

# Superyacht

INTERIOR DESIGN

EXTERIOR SPACE

CREATIVITY AND ARCHITECTURE



# DESIGN

**CASE STUDY**

Thinking outside the box with Italian designer Stefano Pastrovich.  
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In the past few years, new applications of technology have pushed the evolution of superyacht mast, rig and sail design to previously unimagined levels of performance. *SuperyachtDesign* speaks to some of the world's leading innovators about what's changing and what's coming next.

**T**he *Maltese Falcon*—perhaps the most iconic superyacht ever delivered—has been sailing for over eight years, yet still looks as though she's just leaped off her designers' drawing boards. Since she was delivered, a generation of new technical capabilities has arrived, with today's materials, fabrication and testing having turned sailing superyachts into machines of greater strength, speed and ever more radical design.

Sailing is about harnessing the wind, and so its leading manufacturers will always be looking for the next advantage. Based in Valencia, Spain, Future Fibres started out as a

composite rigging company, having revolutionised the use of composites in standing rigs. In the past few years, the company has moved firmly into the high-modulus carbon composite spar business, providing masts to projects by renowned design studios such as Dykstra, Hoek, Tripp and Dubois. At the time of writing it had just delivered a 76m carbon mast, furling boom and bespoke composite rigging package for project C.2218, the latest 60m Perini Navi sloop.

Working with sail makers and hull engineers, Future Fibres' team approach the design of rig and mast with a broad view. "Designing the mast is all about delivering desirable characteristics that work in harmony with the sail designer's goals, as well as ensuring the stay loads are within predefined limits," explains chief design officer at Future Fibres Tim Meldrum.

"Our internal design tools use a sail design module that allows us to apply 3D mesh sails to our rig model to get realistic loads," he continues. "We won't ever claim to be sail designers, but we have identified that we need to start with a high level of understanding for sail loads in order to design a rig. We like to work closely with sail designers and in any project we have the ability to add more refined sail distributed data from any sail maker in order to fine tune the laminate as required, and run through performance design loops to eek out the maximum combined rig and sail performance possible."

Future Fibres entered superyacht mast building just as the cost of high modulus carbon construction was within reach of performance racing and superyacht clients. "Ten years ago

# ON THE LEADING EDGE



# FOCAL POINT

THE MALTESE FALCON MAST AND SAIL DETAIL



STRATIS SAIL BEING LAID IN THE DOYLE SAIL LOFT

COURTESY OF DOYLE

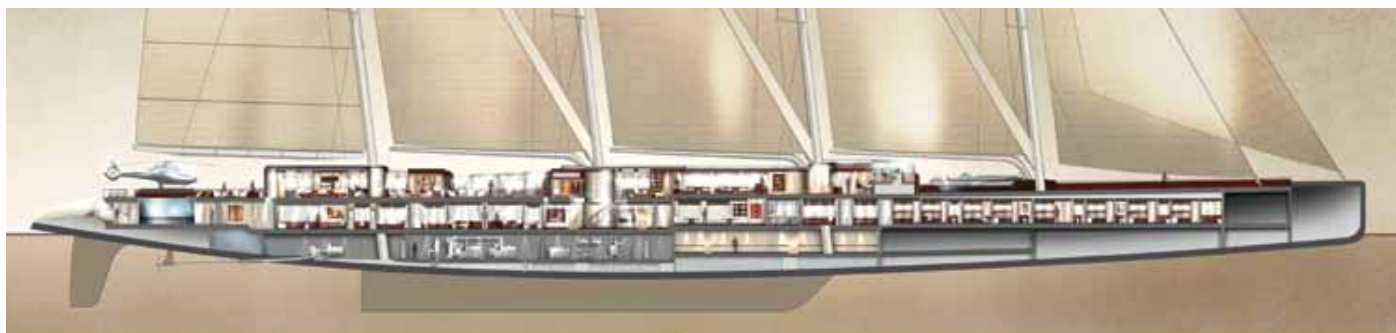
## “Designing the mast is all about delivering desirable characteristics that work in harmony with the sail designer’s goals, as well as ensuring the stay loads are within predefined limits.”

it was all about plain carbon and its improvements over aluminium,” Meldrum says. Higher modulus allows the team to use less material and save weight. This in turn reduces pitching and provides more drive out of the rig. “However, it also provides the opportunity to go the extra mile and improve the shape of the mast. We believe we have fast masts.”

On the sail side of the equation, Richard Bouzaid of Doyle Sails in New Zealand explains that the key issues that have been driving sail design are about achieving higher performance, which translates into sails that both weigh and stretch less.

“The emphasis we have today on the membranes being low-stretch or even particularly lightweight just wasn’t there before,” Bouzaid says. “People wanted easier to handle, softer materials. Today, all but the most relaxed cruising superyachts have sails with at least a blend of carbon fibre, and they’re all on locks rather than just halyards to make things far more rigid. As a result, the loads have escalated.”

Bouzaid points out that when newer-generation sails are installed on older boats, there have been failures of blocks and tracks, which struggle to take the increased loads the sails transfer to the mast, rig and deck. But on all of the current sailing superyacht builds, Bouzaid says the sail and rig makers will be involved together at an early stage to establish the loads and ensure all of the hardware is up to the task. Interestingly, with the increase in the use of carbon in carbon blend superyacht sails, the sails themselves are in fact 10 times stronger than the stays that they ride on. ▶



PROFILE OF DREAM SYMPHONY

# NO LIMITS FOR DESIGNERS

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LOOKING INSIDE A MAST PRODUCED BY FUTURE FIBRES

## When newer-generation sails are installed on older boats, there have been failures of blocks and tracks, which struggle to take the increased loads the sails transfer to the mast, rig and deck.

In the ever-increasing ability of the sails, mast, standing and running rigging to handle loads—many orders of magnitude greater than what was possible a generation ago—the deck hardware is increasingly being used to limit the maximum loading. “You’ll see full sailing systems that can handle huge loads, but an increasing awareness of safety means we’re seeing a limit on what the winches will pull, and the loads at which they’ll automatically start to ease off,” Bouzaid says. “There are load sensors on everything and you can programme the entire sailing system to not go above loads the insurance company has signed off on.”

To build the sails—which are now known by their makers as ‘membranes’—the firm uses a blend of different fibres, including 70 per cent of its own new product that combines strength and flexibility, called Stratis Ice, a high fatigue-resistant fibre from Japan called Technora, and of course carbon fibre.

Ken Freivokh, whose styling approach is as iconic as it is exhilarating, delivered the exterior styling and interior design of *The Maltese Falcon*. He is currently working on a number of wildly creative sailing superyacht designs, including *Dream Symphony*, a 141m all-wood hull and superstructure.

Like forward-thinking designers in all fields of structural design, Freivokh has had his most ambitious concepts become reality as a result of advances in materials. “There’s a very simple bit of the equation for me, and that’s carbon technology,” he says. “The levels of sophistication that have been achieved by people like Damon Roberts when he was with Insensys and they built the rig for *The Maltese Falcon* are impressive. Now he’s with Magma Structures working on a couple of new all-carbon freestanding rigs. Carbon has completely changed the game when it comes to what’s possible.”

In the past few years, the latest advances, as well as the opportunity to reflect on design decisions, have continued to drive Freivokh’s thinking on enormous sailing rig structures. The camber of the DynaRig yards has been reduced, for example, from its decidedly crescent-like form on *The Maltese Falcon*.

Freivokh has also been working with Dykstra on *Dream Symphony*, which required a conventional rigging arrangement with stays, shrouds and backstays providing support to the masts. “On a metal or carbon hull, you can calculate with great precision where the loads are and how they will behave under certain conditions,” he says. “But with this project one of the limitations was on the distribution of loads, which required a more traditional approach.”

Dykstra and Freivokh have used Hoyt booms on a gigantic scale on *Dream Symphony*—a feature that further evolves the relationship between style, function and the interplay between mast, rig, sail and overall look of the superyacht.

It’s a fluid frontier: new sail materials are being engineered just as novel spar arrangements are being planned alongside the handing down of the very latest rig technology from performance racing circuits such as the Volvo Ocean Race. At the same time, who would have guessed a decade ago that we would be seeing a 141m wooden-hulled schooner in build or a 100m-plus square-rigger ever built again? What advances in sail, mast and rig design indicate is that the whole world of sailing opportunities continues to expand, rather than narrow. It’s a good time to be a sailing enthusiast. ■