



*Intermezzo*, our first bluewater cruiser, was a 50-foot (15.4m) ketch, designed by Bill Tripp in the middle 1960s. She was a prototypical Cruising Club of America–racing rule-design. The short waterline rated fast but sailed slow in a breeze. However, the price was right, and most important, she got us out there.

## BREAKING FREE

The single most difficult aspect of cruising is getting away from the dock. There always seems to be a hundred essential things left to do. Each time an item is crossed off the list, several more are ready to be added. It seems the list will never be finished.

And, if truth be told, most folks preparing for their first cruise are just a little concerned about what the future holds. That's natural enough. We like the mental comfort of a known environment. Cutting loose and going cruising for the first time opens a whole range of uncertainties for the neophyte.

I remember some of my own concerns before we started voyaging, almost all of which are laughable now. "I wonder what I'm going to do to keep occupied?" That has to get the prize for the all-time non-issue when cruising. The reality turns out to be just the opposite. There's never enough time to do what I'd like.

Or, "What are we going to do if we can't get the foods that we're used to?" As we now know, you can get almost anything, anywhere. Would you believe Sara Lee cakes in the highlands of New Guinea and Best Food Mayonnaise in Fiji, not to mention McDonald's hamburgers in New Zealand and Australia, as well as much of Europe! (Not that we eat them,

of course.) I was even worried about my usual showers. In the old days I took one in the morning to wake up and another before bed. I knew I couldn't do that aboard. However, we did find ways to shower on an almost daily basis, and this was before watermakers were on the scene.

Linda was worried about the kids' toys. They left rooms filled with them at home. When I gave each girl a small cardboard box and said, "Fill it with your favorites because that's all the space there is," Linda just about cried. But Elyse and Sarah learned to *improvise* and were much the richer for it as they matured.

Of course, the fact that we got over our concerns isn't going to help you much. Whether it's your first long-weekend cruise away from home, or a long-term commitment to voyaging, your own fears are going to be just as real, warranted or not.

The key is to not let them stop you. Don't keep putting off the departure date because of things left to do. *Set a date, get the boat seaworthy, and cast off.* The rest of the things on the list will probably turn out to be not that important after all. Those that are can be taken care of later.



*Intermezzo II* was a 62-footer (19.1m) yacht that we built in Cape Town, South Africa. She was much easier to handle than her smaller predecessor, required less maintenance, and was almost 20 percent quicker on her passages. While she was considered a radical design by the yachting press in the early 1980s, she was in reality an extremely conservative cruising yacht.

Keep in mind that every day you spend tied to the marina, the land-based overhead continues to run. Throw in all those trips to the local marine store, and the amount of money left in the cruising kitty diminishes at an alarming rate. Once you've been out cruising awhile, like almost all other cruisers, you're going to wonder what took so long. You'll rue all that money spent "getting ready," much of which could have better gone into extending your cruising time.

We cannot emphasize too strongly the importance of going as soon as possible, holding off on as many decisions as possible about equipment. Whatever you think today about what is "necessary" for your new lifestyle will turn out to be wrong. We guarantee it. Once you've been out there awhile, your priorities will change enormously.

Finally, we need to say a word about mental security. There is a common notion that the more gear you have aboard the boat, the safer and happier you will be; in effect, that you can buy your mental security. Since time (not to mention budget) is always in short supply when you're first getting ready to depart, the more you spend researching gear and adding it to the boat, the less you have for working on your cruising skills.

And if there's one area that will really bring you mental as well as physical security, it is your cruising skills. Time spent working on those skills, practicing with your boat, and learning how to maintain it will yield far more dividends than time spent pouring over catalogs and visiting the marine store. Obviously, the cruising kitty will stay fatter as well.

Go now, get some experience, cruise for a while, then make those big decisions. Your friendly marine store will still be there when you get back. And by then, rather than asking the clerks what to do, they'll be asking you.

Remember, when in doubt, don't buy it!

## PREPARATION

Having advised you to wait on those big decisions, you still need to be properly prepared for the sea. The offshore cruising yacht must be set up to deal with whatever the sea throws at it.

Proper rigging and safety gear, emergency equipment, backup systems, and ground tackle are all essential. This is what you want to concentrate on at first. The fancy lifestyle-oriented investments can come later.



We designed and built the 67-foot (20.6m) *Sundeer* after we had “retired” from the yachting business. She was to be our “ultimate” cruising home. Aluminum construction (left unpainted) meant maintenance was minimized. The ketch rig was both easy to handle and fast. She had excellent powering ability, and she was extremely comfortable to live aboard — both at anchor and at sea.

today. Our experience is that when you’re cruising, some of the creature comforts of life are worth having if you can afford them.

But there must be a balance. Overloading a cruising yacht with complex gear, whether for local or distant cruising, usually ends up adding to your frustration level and reducing the cruising kitty. Within the context of an affordable, comfortable cruising lifestyle, the emphasis should definitely be on the *simple* side of the equation.

Much of the preparation needed to put a basically sound vessel on an offshore footing can be done by the crew with minimal cash investment. Of course, you’ll want to have the best ground tackle, personal safety gear, and heavy-weather sails. But beyond this level of equipment, the rest of the gear we will be covering in this book should be considered in the nice-to-have-but-not-required category.

When we bought *Intermezzo*, I’d planned to strip her of what I then considered nonessentials in order to simplify maintenance and our lifestyle. The big diesel, refrigeration, radar — even the water heater — were all on the scrap list. What I didn’t recognize then was the difference between

The average cruiser spends less than ten percent of his or her time at sea. The other 90 percent is spent in anchorages where the daily business of living goes on. For a long-term cruise to be successful, you must give careful consideration to the various amenities of the cruising life aboard, both at sea and at anchor. But between the two situations, it’s at sea where things are most critical.

There are certain elements of preparation that are common to all boat sizes and pocketbooks. Nobody can cruise in the tropics without awnings, but you can get by without air conditioning. Awnings can be professionally made, or a nice reinforced equipment tarp will do over the main boom. You must have at least a Primus stove to heat food; a microwave oven is nice but not necessary.

Traditional cruising lore has it that a good offshore voyaging yacht should be spartan. However, most gear aboard modern yachts can be repaired by the crew if they are properly prepared, and technical service is available in most of the major cruising ports





*Beowulf* is our latest creation. At 78 feet (24 m) she is probably the easiest of all of our boats to handle at sea. Of course, the loads are up, but the gear these days is more efficient and we've found her simpler (and a lot faster) to sail on passages than our previous yachts.

living aboard full time and taking occasional extended cruises. After a short cruise we had a warm house, a well-stocked refrigerator, and a water heater waiting for us; it's a different story when the boat *is* your home.

I was forestalled from any rash moves not by that realization, but by a well-honed commercial instinct. What I wanted to do to *Intermezzo* would make it difficult to resell her later. So the amenities stayed. By the time we finally sold her, not only had we learned to appreciate those amenities, but we had added more.

By today's standards *Intermezzo*, even with the gear we'd added, was a very simple boat systems-wise. Most of our investment was in waterline and structure with a minimum reserved for the lifestyle-related equipment. This allowed us to cruise on a larger boat than would have otherwise been possible and kept maintenance costs down.

When we built our 62-foot (19.1m) *Intermezzo II*, we kept the same basic systems approach that had served us so well to that point. She was simple in the extreme for a vessel of her size. With the 67-foot (20.6m) *Sundeer* and 78-foot (24m) *Beowulf* we took the same approach. In each case this allowed us to build a much larger vessel than would otherwise have been the case and to cruise for a very modest budget.

It's quite common to see new owners engage in major projects almost immediately after purchasing a vessel. In general, when it comes to making big changes in the rigging, interior, or machinery of a well-found yacht, my advice is to wait. After you have accumulated experience on board, your ideas will be different.



*Sundeer's 110-pound (49.9kg) Bruce anchor is well supported by an aluminum weldment made up from 3/4-inch thick (19.1mm) plate. The miniature bowsprit keeps the anchor clear of the vertical stem when the anchor is raised.*

## GROUND TACKLE

Ground tackle and anchoring techniques for a serious cruising yacht differ considerably from the equipment and skills adequate for local sailing. Not only do you have to cope with a wide variety of bottom conditions not found close to home, but you can rarely count on reliable data concerning weather and current conditions. Obviously the cruiser must be able to handle the worst conditions and still have a margin of safety. The problem comes in trying to visualize what kind of conditions you may have to face. Sheer weight and size of anchoring gear do not give a full range of protection, although for a given situation, bigger is better.

## CALCULATING LOADS

There's some debate about anchor loading in different conditions. Various organizations publish suggested guidelines, most of which, in our opinion, yield anchors that are too light in weight for serious cruising.

The following load factors need to be considered as they relate to your boat. First is windage. This is made up of a cross-section of your hull and rigging. The more superstructure, hull, spars, sails, and rigging in the air, the more windage you have and the bigger the load on your anchoring system. A roller-furled headsail, for example, will add 10 percent or more to total windage.

Wind loading goes up with the square of wind velocity. Thus, a 20-knot puff will have four times the force of a 10-knot puff ( $10 \times 10 = 100$ ;  $20 \times 20 = 400$ ). Cold, damp air has more punch than warm, dry air. A variation of as much as 15 percent

can be experienced from this effect. Once the static load with the boat facing directly into the wind is developed, you need to add a factor for sheering. The further off the wind your bow sheers in a wind gust, the greater surface area of hull, superstructure, and spars exposed to the wind. (Looked at head-on, your hull, for example, presents a pretty efficient shape in terms of windage. But when you look at it from a 30-degree angle the drag increases enormously.) Sheering can easily double windage.

Finally, you need to look at sea state. If sea conditions are moderate in a protected anchorage, then little extra load will be induced. But swing the wind a bit so that a 3- or 4-foot (0.9m to 1.2m) sea is rocking your bow, and the shock loading on the anchoring system can grow exponentially.

Before going further, we'll describe a situation we experienced at the beginning of our circumnavigation. We were anchored inside the lagoon on Takaroa in the Tuamotus. The sky was an exquisite pale blue, and a gentle southeast wind was blowing.

As we entertained newfound local friends in our cockpit, we noticed a mast moving toward us from the other side of the lagoon. It was a 23-year-old singlehander from Newport Beach, Dean Kewish, sailing a beautiful Vancouver 27. Dean dropped his hook about 30 yards (27 m) to the west of us, and when he snugged up he was abeam. After getting acquainted on the last of our Mexican acquired Carta Blanca beer, we retired for an early dinner and what we thought was to be a restful night's sleep.

About 2100 the wind veered from southeast to west and began to blow 15 knots, gusting higher. The change in motion woke me, and as I glanced at the telltale compass over our bunk it took a



Having a fitting at the water level for attaching the anchor rode reduces the angle of pull and increases anchor holding power

minute for the implications of the shift to filter in. Where before the reef to the east of us had prevented a chop, we were now facing waves building up across 5 miles of lagoon.

We were suddenly looking at a building sea and wind with no possibility of slipping out to the safety of the ocean, no reference marks ashore for bearings, and the vertical face of a reef not more than 100 feet (30.8 m) abaft of our transom. What was worse, since we were not sure of our distance to the reef, I didn't dare let out more scope. We were anchored in typical atoll conditions: a coral bottom with a covering of thin sand. The anchor had withstood only half reverse before dragging when we set it. Throughout the evening and into the early morning hours, the wind continued to build until it was gusting 45 knots, with a 4-foot (1.2m) sea, accompanied by torrential rains.

I kept the engine running all night, occasionally putting the prop in gear in the heavier gusts. Our only solace came from Dean's cabin light. If he was not dragging, then we weren't either, as our relative bearing didn't appear to be changing.

The sounds emanating from our anchor chain were the worst part of that night. The bottom had numerous coral heads scattered about, and as we plunged up and down and occasionally from side to side in the shifts, the chain would foul and then snap the coral heads. The resulting assault on our ears was incredible. To ease the strain, we rigged our standard double shock absorber. This consisted of a 30-foot (9.23m) piece of 3/8-inch (9.6mm) three-strand nylon line tied to the chain and secured to the bow so that 6 feet (1.85 m) of chain hung slack and then a second section 8-feet (2.4 m) long with 2 feet (0.6 m) of chain hung slack. Normally the first section would be just stretched tight. In the big surges the second would draw up, and occasionally the gypsy would take some load.

Dawn found us still afloat. We were delighted to see one of the locals paddling out to us through the rough water. He guided us back to the relative calm of the pass, where we tied up at the copra wharf.

This episode illustrates many of the factors facing cruising yachts at one time or another, and while it takes place in an exotic setting, the lessons are universal in application.

The primary problem is that a majority of tropical anchorages are in coral-infested waters with a bottom of thin sand over hard coral or rock. On a smaller boat this doesn't create a big problem, as its anchor doesn't need as much sand to dig in. A plow-type anchor on a 30-foot (9.2m) boat is usually acceptable under these conditions. That night, Dean's 25 pounder (11.3kg) held him tight; we, on the other hand, rode to a 60-pound (27.2kg) CQR and dragged about 50 feet (15.4 m). Had the wind or seas increased another 20 percent, our anchor wouldn't have held at all.

## CQRs

The CQR plow anchor we used aboard *Intermezzo* is popular among cruisers. It has an excellent holding power/weight ratio and self-stows easily. Since it's a deep burying anchor, it will not trip itself out if the direction of pull is changed. This last factor is significant in tidal anchorages and where you can expect a change of wind direction. The drawback with the CQR is that it will not hold well in soft mud, which means that it's no good for anchoring off river mouths or in areas with substantial topsoil runoff. And, as we've already mentioned, it does not do a good job for larger yachts in thin sand over coral.

In the last few years the manufacturers of the CQR have come out with a modified version called the Delta. This is a self-launching-style anchor, has more fluke area for a given weight, and because of its thinner head will penetrate better. Some cruisers swear by it. On the other hand, the stock is fixed, compared to the CQR's swiveling stock, so when the direction of pull changes it sometimes has to reset itself.

## DANFORTHS

The Danforth-style lightweight anchors have good points to fill in for the CQR. These anchors have a much greater fluke area and do not require such deep penetration to gain their holding power. In the thin-sand conditions described, a Danforth will give much better holding. But it doesn't bury as deeply as the CQR and has a tendency to trip and require resetting when the direction of pull is changed; in these conditions, a careful anchor watch is necessary. Furthermore, in poor bottom conditions the flukes can become jammed with coral or debris, which prevents them from penetrating. Another problem occurs when they foul coral heads. The Danforth-style anchor is more vulnerable to damage under these conditions than the CQR.

In soft mud, though, the Danforth is positively amazing. We once tried anchoring with our CQR at Waiheke Island in the Haurakae Gulf of New Zealand. Even with 8-to-1 scope it wouldn't hold. My dad was aboard and observed that we didn't have enough chain out. Having been through this before, I asked if he would care to wager. The terms set, we proceeded to let out all 80 fathoms of our chain in the 2-fathom anchorage. Even the minuscule backing capability of our folding prop aboard *Intermezzo* was enough to drag anchor and chain all over the bay. After retrieving this gear we set the Danforth with its short chain and 3/4 inch nylon line. With a 5-to-1 scope it dug in abruptly and held against full reverse power.

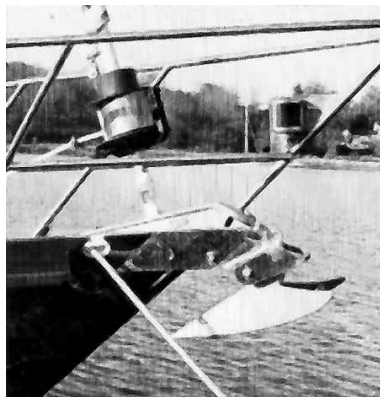
## FORTRESS ANCHORS

The Fortress company produces an aluminum anchor, similar to the Danforth design, that has some excellent attributes. It combines light weight with extreme fluke area, so that under a majority of conditions it will hold as well as its heavier counterpart. For a kedge or stern anchor, where you are handling it from a dinghy, it's an obvious choice. It has the further advantage of being assembled with bolts, so that spare anchors can be easily carried in the bilge.

We typically carry one of their largest models as a spare storm hook for use in really extreme conditions when we want to back up our primary hook.

## NORTHHILL SEAPLANE ANCHORS

The Northhill stainless seaplane anchor has excellent holding power in bottoms with more weed than a Danforth or CQR can penetrate. Its disadvantages include bulkiness and a tendency to foul its rode, since it lies with a non-buried fluke. You can occasionally find one of these surplus for a very cheap price, and as a backup anchor they may make sense. But I would not want to use one as a primary hook.



CQR anchors self-stow easily and work well in sand and mud. In thin sand over coral and soft mud, they do not work as well as Danforths or Bruces.

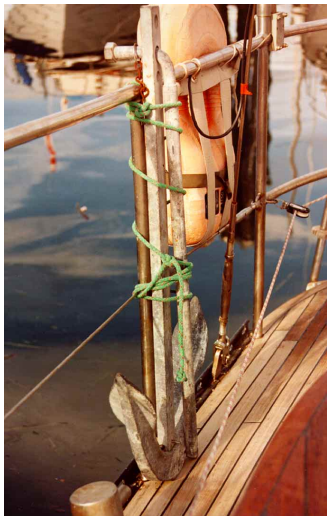


*Intermezzo* carried both CQR and Danforth anchors on the bow, giving us an easy choice in a variety of conditions. Today we would carry a single bigger anchor.



A Viking aluminum anchor rests happily on this pushpit, ready to go in an instant in the event of a grounding. This was the predecessor of the Fortress anchor.

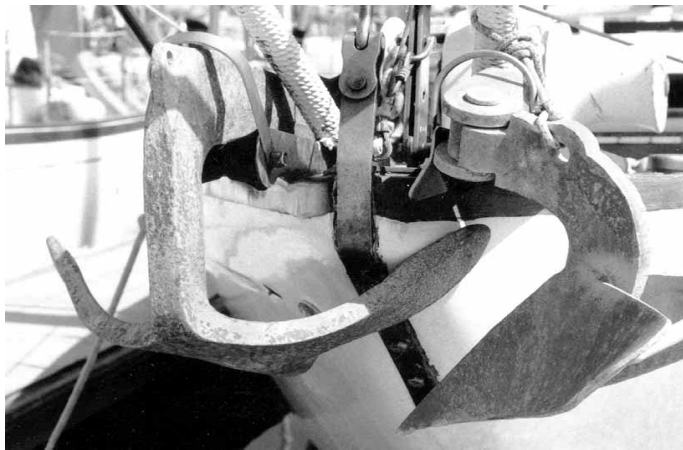




A traditional fisherman-style anchor stowed aft. At sea the weight would be better stored in the bilge. The lashings shown here are too light to keep the anchor in place in heavy going.



A major problem with muddy bottoms is keeping the deck clean as the chain is washed down. We solved this aboard *Intermezzo* by running a small breakwater from the bow aft, around the windlass, and to a scupper cut through the toe rail, thus keeping the mud forward. This solution has been adopted on all of the subsequent vessels we've built.



A combination of Bruce and CQR anchors can be made to self-stow more easily than two Bruces.

## THE YACHTSMAN

The Herreshoff Yachtsman's anchor (also known in variations as a mariner's or fisherman's anchor) is excellent in rock and weed. Many people feel that one of these of significant proportions should be carried disassembled as the anchor of last resort. For rocky coasts or foul coral bottoms I would agree, but their usefulness in the tropics, compared to a Danforth and CQR, is open to debate because of the difficulty in handling them and their lack of holding ability compared to more modern designs in mud or sand.

Patience Wales and Knowles Pittman used one of these picks as their primary anchor during a circumnavigation aboard their 51-foot (15.7m) *Boston Light*.

While we used to keep a Herreshoff aboard for emergency situations, we've actually never had to use it. Lately, we've opted to leave it ashore.

## BRUCE ANCHORS

The Bruce anchor is new to the yachting scene over the last two decades and offers a potential combination of the best points of the Danforth, Yachtsman, and CQR. Non-tripping, with greater fluke area than the CQR, it doesn't have the structural disadvantage of the Danforth when shortened down to a 3-to-1 scope. This is an advantage in deep as well as crowded anchorages. We have used the Bruce on *Intermezzo II* and *Sundeer* (110- and 176-pound [50kg and 80kg] models) and on *Beowulf* (240-pounder) (108.9kg) and found that it's a wonderful all-around anchor.

We've found that the Bruce does much better than a CQR in thin sand over coral. It also works well in rock. When we used the Bruce in Alaska in extremely deep water off glaciers, it did an excellent job with rocky bottoms where our neighbors using CQRs had problems.



## TEST RESULTS

In 1995, the Sailing Foundation of Puget Sound conducted tests on a variety of anchors. Their printed report made reference to several other tests that had been conducted previously.

Results varied but seemed to indicate that the Fortress anchors were far and away the most efficient hooks on a per-pound basis, while CQRs came next in all-around holding ability.

Our favorite, the Bruce, typically would only hold 50 percent or less of what the CQR held.

These results echoed what we've found in the real but unscientific world of cruising.

At first reading this would indicate that Fortress was the way to go, with CQR next in line. And if you are anchoring in mud or sand all of the time, close to home, this is indeed the right interpretation. However, our concerns are different for long-range cruising.

Our primary concern is the ability of the anchor to hold in foul bottoms — those littered with rock and coral.

When the tests were conducted in foul areas the Bruce showed itself to be the champion.

Data also showed that the Bruce set more easily. In fact, in some tests, it was the only anchor that would consistently set.

Finally, the Bruce did best when faced with a change in direction of pull, such as would occur with a wind or tidal shift.

So how do we address the issue of lack of holding power (compared to the CQR and Fortress)? By going up in basic anchor size. Adding a few pounds to the size of the basic anchor will bring the Bruce up to the holding capability of the other anchor types in good bottoms, and improve its performance in poor conditions.

## MAIN ANCHOR SIZE

Which brings us to the question of size. You should carry the largest possible anchor and use it for everyday anchorages. The holding power goes up in proportion to the fluke area, and that goes up dramatically with the weight. But going from a 40-pounder (18.1kg) to a 70-pounder (31.7kg) is only a small percentage increase in the overall weight of the *total* anchoring system. Remember that most of the time you will be anchoring in less-than-ideal conditions, and a few extra square inches of anchor surface are going to make a big difference. For a small overall gain in weight you will achieve a big gain in security.

If you need to make a choice between heavy chain and a heavier anchor, always put the weight into the anchor.

Since there are no good scientific rules of thumb for choosing anchor sizes, we suggest the following: Look at the average size of anchor in use for boats of your type, and double the size. After doing this, if you think you can swing it, add another 50 percent.

When we left Los Angeles on *Intermezzo*, people laughed at us for carrying a 60-pound



Twin 110-lb. (50kg) Bruce anchors rest side by side on *Maya's* bow. By staggering the starboard hook slightly forward either anchor can be deployed without interfering with the other.

The larger the bow roller, the less friction the chain will see. This 6-inch (152.4mm) roller is ideal for 3/8" (9.6mm) chain.



(27.2kg) CQR anchor on the bow. And indeed, the data in the various handbooks we read indicated that this should be considered a “storm” anchor for a boat of our size and windage. Yet after a few months of cruising, we jumped at the chance to trade up to a 75-pounder (34kg) in Fiji. The difference those 15 pounds (6.8kg) made in setting time when anchoring in poor bottoms was really amazing. If we had to do it over again, we would start with a 100 pounder (45.4kg).

The trade started because a cruising powerboat wanted to go from a 125-pound (56.7kg) CQR to a 200-(90.8kg) pounder. Our friends, the Schmidts, aboard their 70-foot (21.5m) *Win'son* took the 125-pound (56.7kg) anchor from the powerboat and traded us their 75-pound (34kg) hook. Our 60-pound (27.2kg) anchor went to other friends on a 45-foot (20.4kg) ketch who took their 45-pound (20kg) anchor and...well, you get the idea. For secondary work on *Intermezzo*, we used a 40-pound (18.1kg) Danforth standard stowed in a chain pipe on the bowsprit. This gave us the option of using either or both anchors quickly.

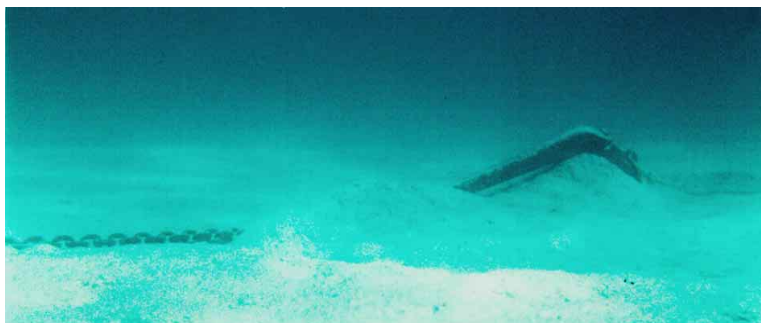
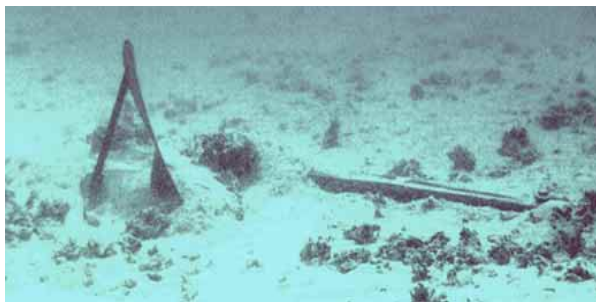
When we purchased ground tackle for *Sundeer*, we went with a 110-pound (50kg) Bruce as the next size available, 240 pounds (110 kg), was simply too much. But when Bruce came out with a 167-pound (80kg) hook, we traded up. You wouldn't think that 57 pounds (25.9 kg), roughly a 40% increase in weight, would make a big difference. Yet it made a huge difference in all conditions. We were surprised at the increase in short scope abilities. In crowded anchorages we found that we could set the anchor at 4-to-1 scope, then shorten down to 2- or 3-to-1 to reduce swinging room. This allowed us to anchor on a single hook in conditions where two might otherwise have

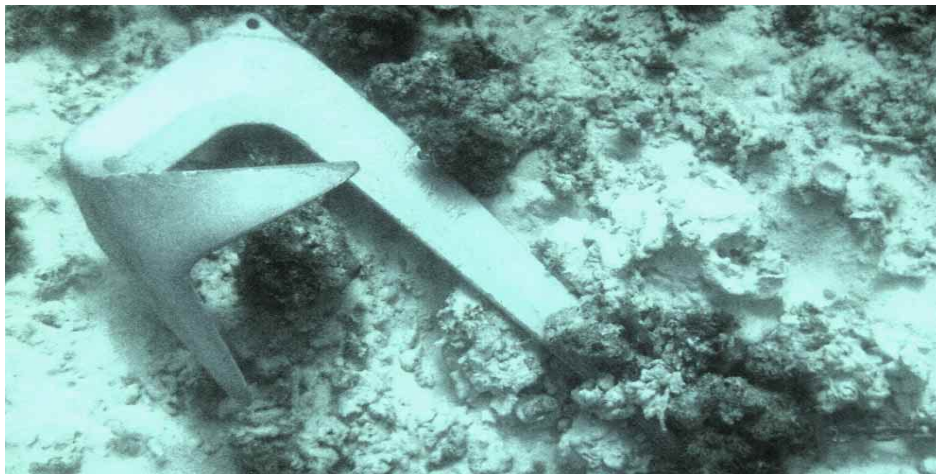
been required. In Alaska we anchored several times in very deep conditions with 2 to 1 scope, and the Bruce held well enough to stand 1,500 rpm in reverse or the equivalent of around 35 knots of wind loading.

When we specified the anchoring package for the *Sundeer* 56 and 64 we went with 110- and 176-pound (50kg and 80kg) Bruces. Overkill? Definitely! But the owners will rarely find themselves dragging, and they'll all sleep better at night. The owner who will sleep the best is Bill Tatum, who decided to use a 176-pound (80kg) Bruce on his *Sundeer* 56!

These two photos (top and middle) show a CQR anchor in thin sand over rock in the Sea of Cortez. Note how the anchor lies on its side, unable to bury. A Bruce or Danforth would be a better choice in these conditions.

A CQR (bottom photo) just beginning to dig in. It will hold moderately well like this. However, to really work well it needs to be totally buried. If coral or rock is keeping the CQR from burying farther, a Bruce or Danforth-style hook would do a better job.





Two shots of a Bruce anchor in a foul bottom. Notice how the flukes hook in and onto what's available. While no anchor will give you good holding in this sort of a bottom, the Bruce (and Luke Yachtsman) will do a better job than other types. This is a good example of why bigger anchors are better. When you anchor in a foul bottom, holding is limited and a bigger anchor gives you a margin of safety that would be missing with the smaller hook.



This is a Danforth "High Strength" anchor which has proven to be nothing of the kind. The shank was in theory going to bend under load and then spring back. Thin steel was to allow better penetration and holding. The problem was that these anchors bent and did not spring back. Some of their welds also failed. They were still being sold a year or more after Danforth was aware of the problem. If you have one of these anchors, get rid of it!





A clever system for dealing with the stern rode: A deck-mounted drum for winding rope and chain lead.



Aboard *Intermezzo II* we carried the stern anchor mounted on the pushpit. It was easy to deploy and out of the way in this location.

## STERN ANCHOR

A third anchor should be carried for the stern. We used a large Viking aluminum anchor on *Intermezzo*. It had the fluke area of a 60-pound (27.2kg) steel Danforth yet weighed only 22 pounds (10kg) (today the choice for aluminum would be a Fortress hook). On both *Sundeer* and *Beowulf* we used 40-pound (18.1kg) Fortress aluminum hooks. This is an enormously powerful anchor, but size was dictated by what I felt comfortable handling from the dinghy in adverse conditions as a kedge (taking into account anchor, chain, and the drag of our heavy nylon warp). Otherwise, I'd use an even larger anchor here.

Many boats we have seen use stern anchors half the size of the bow gear. This could be a costly mistake. The wind often swings until all the load is on the stern, or worse, broadside, when both bow and stern anchors are working harder than under heavy bow-only conditions.

## MAKING ANCHOR CHOICES

Now we get down to the nitty gritty. Obviously choosing an anchor is a personal decision; you'll find successful cruisers all over the world have their own strongly held opinions.

For a minimum offshore package we suggest the following: The main anchor should be the largest Bruce you can fit, twice the size of what everyone suggests you carry. We'd recommend a 66-pounder (29.9kg) for 35- to 45-footers (10.8m to 13.8m) and the 110-pounder (50kg) for 45 to 55 feet (13.8 m to 16.9 m).

Next, for a second main anchor and to back up the Bruce in a hurricane, I'd carry a large Fortress aluminum hook. Again, this would be the biggest anchor you could imagine carrying. On a 35- to 45-footer (10.8m to 13.8m) I'd go for one of their 35-pound (15.9kg) anchors. In the 45- to 55-foot (14.8m to 16.9m) range I'd go the next size up, and from there on carry the largest model (#125) at 65 pounds (29.5 kg).

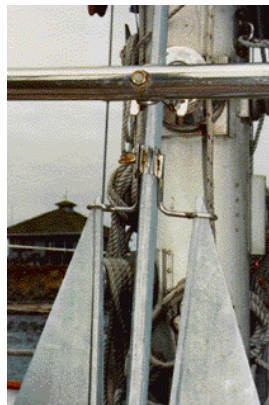
Finally, for a stern anchor, I'd carry either the same Fortress as used for the bow, or one size down.

## How Many Anchors?

How many anchors you carry will depend on your cruising grounds. If the bottom tends to be foul, or the water murky or especially cold, more anchors will be necessary. In the tropics,



If you expect to be using your stern anchor often, a chock of some sort should be available to protect the cap rail and anchor rode from chafe. This chock will do a good job when the rode is off at an angle but will have a problem with the rode jumping out when the rode reaches a 30-degree angle to the centerline. It would work better under these adverse conditions if the roller were set lower or if cheeks were higher.



Controlling the flukes on Danforth/Fortress-style anchors is always a problem. A simple stainless "grabber" does the job here.

assuming scuba gear is aboard, you can count on retrieving a fouled anchor. We average one bad foul every four or five months. In all our years of cruising we've yet to leave an anchor behind. (Of course, now that this is in print we'll probably be leaving them everywhere!)

Otherwise, when cruising for an extended period, you should have at least two spares over your minimum inventory. This would put you up to five anchors.

If you're sailing closer to home, with marinas along the way, you can get away with a minimum of three.

Cruisers who risk sailing in cyclone or hurricane belts during the season will want to have aboard not only extra anchors, but rode and chain to go with them. Should it be necessary to take to a less-than-perfect hurricane hole, the extra gear may be necessary.

## CHAIN

What's the best anchor rode? I've rarely found an experienced seaman with anything but chain. Nylon is much stronger and has excellent elastic properties that reduce shock loading on the anchor and the vessel; however, it cannot stand abrasion and chafe as well as metal. When anchoring in coral-filled waters, there simply is no alternative to chain, if you want to sleep well without an anchor watch. There are areas of the Caribbean that offer open stretches of sand, but in the Indian and Pacific oceans this type of anchorage is rare. A slight wind shift and the rode is working against a coral head.

Chain size is one of the thorniest problems for the cruiser. No body of technical data exists on the proper size of chain for a cruising vessel. Recommendations are generally based on length and vary between sailboats and powerboats. No consideration is given to windage, hull shape, or external conditions. And the data presented are not backed up by any calculations from which you can interpolate.

In general, though, remember that even in poor weather the loads on an anchor rode are not that high. A 50-footer (15.4m) like *Intermezzo* might generate only 2,000 pounds (907 kg) of constant load in 60 or 70 knots of wind (not including shock loading). We used 3/8-inch (9.6mm) nylon three-strand line as a shock absorber in our anchoring system. Without benefit of any chafing gear, it stood repeated use, day in and day out, in some pretty good blows for three years!

On the other hand, if the anchor chain is snagged on a coral head or some other underwater obstruction, the vertical loads as the bow lifts to a swell are enormous.

Size	Weight/100 feet in lbs.			Working load limit/lbs.		
	BBB	Grade 40	Grade 70	BBB	Grade 40	Grade 70
1/4"	72	75	62	1300	2600	3150
5/16"	110	110	94	1900	3900	4700
3/8"	164	150	146	2650	5400	6600
1/2"	282	256	264	4500	9200	11300

This table shows the differences in "working loads" of four types of ACCO chain. Generally, if you multiply by four you will get the ultimate breaking strength of the chain. The differences in weight are accounted for by changes in link lengths. Whenever possible, we use the schedule 70 chain for maximum strength and minimum weight. We then put the weight saved back into the main anchor, where it is most efficient at holding.

In addition to chain size, there are different types of chains to consider. A long link, stud link, proof coil, BBB; these are only some of the terms used to describe the various designs. Then there are grades of chain. As an example, look at what the Campbell Chain Company has to offer for 5/16-inch (8mm) chain: Their System 3 (compatible to BBB) chain has a working load limit of 1,900 pounds (862 kg). Their System 4 (schedule 40) is rated at 3,900 pounds (1,769 kg), and



Proper seizing of the anchor shackle with chain and nylon is essential. We like to use flexible stainless wire and then tape over the ends to prevent snagging of light sails.

their System 7 goes to 4,700 pounds (2,132 kg) working. (Note: It's quite normal practice in the United States to rate working load at a quarter of ultimate breaking strength.) Tradition would indicate that *Intermezzo*'s conservative chain size would be 7/16-inch (11 mm) with a working strength of 3700 pounds (1,678 kg). In most cases, tradition is talking about 7/16-inch (11mm) BBB chain, so by going to a schedule 40 higher yield alloy steel, we can drop to 5/16-inch (8mm) and still have a higher working as well as ultimate strength.

We chose to go with the lighter weight, high-yield chain and carried extra depth: 80 fathoms. Thus we had the strength necessary to protect ourselves and the ability to anchor in deeper anchorages, yet the weight in the bow was the same as it would have been with heavier, shorter link material.

The capability to anchor in deep water meant we were able to pick the best anchorages, sometimes well offshore, which allowed for ease of exit and clearance of obstacles. As a side benefit, we were visited by fewer onshore flies and mosquitoes.

The negative came in tight, crowded anchorages, with *Intermezzo* taking up a lot of swinging room. The lighter chain required more scope for a given holding power, and we were using the CQR, which needed a decent angle. So we generally used a minimum scope of 6-to-1.

But with *Intermezzo II* and *Sundeer* the same light-chain philosophy, coupled with our big Bruce anchor allowed us to anchor with 3-to-1 scope (although we set the hook at 5-to-1). When the time came to specify chain for *Beowulf* we went the same route, using 3/8-inch (9.6mm) System 7, with a breaking strength of 26,000 pounds (11,791 kg).

Once you decide on your chain, get a test certificate. This means that the chain has been tested, usually to 80 percent of its specified strength.

Be sure it fits the gypsy of your windlass like a glove. If it doesn't, it can jump right out of the gypsy under heavy load.

If you're using a high-strength, small-size chain, have the chain manufacturer affix an oversized link at each end to accept the anchor shackle; the space between the links is generally not large enough to accept a full-strength shackle.

Don't let anyone sell you two lengths with a joining link. We know firsthand of three cases where yachts or anchors have been lost because joining links came undone.

## Cleaning Chain

If you anchor in rock, weed, or sand, the chances are your chain will come aboard nice and clean. But if you anchor in mud or an industrial harbor with a coating of oil on the bottom, the chain will become fouled beyond belief. If your anchor happens to be down for more than a couple of weeks, even the suspended chain will become slimy.

If any of this biological or other matter finds its way into your chain locker after a couple of days, the odors will be substantial. It is much better to make sure the chain is cleaned as it comes aboard. This procedure can be very time consuming if you are doing it by hand, with a bucket and scrub brush. It is much better to have a saltwater pressure pump, hopefully with a nozzle fixed to the bow so both of your hands are free to run the windlass.

Most of the goop is typically stuck to the anchor and the chain that has been lying on the bottom close to the anchor. If you are in a deep enough anchorage, you may be able to do a pretty good cleaning job by powering forward with anchor and chain dragging through the water. Take care that the anchor, however, doesn't begin to trail back against the hull and damage the bottom paint.

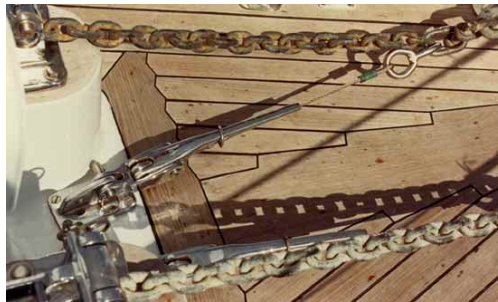
## NYLON RODES

You will want nylon rode in addition to chain. How much depends on where you cruise. A minimum should be two long rode, about 300 feet (92.3 m) each. If there's a chance of getting caught in a hurricane anchorage, the rode should be increased to between 1,000 and 1,200 feet (307.7 m to 369.2 m) of total rode aboard.





Two views (above and below) of the Maxwell/Nilson chain stopper. Note how the chain dog is easily removable with a fast pin for maintenance and to allow the chain to run freely when anchoring.



A clever use of HiField over-center levers to tighten the anchor against the bow roller.



This adjustable brake-style stopper on *Maya* (left) also allows a speed adjustment with clamping pressure.

A shock absorber of some form, as described earlier, is a must on the chain in order to reduce the load on the windlass and anchor, as well as to suppress some of the noise coming back up the chain.

### Combination Rodes

Where weight in the bow is a problem and bottom conditions indicate chafe, it is possible to use a combination of chain and nylon for the anchor rode. The chain should be long enough to ensure that nylon can't lay on the bottom and chafe. The chain-to-nylon connection point is then attached to a float of some sort, usually a fender, and lifted off the bottom.

When using a float, remember that the lower it is pulled in the water, the greater the external pressure on the float. This reduces the size of the float, making it sink as it loses buoyancy. You always need to check height of the float off the bottom to be sure it is doing its job.

When we stopped to visit Takaroa in 1995, there were two French yachts using this system. They'd employed it without difficulty throughout the Caribbean and into the Pacific. Still, it would make me extremely nervous.

## ELECTRIC WINDLASSES

If your chain is heavier than 1/4-inch (6.2mm), a powered windlass is a good idea for short-handed sailing and an extra safety margin. Under emergency conditions it allows a much faster getaway. A second major consideration is that it reduces the reluctance to hoist anchor and reset the hook when you don't come to rest where you think is best. I can recall one instance in the Soci-



A working view (left photo) of the pivoting bow roller as Jim Schmidt brings his 110-pound (49.9kg) Bruce anchor aboard *Wakaroa*.

Cleaning the chain can be a mess if the bottom is muddy. Some form of pressure washdown is desirable, although a bucket will do the job in a pinch. For those of you interested in making the right impression, note the parallel alignment between bow angle and the crew's legs. This would almost certainly rate a 9.7 or better!



Here's a clever amalgam of three deck brushes, a chunk of pipe for a handle, and some PVC as a brush holder. This gives you a much better chance of having a clean chain locker (lower right).



Anchor recovery can be speeded up with fewer hands if the wash-down hose is permanently fitted to the bow roller, as it is here aboard Kelly Archer's *Mistral*.



eties where we were trying to anchor in 15 fathoms of water with 80 fathoms of chain, and it took three tries to get the anchor to bite properly. Can you imagine cranking all that chain up by hand? Without our powered windlass we might have decided to live with the poor setting, which could have been dangerous.

Another consideration is going aloft. Using the warping drum and spinnaker halyard makes it quick and easy to go aloft. Be sure the winch is well bedded to prevent moisture from getting at the electrical components. Carry spare brushes for the motor and a spare starter solenoid. Even better yet, carry a complete spare motor.

The windlass should be located so that the hand crank can be used in a variety of positions should the motor fail. Also, consider how easily the gypsy clutch is to operate.

A consideration in choosing windlass power is its ability to pull the boat off a reef. A 40-footer (12.3m) with a windlass of 3,000-pound (1,360.5kg) capacity, running through a tackle, could in many cases get herself off a coral reef at high tide.

Few joys are so great as pushing a button and watching all that chain come in without effort and stow nicely below. When picking the hook up or letting it go, nothing is worse than having to stop repeatedly to free chain jams. To make sure the chain strips easily and runs out freely, place the



A chain pipe helps stow the chain farther aft but almost always results in a crewmember having to flake out the chain as it comes in. If there are extra hands aboard this is okay, but for short-handed cruising it's a problem.



Two very different approaches to chain stowage. The right photos show the chain system on the Sundeer 64. The tall, skinny chain locker (plywood covered in fiberglass) keeps the chain from getting fouled and ensures a clean stack. The railing is for a sail bin (not yet installed). Note the rubber hose attached to the deck through which the chain exits. This hose keeps splashes below the motor line.

The second approach (bottom left photo) on the Sundeer 56 is also quite efficient. In this case we used a 14-inch (355mm) PVC pipe to contain the chain.

The downside to these two systems comes with a higher center of gravity for the chain. On long uphill passages we suggest flaking the chain in the bilge where the vertical center of gravity would be lower.



chain stripper carefully. Try to get as long a fall for the chain off the gypsy as possible, and do everything you can to stay away from a chain pipe.

Another problem is making the chain pipe watertight. In heavy weather going upwind, it's incredible how many gallons per hour will come through an improperly stopped chain pipe.

When securing for sea, never depend on the gypsy itself to hold the anchor. Always secure it with line. A good friend of ours almost lost his boat because of a hole punched in the bow by an errant anchor in heavy weather in the Mediterranean.

### Chain Stowage

Give careful attention to chain stowage. Nothing is worse than having to send a crewmember below to knock down the chain castles that get built up. We've found that a straight drop into the chain locker is best, with enough vertical space for the chain to stack itself about two-and-a-half times its final height. In other words, if after being smoothed out the chain is in a pile 18 inches (457.2 mm) tall in the locker, there should be about 45 inches (1,143 mm) of clearance from the bottom of the locker to where the chain exits through the deck or the end of the hausepipe. The



end of our chain is secured to a 3/8-inch (9.6mm) piece of nylon, which is anchored to an eye bolt. It will hold the boat if necessary and is easy to cut in an emergency.

The chain locker needs good ventilation, as the chain will frequently come aboard with a few creepy-crawlies and slime. Also, be sure the limber holes are large and numerous. A lot of water comes below through the chain pipe at sea, no matter what is done to stop it up. That water, in combination with a bit of grass or related muck, will test any drain system.

On the subject of chain muck, when we were in New Zealand aboard *Intermezzo* we added a teak strip from the bow to the anchor winch and then across the deck to the rail, where we cut a scupper. We've had this arrangement in one form or another on all subsequent boats to keep the chain drippings from washing off. We used a "T" off our engine-driven bilge pump for a deck hose on *Intermezzo*. The hose end was lashed to the bow pulpit to clean the chain as it came aboard.

## THE BOW ROLLER

If the roller has to carry the load of the chain sawing through the coral and if a sea is running, the loads can approach the full strength of the chain. Be sure the roller and its attachment fittings are good and husky. We had a 5/8-inch (15.4mm) bronze pin in *Intermezzo's* roller, which lasted one year before it wore through to half its original size. The roller should have 1/16-inch (1.5 mm) of clearance from the pin to prevent buildup of salt and dirt. When anchoring bow and stern or with a beam wind there is a tremendous side load on the cheeks of the bow roller. Consider this aspect when looking at the unit's strength. The roller itself is best made from



A key issue with any windlass is the ease of removing the motor for maintenance or replacement. On these newer Maxwell/Nilson models undo a couple of bolts and you are finished. This is a major advantage over their earlier models! (Maxwell/Nilson photo)



We've been using Maxwell/Nilson windlasses for years and have generally found them to be pretty reliable. This new model uses a separate handle for tightening the clutch, not nearly as easy to operate as the older style with a built-in handle.



It is much better to have a riding sail made specifically for the task, as in the photo at right.



The typical way to control a windlass is with a foot switch. However, these tend to be unreliable over time because of the humid environment in which they live. We prefer to use a waterproof switch on a remote cable which is hung up when not in use. This allows you to move around the deck while the windlass is in use. If the switch fails it is easily replaced.



If you are going to use a manual windlass make sure that the handle is long enough to be comfortable to use, that you have some place to hang onto with your free hand, and that there is enough free room to place your body comfortably.

A storm jib is being used as a riding sail in the photo at left. It gets the job done, but subjects the storm jib to ultra-violet degradation.



UHMW (ultra-high molecular weight) plastic. This material is tough enough to last almost forever, yet easy on the chain galvanizing and roller pin. Bronze rollers also work, although they tend to abrade galvanizing and roller pins.

## THE RIDING SAIL

An important part of our anchoring gear is a riding sail. Under marginal conditions in a good breeze, keeping the bow head to wind can substantially reduce the loads and prevent the anchor from breaking out. A second advantage occurs in light airs and hot weather. Boats ventilate best head to wind, and the riding sail helps the boat respond to those little puffs that make life bearable if they find their way below.



We are frequently asked for dual rollers by our clients. Having lived with a dual system, I think you are much better off putting all the bow anchor weight into a single, all-purpose hook.



In the olden days you saw this type of anchor stowage quite often. However, it makes it very difficult to clean the anchor when it comes up with a mess of weed, and it does present a lot of water drag under way. On the other hand, the mess tends to stay off the deck and the weight is much lower.



Two views of the bow-roller system on a Sundeer 56. This bow roller is designed to take the full breaking strength of the schedule 7 5/16th (8mm) chain, or 21,000 pounds of load (9,500 kgs.) Note the high ears on the end of the roller to keep the chain in place when the boat is tide-bound. These ears can also be used for attaching asymmetrical spinnaker tacks and in some docking situations. The inboard roller is to keep the chain lead to the winch fair as the anchor pivots as it is winched onto the bow roller.





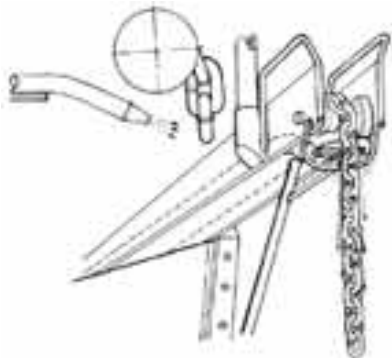
Dual anchors are always difficult to work into a stem-head fitting on a permanent basis. Here two CQRs are ready to go.



When designing the bow-roller assembly you always have to keep in mind a tide-bound situation, where current and wind fight and you end up with the chain at right angles to the boat. In this case high cheeks or some form of a guard must be built in to keep the chain from jumping off the bow roller and pulling back down the deck.



The bow roller and support structure must have enough beef to take the full breaking load of the chain when it is pulling straight down (as it will if snubbed on a wreck or rock). On the Sundeer 64 and 56 we use an angled strut back to the stem fitting to provide extra support.



On the Sundeer 64 we worked on a built-in anchor wash-down system. It was never totally successful, as we didn't find the right combination of nozzle design and pump pressure. However, the concept is still valid.



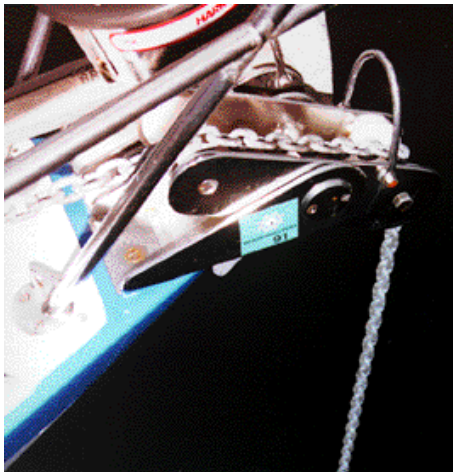




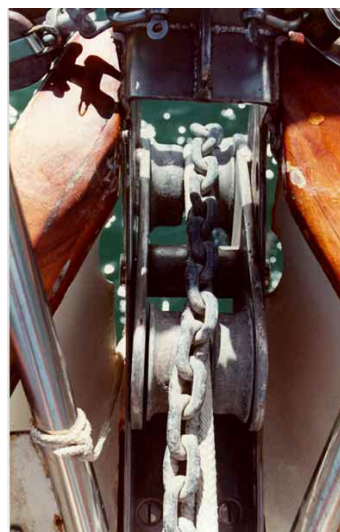
While this is a clean and light anchor-roller system, if there was ever a pull to starboard the chain would jump the roller and proceed down the toe rail.



The photo above shows a locking mechanism for two CORs which holds the anchors in place and keeps the chain from jumping off the bow roller.



The bow roller above is another example of a design that will not hold the chain in place when it is running at a right angle to the hull.



The three bottom left photos and the bottom right photo all show different types of "wobble toggles." The use of two rollers and a center pin support means the anchor will self-launch. All you need to do is back off the windlass or ease the clutch, and away goes the hook.

The only disadvantage comes with the risk of an accidental launch, so you need to be doubly sure that the anchor is well secured when you head to sea.

Wobble toggles need to be heavily made to take side loads when you are caught with tide against wind, or when the chain is snagged on a wreck or rock.



## TYING UP

By definition, serious cruisers spend most of their time on the hook. Still, the time comes when it is advisable to tie up in the local marina or participate in a raft with other cruisers.

Most of us come from places in the world where the weather is benign; this is reflected in our dock lines and fendering systems. However, when you head to foreign lands the conditions at the dock are apt to be more boisterous.

Tying up in front of the Durban Yacht Club in Durban, South Africa, is a good example. About half the time conditions will be nice. But the other 50 percent of the time it can blow as hard as 50 or more knots, and this is considered mild compared to what you may find in Cape Town, a bit down the coast.

### Dock Lines

The problem in these windy conditions is not so much one of strength for dock lines as it is chafe. The heavier the line, the less it will stretch under load, and it is the stretching in and out that creates chafe.

So you want some degree of stretch resistance which of course comes from rope diameter. At the same time, that increased line diameter gives you more material to chafe through.

How big is big enough? We usually go one or two sizes up from our anchor rodes until handling gets to be a problem (typically around 3/4"/18.5 mm). Once the handling is a problem, we stay with the same size as the anchor rode.

### Inventory

You'll want to have two long spring lines aboard. These should typically be about 130 percent of your boat's length (about 65 feet/20 m long on a 50-footer/15.4m). They need to be long to help when maneuvering the boat where they may have to be doubled back aboard and when there is a significant tidal range.

Next come the bow and stern lines. We usually do these in two sets. The first is a short set for use when docked between pilings or finger piers. These are usually about half the length of the boat but typically not less than 20 feet (6.1 m) or so.

The second set is longer so they can be used as extra springs or long bow and stern lines. We make these about 80 percent of the boat's length but not less than 30 feet (9.1 m).

### Fenders

Such a mundane subject, yet one with so many issues!

To begin with, you will probably want to have enough fenders aboard to protect yourself during a Mediterranean mooring situation, meaning fenders on both sides of the boat. Of course, this doesn't happen all that often, so you have to worry about storage for all of these fenders.

For us, this eliminates the pre-inflated fenders. By using fenders that you need to inflate yourself, you have the option of deflating and stowing the extras that are not normally in use.

We typically carry six cylindrical fenders, leaving only two of them inflated for use when we have local visitors in canoes or fishing boats.

We also like to carry a couple spherical fenders. These work well when you need to fend off from the bow where there is a lot of shape in the topsides and in areas where the cylindrical fenders will tend to roll away. This makes for a total of eight fenders aboard.

How large should your fenders be? This is a tough question. Under normal loads, most fenders are pretty long-lasting. But then along comes that gale, blowing on the beam with some chop, and your boat is being hurled repeatedly against the fenders. If they start to fail, the damage to your topsides will be significant.

My suggestion is to go with a size heavier than the manufacturers recommend, as a minimum.

### Securing Fenders

Try to secure fenders to cleats, deck hardware, or the bases of lifeline stanchions. Never tie them to the lifelines. The repeated jerking of the fender lanyards up and down eventually fatigues the lifeline.

Since the wire is covered in plastic, it is impossible to tell the state of your lifeline wire. And a broken top lifeline could wreck an otherwise pleasant passage!

### Fender Boards

The time will come when you are forced to lie against pilings. Your fenders need to be tied horizontally for this, and if there is any surge around they'll probably still roll out.

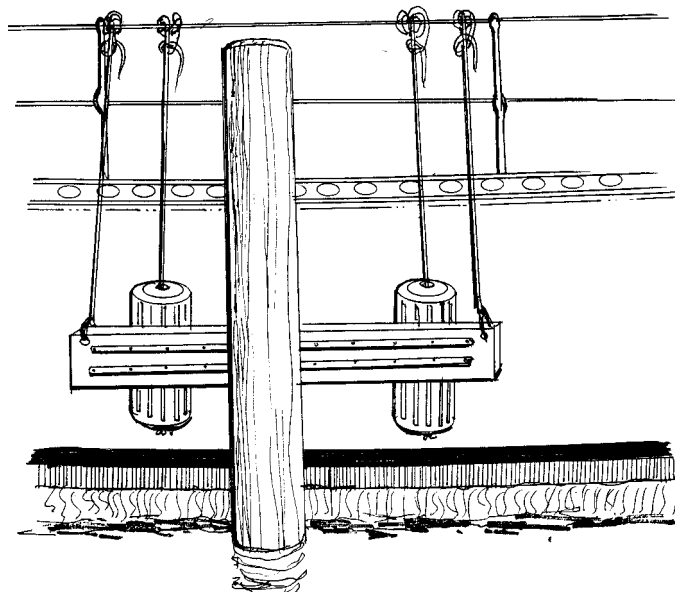


Fender covers come in handy over the long term, especially in dirty harbors. They can be easily washed, whereas a stained fender is sometimes impossible to clean. Notice in the right photo how the fender is tied to the bottom of the lifeline stanchion. This is much better than tying to the lifelines, as the loads on a fender tie can get quite high if the boat is rocking.

The answer is a horizontal fender board that takes the piling load and is kept off the hull with two fenders hung vertically.

On most boats this fender board can be as simple as a chunk of 2-inch x 6-inch (50mm x 150mm) timber, about 4 feet (1.23 m) long.

The ropes should tie to deck hardware rather than to lifelines, as mentioned above.



Fender boards can be made from chunks of timber found in the junk pile of local construction sites, or you could pick up a piece of lumber at a hardware store. Two will normally be required to hold you off pilings.

The fenders and fender board in this drawing would be better off if tied to the toe rail instead of the lifeline.