



RACE TO THE SUN

This article provides an overview of this unique sailing regatta and gives an insight into the use of SCIGRIP specialist adhesives and the role that high-strength bonding solutions can play in marine applications.

BACKGROUND

The Dong Energy Solar Challenge is a biannual race that attracts teams of composite engineers, boatbuilders, designers and technical students from all over the globe. This year, the world championship was hosted in Holland between 28th June and 5th July. The race is highly competitive and generates some of the most dynamic boat designs and construction techniques in terms of lightweight composite development and sustainability.

This unique 'solar-powered' contest is by no means confined to European entrants and is truly a global gathering. This year's competition saw 40 international teams competing from countries such as Bahrain, China, the USA, Brazil, Finland, Poland and Indonesia.

Participants must complete the 250km staged course in highly customised vessels powered only by energy from the sun and driven by solar panels. The teams must finance themselves, either through sponsorship or private funding, and the solar panels are provided by the organisers.

The week-long competition sees the teams navigate a challenging course across the north of the Netherlands between the cities of Blauwstad and Leeuwarden. Split into five different stages, contestants must participate in both sprint and endurance races, often exceeding distances of 40 to 50 kilometres a day, making it a demanding and very physical race. With no luxury hotels or accommodation marked out on the course, the

skippers and their support teams have to set up camp along the route after a hard day on the water.

In order to participate, the entrants and vessels must pass a strict set of criteria for their particular class. These include rigorous inspections from the technical commission team during the prototyping phase, construction and pre-race sea trials.

Participants sail in one of the four different classes and these are categorised based on different technical specifications, solar panel capacity and crew expertise. The first is the Top Class – dubbed the Formula 1 of solar-powered boats. These ultramodern boats are capable of spectacular speeds and can participate in the race with almost no restrictions. The competitors are free to choose their solar panels, thereby allowing greater flexibility in the design of the boat.

Challenge A is the one-man class of the Solar Challenge and is also positioned at the high-tech end of design and innovation. The most popular class, it attracts the most entrants and generates a great deal of new talent in the form of engineering and university students. Solar panels for the A Class boats are supplied by the organisers and not selected.

Challenge B is distinctly different from the other classifications as this is a two-man class and therefore requires an extra passenger to be incorporated into the design and construction of the boat. Ensuring that these vessels remain fast and manoeuvrable with the extra weight on board adds another challenging dimension in terms of design and material selection. Again, the solar

panels are supplied by the race organisers.

Finally, the V20 class completes the race classifications. All these boats are produced by Dutch yacht design and naval architecture company Vripack.

THE SCIGRIP SOLAR BOAT TEAM

The SCIGRIP Solar Boat Team, formerly named the Green Solar Power Team, has competed in the Dong Energy Solar Challenge since the race's creation in 2005. The crew consists of a dedicated group of engineers with a vast knowledge of the marine industry and composites technology. This is combined with a real passion for boats and environmental sustainability.

Since participating in the first Solar Challenge in 2005, they have been improving and enhancing the design of their boats to really push the boundaries in terms of performance and lightweight construction. Thanks to the team's hard work and dedication, they have already asserted themselves as serious contenders over the years, achieving second place in 2008, third in 2012, and then going on to win first place in their class in this year's competition.

CONSTRUCTION

With the SCIGRIP Solar Boat Team's sights firmly set on winning the 2014 world championship, they decided to design and build a completely new boat from scratch and enter the boat in the Challenge A class. This revised structure resulted

In a hull that was even lighter than their previous entry, which had received the Innovation Award for the Lightest Boat in the Regatta in 2012. The engine features rare-earth magnets, the strongest type of magnet available, thereby increasing the efficiency of the drive system and boosting the vessel's speed. Specialist software was also developed and utilised to optimise the boat's energy and power consumption.

After designing the prototype structure and conducting extensive testing procedures, the SCIGRIP team completed the construction of their new hull during the Cracow Composite Expo 2013 in Poland. Owner of Cree Yacht Design Studio, Bartosz Puchowski, was the skipper and main constructor of the boat. Bartosz brought essential experience to the project in his role as a naval architect, and knowledge in the application of composite technology. To ensure maximum efficiency and high speeds on the water, the hull features a carbon-fibre epoxy sandwich construction using polyethylene terephthalate (PET) foam as the core material.

Participants must complete the 250km staged course in highly customised vessels powered only by energy from the sun and driven by solar panels.

Following the production of the hull, the boat then entered the final stages of production back at Cree Yacht Design until she was completed in May 2014. Then followed a series of sea trials in the waters off Gdynia, allowing the team to familiarise themselves with the boat and her capabilities.

RACE RESULTS

The Solar Challenge 2014 proved a challenging and exhilarating week on the water. Some competitors performed consistently well and dominated the leader board, while others faced the disappointment of having to withdraw completely due to technical failures. In one very unfortunate incident during the first stages of the competition, one team had to simply stand back and watch their vessel be engulfed by flames due to an electrical fault.

The SCIGRIP Solar Boat Team sailed very well, and despite slipping into third place on one occasion due to a navigational error, they managed to lead their class for the duration of the week-long event. On Saturday 5th July they completed the course in the city of Leeuwarden ahead of their closest rivals by 4 minutes 18 seconds, which secured them first place in the Challenge A class. The atmosphere was fantastic as crowds of spectators and well-wishers cheered them across the finish line.

'Our team led the class on and off throughout the race,' remarked Bartosz Puchowski, captain and helmsman, 'We sailed tactically and I am delighted our efforts paid off. The SCIGRIP Solar Boat performed very well, and thanks to its incredibly lightweight structure of 135kg it had a real speed



Images: Above: Crossing the finish line for the last time, 3 minutes ahead of NHL team. Below top left: The trophy. Bottom left: Victory smile in the rain. Below top right: Winners from all classes on stage. Below right: Onshore team on the first bridge.



advantage over our competitors during the reduced solar power phases of the race. As a result of this higher efficiency, the boat was then able to really excel during the longer, sunnier distances of the course, reaching maximum speeds of 24km/h.'

The SCIGRIP Solar Boat Team relish a challenge and they are already giving serious thought to their 2016 entry.

For more information on SCIGRIP and their range of high-strength adhesives and bonding solutions for marine applications, please visit www.scigrip.com. Details of the Dong Energy Solar Challenge can be found at www.dongenergysolarchallenge.com, and for further information on the SCIGRIP Solar Team please visit www.scigripsolarboatteam.com **CRP**

