



## Evaluating Modern Anchors

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For those of us out full-time cruising, some of the best insurance we can have is good ground tackle. Ground tackle includes not just the anchor, but the windlass, rode, snubber, and miscellaneous connecting hardware. All must be of equal strength. The primary feature of good ground tackle is its ability to pin us securely to the sea floor in a variety of strong weather conditions. But holding in heavy weather requires strong, well-designed equipment that won't bend, break, or release the bottom as the weather deteriorates.

In order to ensure that we won't have a mad scramble in the middle of the night as a surprise and dangerous high wind event passes, I prefer to size our ground tackle for about 60 knots of wind. This is about the maximum wind strength we might expect to see in a surprise squall or frontal passage in the tropics. I have seen this un-forecast wind strength twice in the past 20 years, both times in the Florida Keys. Both instances were very scary. More than that will usually be forecast in advance as a tropical cyclone or other major weather event of some sort. That should give us enough warning to better secure the boat out of the wind and away from other boats.

The one item that most affects our boat's ability to stay put at anchor in strong winds is the anchor itself. But not all anchor types are up to this task, and a few perform this function significantly better than others. Today there are many more options than in the past. Competition among anchor companies is stiff. And unfortunately, as patents run out, cheap and unreliable Asian copies crowd the market. Below are some of the features of common anchor types that I found helpful to consider prior to the 2014 purchase of our new primary anchor.

### **General Features**

Negative features include, small relative fluke area, stainless or mild steel construction, high weight on the shank or above the blade, wide shank cross sections, poorly executed welded construction, and copies of originals (especially Asian).

Larger/heavier anchors are generally more efficient than smaller sizes. Just based on my own experience, I use the following for sizing scoop anchors for strong winds: boat length in feet + boat weight in K pounds = anchor weight for up to 60 knot winds. This assumes reasonably good holding conditions in a homogeneous bottom.

## **Hook anchors**

These include the Luke, Hereshoff and other Kedge anchors that have been around a long time. They were used extensively during the golden age of sail prior to the early 1900s. Typically, they are very strong, hold well in rock, coral or other hard rough bottoms and are often used as storm anchors for monohulls. However, since the fluke (palm) surfaces are small, the holding power is weakest of all anchors in soft sand and mud where cruisers prefer to anchor. They are also difficult to stow and launch off the bow of a typical cruising sail boat. They are not recommended as primary cruising anchors.

## **Rotating Fluke anchors**

These include the Danforth (1948), West Performance (1980s), Fortress (1980s) and many other copies. They are commonly used on smaller power boats requiring light anchors. They often exhibit high holding power in soft homogeneous bottoms. The Fortress has shown itself to hold the highest straight-line loads of all anchors in soft sand and mud bottoms. However, due to their light construction and large flat flukes, if the end of a fluke catches a hard spot in the bottom, the resulting point loading will soon bend the fluke under increasing load. Some have had problems with bent shanks and resetting during a significant wind shift. They are not recommended as primary cruising anchors.

## **Claw anchors**

These include the Bruce (1971) and its many copies as well as the Max. The original forged steel Bruce design was engineered for anchoring oil rigs in the North Sea where high strength and short scope holding were required in hard sand bottoms. The original Bruce design is exceptionally strong, and so it is one of the best designs suitable for hard coral or rock bottoms. The one-piece design stows well on most anchor roller trays. However, as a primary cruising anchor it suffers from relatively low holding power in soft bottoms because of its smaller fluke area. Also, it is reported to trap coral heads and other bottom debris in its basket shaped flukes. The Super Max reportedly holds well in soft homogeneous bottoms but is little tested against more popular anchors. So, it is difficult to judge its relative merits.

## **Plow anchors (convex blade)**

These include the hinged CQR (1935), the fixed Delta (1984) and their many copies. For many years the venerable forged CQR was the favorite serious cruiser's primary anchor. In the 1980s, the fixed plow Delta gained popularity with both cruisers and builders because of its somewhat better performance and better price point. Plow anchors stow and launch easily but have several problems. The convex blade and flat underside of the tip area keep them nearer the surface as they try to dig in.

The CQR has a relatively small blade area, a wide shank hindering deep penetration, high weight in the hinged knuckle reducing tip weight and hindering it from rolling upright while setting in firmer bottoms. During testing it has shown a propensity for rolling in and out of the

bottom during heavy loading. The Delta is more stable, but its basic design still hinders it from deep penetration and high holding power. A significant problem with the Delta is that it is stable upside down in soft mud. If in this condition, its geometry is not good enough to allow it to roll over and adequately set.

### **Scoop anchors (concave blade)**

These anchors are a good example of modern technology bringing us better equipment. The German Bugel (1988) was the first anchor with a flattened rather than convex blade. The newer concave blade anchors include the roll bar Rocna (2004), Manson Supreme (2006), and the three piece Mantus (2012). Those without roll bar include the two piece Spade (1996), Ultra (2011) and Rocna Vulcan (2014). Several holding, veering, dragging and setting tests conducted over the past 15 years have shown that these anchors consistently outperform claw and plow anchors. In comparison to the claw and plow anchors, they have considerably higher holding power, remain in the bottom better during veering tests, reset quicker and more reliably, and are more stable under high load dragging conditions. Most of these anchors use high strength steels, especially in their shanks.

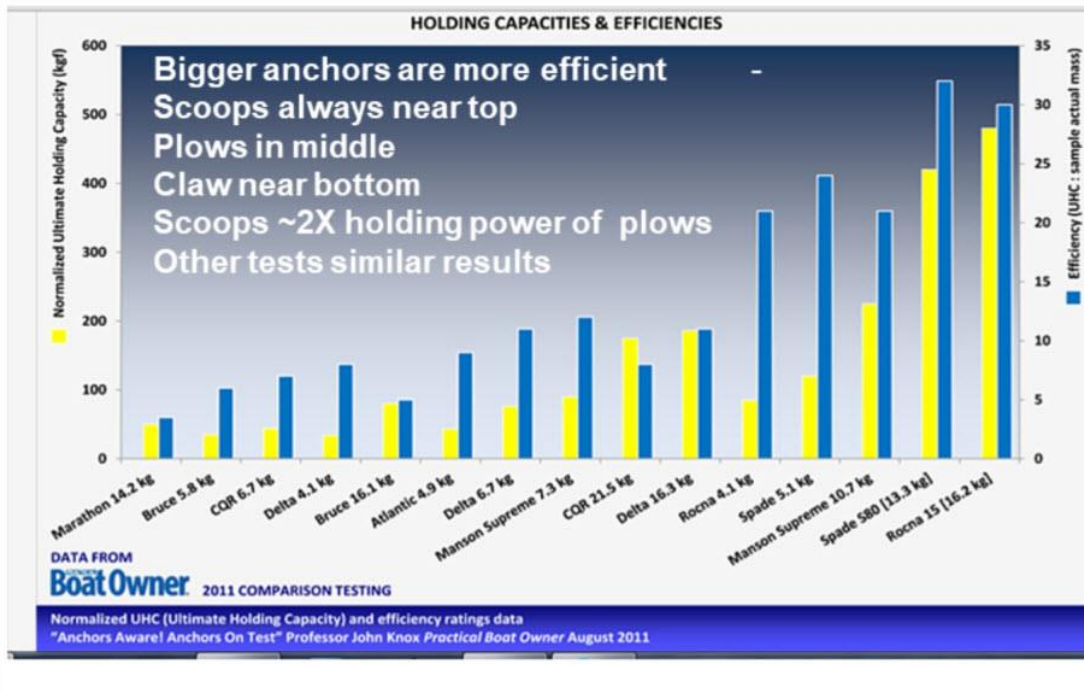
Scoops do have a few negatives, including the following:

- Roll bar scoops have been known to catch coral pieces on their blade, hang on the roll bar in coral bottoms and have difficulty setting in heavy weed conditions;
- The roll bar may foul a second anchor roller tray or impede stowage on the bow of some boats.
- The spade, like the CQR, must have the lead in the tip removed prior to re-galvanizing and is more expensive than the rest of the scoops.
- The new Vulcan is little tested with the other popular anchors, so its relative performance is unknown.

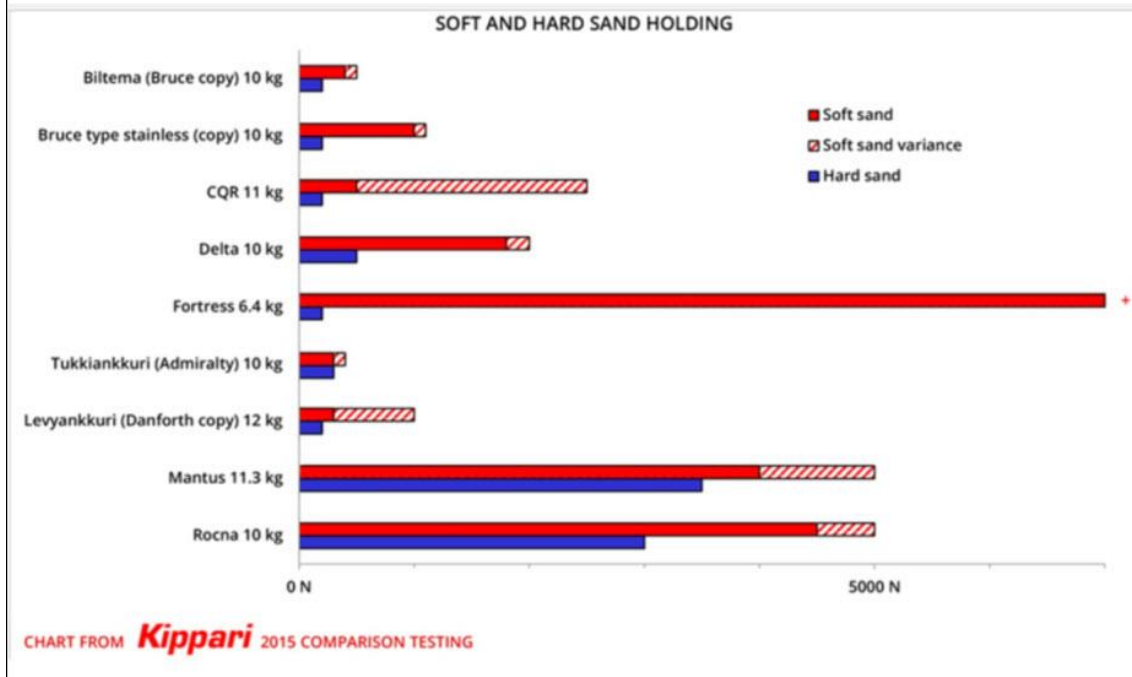
### **Summary**

Most of us realize that, like many issues with cruising, there is no perfect anchor for all conditions. However, there is a preponderance of evidence indicating that modern generation scoop anchors are superior to the older anchors in many important characteristics. Based on most comparative holding tests, their holding power is generally twice that of the plows and claws. The results of two such holding tests are shown below:

# 2011 PBO Holding Test Results



# 2015 Kippari Sand Holding Tests

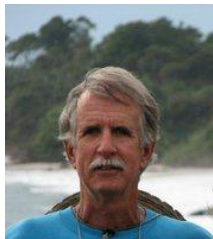


So, I leave it up to you to do the research, validate the comments above and make your own decision. Just remember that when it comes to ground tackle, bigger and stronger are always better, but better design is *much* better.

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