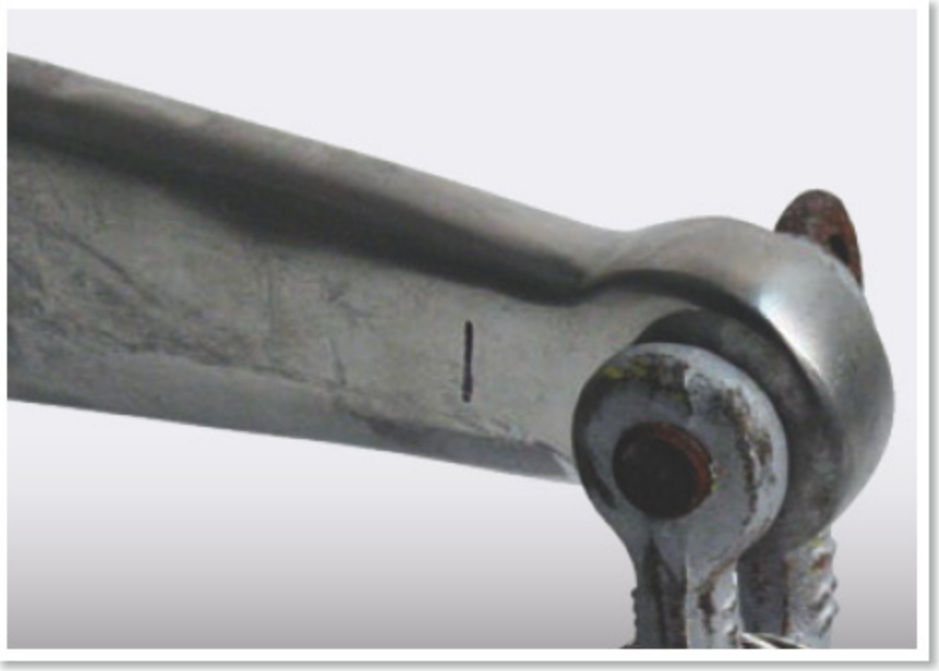
Bling for Your Boat: Is a Shiny Anchor Better?

Stainless steel is much less prone to unsightly and destructive oxidation than mild steel, even when it has been hot-dipped galvanized and protected by a heat-bonded zinc coating. Unfortunately, zinc is a relatively soft metal. As an anchor rubs and scrapes the bottom in its normal operation, the galvanized coating is damaged, mild steel uncovered, and oxidation begins. In many cases, however, rust can be a good friend, announcing to the skipper, with an undeniable bold red stain and flaking metal, that corrosion is taking place.

Stainless steel is much more insidious in how it degrades. Lacking mild steel's eruptive metal flaking form of corrosion, the shiny steel crevice corrodes with minimal signs of deterioration. Even when a shackle or swivel approaches failure, its surface patina may hardly change at all. The metal also tends to work-harden, and when submerged for long periods, suffers from oxygen starvation. Thus, its shiny appearance may have made it the diamond earring of anchor alternatives, but the same looks and assumed good quality, throughout the fatigue cycle, can present problems.



Although a stainless steel anchor may increase the rate at which zinc coatings erode on galvanized shackles, a high-grade galvanized shackle remains a good choice for ground tackle, if only for the fact that it offers a visible sign that it is time for replacement.

Perhaps the best metal for an anchor is hot-dip galvanized drop-forged steel, a low-carbon alloy that is shaped by forge hammering when the metal is red hot. It results in nonwelded, one-piece shanks, or entire anchors. This is very different from casting, even though the anchors may look the same. In a drop-forged anchor, the grain structure in the metal aligns in a manner that lessens brittleness and enhances strength. Cast iron has just the opposite set of traits and represents a lesser quality option.

Welding low-carbon steel is a proven and reliable technology, but small critical joints that hold some anchors together require the best of a welder's skill to make these connections properly. In the U.S. Navy, for example, critical welds are inspected by X-ray. Many ads claim that an anchor is the "world's best," but very few mention anything about welds being X-rayed. Anchors with poorly executed welds sacrifice quality for price.

Design plays an important role in how well an anchor holds a vessel in place, and how well the anchor itself holds together. In essence, it's a fairly simple structure, and it provides a good lesson in how loads migrate through a material and where stress accumulates.

The shank, like the handle of a frying pan, transmits the energy into the main structure, and the junction between the handle and pan or shank and fluke is where a significant stress riser develops. Engineers know that stress escalates at the point where a flexing arm attaches to an immovable body. And in the case of an anchor, this shank-to-fluke junction is just such a stress riser. Most anchors are designed well enough to handle in-line loads, but as soon as the vessel yaws and starts to pull at an off-centerline angle, there's an assumption that the shank will handle the load or will realign to the new line of pull. Drop-forged anchors tend to take such side loading in stride. Welded flat-stock anchors often have shanks that are easier to bend.

When a vessel is dancing to the thrum of a building gale, the surging loads imposed on the anchor shank vary in both intensity and angle, and when the fluke(s) of the anchor ends up wedged in a rocky outcrop or pinned in a coral pothole, the anchor's shank and the fluke(s) themselves need to be rugged enough to handle loads imposed.

Mixing and matching stainless steel and galvanized mild steel chain, shackles, and anchors is interesting from a galvanic corrosion point of view. It's true that stainless steel becomes less noble when submerged, but the zinc galvanizing will be the least noble metal in the mix, and in salt water, its rate of electrolytic disappearance may be slightly increased. More of a concern however, lies in any stainless steel shackles and swivels that may show little sign of deterioration prior to catastrophic failure. Many bluewater veterans swear by U.S.-made galvanized mild steel shackles and chain, and agree that swivels, although a necessity for mooring pendants, should be omitted from anchor rodes.

Stainless steel anchors are welded structures, and if properly designed and fabricated, they are a valid alternative to other metals. When submerged, their holding power is neither increased nor decreased over a galvanized mild-steel sequel. How much value a shiny anchor housed in a bow roller affords is up to the owner, much like the decision of paint or varnish.