

Magma Structures delivers world's tallest composite superyacht masts



Composites specialists, Magma Structures have delivered three of the world's tallest carbon composite free-standing masts. The rigs are designed to withstand bending loads of more than 40Mn; more than twice the load on a Boeing Dreamliner wing. The masts were ordered by a German shipyard and are destined for a sailing superyacht.

Built at Magma Structures' waterside manufacturing facility near Portsmouth, the masts have taken over 3 years to develop, test, design and build using advanced composite manufacturing processes. Over 70 people have worked on the build of the rigs, including an in-house team of specialist composite design engineers.



UNIQUE CHALLENGES: ENGINEERED

The rig concept was designed by Dykstra Naval Architects in the Netherlands; the load analysis and engineering drawings were compiled by Magma Structure's in-house engineering design team. Each mast is able to rotate using systems mounted on 'wings' at the side of each mast; adding to both the design complexity and build challenge.

High performance carbon fibre was used in the manufacturing process of the masts; a similar grade to that used in motorsports and high-end aerospace products. The very high specific strength (strength/weight ratio) of carbon composite and its exceptional fatigue and corrosion resistance make it the ideal material for large free-standing structures which need to withstand high bending loads. Despite their height, each cantilevered freestanding mast weighs around 50 tonnes.

The masts support a sail area greater than a standard sized football pitch, with full automation in terms of sail deployment, setting and reefing.

The free-standing, rotating rigs are intrinsically safer and more reliable than conventional rigs where failure through fatigue or overload of the many rigging elements can occur. The absence of standing rigging results in a much cleaner and uncluttered deck as well as significantly reduced maintenance issues.

The rigs are embedded with fibre optic sensors to give real-time, comprehensive load data on all aspects of the rig as well as safety warnings, historical data, condition monitoring and information to optimise the sailing performance.

Magma Structures undertook all the structural engineering design, prototyping, testing, and build of these highly technical rigs and is responsible for commissioning the rigs, controls, sails, automation and monitoring systems.



UNIQUE CHALLENGES: ENGINEERED

Clive Johnson, Managing Director of Magma Structures commented, "These rigs are amongst the most technically challenging free-standing carbon composite structures to have been manufactured due to their size, design load requirements and the marine environment in which they will be used. The skills developed and experience gained from building these rigs are already having a direct impact on projects we are developing in other sectors including bridges, stadia and buildings where the benefits of manufacturing in composites can be significant."

Damon Roberts, Technical Advisor to the project noted, "The high strength, fatigue resistant nature of carbon has been the key in enabling us to develop and manufacture a free-standing structure much larger than anything currently built, including the current generation of wind turbine blades, and with much higher bending loads. The embedded fibre optic monitoring data is invaluable in giving us real-time data to optimise the sailing performance as well as verify the design concepts and give us load case data to minimize the maintenance."

Ends

Notes for editors:

June 2015

Magma Structures provides clients in diverse sectors with access to a unique team of experts, world-leading carbon fibre engineering capabilities, flexible manufacturing resources and the financial strength to take on board ambitious projects and deliver them. The company uses a systematic design and engineering led approach to design and manufacture large complex carbon structures that meet unique structural requirements. The company launched in 2011 and employs over 120 people at its flexible waterside manufacturing facility at Trafalgar Wharf, Portsmouth, England. The team includes highly qualified designers, engineers, manufacturers and project managers with extensive experience of manufacturing massive carbon composites in high performance sectors including marine, oil and gas, wind energy, aerospace and public art.

For more information please visit www.magmastructures.com and for media enquiries please contact Sarah Johnson, pr@magmastructures.com or call 07855 557034



UNIQUE CHALLENGES: ENGINEERED

Magma Structures is a subsidiary of Magma Global, the manufacturer of m-pipe®, the world's most reliable subsea pipe for use in the offshore oil and gas industry. This high performance carbon fibre / PEEK polymer pipe has been proven to significantly reduce the cost of oil and gas exploration, development and production for operators. m-pipe® has unique properties including higher strength, lower weight and better corrosion resistance versus equivalent steel pipe, ensuring its integrity in the harshest deep water environments and lowering subsea project risk as well as cost.