

BoatWorks



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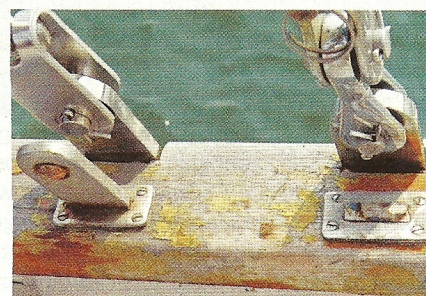
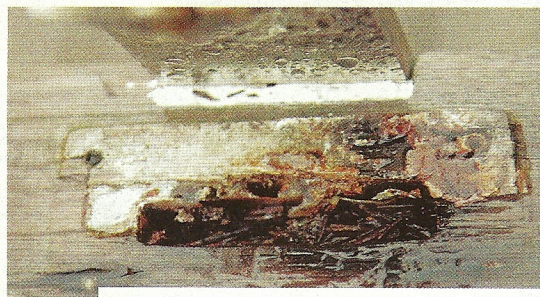
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Edited By Charles Mason

The consequences of chainplate failure can be drastic (below); stainless steel encased in wood and fiberglass can corrode quickly (right)



Tech Notes WITH NIGEL CALDER

CHAINPLATE BLUES

HAVE YOU TAKEN THE TIME TO CHECK YOUR CHAINPLATES RECENTLY?

Some years ago a leading insurance company did a survey and discovered that most dismastings occur in less than 15 knots of wind, typically as a result of a corrosion-induced failure. Most failures involve rigging screws and chainplates. Generally speaking, there's little excuse for having a rigging screw fail, as corrosion is evident long before the part fails.

Chainplates are another matter. The majority of chainplates are manufactured from stainless steel and are installed through a deck, which means much of the part is neither visible nor accessible. And herein lies the problem.

THE IMPORTANCE OF OXYGEN

Unfortunately, even high-quality stainless steel is corrosion-resistant, but not corrosion-proof. All grades of stainless steel, like any type of steel, contain a lot of iron. The addition of chromium, nickel and traces of other substances (notably molybdenum) create an alloy that resists iron's normal tendency to corrode. Generally speaking, the more chromium, nickel and molybdenum in the alloy, the greater its resistance to corrosion. This is largely the result of a reaction between oxygen in the atmosphere (or dissolved in water) and the chromium. It causes an inert layer of chromium oxide to form on the surface of the stainless steel.

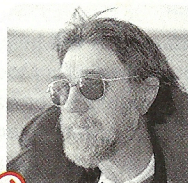
If you take away the oxygen, the chromium oxide will break down. If you then add

moisture, the iron in the alloy will begin to rust. These are precisely the conditions found around deck-penetrating hardware. The tight fit of the deck opening around a chainplate prevents re-oxygenating air from flowing over the surface of the chainplate, but the working of the chainplate under load eventually allows moisture to seep through the deck penetration, regardless of how well it appears to be sealed.

We now have the conditions needed for the inert surface of the stainless steel to break down and allow corrosion to begin. Once a corrosion "cell" gets underway, the resulting brew tends to accelerate the process. In extreme cases, it can eat through a quarter-inch (6 mm) of metal in a year.

"GOOD" AND "BAD" STAINLESS

There are more than 500 different grades of stainless steel. The minimum amount of chromium required to create a reasonable level of corrosion resistance is 12 percent. Typically, up to 20 percent is used in better grades of stainless steel. There should be



Nigel Calder has written many technical articles and books, among them *Nigel Calder's Cruising Handbook*, published by International Marine