COMPOSITE DESIGN MADE EASY

In its search for a solution that supports the construction of composite parts throughout the entire pre-production process, Carbo Tech Composites GmbH found the right software and the right partner. Now their construction processes run up to 30 percent faster.

► HIGH DEMANDS

They're light, strong and rigid. They have good dampening properties, expand little when heated, and are resistant to corrosion: the advantages of composite parts made of carbon fiber-reinforced plastics (CRPs) are many. The engineers at Carbo Tech Composites GmbH near Salzburg in Austria know all about these strengths – and so do their customers, who work in Formula 1, automotive and mechanical engineering.

But for Carbo Tech, the real art lies in finding ways to meet all the demands in terms of sturdiness, design, production costs, and feasibility. Carbo Tech Composites GmbH is one of a handful of businesses that have such deep knowledge of the material and the manufacturing process. This is owed first and foremost to their engineers and designers, but also to the use of modern software solutions. For example, the enterprise relies on the CATIA V5 configuration "Composites Design" by Dassault Systèmes. CENIT took on the training of Carbo Tech staff, and successfully so: "It's allowed us to speed up our construction processes by up to 30 percent", says Herbert Egger, Head of Racing Construction at Carbo Tech Composites GmbH.

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> **Head of Racing Construction at Carbo Tech**

► THE ART OF PLACING LAYERS

It is possible to manufacture composite components in batch, but for the most part they are and will continue to be made by hand. Using autoclave technology, so-called prepregs, resin-soaked fiber mats made of carbon, glass or aramid, are placed layer upon layer into a mold. The experts who lay the fiber mats in the cleanroom have to take great care in placing the prepared and pre-cut mats at the right angles and with the right fiber grain orientation. In addition, they often have to reinforce high-stress areas.

"The more complex the geometry, the harder it is to place the layers correctly", explains Egger. The key aspect is the know-how of the design engineer who determines the placement of the layers. But he has help: information from "Composites Design". "The CATIA V5 configuration clearly displays the fiber grain in the mats and helps us manage the placement", says Egger. "The system alerts us to problem areas right away. Already during the construction phase, we can see quickly and easily where we'll have to make incisions or separate the layers. That way, the software helps us to avoid expensive rejects right from the start."

CARBO TECH SPEEDS UP CONSTRUCTION PROCESSES BY 30 PERCENT

► BENEFITS

"Composites Design" is not just a solution for the construction sector: it supports the entire process leading up to parts production.
Carbo Tech's construction data are used to create 2D images for suppliers, so-called ply-books, other production documents for the cleanroom and finishing, production templates, as well as cutting plans for the prepreg cutters. The ply-books provide graphical displays of all the layers, including their dimensions in the order of placement and with the correct alignment of the fiber grain. These work instructions greatly facilitate production for the engineers and allow them to achieve high quality even in batch production.
In addition, "Composites Design" can, where needed, manage a layer positioning system using the CAD data. Laser beams show the engineer the millimeter-perfect positioning and orientation of the fiber mats.

► IMPLEMENTATION

CENIT was responsible for the introduction and training of Carbo Tech staff in working with "Composites Design".
"People and their know-how are the heart of our company. For that reason, staff training and competent staff support are essential to us", emphasizes Herbert Egger and adds: "So naturally we decided in favor of CENIT as a well-known service provider with years of experience as a Dassault Systèmes partner. Thanks to the excellent training our staff received from CENIT experts, we were able to implement the solution and optimize our processes quickly."

► CARBON FIBER REINFORCED PLASTICS

Fiber composite materials are created by combining high-strength fibers with a resin that hardens under heat and pressure. The fibers can be made of glass, carbon or aramid and can be woven in different methods. Fiber composites allow manufacturers to save up to 65 percent of a product's weight – without sacrificing strength.

► ABOUT CARBO TECH

From humble beginnings in 1993 as a supplier of motorcycle accessories, Carbo Tech Composites GmbH has grown into a highly sought-after partner of Formula 1 racing teams, auto manufacturers like BMW, Audi and Daimler, but also customers from the mechanical engineering sector. Carbo Tech's 270 employees build structural components, aerodynamic parts and vehicle shells. Moving engine components and parts for cycle and ski racing also list among Carbo Tech's products.

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Herbert Egger
Head of Racing Construction at Carbo Tech

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