

We've found that when the wind is much more than 45 knots, we're limited in our ability to do anything. Try sticking your hand out the window of a car driving 40 mph to get an idea, then try it at 60 mph. This isn't even hurricane force. And consider that the wind will come veering and gusting, that the boat will be plunging, that rain and spray will be hitting like bullets, and that other things may be flying through the air.

IT ALL COMES BACK

When the big ones come, you'll have to decide what's best for your boat. Depending upon the circumstances, it may be best to haul the boat, leave it in a marina, anchor, or to do something else. Some people shrug and say, "There's nothing I can do. This is what I have insurance for." A boat might not be worth risking life and limb for, but you can do a lot to save her. It will save us all in future insurance premiums. And besides, she'll do that for you if you give her the chance.

ABOUT THE AUTHOR

Tom and Mel Neale have lived and cruised aboard since 1979, averaging 3,000 to 5,000 miles per year.

They have boated since the early 1950s. Tom is author of *All in the Same Boat* and *Chesapeake Bay Cruising Guide, Upper Bay*. He is currently Technical Editor and columnist for *Soundings*, Editor at Large for *PassageMaker* magazine, and columnist for the BoatUS web site, www.boatus.com (Tom Neale's

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SURVIVING A STORM AT ANCHOR

BY TOM NEALE



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Photo by Onne van der Wal of Newport, RI.
Please visit his web site: www.vanderwal.com

Before storm clouds roll in, make sure you have the proper anchor, ground tackle and chafe protection.



Photo by Mel Neale

SURVIVING A STORM AT ANCHOR

A look at equipment and techniques, from choosing a hook to finding a storm hole

One of the most important pieces of gear needed to survive a major storm at anchor is a big piece of heavy cloth. I have a locker full of it aboard *Chez Nous*, our 53-foot Gulfstar motorsailer.

In addition to being scared to death, I've come away with one underlying impression: If you have good equipment, plan carefully, and pay attention to details like the heavy cloth — for protecting against chafe — your boat has a good chance of surviving.

SEA SAVVY

TOM NEALE



Over the past 50 years I've anchored in boats from 12 to 53 feet in most types of bottoms and many kinds of bad weather, including prolonged hurricane-force winds and tornadic activity.

THE ANCHORS

I live and cruise aboard *Chez Nous*, and use a Fortress FX-55 and a 60-pound CQR for daily anchoring. These, individually and in combination, have held me in prolonged storms with winds exceeding 50 knots, often with sea surge.

But I want an ultimate anchor for ultimate storms. I have a Fortress FX-125 on board for this purpose. Following are some of the reasons for my choice of equipment and how I use it. However, it's important to note that other cruisers, also with

extensive storm-anchoring experience, will have other choices as to gear and methods. You should decide what's best for your boat and circumstances. Considerations unique to your situation should include your boat's length, weight and windage, as well as features of the area you're in and the nature of the storm.

I want my major-storm anchor to be well designed and proven, with as much overkill as possible. This normally means heavy and big. But most pleasure boats are limited as to storage of such items, and sometimes you must deploy a second or third storm anchor with your dinghy.

The FX-125 is very large when assembled, but all Fortress anchors (www.fortressanchors.com) can be disassembled and stored out of the way. And they are lightweight because they are made of high-tensile aluminum magnesium alloy rather than steel. Assembly is quick and easy, with only two bolts. An optional Cordura bag stores all the pieces and comes with the two wrenches needed to assemble the anchor, some spare parts, and room for some chain. Fortresses have a lifetime guarantee, as does the CQR.

My bias has been that light anchors don't work as well as heavier ones; however, I've come to believe that this isn't so with regard to the Fortress. This is because of my own experiences, observations of Fortress anchors in use on other boats — including 110-foot Coast Guard Island Class and 87-foot coastal patrol boats — and various tests (see accompanying story). There is concern with any anchor of this general shape that the rode could catch in the stock and pull the anchor out if the wind or current were to reverse. However, in storm conditions and with good bottom, the stock usually is buried under the bottom, and other anchors should be set if a reverse in wind is expected.

I also use my 60-pound CQR — as well as the FX-55 — in storm conditions, depending upon bottom characteristics and whether I want to put out more than one anchor. (I also have a 35-pound CQR in my arsenal.) I've used the genuine CQR anchor since the early 1970s for thousands of nights on the hook. This is a very popular anchor among long-term cruising liveaboards, who, like me, must anchor reliably night after night — in many types of bottom and all kinds of weather — to keep their homes safe and their sleep uninterrupted.

The CQR is hot drop-forged of high-tensile steel, is Lloyd's Register-approved for high holding power, and 87 percent of

Ocean Cruising Club members choose it as their primary and storm anchor, according to Lewmar, which manufactures CQRs. Though I've seen what I consider to be miracles with this anchor, in my opinion it doesn't set as well as the Fortress in exceptionally soft mud or hard sand.

I've spoken with other people who add interesting insight. Jet Matthews — owner of Matthews Point Marina off the Neuse River in Havelock, N.C., and a principal of the Morehead City Yacht Basin — feels that it's better for boats in his marina to anchor out during hurricanes. He says that in the past few years at Matthews Point (www.matthewspoint.com) they have done this in seven hurricanes with more than 100 boats, and he's only lost one, when another boat broke free, drifted and cut the rode. He says they use the Fortress FX-37 and FX-55 for boats from around 35 to 50 feet. The boats are usually taken to a creek with a very soft black-mud bottom. The angle of a Fortress's flukes can be changed to increase holding in soft mud, and Matthews uses this feature.

Ed Carter owns Diamond 99 Marina on the Indian River in Melbourne, Fla., near ground zero for Hurricanes Frances and Jeanne. The marina was destroyed, although it's mostly rebuilt and back in business (www.diamond99marina.com). Carter believes in anchoring boats for hurricanes in his area, and helps his slip holders who wish to do that. He says that of the 75 boats anchored, 12 were lost — but all would have been lost if they'd remained in the marina because of the direction and strength of the two storms. Good anchoring tactics seemed to make the most difference as to who held; for his bottom — a combination of mud, sand and shell — the CQR fared best, he says.

Elbert (Mack) Maloney is author of "Chapman Piloting and Seamanship," which he began updating in 1965. He also is a cruising editor for the "Waterway Guide" series, and has cruised extensively along the East Coast, Bahamas and elsewhere for many years with his wife, Florine. At 85 years old, he still works on the Chapman book.

Maloney lives in Florida and has a 38-foot trawler, which he prepared and anchored during last fall's onslaught of hurricanes. His everyday anchors are a Fortress FX-23 and a 35-pound CQR. For storms he uses the CQR and a Fortress FX-37. He prefers the Fortress for the soft to medium bottoms (as with soft sand) he typically encounters in the Bahamas and for mud back in the States. He prefers the CQR if he must anchor in a grassy bottom. He uses chain and three-strand

nylon for rode, and buoyed trip lines to assist in getting the anchors up after the storm.

HOW MANY ANCHORS?

I seldom use two anchors at the same time because when the wind or current changes, the rodes become wrapped. However, if I'm expecting a major storm I usually set out a second anchor after the wind has picked up and I have a good idea of the direction it's going to blow. I set this so that the two rodes form a V off the bow, though never so close that the two sets of gear will overlap. The main purpose for this is to have something else down should a rode part or something happen to one anchor.

In cyclone situations (tropical storms or hurricanes) in which I expect the wind to clock, I sometimes set out a third anchor to hold when the wind changes direction on the backside of the storm. This is more important if I have concern as to the holding characteristics of the bottom, if there isn't much room to swing, if the backside winds are forecast to be strong, or if I will have poor protection from the land elevation in that direction. Again, I wait until I'm fairly certain as to wind direction to avoid wrapping rodes.

Some prefer to put out two anchors, such as CQRs, on one rode. There's much merit to this, but I don't use this technique because of the difficulty in setting and retrieving the anchor, and the need to quickly redeploy if necessary for wind clocking.

RODE



I prefer to use Hi-Test chain as my primary rode. It's less likely than nylon to be cut by debris on the bottom or boats drifting down on it. Along with the chain, I also use a long three-strand nylon snubbing line, and I droop a length of the chain down from the line, as I described in the January issue ("Make anchoring less of a drag"). These two features help achieve the elasticity so critical in storm conditions.

Elasticity helps prevent the anchor from being jerked free in gusts, and relieves stress on gear and boat. If you have enough snubbing line — I prefer at least 30 feet in storm conditions — with the chain drooped down so that it's well below the water surface, you get the combined benefit of chain and nylon, the elasticity provided by the catenary effect of the loop, and the yaw-dampening caused by the chain in the water. Others, Maloney included, prefer shorter lengths of chain at the anchor and then all-nylon rode.

For a soft mud harbor, Matthews prefers galvanized steel cable at the anchor, with eye thimbles double- or triple-swaged at each end. To this he attaches three-strand nylon. He says the cable slices into the mud better than chain, enabling the anchors to bury themselves deeper. Many commercial fishing boats also use cable.

Steel cable is inexpensive, and 20 to 50 feet doesn't add much weight or consume much space on board. Cable should be replaced frequently because of possible corrosion within the strands. Replace cable any time strands have broken.

I've found that all-chain rode — or as long a length of chain as is practical at the anchor — helps in soft mud, as well as other bottoms. The chain becomes an anchor itself, its links dragging into and clinging to the mud or sand while its

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weight creates a horizontal pull on the anchor, which helps it set and hold. I've watched under water as storm-force winds whip boats above, and have seen that the pull from the boat from strong gusts is absorbed by a chain in mud or soft sand and doesn't even reach the anchor, even though the chain appears taut from above.

I've also taken note of Matthews' experience with cable. The next time I anchor in soft mud for a severe storm, I'll probably have 25 feet of cable between anchor and the chain. I described at length how I set my anchors and rode in the January issue, but basically more scope is better than less as long as the boat won't swing into trouble when the wind shifts. A given length of rode, however, will have more effect in shallower waters.

FOREDECK GEAR

Many boats aren't designed well for storm anchoring. For example, it helps to lead your rode through a strong and well-supported roller on the prow. As the rode stretches and contracts and the boat moves up and down in the gusts, a turning roller will cause less chafe than a stationary chock over which the rode slides.

It is important to have the rodes exit the bow from the very peak, rather than from a point aft, as is often the case with bow chocks. This helps keep the bow into the wind and sea, and reduces sailing about. If your boat doesn't have this configuration and you can't modify it, use a bridle from each bow chock, meeting at a V point forward of the bow, so that the boat points into the wind. The bridle works for all-nylon rode or as part of a snubbing line for chain.

Strong cleats with wide backing plates bolted through solid deck also are important. There should be a fair run between the cleats and the roller or chocks, and then down to the sea, with nothing in the way to foul or chafe the rode. A windlass that can independently handle two rodes is very helpful. The stronger the windlass the better, although in heavy storm conditions you probably won't be able to do anything with it.

CHAFING

Material used for chafing gear should not be brittle, should protect the line rather than contribute to the chafing, should not promote heat from friction, and should be tough enough to last. Carter, of Diamond 99 Marina, anchored his 38-foot Downeaster cutter in Hurricane Frances, and used fire hose with rubber-like lining for chafing gear. Although his CQRs held firm, his nylon rode parted. He found globules that looked like melted plastic on the rode in the area that would have been near the end of the hoses. He believes that the friction from the rope's pulling back and forth against the rubber lining, coupled with the fact that rain couldn't penetrate to provide cooling, caused enough heat to melt the rope. He now recommends a heavy cloth such as 8-ounce duck cloth or even old heavy blue jeans. We frequently use soft bathroom carpeting, though none with a rigid or waterproof backing.

Wrapping chafe material around the rode isn't enough. As the rode stretches and contracts, not only can it saw through the chafing gear, it'll move it along until the material is eventually out of place. The material should be wrapped all the way around the rode and tied to the rode or cleat so it stays in position. Secure chafing gear on the rode with a rolling hitch

Putting the Fortress to the test

The FX-125 weighs 65 pounds, yet in a test conducted by the Navy in 1989 it survived pulls of 14,600 pounds with a self propelled crane (YSD-53), and a 74-foot workboat (LCM-8) tried to pull it out of a hard sand/clay bottom. The test had to be stopped because one of the engines on the workboat overheated.

These tests included both slow and rapid acceleration. The testing team concluded, "The fact that the Fortress anchors incurred no significant structural damage at such high holding ratios suggests that the anchors have been extensively engineered from both the hydrodynamic and structural standpoints."



The smaller FX-55 broke out at around 4,500 pounds in a clay/mud bottom and at 8,800 pounds in a hard sand/clay bottom. However, it held longer in other tests, including 6,200 pounds (the maximum power the test boats were able to generate at the time) in the clay/mud bottom and 10,600 pounds in the hard sand/clay bottom, at which point the test was stopped to avoid breaking the rode. The stock and shank were "slightly bent, but the anchor was still usable."

Photo by Mel Neale

Putting the Fortress to the test

The FX-85 held at 10,200 pounds until the test was stopped to avoid parting the rode. It took 30 minutes to retrieve it (from “stiff clay”), and the Navy boat had to pull from different angles in 180-degree arcs, which bent the shank but finally got the hook out.

The Navy testers noted that “high-strength steel” might be less “susceptible to permanent deformation under concentrated or unanticipated loading conditions,” but that Fortress compensated for the aluminum alloy it uses “through careful structural design.”



The FX-125 is very large but lightweight because it is made of high-tensile aluminum magnesium alloy.

All Fortress anchors can be disassembled and stored in an optional Cordura bag.



More recently, Fortress models FX-85 and FX-125 received the Super High Holding Power (SHHP) rating from Norwegian certification agency Det Norske Veritas. Smaller Fortress anchors also performed well in these and other tests. It's important to note that other anchors also receive high marks in various tests.

Because of the many variables at play with anchoring, such as bottom and other conditions, individual anchor tests shouldn't be exclusively relied upon as conclusive. Even the best anchor tests are limited in their ability to reproduce true anchoring conditions.

at each end of the material. Also, tie small line around the wraps of gear to prevent it from becoming unwrapped as the rope twists and stresses.

Chafing gear is sacrificial and as such might need to be replaced in a prolonged storm. In a particularly severe storm, you should be ashore if possible, and you'll need to lay on as much chafe protection as possible. If you're going to be aboard, tie several sections of chafing gear around your rode. The first should be at the chock or roller, the others above that point. As the storm progresses and the first gear wears through, you can very carefully let out just enough line to position the second set over your roller. Beware: If you have a chock without a roller, subsequent sets of chafing gear may foul on the chock, and attempts to lift the rode to get them through may cost you your fingers or hands.

Your boat's behavior at anchor in high winds may worsen chafing. Some boats veer from side to side, jerking short at the end of the veer. This can saw through chafing gear and rode.

It can cause chain without snubbing and chafing gear to saw through chocks, rollers and deck. (The length of chain looped down from the snubbing line helps lessen veering.) Significant rising and falling on waves can cause the same problems. Lighter boats are obviously more susceptible to this. Some add weight to their bow to help dampen plunging during storms, but this must be done very carefully because too much weight forward can adversely affect the boat's seaworthiness.

CHOOSING YOUR STORM HOLE

Visible characteristics — The best storm holes have high land giving 360-degree protection from wind and with access that doesn't allow wave surge. Usually, the farther inland you are, the better. Study the shoreline. What's going to happen if you drag ashore? Does the bottom gradually slope up to the shore with soft, forgiving mud, or does it rise vertically to killer rocky ledges? An otherwise good storm hole may be bad if its shore is rocky or spiked with piers or pilings that could impale your boat if you drag, or if there are too many boats already at anchor. It's also important that the harbor have enough room for you to be able to pay out sufficient scope.

Check the terrain for what could happen during the storm. We once were trapped in an area we'd never consider for hurricane holes by a devious tropical storm. We found the best spot we could and dug in; we were landlocked. During the height of the storm and tide, however, we could see nothing but water between us and the ocean. The tide had covered

marsh and low lands. A variation of this is the cove typically protected by a low spit at the entrance. When the storm tides rise, this spit may be under water, allowing waves to pile into your “protected” area.

Consider what storm surge will do in your location. If you are near the end of a funnel into which the storm is going to push a mound of water, you must be ready with enough scope out. Also, consider what the surge will do to things on shore upwind of you. Will it float boats off their trailers or jack stands? If you are in a cove on a river that may flood rapidly from rain, you have the same concerns, as well as the possibility of raging current coming over a submerged entrance spit, bearing debris.

Know your bottom — The most important feature of a storm hole is invisible: the bottom. You can't see it, but it will be critical to your boat's survival. It's been my experience that the best holding comes from thick mud or a mud/clay mixture, soft sand, a mixture of mud and sand, or mud and small shells. Thick mud may require more patience in getting the anchor securely “dug in,” but once it's there it will usually stay.

Charts give general indications as to bottom characteristics, but you'll need much better information. Ask someone with local knowledge, and study the features you can see. For example, a secluded cove with wooded hills and no current may seem perfect. But if those trees have been dropping leaves into the water for centuries with little to disturb the bottom, your anchor may find many feet of thin mud soup. If the shoreline is rocky or sandy, those features may extend to the bottom, though not necessarily. If the surrounding area is old forest with current coming down a river, there's reasonable risk of logs on the bottom that can grab the anchor and give you the impression that you're secure but which might not hold well in a blow.

The bottom is so important that, if possible and safe to do so, I dive down and check it out. If the bottom appears good, I don't assume that the good stuff necessarily goes deep. It isn't unusual, for example, for a layer of soft sand to cover solid rock.

If in doubt, I also plumb the bottom by dragging a small CQR or grappling hook on a short scope of nylon with chain at the anchor. Mud or grass usually will be obvious when you pull up the anchor. A clean anchor will probably indicate sand. If the bottom is rocky, you should see an all chain rode jumping, and be able to feel it and even hear it. Check the bottom in the

spot where you hope to anchor. The same harbor may have varied bottoms.

Problem bottoms — Sometimes you can't find an ideal bottom — for example, runny mud. If you're stuck with this, remember that the mud is probably much more firm as your anchor digs down beneath the surface layer. I've found that the Fortress set at its soft mud angle does well in these conditions when other anchors don't. I've also found that hard-packed sand may thwart a CQR and other plowing anchors, but the Fortress will usually dig in well with its sharp flukes.

Never anchor in grass. It may seem to hold well at first, but this is probably from hooking into the root system. During the blow, root after root will break until suddenly you've broken free with a clump of roots and grass around the anchor that will hinder or prevent its resetting. Rocky bottoms also can give false security. The anchor may wedge under a rock, but as the boat works the anchor back and forth it may suddenly break free and bounce along until you're on shore.

OTHER BOATS

We once anchored in Rhode Island for a hurricane, along with numerous other cruising boats. We worked all day setting anchors, preparing chafing gear, positioning boats safely relative to each other, and helping each other. A kind gentleman who lived on shore came out in a skiff and invited anyone who wished to spend the storm in his home, or to contact him if we had problems. As the winds began to rise and premature dusk darkened the harbor, we settled in, as prepared as possible. And then came three boats from nearby marinas or moorings.

Their owners motored into the midst of the anchored fleet with no regard to positioning or anticipated wind shift, threw over anchors with short chain and skimpy nylon, set no chafing gear, and left. Those already anchored offered to help these people position their boats, and offered extra rode, anchors and chafing gear. The offers were rejected. If the storm had tracked just a little differently, the negligence of these few would have caused havoc.

When another boat threatens yours as you prepare for a storm, there is often little you can do about it. The best solution, if possible, is to visit the other owner in your dinghy and in a friendly manner express your concern and offer to assist.

Yelling across the water from your boat is just that — yelling. It's easy to misinterpret this as hostility, even though it may be

an attempt to communicate. Usually the other boater will appreciate the situation, and you can work things out together. He or she might not have the experience to know what should be done — don't put the person down or back him into an ego corner — and this could be the only harbor available. But remember that if that boat drags down onto you during a serious storm, the results could include personal injury or death.

WINDAGE

Reduce your boat's windage as much as possible to prevent damage to gear and lessen the chances of dragging. Remove all loose material from the deck. Extrusions for roller furling gear on a sailboat should be secured tightly, and sails should be removed, not simply tied to the boom. Hurricane-force winds will rip sails loose, and they'll wreak havoc, flailing about until they shred. They might even cause you to drag ashore.

PEERING INTO HELL

If you're on board, you'll need to occasionally be able to look out. You might not be able to do anything about what you're seeing, but it helps to know what's going on.

Sailboats without inside steering present the issue of whether to take down the high-windage dodger and cockpit enclosure, which may give some protection for peering out but which

can be torn to shreds in high winds. If the storm's predicted to be bad enough, such as a close hit by a major hurricane, it probably is best to remove them. If you don't, be sure they are tightly enclosed to prevent wind from entering and blowing them out. Some prefer to leave the sides loose, so that the wind will blow through, but our experience has been to the contrary.



Photo by Mel Neale

The writer's 53-foot motorsailer has a heavy-duty windlass with chain rodes for both a Fortress and CQR anchor.

I've sometimes used a wet suit, dive mask and snorkel to go up on deck and have a look around. This is a shot you'll have to call depending upon the circumstances.

Most experts agree that when bad storm conditions are expected, you should do the best you can to prepare your boat, then seek safety ashore. We've been aboard in hurricane and tornadic conditions, but this was because we were living aboard and cruising, and had little other choice under the circumstances. We do not recommend it.

If you must remain aboard there are certain things you can do to help your boat, including letting out rodes, motoring into the

storm if you're dragging, and renewing chafing gear. But the fact is that if the storm is severe enough, there's nothing you can do, except possibly die. It's difficult to quantify "severe enough," and even if you could, you never know for sure what a storm's going to do.