

## Missionary Sailing School

Before continuing our chartwork review this **webpage** once again, paying special attention to the sets of chart symbols [about mid-way down]:

<http://www.schoolofsailing.net/unlockingthechart.html>

### **Lesson 11: Coastal Navigation Part Three**

Now, let's re-open our chart of Ft. Pierce to the position we were at last and continue our journey through the harbor. [This lesson requires the completion of Lesson 10 first].

<http://www.charts.noaa.gov/OnLineViewer/11475.shtml>

#### **1. Range Lights** (necessary for ships / great help for us)

Center the right scroll bar [by dragging it down] and press the **Plus** button twice to enlarge. You should now see "Dynamite Point" near the center of your chart. There is a **light symbol** just beneath it [**left click** on this symbol] which is labeled "Iso G 6s" [meaning a green 'Isophase' light – light is on for the same period it is off – for a period of 6 seconds, then remains off for 6 seconds] This light fixture is quite tall ["32ft"], probably a steel structure. It is part of a pair of lights that serve as a navigational **range** to assist large vessels to remain centered in the channel as they make their way to or from seaward.

Follow the dotted line that leads westward away from this light until you see a second light structure ["Q G 20ft"] that is 20ft tall, having a quick flashing green light which continues flashing at about 1 second intervals. Together these **range lights** tell ships if they are centered, or too far to the left or right side of the deepest channel.

**Range lights** may look something like this: a metal frame tower having a directional light [one that is mostly seen from directly ahead] and a striped **dayboard** [intended for daytime use – usually a bright color that contrasts well with the background. Here is a red and white board with dark trees behind it. Elsewhere it may be one with black stripes and a light colored center when the background will be sky.]

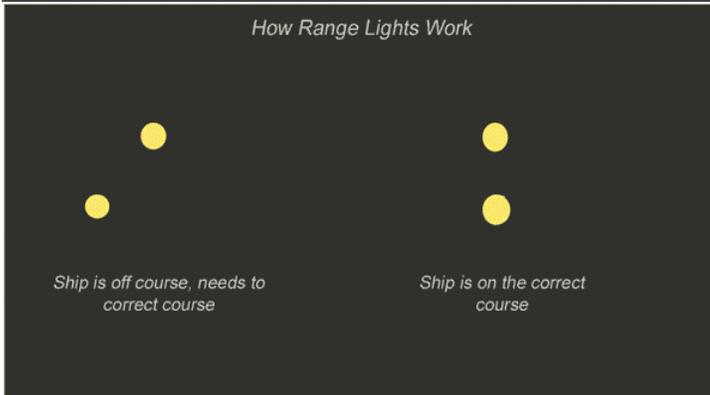




Some are mounted on a platform standing over water [as “Q G 20ft” is on your chart.] Or they may be mounted high, away from the water [as in the photo to left – I’ve seen some on buildings on shore!!]

Your chart will tell you where to look for them and they can be very helpful, even to smaller craft when conditions are not favorable [their lights penetrate rain and fog better than the ones on buoys low to the water and, on many parts of the ICW in places like Georgia and South Carolina, they will be your best hope of not going aground on the gradually shallowing river banks!!]

The way to use a **range** (to keep yourself on line with the recommended course to follow) is to keep the two **dayboards** [or their respective lights at night] lined up with one another [as in the picture to left below.] If you are off, steer towards the lower board (or light) until they begin to line up, then straighten your course. Thus, to *correct* your heading on the range below-right you would steer a little to port. [The third illustration shows how to use a range at night]



Back to our chart, these two light features make up the “Fort Pierce Inlet Inner Range” [continue following the dotted line westward until you see those words.] This is the **range** that ships would be using during their ‘second leg’ through the harbor. Now go over to ‘Red 14’ [just to the west], then north to the range tower above it [“ISO G 6s 50ft”] This one is 50 ft high! Follow it’s **range** [dotted line] back towards the southeast [to the right] until you see it’s

counterpart, a 15ft platform having a quick green flasher [“Q G 15ft”]. Remember that these lights are **directional**, meaning they have cone like shades that limit their being visible from most directions other than ahead [see illustration at right.]



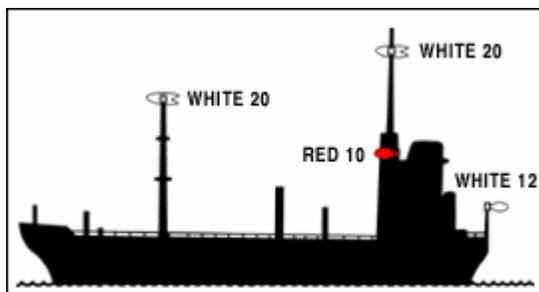
You can continue on this range line right out to sea [just past the jetties] and find that it is labeled “Fort Pierce Inlet Entrance Range” Now here’s a question for you: coming from sea it’s easy to understand how, looking ahead, you would line up these two range lights to stay centered between the jetties - but how would you use them when heading back out to sea? Answer: by looking over your stern! [not as easy to do, however, but it is the way it’s done]

It is a good practice to keep a watch behind you (as well as ahead) not only for other vessels approaching, but also to ensure you are staying where you want to be in the channel. There are stretches of the ICW where a strong wind or cross-current might be gradually ‘sliding’ you closer to the side of the channel and (though you are still facing towards your next markers) you are actually no longer in the ‘center’ where you need to be. The only solution is the occasional glance over-the-shoulder to compare your position [angle] to the markers you have left behind [Believe me – plenty a ‘waterway sailor’ has gone aground just for this reason! Also, keep an eye on your depth sounder, especially along stretches that have been dredged. More on dredged channels later.]

## 2. Avoiding Collisions at sea.

Understanding how to interpret range lights when you see them is also important for dealing with shipping traffic at sea. Often the only thing you can see of a large vessel ‘out there’ are his *mast lights* [until they get pretty close! Then getting out of their way in your tiny boat’s not such an easy thing!]

This is an illustration of a freighter and the position of his lights. Notice that the two high, ‘white’ lights [on the masts, one well above the other] actually creates a “range.”



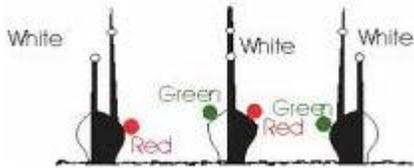
If he were coming directly towards you it would look like the illustration of the two range lights, one above the other seen in the previous illustration [“ship on a correct course”.] If he were passing towards your port side [like the freighter below is doing] the lights would be off-center [as the ship that “needs to correct course” in the same illustration.] As I mentioned, you will likely see only these two lights long before his colored running lights or any other deck lights [until he passes and lights are visible on his stern.]



The tug pushing a barge [above] has his own taller mast light but with a shorter one on the bow of the barge. However, if he is pulling the barge [as they usually do at sea] the tug would have two lights, one above the other [indicating a ‘tow’] and on the barge should



be a light at each end [but don’t count on them being very bright!!]



With the above in mind, study these three illustrations of what you can expect when a ship is heading ‘your way’.

Whatever you do, take evasive action early if there is any possibility your two paths will cross at the same time.

We will discuss the VHF [ship’s radio] in another lesson, but let me give you this brief instruction when at sea during the night: Be ready to announce your position [latitude and longitude], as well as direction [compass bearing] from the vessel of your concern. A radio call may sound like this, “This is the sailing vessel *Faith* to the northbound freighter near 25.6 degrees North and 77.5 degree West. I am off your port bow on a **heading** of 120 degrees [the direction I am going].” The bridge of the ship can give you their present heading as well and assure you that they already have you on their radar [not always the case with our small boats.]

There is a very simple ‘formula’ for determining whether your course and his will cross at the same time [daytime or night.] It is simply called, “**Checking The Angle on the Bow**”. As you observe a vessel (or it’s lights) over the forward areas of your boat, note the ‘angle’ in relation to your bow



Some sailors use their ship's compass or a hand bearing compass - as seen at left - to measure the **bearing**. But you can just as well note any object on deck, such as a stay or stanchion, in line with the vessel of concern.]

Check that 'angle' again in increments of several minutes or more. If the angle remains the same [the other vessel still appears over that same object on deck or same compass reading] then your two paths will cross at the same moment sometime soon, depending on both vessels' speed. You must take action by slowing down or changing course.

**Hint:** I have learned that, when there is any concern I might be on a "collision course", if I just change my heading so that I am now facing behind his stern, then maintain that new heading [compass direction] until I am certain the vessel will pass safely, any doubt will be removed and I can enjoy my sail [rather than 'fret' for quite a few 'anxious moments'!] Why does that work? By changing my heading I immediately change the 'angle on the bow'. After we safely pass I can always resume my original heading with very little progress lost (but certainly needed peace of mind gained!)

[Note: for a very helpful discussion on **Avoiding Collision at Sea** review the top sections of this important **webpage**:

<http://www.mcaorals.co.uk/Action%20to%20Avoid%20Collision.htm>

[The last line, "Never alter towards the giveaway vessel", is not contradicting my advice above. It is really saying "Don't head towards his bow as though you will try to out run him"!!]

### **3. Things on Shore**

Returning now to our chart, you should still be positioned in the **inlet** [between the jetties.] If not, re-open or reset the chart [if necessary, following the instructions at the beginning of this lesson] Now, 'sail' back into the harbor, following the channel until you come to Green "9". Then **left click** on it to center the chart here.

Directly below this buoy you will find shallow water [blue] with an assortment of straight and jagged black lines extending outward from the shore. These are docks. [probably belonging to private homes.] Further down is a 'white' one with many small **slips**, and west of it one with larger slips. This is a 'busy' stretch – many docks – but not a problem since they are well away from the channel and set back into a cove of sorts.

But beware: docks like these occur in many places along the ICW, reaching right up to the navigatable channel and often not lighted or with any kind of reflective devices! Difficult to see at night and also a danger in fog - sometimes in the bends of rivers and too close to **daymarks**. Always keep alert by checking ahead on your charts, but know that there have been many new ones built since your charts were made!!!

The beige chart area is land and the many straight, black lines are various streets or roads. Follow the shoreline more to the West and you will find “Faber Point”. Beyond that is another cove with many more docks. Also, you will find small circled objects labeled “Piles”. These are likely pilings associated with the docks, but a *pile* can be any pole-like structure [some may have been old markers or signs now missing their upper features] and most hazardous is the *submerged pile*, meaning it is no longer visible above the surface [possibly a sign that an unattentive boater ran over!] Note, also, the Coast Guard Station [“C G Sta”] located on the west side of this cove [the rectangle with diagonal lines represents the principle building here. Some buildings are included on the shore areas of charts to be used for referencing when sighting ‘bearings’ as a part of traditional navigation. See Lesson 12.]

Now, head directly north from the center of this cove and you will find a secondary channel lined with **daymarks** [having no lights] beginning with Green “3” and Red “2”. The words “**Priv aids**” [private aids] means that these markers are not a part of the State or Federal buoyage system but rather are the responsibility of the small park located just above the northern limit of this chart. Follow this channel northward until you see the words “5 ft rep 2004” [there is another further up that states “4 ft rep 2004”] This tells us that in 2004 reports to the Coast Guard or NOAA confirmed a place here in the channel had a depth less than charted [5ft and 4ft – enough of these ‘reports’ warranted a notation here. Consider these with real caution! ]

Return to the main channel and **left click** on Red “14” [to center the chart here. Also, press **Plus** to the maximum enlargement] South of Green “15” you will find “**piles**”, “**submerged piles**”, and “*ruins*” [likely the remains of a cement wall or pier, possibly not seen from the surface.] North of Red “14”, note the “**Sign**” and the *shallow point* leading off the end of the island [appears in the NW area of your chart at this setting] Two channels of water are converging here [click the **Minus** button once to get a broader view] and the resulting ‘deposit’ of mud and sand in this location is common and should be watched for.

Also, deposits occur in the bends of rivers [on the narrower, inside part of the curve] and at the junction of any tributary or creek with the ICW. Most problematic will be in and near inlets to the sea where huge amounts of sediment is moved about with every tide change. For that reason **buoys** (rather than **daymarks**) are usually the rule [so they can be easily repositioned with the constant shifting of the channel here.] Always stay alert in these areas, watching for any signs of ‘uncharted change.’

For daysailors, out for an afternoon’s fun, the channel north of this island may be an enticing alternative for going west but notice that it abruptly shallows before merging with the ICW. The dashed box labeled “*Spoil Area*” will be shallow water. These **spoils** [sometimes small circles or, offshore, very large rectangles] are the ‘depositories’ for the sediment that has been dredged out of channels or inlets to deepen them. They will always be charted but their depths are not indicated. Assume they are too shallow – even if another boat is seen crossing them!

#### **4. Sailing the ‘Ditch’ (the Intracoastal Waterway)**

West of the spoil area you will find the ICW [“Intracoastal Waterway”] Notice that the sides of the channel along this stretch are marked by dashed lines. This always means that the channel was dredged here to ensure a ‘controlling depth’ [usually a minimum 11 ft, though there are many areas where much shallower water may be encountered due to lack of dredging] A larger dredged *turning basin* will be found as you head south. Here it is noted that, as of “January 2008”, the basin was being maintained at a minimum of “21ft” so that large commercial ships can maneuver in and out of the wharf along the west shore [the channel leading back to sea being directly east of this basin.]

Go a little further south [just beyond the words “(see note B)” – which refers to special information provided elsewhere on the chart] and you will find a bridge crossing over the ICW. It is identified as a “*Fixed Bridge*” [meaning it does not open] having a height more than sufficient for most sailboats to pass under [“VERT CL 65 FT” - for vertical clearance of 65 ft.] Nearly all ‘**high rise**’ bridges on the ICW are at least 62 feet high provided that you pass through “AT MAIN CHANNEL”. [The sides of the ‘main channel’ through a bridge will be lined with *fenders* – usually wooden fence-like structures designed to protect your boat from colliding with the bridge structures. You will see these in the videos coming up shortly.]

Just beyond the bridge is a dashed line going east-west representing an *overhead power cable*. Not a great concern, though, as the chart notation [“OVHD POWER CABLE AUTH CL 85FT”] says there will be plenty of clearance. However, always use caution when there are lines crossing like this because the steel towers used to support these cables are often not easily seen in fog or rain, and sometimes not far from the channel (making collision a possibility if you stray outside of the channel.)

Now, let’s sail north [up the ICW]. Notice the position of Green “187”. This is a large marker [being 16ft tall it is probably a *dolphin* – a cluster of several or more pilings] with a flashing light so bright it can be seen 4 miles away [“4M”] **But most importantly:** notice that now the marker colors have been reversed. Green is now to starboard and, a little more north, Red “186” is on port. [remember: ‘red’ will always be towards the mainland and green towards sea. Better to just keep in mind: ‘Red right returning’ when ‘southbound’ in the ICW]

Just before Red “184” there is a ‘private channel’ to port which leads into a boatyard and several marinas. The large area of deeper water [mostly 8ft] just north and west of “184” is a popular anchorage for boats traveling the waterway. But beware, it is bordered to the west by a shallow “oyster bar” [labeled ‘Oys’, having only 2-3 ft.]

Another bridge is encountered as you continue north. This one is a “Bascule Bridge”, meaning it has spans that have to be raised to allow boats taller than 26ft to pass through [“VERT CL 26FT”]. The proper procedure to request an opening is to approach the bridge and contact them on your VHF radio [channel 13 in most states. The channel they are using is usually posted on a small blue sign located near the center span.] The name of the bridge will also be found posted [though when in doubt, address it as the “(name of closest community) Bridge” – they’re usually understanding] It is best to inquire what their “schedule” is [most bridges in busy areas only open at fixed times- i.e. on the hour and ½ hour] though commercial vessels such as barges receive immediate openings [you can sometimes ‘slip’ through with them and not have to wait.]

It is important that you account for wind and current as you position yourself for the bridge opening. This bridge has a very strong current passing under it [direction determined by the tide] and, as you can see on the chart, not much room for maneuvering on its southern side. [Better to be a little further back until the bridge sounds its whistle to open. Also, watch for the ‘gates’ to drop, stopping traffic, as your first clue bridge is about to open since you don’t always hear the whistle.]

North from here [beyond the limit of this chart] the ICW passes through a broad but very shallow area of natural river, the waterway itself being a mostly straight and narrow dredged channel. There are daymarks at regular intervals but the lighted ones are pretty far apart. In daylight, rather than just head towards the ‘next one in line’ try to line up on the one beyond it, always looking over your shoulder to assure that you are not being *set* [pushed to the side] by wind or current. At night, start off in the direction of the next flasher you see but when you are about halfway there begin to steer away towards the appropriate side of it. Always stay alert for the unlighted daymarks between you and the lighted one – check your chart - know what’s coming!!!

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I know this has been a long lesson but I wanted to get you introduced to some of the more common symbols and issues you will encounter with inshore navigation. Have your “Chart No. 1” [list of chart symbols] always at hand and don’t hesitate to look up anything unfamiliar!

As a final exercise in chart reading, as well as helpful information on “Choosing An Anchorage”, look over this **webpage**: <http://www.schoolofsailing.net/choosingananchorage.html>

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Finally, enjoy the feel of the Intracoastal as you travel aboard a small trawler [power yacht] in these three videos. A little lengthy [about 8 minutes apiece], but each one contains discussion and views that will help familiarize you better with the material we have covered in the two lessons on charts [I encourage you to watch all three]:

- [http://www.youtube.com/watch?v=hySV2X-Shr4&feature=mfu\\_in\\_order&list=UL](http://www.youtube.com/watch?v=hySV2X-Shr4&feature=mfu_in_order&list=UL)  
[Note the shoal waters alongside the channel and **fender** boards on the bridges encountered.]
- <http://www.youtube.com/watch?v=9RDDSxHaDMo&feature=channel>  
[Note why a chart is important for unexpected changes in channel direction and listen for this comment, “If you see birds walking in the water you know it’s shallow”]
- <http://www.youtube.com/watch?v=9ehUaK7ZgjU&feature=channel>  
[A sail through St. Augustine – remember to use caution as you pass inlets to the sea.]