



Interview with Sebastian Raffauf, Team Sonnenwagen Aachen

INTERVIEW

Sebastian Raffauf

Reinforced Plastics spoke with Sebastian Raffauf from Team Sonnenwagen Aachen about the development of their solar car.

Please can you start by introducing yourself, telling us about your background and that of Team Sonnenwagen Aachen?

My name is Sebastian Raffauf. I am a 26-year-old master's student, majoring in aeronautical engineering. I joined Sonnenwagen Aachen in January 2016 as head of the aerodynamic department. Together with the other five members of the aerodynamic team I am responsible for the aerodynamic design and manufacturing of the carbon fiber reinforced plastics (CFRP) of our solar race car.

The story of Team Sonnenwagen Aachen began in September 2015, more than two years ago, when our founders Hendrik Löbberdings and Niklas Kaltz watched a solar car race with friends in Aachen and wondered, why there was no German participant in the main challenger class. The race they have been watching happened to be the toughest solar car race in the world – the Bridgestone World Solar Challenge. As part of the World Solar Challenge, more than 50 teams from around the globe race through the Australian outback over 3000 km from Darwin in the north of the continent, to Adelaide in the south. It takes place every two years and attracts attention of both industry and academia.

Interested in competing in the race, a small group started to grow Aachen willing to take on the challenge to develop the first German solar car for the challenger class – the premier discipline of the race. Since Aachen houses the RWTH Aachen university and the FH Aachen, both considered among the best of the German technical schools, Team Sonnenwagen Aachen found many students from different backgrounds willing to contribute to this project (Figures 1 and 2).

Corresponding author: s.raffauf@sonnenwagen.rwth-aachen.de



FIGURE 1
Sebastian Raffauf.

Could you tell us about your project and its impact?

The obvious reason for engineering students to join Sonnenwagen Aachen, one would say, is to develop a race car. However, the team's goal is of more fundamental nature. We want to change the perception of sustainable mobility and inspire people for this topic.

Here, in Germany, there is a public debate about the future of automobility and the evolution to e-mobility. Although, Germany is known as a great car nation, there seems to be a lack of willingness to strive for this change. Regarding their range and costs, many people nowadays are sceptical toward electric



FIGURE 2

Team Sonnenwagen Aachen at the official unveiling in July 2017.

cars. Moreover, people are aware of the fact that e-mobility alone will not solve the energy problem, since conventional power plants still have a big share in power generation in Germany.

We are convinced that Germany presents all important conditions to be a leading nation in the evolution of mobility in the next decades. Therefore, Sonnenwagen Aachen wants to raise awareness for and fight prejudices against e-mobility. With our first solar car we want to demonstrate the possibilities of focused and collaborated research and development (R&D) in the field of solar e-mobility.

In the last two years, we worked on this mission and established a network of sponsors and supporters. In November 2016, we signed Huawei as our main sponsor followed by Covestro and Porsche as sponsors in the spring of 2017. In total we found more than 40 specialized partners from different industry sectors and academic facilities, who strongly supported us and made this whole project possible. Moreover, we even experienced support from politics. Dr. Barbara Hendricks, German minister for environmental affairs, held a speech at the official unveiling and acknowledged the significance of our vision and our team.

What materials do you work with?

Our solar car consists of four different technical sections: the structural frame, the suspension, the aerodynamic shell and the electric system. Whereas the structural frame consists of extra-thin steel tubes and the suspension is designed with

aluminum components, all aerodynamic parts are made out of fiber reinforced plastic sandwich composites. According to the component's purpose, we used carbon fibers, aramid fibers and glass fibers as skin material and polymethacrylimide (PMI) foam and balsa wood as sandwich cores both bonded by an epoxy resin system. In addition to the carbon fiber parts, we manufactured the molds with a special epoxy tooling paste applied onto a polystyrene raw mold (Figure 3).

What are the benefits of these materials?

Our goal during the last two years has been to develop an ultra-lightweight car. However, we had to meet many constraints, regarding the driver safety and electric isolation, posed by the official competition regulations.

Focusing on the aerodynamic composite parts we used different fiber types to benefit the most from each individual fiber properties. To achieve the maximum lightweight potential, every part is designed as sandwich composite with carbon fiber as main skin material. Due to its high specific tensile strength and excellent adhesive properties it is the optimal fabric to minimize the weight of our sandwich structures. Using a special spread tow carbon fiber fabric for large surfaces, we could reduce the overall component weight even further compared to classic twill fabric.

For the solar panel, although carbon fibers have better mechanical characteristics in comparison to other fiber materials, we chose glass fiber as top layer material. However, since carbon fibers

Download English Version:

<https://daneshyari.com/en/article/11007883>

Download Persian Version:

<https://daneshyari.com/article/11007883>

[Daneshyari.com](https://daneshyari.com)