

A bicycle like a spider's web

Designer Paul Martin, together with the CEO of CirComp Ralph Funck, has built a bicycle from carbon threads: In a new lightweight construction with highest stability and incomparable look.

Paul Martin loves Spiderman and he loves bikes. As a product designer, he deals with consumer goods of all kinds on a daily basis, and so the question arose as to whether you could build a bicycle like a spider's web. No 3-D printing, welding or glueing, because the forces should be transmitted over long carbon strands. The engineer Dr. Ralph Funck with his company Circomp can do that. Both met in the Kunststoffnetzwerk Rheinland- Pfalz and the idea of the project was born.



For the IsoGridBike they used epoxy resin matrix in combination with a 24k carbon fiber roving. Depending on the application, different matrix / fiber combinations can be used. The production uses the wet winding process. Carbon fibers impregnated with epoxy resin are endlessly applied to an water-soluble core into the defined grooves by the fibre winding process. This is done in layers until the tool is filled towards the outermost layer. After the IsoGrid fibre composite has cured, the core is dissolved in water.



The study has two benefits. This type of construction is currently unique and opens up new possibilities to create stable, light and new forms from bionics. The diamond frame will always remain with bikes, but the industry is struggling with real novelties and is not really pioneering in this area. The E-Bike had stimulated the market, but it is rare to see anything fundamentally new in the field of frame construction. Conversely, the possibilities of design are changing due to new software and hardware features.

We see more and more open "skeleton structures" in architecture and design. Designers have already ventured into the bicycle, but the wrapping process is more promising than 3D printing. The load transfer is continuous. There are no fractures and the structure is extremely light.

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