

# Anchoring

With so much investment literally riding on your anchor, your boat's ground tackle system is no place to cut corners. Your choice of anchor depends on the size and type of your boat, and the weather and anchoring conditions you generally encounter. Boats with heavy displacements or superstructures that present a lot of wind resistance need heavier gear. The same is true of cruising yachts that brave a wide variety of conditions and may sometimes have to anchor in open waterways. Even if you're a confirmed fair weather boater, remember that the true test of your ground tackle will come in adverse conditions when you need it most. So, when talking anchors, bigger is better, and there's safety in numbers. No anchor can be all things to all bottoms, so have aboard at least two anchors of different designs to handle varying conditions. Finally, keep an anchor close at hand. There are stowage systems available for every type of anchor-brackets, bow rollers, chocks-don't let convenience outweigh common sense if it means your primary anchor has to be assembled before it can be deployed.

## Which Anchor?

### Fluke (Danforth-type) or Light-weight

This popular burying anchor has wide, sharp flukes. Its excellent holding power-to-weight ratio means it can be lighter than other types of anchors used for the same conditions. High-tensile strength aluminum models are lighter still. Fluke-type anchors hold very well in soft bottoms like mud and sand, but tend to slide on grass and skip on rocks. The projecting flukes can be fouled by seaweed, shells, etc., preventing anchor set and are also rather unwieldy, although some models like the Fortress can be disassembled for easy stowage. The Fortress also offers variable fluke angles that can be set for either mud or sand.

### Plow

An efficient anchor made of three steel-drop forgings, the plow features a single swivel at the shank base which prevents it from breaking out when the direction of pull changes. The plow is very effective in grasses, weeds, sand, and mud, but opinion varies as to its effectiveness in heavy grasses. Although its shape is somewhat awkward and hard to stow, it can be handled easily with bow rollers. And because it has no projecting fluke, it won't foul the anchor lines. Delta anchors have a similar design, with the added benefit of single-piece construction. The Delta's more streamlined shape also affords deeper penetration and prevents rolling.

### Claw

A relative newcomer featuring a proven three-claw scoop design, effective in mud and sand. It sets quickly and reliably in most conditions, including gravel. The stabilized, single-piece design rolls over rather than breaking out when the angle of pull shifts. Its one-piece construction is easy to handle, although it must usually be stowed below, or on rollers.

## Ground Tackle Holding Requirements

Now that you have an idea about the type of anchors you need, check the chart to determine the holding power you require. Since modern anchors are so efficient, it's their holding power, not their weight, that proves their adequacy. In the chart below, find your boat's length or beam, whichever produces the greater load. For example, a houseboat would use the load for the next larger powerboat size. Next, match it to your intended use for the anchor (lunch hook, working, or storm anchor) to determine the minimum holding power you need. Cruising boats should consider carrying all three types of anchors.

Boat Dimensions Horizontal Load (lbs.)					
Length	Beam (Power)	Beam (Sail )	Lunch Hook	Working Anchor	Storm Anchor
10'	5'	4'	40	160	320
15'	6'	5'	60	250	500
20'	8'	7'	90	360	720
25'	9'	8'	125	490	980
30'	11'	9'	175	700	1,400

## Anchor Rode

Depending on the size and type of your boat, your choices are either an all-rope anchor rode, combination rope/chain, or all chain. Rope should be nylon, either three-strand or braided. Nylon rope is elastic, making it a great shock absorber for sudden loads caused by wind and waves. Three-strand line should be medium lay, which has more twists per foot than soft lay. This is particularly important for use with a windlass, as the soft lay strands can untwist and separate, fouling the equipment. Three-strand rope can become awkward to handle, especially when hardened by salt saturation. An occasional bath in fabric softener will help to keep it supple.

Chain, used alone or in combination with rope, offers great benefits: it decreases the angle of pull on the anchor allowing it to set and hold more effectively, it's unaffected by chafe from rocks or sharp surfaces on the bottom, its weight forms a curve that absorbs shock loads in heavy weather, and, in the case of all-chain rode, requires much less scope-roughly half-for the same holding power as rope.

All chain is not created equal, however. Due to the inconsistent quality and often substandard galvanizing of many imported chains, we recommend that you avoid chain from foreign manufacturers. Proof coil is the most commonly used chain for anchor rodes. Made from low-carbon steel, it is identified by "G-3" imprinted on each link, and is adequate for most marine applications. BBB chain is slightly stronger than proof-coil, and has short links allowing a snug fit into windlass gypsies. BBB is also preferred by many cruisers using all-chain rode. Hi-test chain is made from higher carbon steel that has been surface-hardened. It has a higher strength-to-weight ratio than proof coil and is favored by the weight-conscious, as it can reduce the weight in the bow by up to 30% without sacrificing strength.

Suggested Minimum Working Rode Sizes* (For winds up to 30 knots.)				
L.O.A.	Beam (Sail )	Beam (Power)	Nylon Rode	Chain Rode
10'	5'	5'	125'-3/16"	3/16"
15'	7'	7'	150'-3/8"	1/4"
20'	8'	9'	150'-3/8"	1/4"
25'	9'	10'	150'-3/8"	1/4"
30'	10'	11'	200'-7/16"	5/16"

\*Suggested sizes assume fair holding ground, scope of at least 5:1 to 10:1, and moderate shelter from high seas. Boats that operate generally in shallow waters, as on the East Coast of the United States, may get by with shorter rode lengths.

## Chain Length

There are two schools of thought on figuring the proper chain length. Chapman's suggests using one half foot of chain for each foot of boat length. But Earl Hinz, a former aeronautical engineer and inveterate Pacific Ocean sailor, in his work *The Complete Book of Anchoring and Mooring*, says "the chain lead should weigh at least as much as the anchor whose weight it is supplementing". From his experience, he has determined that the length of

the chain lead has nothing to do with the depth of the water or the length of the boat. He suggests using the following formula to help you determine the minimum length of chain lead you will need:

**Minimum Anchor weight in lbs. Anchor materials factor = length of = x Anchor materials factor 1 for steel and chain lead Unit weight of chain, 1.6 for aluminum lbs./ft.**

For example: If you have a 7-lb. Fortress aluminum anchor with a 1/2" twisted three-strand nylon rode, you would need to use at least 11.2 lbs. of 5/16" proof coil chain, which weighs 1.15 lbs. per foot. Therefore, you will need at least 9'8" of chain.

## Setting the Anchor

For a firm set and a good night's sleep, follow these simple guidelines:

Approach your spot slowly, and put the boat in reverse when you're over the desired location. When the boat begins to gather sternway, lower the anchor to the bottom, and gradually pay out the rode. Take a turn around the bitt, snugging up the line and causing the anchor to "bite." Then pay out the rest of rode to the appropriate scope. Finally, check the set of the anchor by one of these methods. Using a buoyed trip line, reverse slowly and note if the buoy bobs up and down in one spot (you're OK), or is being pulled backwards with you (you're not OK). Another method is to choose two objects abeam that form a range, and check your position periodically in relation to them. Any change in their bearings means you'd better try again.

## Determining Scope

The amount of anchor rode paid out depends on the type of rode you're using and the weather and bottom conditions. Scope is the ratio of rode paid out to the depth of the water. The proper scope for all-rope rode in average conditions is between 7:1 or 8:1; as noted before, you can be comfortable with a mere 3:1 or 4:1 if you're using all-chain rode. The key is to keep the angle of pull as close to horizontal as possible. Heavy weather or adverse anchoring conditions demand longer scope; however, keep in mind how you'll swing in relation to your neighbors.

## Retrieving the Anchor

Break out your anchor by powering up to it slowly (with your engine, not your windlass), taking in the rode as you go. Once over the anchor, move all the crew to the bow, snub the anchor, and move aft. You should be able to lift it vertically. If it resists, snub the rode around the bitt and power forward slowly, taking care not to carve up your topsides. A handy device is an anchor retrieval system, which uses a buoy attached to the rode to help break the anchor free.

Whatever system you choose, remember that your boat's ground tackle system is also its greatest safety feature. Buy the best you can, and check the gear often for signs of chafe and wear. With so much at stake, don't let the anchor and chain be your system's weak link.