Snatch Block Metallurgy Holds Clues to Longevity

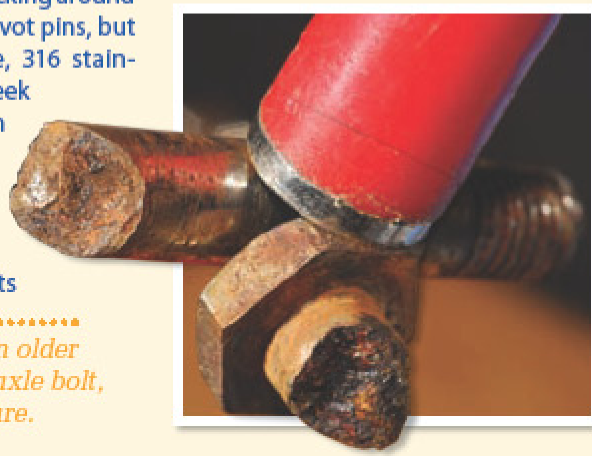
Structural quality has a lot to do with both how a block functions and how long it will last. We rated each snatch block tested based upon the materials it was made from and the attention to detail seen in the construction. The observed deterioration and under-load failure seen in the older products we inspected provided insight into potential failure modes.

Among the older gear, signs of physical deterioration (rust and crevice corrosion) directly correlated with an increased tendency to fail under conditions that were a small percentage of the block's original safe working load. Magnetic permeability, or the habit of some lower grades of stainless steel to be attracted by a magnet, also directly correlated with metals prone to chemical corrosion. Broken parts from older snatch blocks had an 85 percent correlation with magnetic permeability. From that evidence, we determined that the less magnetic stainless steel components (316 alloy) are better suited to the marine environment.

Although less resistant to corrosion than 316 stainless, the hardened magnetic, martensitic stainless steel in the snap shackles is stronger.

Of the new products, snap shackles across the board were magnetic, and were made from either 17-4 PH, 15-5 PH high-strength stainless steel, or other, similar precipitation-hardened martensitic stainless steel, rather than weaker, but less corrosion prone, 316 stainless steel. All of the high-strength alloys have the anti-corrosion quality of 304 grade stainless steel, while the 316 alloy contains a chromium-to-nickel ratio that all but eliminates magnetic tendencies, and is more noble on the galvanic scale.

It was not surprising to see that older blocks showed considerable corrosion and cracking around snap shackle bodies and pivot pins, but less around higher grade, 316 stainless steel snatch block cheek plates, and other parts. In an annealed state, even low-grade stainless (304) is non-magnetic, but cold working and polishing can induce magnetic traits in such lower grades of stainless steel. Thus, when a poorer quality metal is pressed into a complex shape and highly polished to create an initially shiny surface, it actually becomes more prone to failure.



Magnetic components on older blocks, like this sheave axle bolt, were more prone to failure.

As noted, many different grades of stainless were used in the blocks we tested, and all were mechanically abraded and electro-polished (an electro-chemical process that causes ferrous metal contaminants to be removed from the surface.) The result was a gleaming array of shiny stainless steel that ranged from absolutely non-magnetic, to metal that was as vigorously attracted to a magnet as high-ferrous content mild steel. Experts consider magnetic permeability of a stainless steel alloy to be a pretty fair indicator of material grade in 300 series alloys. However, magnetic quality is a symptom rather than the cause of a problem in marine hardware. It is indicative of high-strength alloys and lower grades of austinitic 300 series stainless steel. All are more corrosion prone, and this characteristic, rather than the magnetism itself, is the real issue when it comes to the durability and longevity of marine hardware.

The rivet on the Schaefer block showed signs of corrosion.

The axle bolts on all of the blocks tested, except for the Harken snatch block, showed no magnetic permeability. Older snatch block axles that failed under load were seriously corroded and displayed significant magnetic permeability. Some investment-cast stainless steel block parts were attracted to a magnet (Lewmar and Wichard). Others were not (Harken and Schaefer), and only Antal's web- or line-lashed snatch block showed no magnetic properties at all.

The long story short, is that 316 stainless, even cold formed and highly polished, shows little if any magnetic permeability. However, it is seen less and less in modern hardware—especially when a strong metal is required to get the job done.