

# 2022

Royal Brighton Yacht Club



## RECOMMENDED DOCK LINE PRACTICES

## Table of Contents

Introduction .....	2
Purpose of Dock Lines .....	2
Our Moorage Facilities .....	3
Bow and Stern Lines .....	3
Spring Lines .....	6
Breast Lines .....	10
Summary of Recommended Dock Line Arrangements .....	11
Dock Line Materials .....	12
Transient vs Fixed Dock Lines .....	14
Dock Line Sizing .....	15
Care and Maintenance of Dock Lines .....	16

## Introduction

This set of recommended practices is intended to help skippers of boats moored in the Royal Brighton Yacht Club marina choose the best way to tie their boats to the club's docks and fingers. Following good practices and using proper dock line materials and sizes will help to ensure that your boat has the best chance of handling the next violent wind storm and avoid damage by minimizing movement of your boat in its pen.

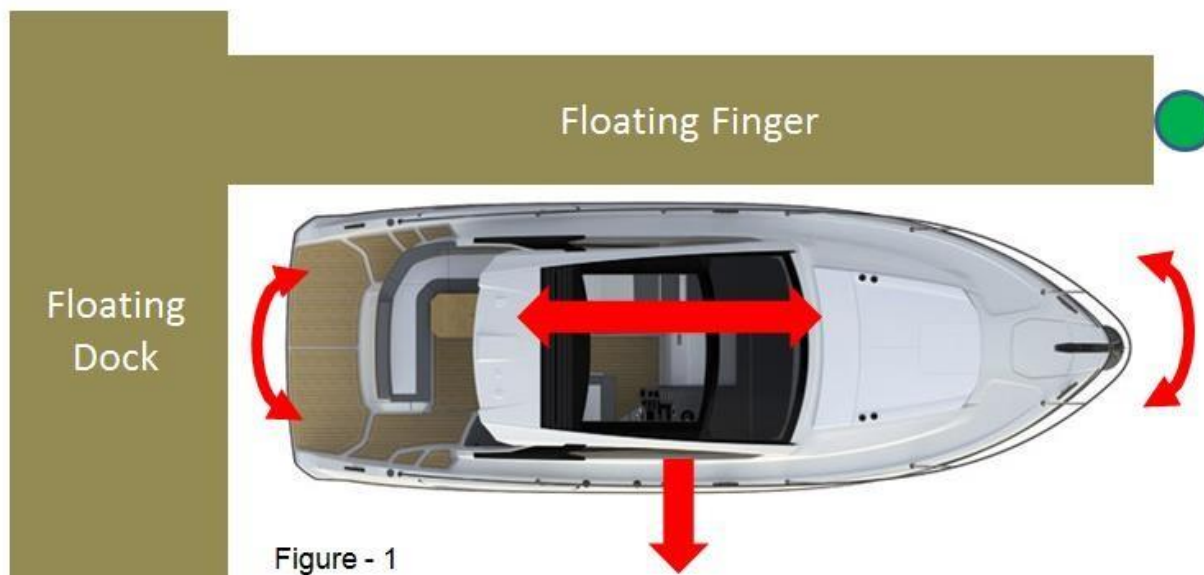
It is the responsibility of the owner of any vessel moored in the Club's facilities to ensure that their vessel is properly secured. Each current pen member has agreed to and signed the Lease Agreement. Clause 3.1 of that agreement states:

*"The member must ensure that any yacht using the pen is securely moored and that attachment points on the yacht for mooring lines are sufficiently robust."*

## Purpose of Dock Lines

The purpose of dock lines quite simply is to minimize the movement of your boat in its slip while it is in the marina. Properly placed dock lines should:

- keep your boat close to its finger,
- prevent forward and backward movement along the finger,
- prevent sideways movement away from the finger, and
- prevent a yaw motion where the boat's bow and stern tend to rotate in either direction.



The obvious consequences of any of these movements will be rubbing and chafing of the boat's hull against the finger, the main dock or in the worst case against the boat that is sharing the slip with your boat. Significant movement of the boat could also mean that the dock lines themselves will suffer chafe where they are connected to cleats or bull rails and where they run through chocks or rub over railings of the boat. Movement will also result in potentially strong shock loadings on cleats, bull rails and attachment points on the boat as the boat picks up momentum in any direction and then is halted by the dock lines.

## Bow and Stern Lines

As shown in Figure 2, the basic dock lines required are at least one bow line and one stern line to the finger. Ideally both the bow line and stern line should be tied off to the finger as far forward of the bow and as far aft of the stern as is possible. This will help to reduce forward and aft motion.

This dock line placement is not always possible with our slips since most often the boat is as long as or longer than the finger (Figure 3). In this case either, or both, the stern or bow line will be less than optimal depending on whether you dock bow-in or stern-in. The placement of cleats on the fingers also aggravates this situation when they are not located near the extreme ends of the fingers.



Figure - 2

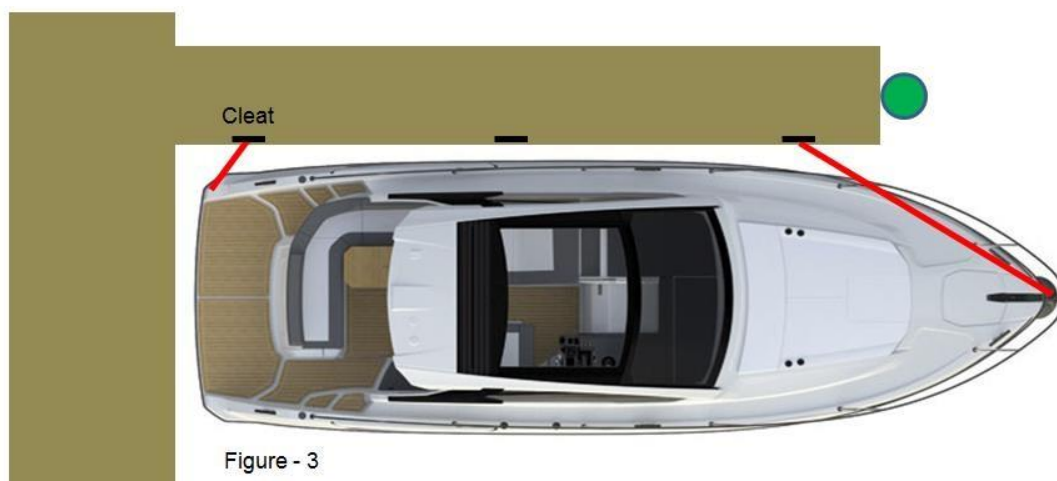
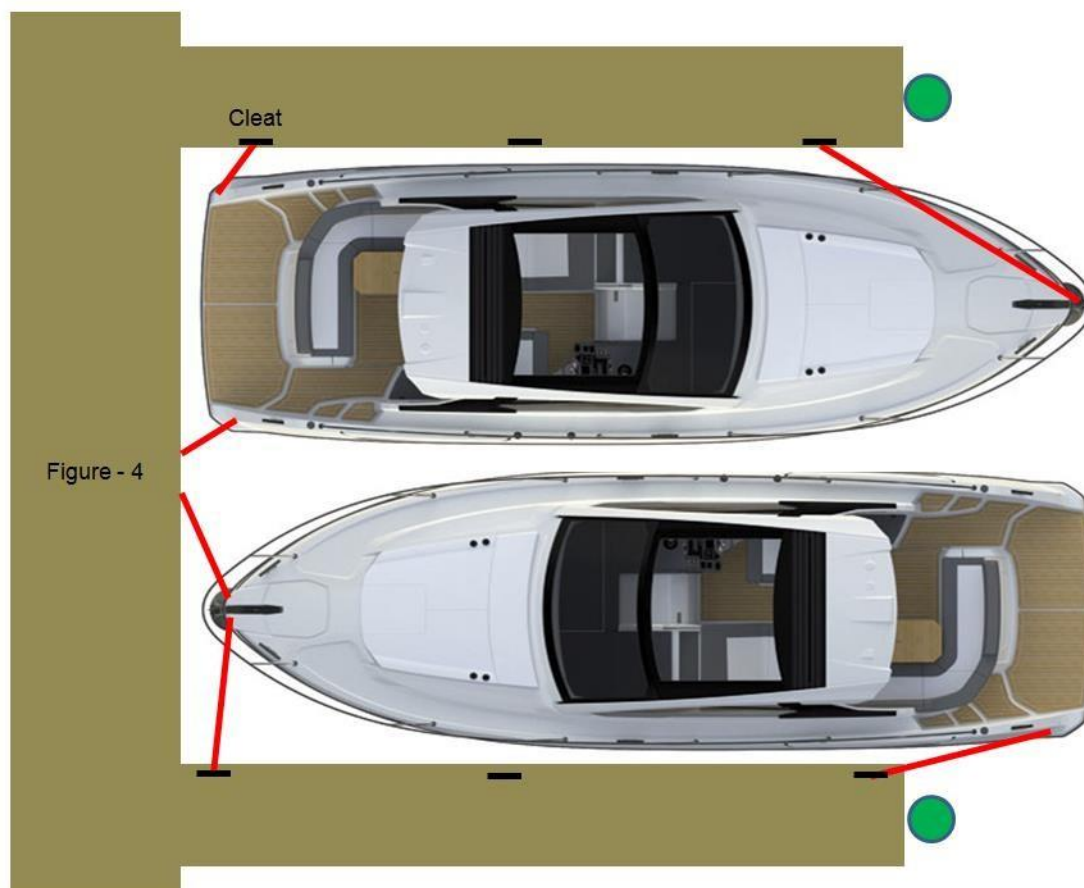


Figure - 3

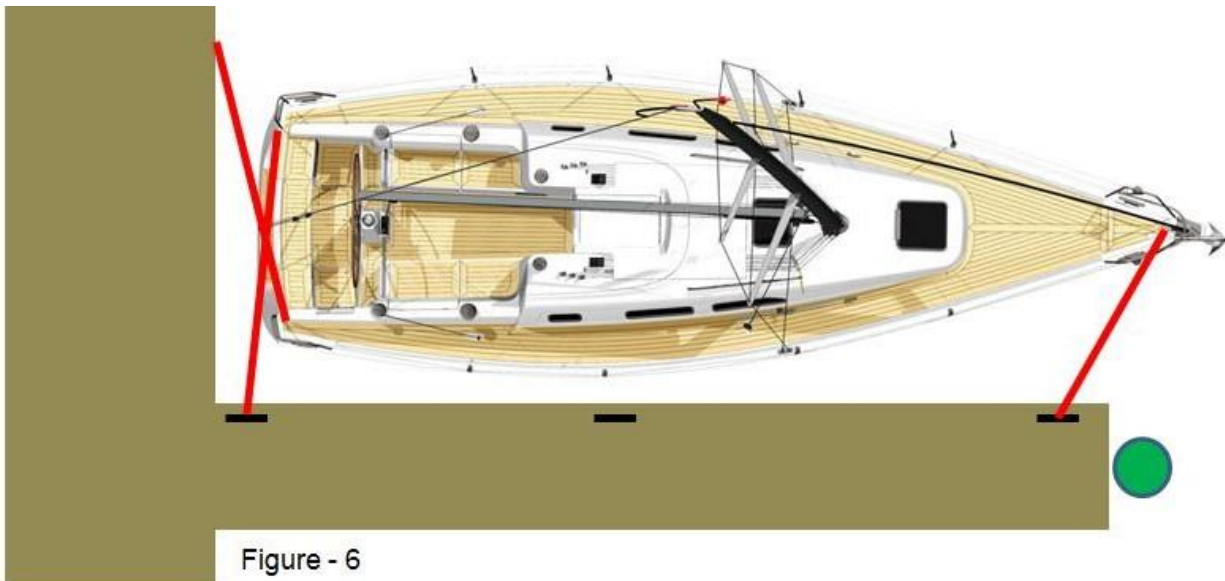
It is recommended that two bow lines be used when docking bow-in. If you dock stern-in then two stern lines should be used as shown in Figure 4. Using two lines will help minimize the yaw motion of the boat and keep it centered in its half of the slip.



When docking stern-in the ideal placement of the two stern lines is to have them crossed as shown in Figures 5 & 6. This better aligns the direction of the dock lines with the direction of the yaw motion that you are trying to prevent. This arrangement may not be desirable, due to the tripping hazard, when the stern platform is being used to get on and off the boat.

Figure - 5





## Spring Lines

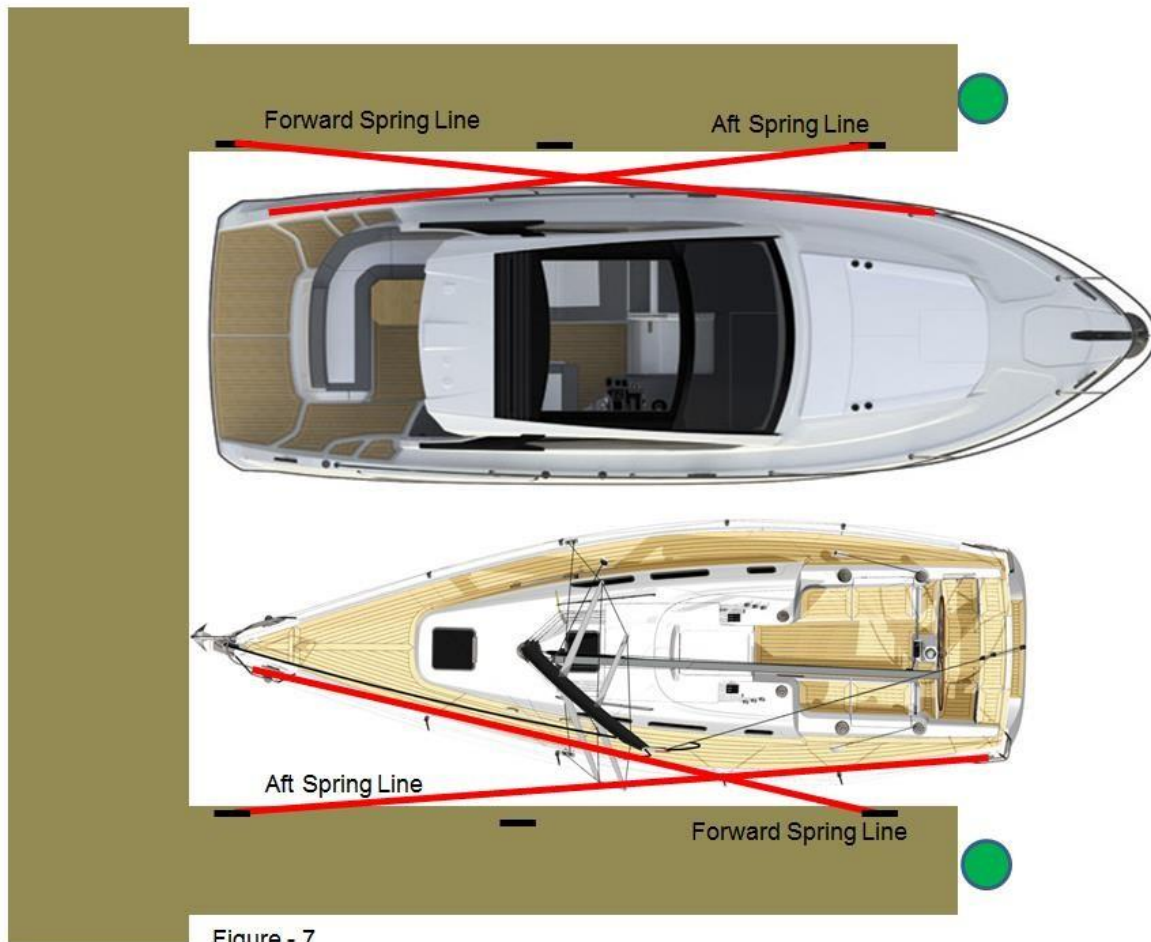
In addition to bow and stern lines, the use of spring lines is required. The purpose of spring lines is to minimize the fore and aft motion of the boat along the finger.

- The spring line that opposes the motion of the boat in the direction of its stern is called the **aft spring line**.
- The spring line that prevents the motion of the boat in the direction of its bow is called the **forward spring line**.

There are various ways to tie spring lines between the finger and the boat. Figure 7 shows the basic arrangement of spring lines for both bow-in and stern-in docking (*Note: bow and stern dock lines are not shown in the spring line diagrams to keep the diagrams simpler*). The forward spring line would go from the bow (or the closest attachment point on the boat towards the bow) to the furthest cleat at the opposite end of the finger. The aft spring line goes from the boat's stern cleat to the furthest cleat at the other opposite end of the finger.

The spring line arrangement shown in Figure 7 isn't always achievable due to the curvature of the bow on many boats, and the lack of cleats on the forward section of the boat. In addition it requires spring lines that are at least the length of the boat, if not longer.





Two alternate suitable arrangements involve use of a midship cleat or a cleat at the middle of the finger.

Figure 8 shows spring lines run from the boat's stern cleat and the furthest forward or bow cleat to a cleat or bull rail attachment point at the middle of the finger.

Figure 9 shows spring lines run from a cleat at each end of the finger to a cleat on the boat at the midship point of the boat.

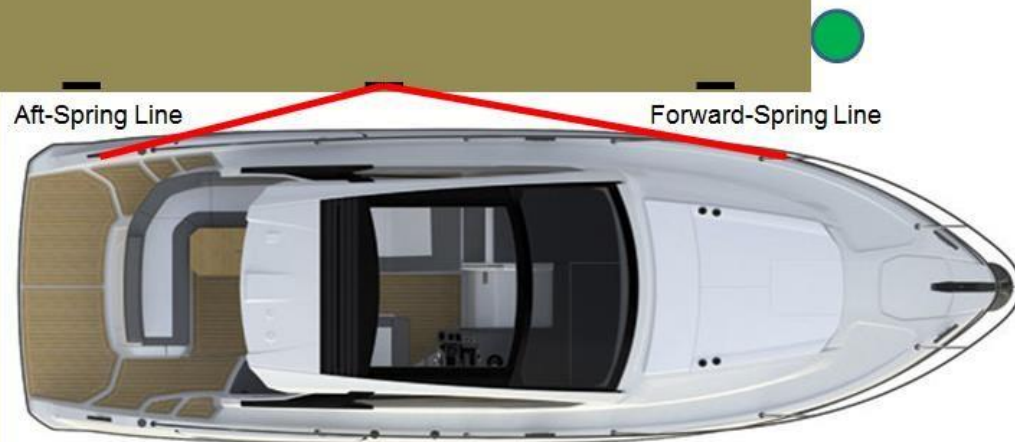


Figure 8 – Spring lines run to middle of finger

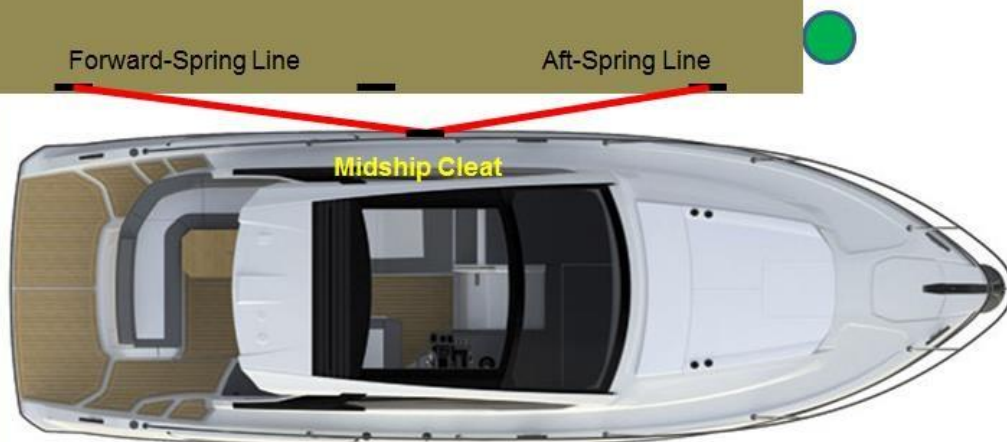
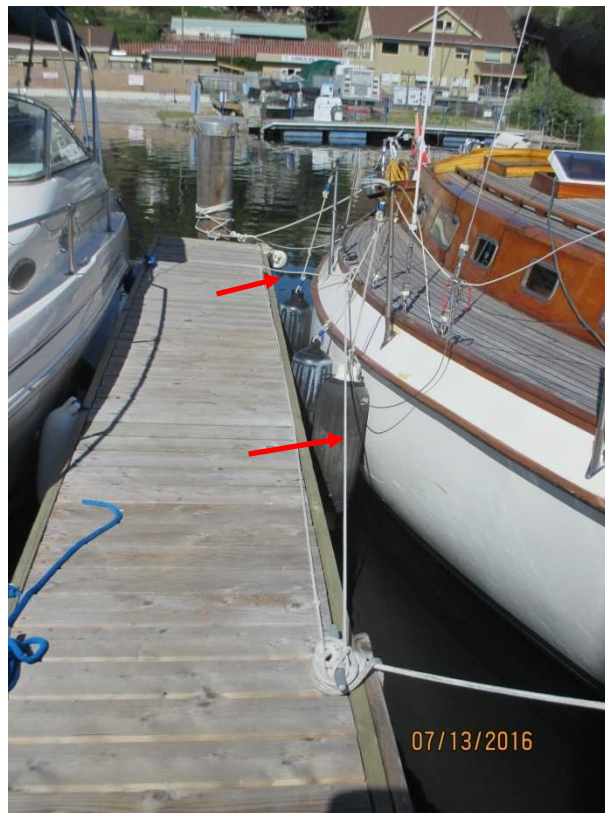


Figure 9 – Spring lines run from finger to boat's midship cleat

A good example of properly using a midship cleat on the boat to tie spring lines when no mid ship cleat on the dock.



A good example of using a cleat on the finger at the midpoint of the boat to tie spring lines to the boat's bow and stern cleats. Note: there is an owner mounted midship cleat/ring attached to the boat's toe-rail. While this will permit the midship spring line arrangement, it would be best to use the available dock cleat and the manufacturer installed boat cleats and not unnecessarily load the toe-rail.

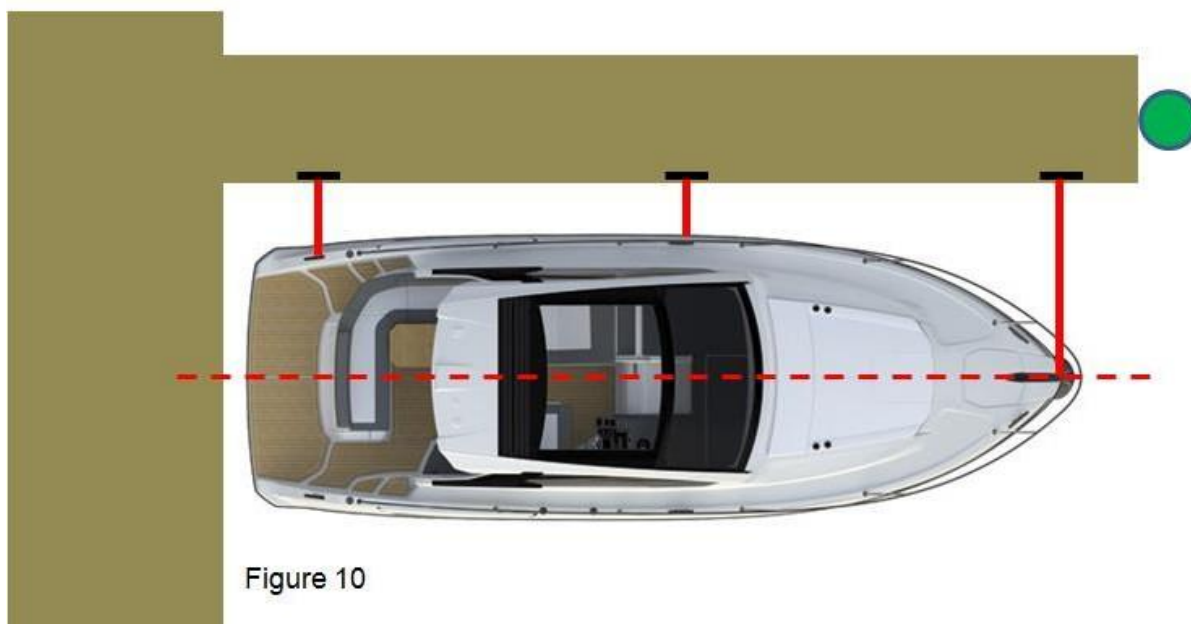


## Breast Lines

The purpose of a breast line is to keep the boat positioned and only be able to move a fixed distance away from the finger. Breast lines are tied from the boat to the finger at a right angle to the longitudinal axis of the boat. Stern, midship and bow breast lines can be used. Often in our moorage facilities what we might call a stern line or bow line are really breast lines because our fingers are not long enough to tie true stern and bow line arrangements.

Figure 10 shows the placement of stern, midship and bow breast lines (*Note: bow, stern and spring dock lines are not shown in the breast line diagram to keep the diagram simpler*). The boat can move closer to the finger but can't move any further away from the finger than allowed by the length of the breast lines.

In our facilities, because of the usually tight separation between boats sharing a slip, it is recommended to use a midship breast line. This dock line will ensure that your boat doesn't move sideways against the other boat.



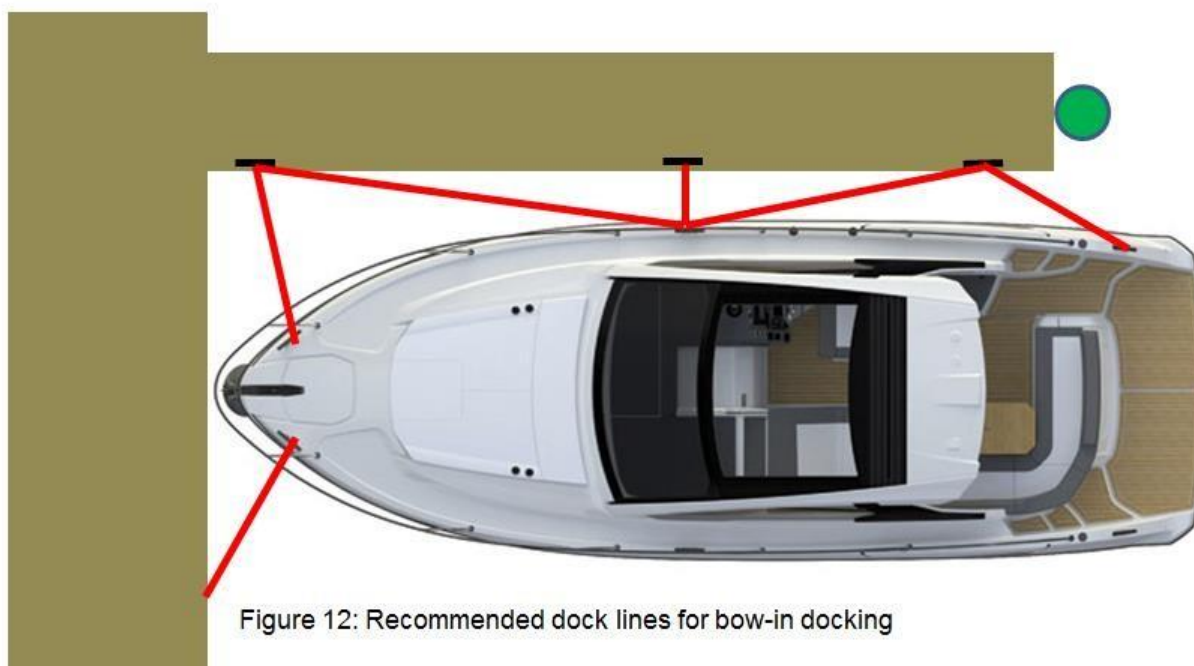
## Summary of Recommended Dock Line Arrangements

The following dock lines are recommended for all boats moored in the Royal Brighton Yacht Club marina:

- two bow lines when docking bow-in, otherwise one bow line,
- two stern lines when docking stern-in and, where convenient, the twin stern lines should be crisscrossed,
- forward and aft spring lines tied in the midship cleat arrangement when a midship cleat is available, otherwise tied from the boat's bow and stern cleats to a cleat at or near the midpoint of the boat,
- a single midship breast line, attached to the finger as near as possible perpendicular to the longitudinal axis of the boat.

Figures 11 and 12 show the recommended arrangements for stern-in and bow-in docking.





## Dock Line Materials

Dock lines should be made from a material that has elasticity that allows the line to stretch a small amount when put under load. A dock line that has no stretch will transmit shock forces to dock and finger cleats and also to the boat's cleats. By stretching under load, the dock line will absorb some of the energy of the boat's movement.

**Rope made from nylon is the only recommended dock line material.** Nylon has high strength, elasticity, abrasion resistance, will not rot, and has great resistance to the harmful effects of sunlight. Nylon dock lines most commonly will be either three-strand or double braided. Both are suitable for dock lines but each has its advantages and disadvantages compared to others.

Rope made from **polypropylene**, particularly the popular yellow polypropylene rope, should not be used for dock lines. It has a relatively low breaking strength, is stiff and will loosen easily when tied around cleats, has low abrasion resistance, and will deteriorate in sunlight.

Rope engineered for use as running rigging (halyards, sheets, etc.) on sailboats is made to have very little, if any, stretch. This is the exact opposite of the elasticity that a good dock line should possess. It is common to see halyards and sheets, usually made of polyester blends,

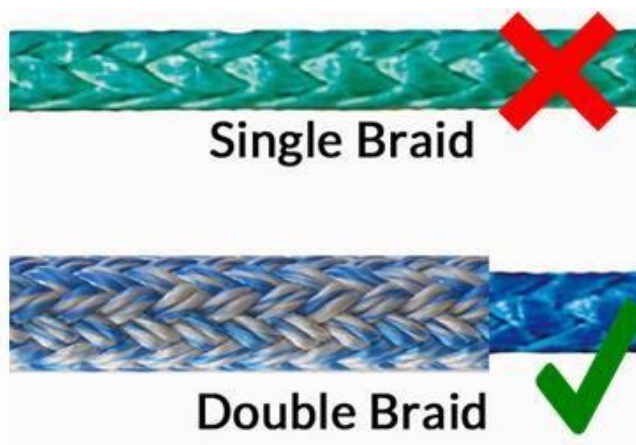
being repurposed as dock lines when they have reached the end of their life as running rigging. **Do not use these ropes as dock lines.** Think about it....a rope that has already been used for a number of years, has seen lots of exposure to sunlight and heavy loads, and has little inherent elasticity is not the correct choice to tie your precious boat to a dock.

Three-strand and double-braided nylon ropes are widely available and can be purchased with pre-spliced eyelets.

Three-strand (or twisted) rope has many filaments of nylon twisted into a primary strand and then three of the primary strands are twisted into the final rope.



Double braided nylon rope has a nylon inner core and a nylon outer jacket with a smooth surface. Note that there is also single braided nylon rope. This rope has no core and is essentially a braided shell. **Single braid is not recommended for dock lines.**



## **Transient vs Fixed Dock Lines**

Transient dock lines are dock lines that are detached from the dock or finger every time the boat leaves the marina, taken on board, and then reattached when the boat returns to the home or guest marina.

Fixed dock lines are configured in the home marina to the optimum arrangement of dock lines, detached from the boat every time it leaves and left on the dock to be quickly reattached when the boat returns to the home marina.

Either approach is suitable. However, it is recommended that if you choose a fixed dock line arrangement, then

- use double braided dock lines to take advantage of the slightly stronger, more abrasion resistant, and more supple lines,
- carry a minimum set (bow, stern, and two spring lines) of three-strand dock lines on the boat. Unless you can guarantee that you will always end up at your own slip it is best to have a backup set of slightly cheaper, more elastic, and lightly used dock lines for this circumstance.



## Dock Line Sizing

The diameter and length of dock lines will vary depending on the size of your boat.

Vessel Length(m)	<6	6-8	8-10	10-12	12-14	14-16	16-18	18-22
Displacement (Tons)	1	2.5	5	9	13	16	20	25
Rope Dia	8/10mm	10mm	12mm	14mm	16mm	18mm	18/20mm	20/24mm

If the boat, for its length, is abnormally heavy or has a much higher wind profile, then increasing the diameter to the next size is advisable. Choosing dock lines much larger than the above recommendations is not recommended. Much larger dock lines will not load the dock lines sufficiently to take advantage of their elasticity to dampen shock loads to the boat and docks.

If you are using a set of fixed dock lines it is recommended that you:

- use spring lines that are the same length as your boat
- use a bow and stern lines that are about 2/3 the length of your boat
- use a midship breast line that is 1/2 the length of your boat.

If you are using transient dock lines for your assigned slip, or you are purchasing a set of transient dock lines to carry on your boat, then it is recommended that you simply purchase dock lines that are all the same length as your boat. This makes it simpler since you don't have to sort out which rope to use for each dock line when coming into your slip or an unfamiliar marina.

## Care and Maintenance of Dock Lines

Chafe is the main enemy of dock lines.

Dock lines will accumulate dirt or have stuff growing on them if left in the water. Dock lines can be washed. This will clean them up and also return some suppleness or softness to the lines. Only use a mild laundry detergent, for example, Wool. Fill a bucket or tub with your lines and some detergent and add hot water (not boiling water). Let them soak and periodically agitate the lines. If this doesn't clean the lines then they can be washed in a washing machine. Put the lines in an old pillow case, tie the pillow case end in a knot and wash the lines in a gently cycle using a mild detergent.

And finally...while we wish dock lines would last forever, they won't. Inspect your dock lines on a regular basis and replace any line that looks damaged or chafed. If you can't remember when you purchased your dock lines, maybe it's time for a new set of lines.