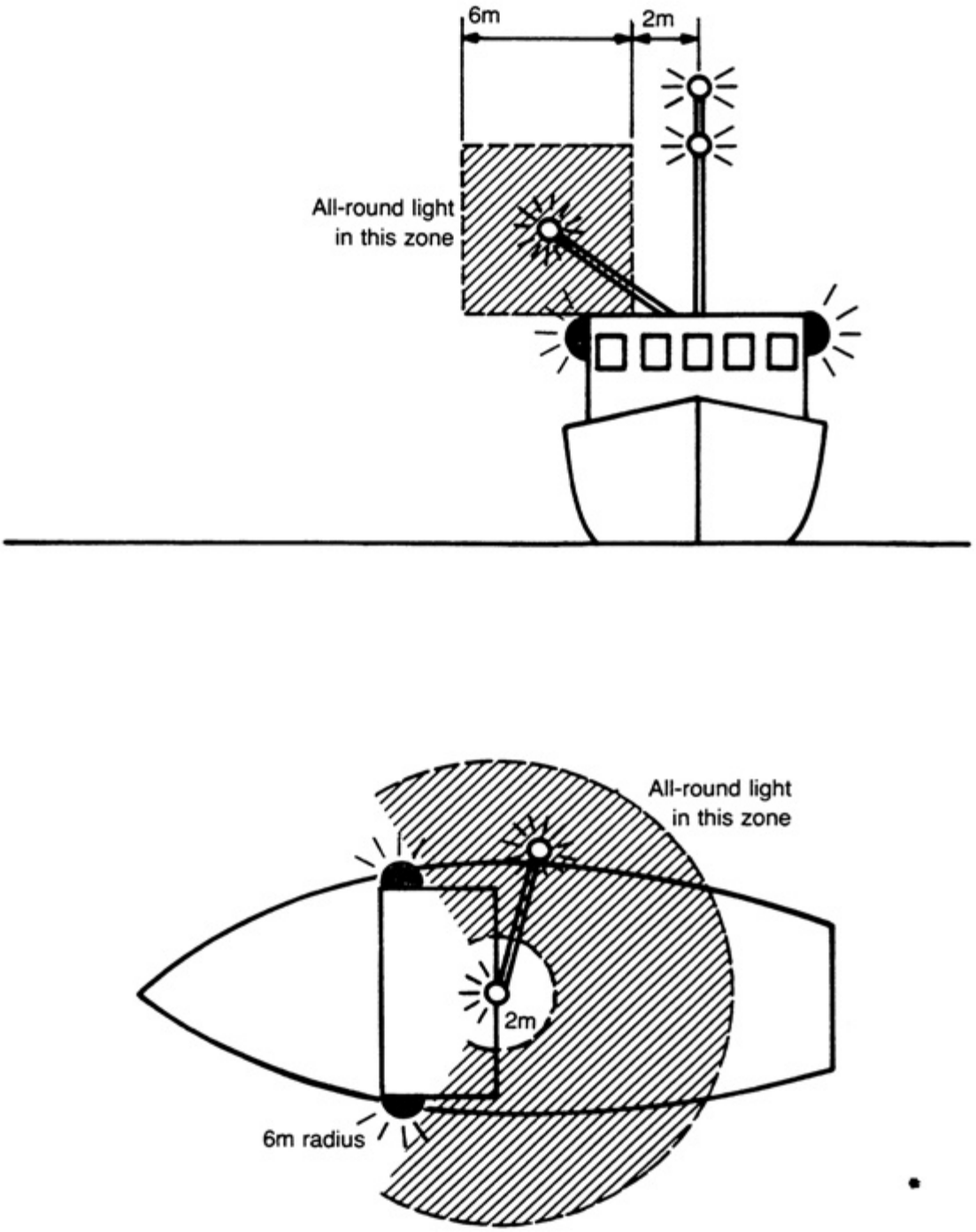
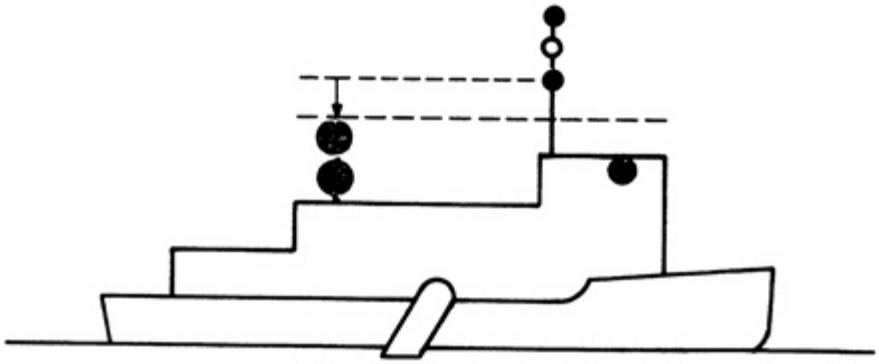


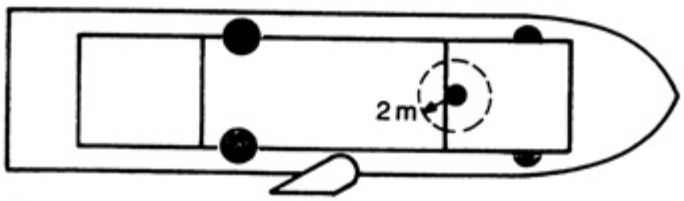
Figure 18—Placement of direction-indicating lights.

INTERNATIONAL	INLAND
(b) The lights and shapes on a vessel engaged in dredging or underwater operations to indicate the obstructed side and/or the side on which it is safe to pass, as prescribed in Rule 27(d)(i) and (ii), shall be placed at the maximum practical horizontal distance, but in no case less than 2 meters, from the lights or shapes prescribed in Rule 27(b)(i) and	(b) The lights and shapes on a vessel engaged in dredging or underwater operations to indicate the obstructed side and/or the side on which it is safe to pass, as prescribed in Rule 27(d)(i) and (ii), shall be placed at the maximum practical horizontal distance, but in no case less than 2 meters, from the lights or shapes prescribed in Rule 27(b)(i) and

(ii). In no case shall the upper of these lights or shapes be at a greater height than the lower of the three lights or shapes prescribed in Rule 27(b)(i) and (ii).

(ii). In no case shall the upper of these lights or shapes be at a greater height than the lower of the three lights or shapes prescribed in Rule 27(b)(i) and (ii).





Red and green pairs must be displayed outside 2-meter-radius circle surrounding red-white-red all-round lights, as far away as "practical."

Figure 19—Lights for vessels engaged in dredging or underwater operations.

Rule 27(d) applies to vessels engaged in dredging or underwater operations when their work involves placing an obstruction to one side of the vessel. The vessel displays the 27(b) red-white-red vertical array to indicate restricted ability to maneuver, the 27(d) red-over-red all-round lights to indicate the side having the obstruction, and green-over-green all-round lights to indicate on which side it is safe to pass.

These Annex I provisions also apply to the corresponding shapes during the day.

Annex I continues - Click Here

Home

Table of Contents

Annex II