Titanium shines in super yacht

industry

Titanium is strong, very light, resists corrosion and has a beautiful, luxurious finish. Plus, its expense has made titanium an object of exclusivity. On the face of it, it's the perfect metal for super yacht fabrication. And yet, as metallurgist Ko Buijs explains, this unique metal has only recently begun to attract the attention of luxury yacht builders.

By Mr. J. Gauldie

There is a growing trend for the use of titanium in racing yachts.

There are few super yacht yards in Germany and the Netherlands who have not had a visit from Ko Buijs, owner of Dutch metallurgical advisory office Innomet. As well as lecturing on titanium at technical universities, he is largely behind the yacht building sector's increasing awareness of titanium's unique properties and growing expectations for the metal. Super yacht yards are ready to listen, he says, but until owners are convinced, the yards remain hesitant.

"I'm still surprised that this unique metal hasn't been used more in yacht building. According to the yards, there seem to be no clients asking for titanium and that's largely to do with lack of awareness, I believe. That's been my experience in Germany as well as in the Netherlands. Nevertheless we're talking with one yards about a completely titanium hull and a number of suppliers are staring to produce titanium deck equipment."

No more tea stains

It's quite well-known that stainless steel type AISI 316 has a limited resistance against maritime environments. Most of this corrosion is caused by aerosols and chlorines. Corrosion is visible most of the time as so-called tea stains; however severe corrosion is possible as well. The resistance of the passive oxide skin of AISI 316 is very limited and this material is extra susecpti8ble to corrosion, especially if the surface is rough or grinded.

"Such trouble is completely solved by applying titanium," Mr. Buijs says. "That's the very reason nowadays we're seeing more and more suppliers apply titanium in equipment and parts for mega yachts instead of stainless steel. This is a remarkable, but understandable development."

Titanium superyacht parts. Photo: Peekstok

Exotic materials for superyachts

Titanium is an ideal material for superyachts and it is increasingly being specified by owners. According to Johan Peekstok, CEO of steel machining company Peekstok which has produced parts for the superyacht and other industries since 1965, the most common specified exotic materials are AISI316L or 1.4462 duplex, and increasingly titanium grade 5 and 2.

Titanium parts manufactured by Peekstok including a Ø70mm splined shaft. Photo: Peekstok

"The items most commonly specified in superalloys such as titanium are those parts of carbon fibre boats which come into direct contact with sea water. Recently we've also had orders for deck equipment in titanium. The advantage of titanium over other metals is that it has much more resistance against corrosion; standard stainless steel parts are not resistant enough for carbon boats. Furthermore materials like titanium impart a luxurious, modern look which is an advantage for deck equipment. There is definitely a trend to use more titanium and other exotic alloys, especially on carbon fibre boats and racing yachts. However it's generally considered to be too expensive for small pleasure craft."

"The largest titanium part we have manufactured to date was a Ø70mm x 3.500 mm propulsion shaft in titanium grade 5, and a V-Bracket (800 x 600 x 400mm) made from a titanium grade 5 casting. While titanium and other super alloys are in general more difficult to machine, it can be done when the right tools and machines are used."

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The unique corrosion performance of titanium offer new perspectives for maritime applications. Photo: Rondal b.v.

Seawater & atmospheric

Examples of titanium products in the super yacht industry include winches, hatches, cooling systems, heat exchangers and deck equipment such as eye plates and sheet systems. The extraordinary and unique corrosion performance of titanium offer new perspectives for these applications. Titanium is a reactive metal with a standard negative potential roughly four times more negative than the negative potential of iron. Yet this very ignoble metal behaves in a very noble way in that the titanium dioxide skin provides such excellent protection. Titanium is so reactive that a titanium oxide skin forms spontaneously in contact with air, without the presence of water. By contrast, iron needs moisture as well as air in order to oxidize. There are titanium products that guarantee continual use of titanium in seawater for 40 years without steps having to be taken to prevent corrosion.

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