



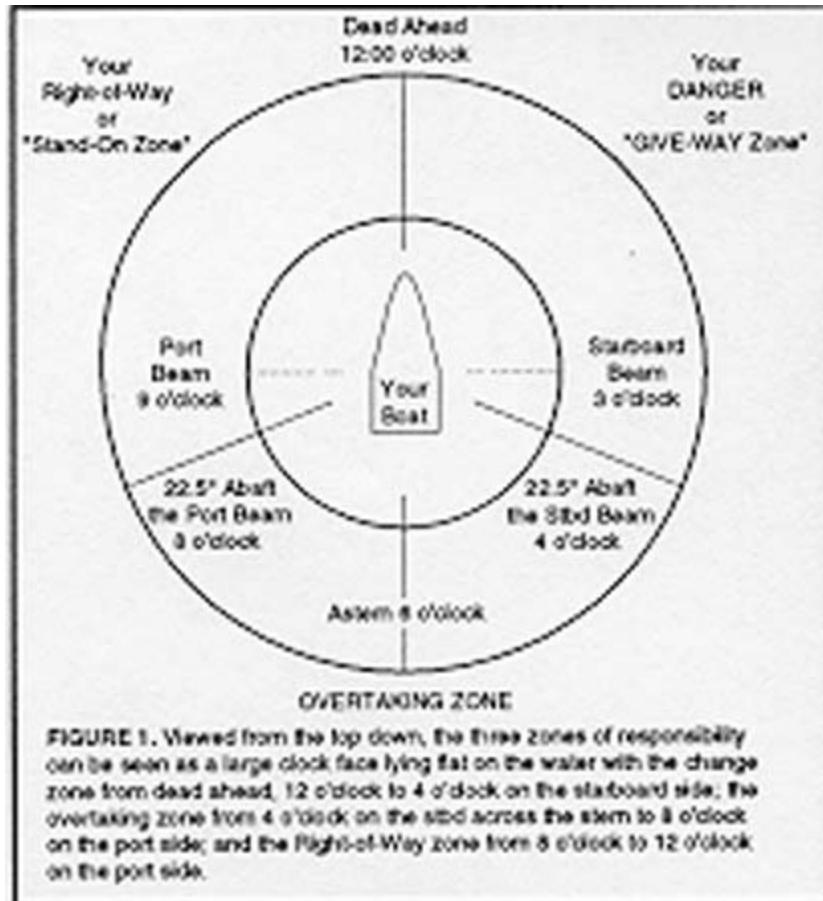
The Professional Captain

Collision Avoidance Knowing your right of way by Captain Don Fleming

The typical sensible boater who is unsure of "Rules of the Road" figures that he or she will simply avoid everyone in close proximity of his or her vessel and everyone will be safe. Makes perfect sense; Right? Wrong. In reality this individual is one of the most dangerous operators on the water, especially on busy weekends when as many as five or six boats can be converging on the same theoretical collision point at the same time. Because this person's movements are completely unpredictable to other boaters, he or she is quite literally an accident waiting to happen.

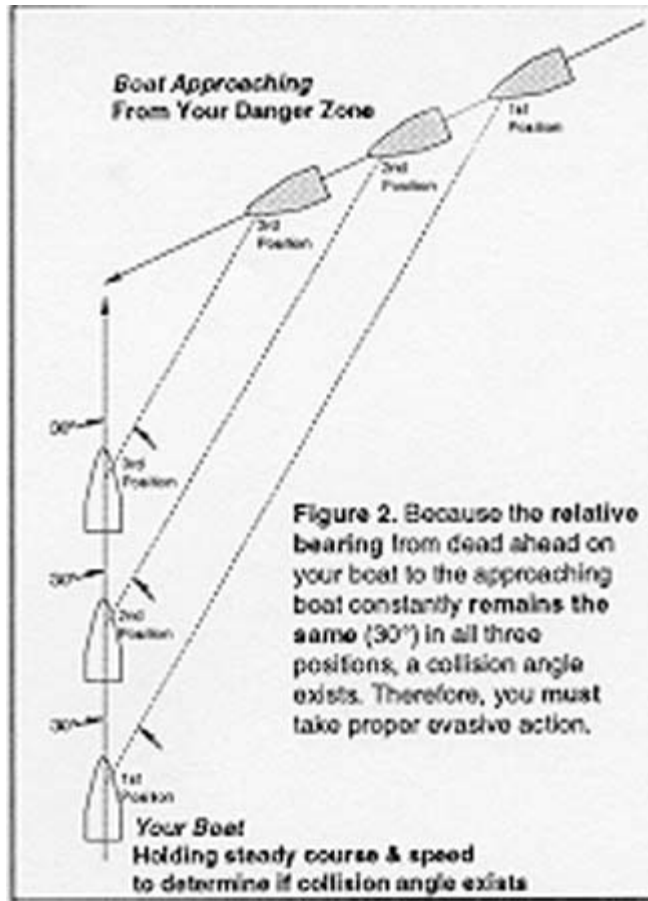
In order to avoid this dangerous situation, let's review the fundamentals of what the United States Coast Guard calls the "steering and sailing rules" in their publication Navigation Rules: International - Inland which is available in most local marine supply stores and from the US Government Printing Office. This publication is required by law to be carried on all larger vessels, and it is a good idea for every boat owner to keep a copy on board and be thoroughly familiar with all of the rules. However, such a discussion is beyond the scope of this article. Here we are concerned with the basics.

To begin, with let's look at the three zones of responsibility the boat operator must keep in mind in order to determine who has right of way when two power-driven pleasure boats are approaching one another in clear visibility (See figure 1). Keep in mind that power driven pleasure boats include sailboats when they are operating under power. I will discuss power boats meeting sailboats and large commercial vessels as well as collision avoidance in restricted visibility in later issues.

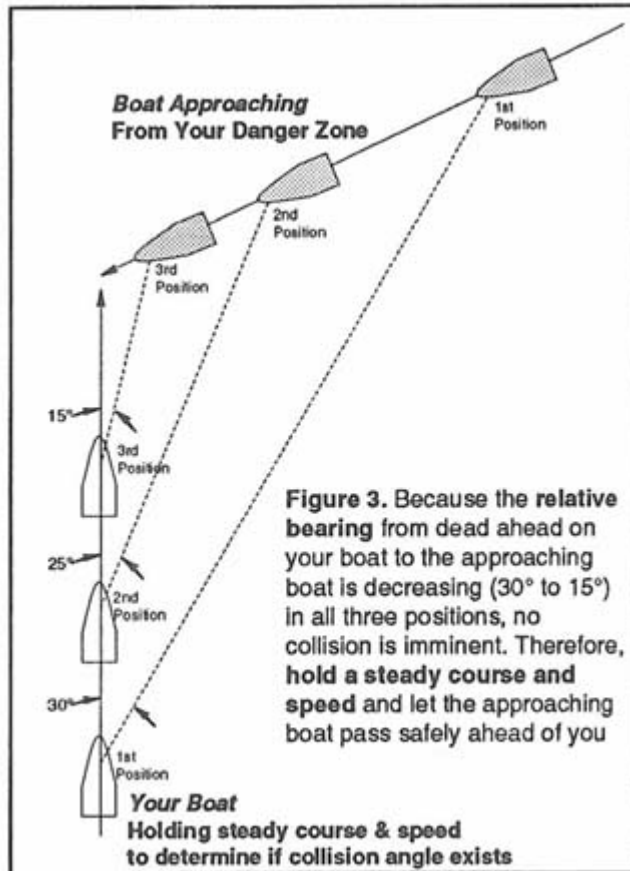


As you can see from the diagram any vessel approaching you from deadahead on your bow to 4 o'clock on your starboard side is in your danger zone and you must give way. This is simple enough. You are what used to be called the "burdened vessel", and what is now termed the "give-way vessel" according to the latest regulations.

However the situation gets more complicated when there are several boats approaching from various directions, from various distances and at various speeds. What do you do? Assuming you have been keeping a vigilant lookout and none of the vessels that are approaching your danger zone are so close that a collision is imminent, you will want to hold your present course and speed so that you can determine the angle or bearing of the approaching vessel relative to your own boat (See Figure 2). Start, of course, with the approaching boat that is either closest to you or closing-in the fastest, whichever you feel is most likely to create a close quartered situation first. As figure 2 indicates you are trying to determine if the angle or relative bearing between your boat and the approaching vessel is constant. If it is constant, then a collision is likely to result unless you take the proper evasive action.



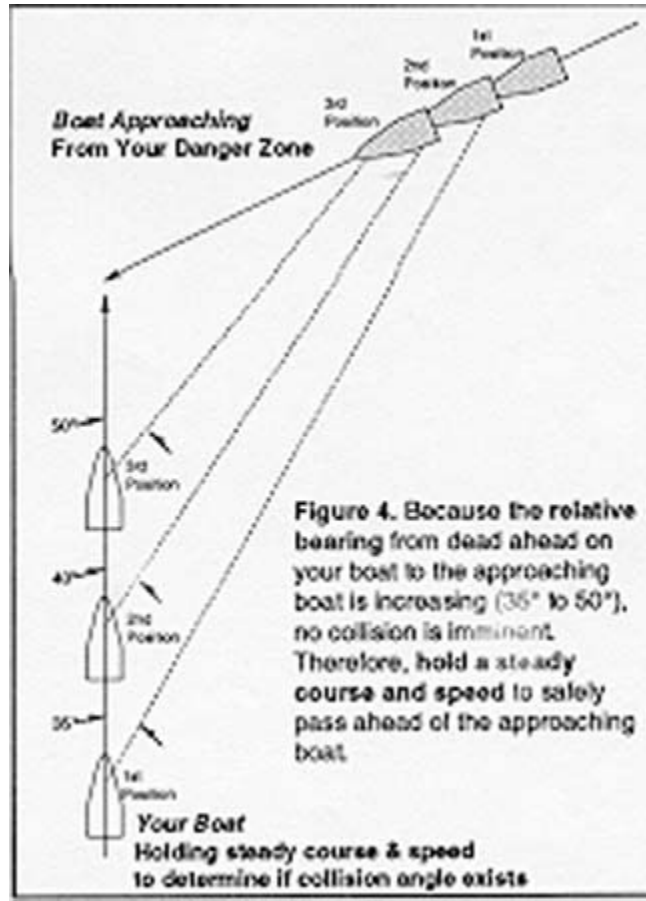
A constant or steady angle of approach signals the danger, and with a practiced eye this "collision angle" can be determined very quickly from great distances. In the beginning however, it will take some getting used to; so the prudent skipper will want to practice determining this collision angle with relatively slow moving targets at relatively far distances. For example a trawler yacht with a speed of approximately ten knots approaching from within a mile to one half mile range would be a good start.



Once the "collision angle" has been established you have three choices of evasive action. First, you can turn to starboard so that you will pass well behind the approaching vessel. The turn should be decisive enough so that the approaching vessel understands that you are yielding the right of way, but does not need to be so extreme that you take yourself drastically off your own course. Rule 8 states, "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 any other vessel A succession of small alterations... should be avoided." The sooner you turn the less extreme the turn has to be.

Second choice is that you can simply slow down. This will enable the boat approaching from your danger zone to pass safely in front of you, assuming that it does not. alter its own speed in the process for reasons immediately not apparent to you. This changing of speed by the right of way boat is against the Rules, but more on that later. You can check to see if the other guy has slowed down by remeasuring the approach angle to see if it still remains constant. If it does, then he has slowed down to the same speed as you.

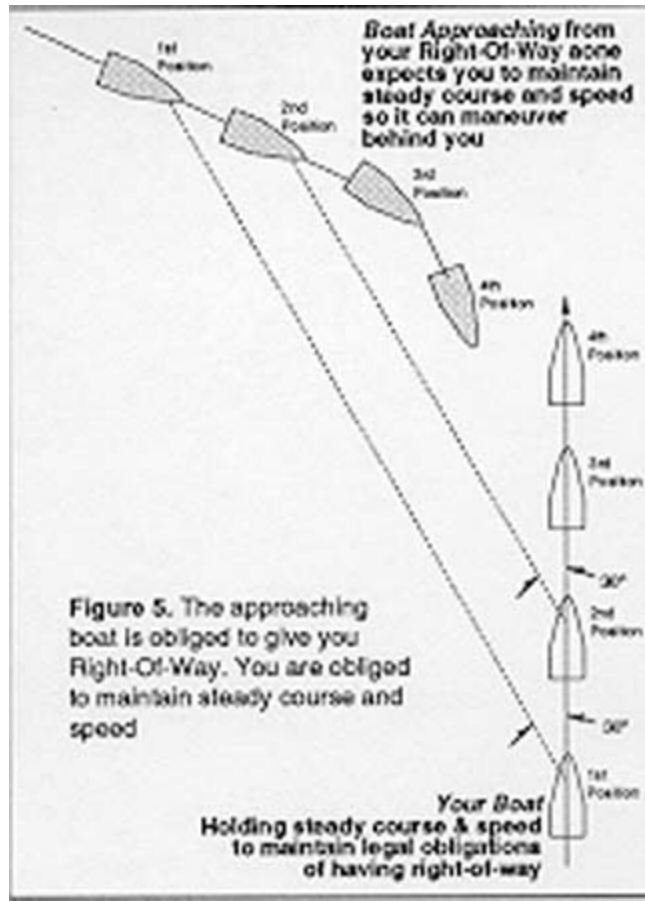
This leads us to you third choice which is to slow down and turn to star-board simultaneously. Any of these actions on your part will result in allowing the boat approaching from your danger zone to pass safely ahead of you, thus fulfilling the requirements of the Rules. Before you take any eva-sive action you would be wise to anti-cipate how this action will affect other boats in your immediate vicinity. Also, once you have taken the evasive action you will immediately want to check the other boats in your danger zone to be sure you have not maneuvered yourself into an impending dangerous situation with any of them.



Now let's look at the situation where several boats are approaching you from your danger zone. From your vigilant lookout post at the helm you want to be observing the relative bearings of all these boats, singling out the few where the relative bearing remains the same as in figure 2.

Those boats that you observe whose relative bearing or approach angle is decreasing as you get closer to them are going faster than you are, and they will pass safely in front of you (see figure 3). Those boats whose relative bearings or approach angles are increasing or widening as you get closer to them are going slower than you are, and they will pass safely behind you (see figure 4). Therefore, in these two instances, where the relative bearing or approach angle is decreasing (narrowing down) or increasing (widening, open) you will want to maintain a steady course and speed so that they can pass safely in front or behind you as they get nearer to you.

Obviously, you do not want to cut this too close, in normal conditions I would say before the other boat is a quarter mile away, because you are legally obliged to give way. The point is that you do not want to make unnecessary and perhaps dangerous zigzagging maneuvers trying to avoid boats that are not on a true collision course with you merely because they are in your give-way zone. In other words, if no collision is indicated because the relative bearing or collision angle is gradually changing, then don't take any evasive action.



Now let's look at the boats approaching you from our port side, your "right of way" zone (see figure 1). The same principal of constant relative bearing equals collision angle discussed above holds true for this situation as well. In this situation you are what used to be called the "privileged vessel", but what is now termed the "stand-on vessel." This change in terms from "privileged" to "stand-on" was instituted in order to better reflect the responsibilities of the "stand-on" vessel. The big change here, as the term "stand-on vessel" implies, is that you are now required to hold a steady course and speed so that the approaching boat can maneuver around you (see figure 5). The big mistake here is thinking that because you have the right of way, you can maneuver any way you want to. This is not true, and the Rules specifically forbid you to do this.

The only exception is, obvious, an imminent danger of collision, which must be avoided even if you have to "break" the Rules. And there is a rule for "breaking" the rules; it's rule 2(b) which states, "In construing and complying with these Rules due regard shall be had to all dangers of navigation and collision... which may make a departure from these Rules necessary to avoid immediate danger." In other words, if you have the legal right of way, you are legally bound to maintain a steady course and speed until you feel that imminent danger exists. At that point you will certainly want to sound the danger signal on your horn (five short blasts repeated as necessary) to wake the other guy up, and you will want to consider taking evasive action, especially if you feel the other guy has no idea what he is doing.

Remember to consider the possibility of simply slowing down or stopping completely as this can often be more effective than turning. Also keep in mind that Rule 17(c) strongly urges that you "not alter course to port for a vessel on [your] port side." So the only sensible turn to make to avoid someone approaching you from your port side, who is not yielding the right of way as he is legally required to do, is to turn away from him by turning to starboard. Of course, you must use your own best judgment under this most difficult of situations; and yes, the Rules require that you do just that!

Another obvious area of concern is the overtaking zone (see figure 1). The Rules state that when you are being overtaken, you have the right of way; you are the "stand-on" vessel. They also state that when there is any doubt whether a vessel is being overtaken or not, as in the case where the approaching boat is exactly on or slightly forward of the eight o'clock or four o'clock borders of the zones, it should be assumed that an overtaking situation does exist. The big danger here is again not realizing that you are legally obliged to maintain a steady course and speed when you have the right of way as you are being overtaken. Many accidents occur because the "stand-on" or right of way boat turns sharply without looking astern before hand. Typically the skipper of the "stand-on vessel", who is more concerned about what is happening ahead and off to the immediate sides, decides to make a decisive turn to avoid an oncoming boat that is in his danger zone or to cross an oncoming wake and does not check his stern. Often a much faster boat which is overtaking this skipper cannot react quickly enough when the "stand-on vessel" makes this abrupt turn, and unfortunately the results are often tragic. Therefore, an excellent rule of thumb is to always look behind you before making a course change.

Now let's consider the simplest and most obvious collision avoidance situation, that of a boat approaching you from a head-on or nearly head-on direction. The basic Rule here is that you should turn to your right just as you would in a car. With both boats turning to starboard well ahead of each other, the head-on situation is easily negotiated. Neither boat has the right of way in this situation; both are equally responsible for making the turn. (See figure 6A).

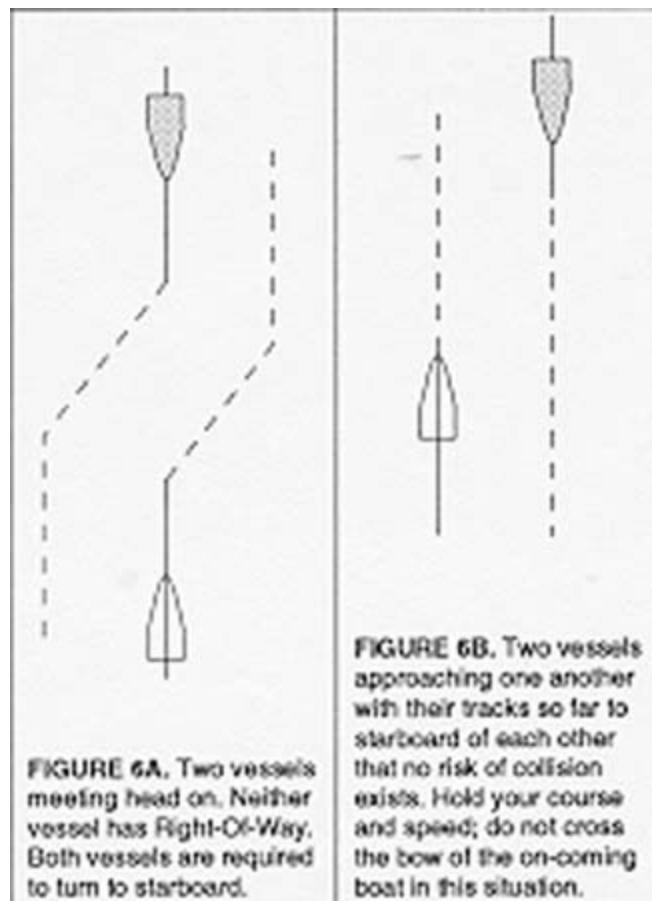


FIGURE 6A. Two vessels meeting head on. Neither vessel has Right-Of-Way. Both vessels are required to turn to starboard.

FIGURE 6B. Two vessels approaching one another with their tracks so far to starboard of each other that no risk of collision exists. Hold your course and speed; do not cross the bow of the on-coming boat in this situation.

Be very aware of the closing speeds involved in these head-on situations. With the typical planing hull pleasure craft traveling between 20-25 knots the closing speed of the two vessels can easily reach 50 miles per hour. Things tend to happen very quickly in the last few hundred yards, and the Rules call for "...early and substantial action" in these head-on meeting situations for obvious reasons.

The latest Inland Rules do not deal directly with the situation where two vessels are approaching one another with their tracks so near to starboard of each other that they are not really meeting head-on and no risk of collision exists. (See figure 6B). It should be understood that both vessels must maintain their respective course and speed so as to pass starboard to starboard of each other. It would be a mistake to cross the bow of the oncoming boat in this situation in order to attempt to pass port to port. Of course, if there is any doubt as to whether a head-on situation exists you must assume that it does exist and act accordingly. (See figure 6A). Although the Rules do not specifically state exactly how many degrees off dead ahead constitutes a head on meeting, court cases over the years have established 11 1/4° or 1 point off either side of the bow as the demarcation line. (See figure 6C).

Now that we have discussed all the basic right of way situations, let's conclude with a brief review of the whistle or horn signals required. I already mentioned the "danger signal" of five short rapid blasts repeated as necessary which means, "I fail to understand your intentions or actions and/or doubt sufficient action is being taken to avoid collision". The other three common signals in inland Waters are as follows:

1 short blast means "I intend to leave you on my port side." This means you are planning to turn to starboard.

2 short blasts mean "I intend to leave you on my starboard side." This means that you are planning to turn to port.

3 short blasts "I am operating astern propulsion." This means "I am putting on the brakes!"

Notice that the 1 and 2 blasts are worded to signal your intentions. The Rules call for a return signal from the other vessel to either agree with your intentions by responding with the same signal or to disagree by responding with the danger signal. If the other vessel disagrees, then "each vessel shall take appropriate precautionary action until a safe passing agreement is made."

Most pleasure craft are not in the habit of making these whistle signals in every meeting, crossing or overtaking situation, usually because most pleasure craft take very early and substantial action so that close-quartered situations never develop. However, the Rules do require these signals, and they must be used whenever the slightest doubt exists as to what your intentions or the intentions of the other boat are.

Captain Don Fleming is a licensed USCG Operator with over 25 years experience in sail and power vessels up to one hundred tons in both local area as well as ocean voyaging and racing from Maine to Grenada. He is well known throughout the area for his hands-on training programs that range from close-quartered docking and maneuvering to navigation, electronics, and ocean passage making skills. Questions or inquiries to Captain Don may be addressed to: Don Fleming Yacht Services Inc., 506 Eagle Bay Drive, Ossining, N.Y. 10562 914-941-3998. Copyright 1992 By Captain Don Fleming