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SECTOR REPORT

GOING GREEN IN MARINE *p12*

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Going green in marine



Ed Hill learns more about Sicomin's bio-based resins and how they have been developed for use in advanced composites for marine applications.

Advanced composite materials can offer many strength, lightweight and corrosion free properties in marine applications but there is a continuing debate concerning their sustainability and environmental impact.

With the prospect of further legislation and increasing consumer awareness, suppliers are looking at ways to see if these materials and associated manufacturing processes can be made 'greener'.

One company at the forefront of developing resins derived from bio (organic) sources is Sicomin. Currently the majority of epoxy resins used in the marine industry are derived from petroleum sources, but in recent years Sicomin has been developing products with a higher degree of bio content to at least make the resin compound's source more environmentally sustainable.

A new green resin from Sicomin that is beginning to be adopted more by marine manufacturers is its InfuGreen 810.

InfuGreen 810 contains more than 30% carbon content derived from plant-based origins. It is a low viscosity resin primarily intended for injection or infusion manufacturing processes. It is offered with a range of different hardeners making it suitable for both small and large component manufacture.

The organic content in InfuGreen 810, and Sicomin's other GreenPoxy resins, is derived from a by-product (glycerol) created during the production of bio-diesel.

Eco friendly options

The company was keen to promote the idea of bio-resins as it wanted to have a product it could supply to its biggest market of sports customers as the end users in that market were more enthusiastic about the idea of using 'environmental' products. However, initially uptake was low because the resins tended to be more expensive.

Sicomin's export manager, Marc Denjean says the company started experimenting with bio resins around ten years ago, but at that time the raw

materials needed were not available in enough quantity and quality.

"At first, we had low sales to small companies making custom made parts but this did allow us to build our knowledge with the use of these resins," he explains. "Once we had proven their performance we were able to offer them to bigger customers in larger volumes and at a similar price to traditional resins. It was around a year ago companies from the marine industry began to approach us about using the resin and making the switch from their current products."

An important development for Sicomin was to get DNV GL certification for the new resin. The marine industry standard confirms that the product meets the required quality efficiency and safety standards for these applications.

The company has also sought further third-party accreditation for its green resins from the likes of the USDA, as a 'BioPreferred' product in America, and Veritas one of the world's leading classification societies and offshore verification bodies.

Above
The idea behind SeaBubbles was to create a water taxi based on a futuristic hydrofoil design that glides silently above the water

"It was important to work with third party bodies to help validate what we say about these resins," notes Denjean. "We are leaders in this area and we want to prove the authenticity of our products and help the industry easily understand their origins and properties."

One high profile application of the new resin has been its use in the SeaBubbles project. The concept of hydrofoiling yachtsman Alain Thébault and champion windsurfer Anders Bringdal, the idea behind SeaBubbles was to create a water taxi based on a futuristic hydrofoil design that glides silently above the water when the craft reaches 12km/h (7.5mph). A clean charging electric drive system converts solar, wind and water power so the vessel does not generate any CO₂ emissions.

The boats were built by Décision SA, a Swiss company specialising in the development and prototyping of complex composite structures. Décision's manufacturing process were required to include a significant percentage of bio-based materials so Sicomin was the ideal partner as it could supply not only bio-based epoxy resins, but also natural fibres and core materials.

"Décision has bought our standard products for many years," Denjean comments. "They were selected to make the first five SeaBubbles prototypes for this project and as this was going to be an electric water taxi with a low environmental impact we asked them if they wanted to use the bio-based resin. The customer agreed and they not only wanted to use the bio-resin they also wanted to use organic fibres where feasible so the vessel would be as bio-based as possible."

Infusing the bubble

All of the SeaBubbles' composite parts were produced using vacuum infusion where the sandwich structure comprising of reinforcement fibres and a natural cork core were infused with Sicomin's InfuGreen 810.

Sicomin also supplied a range of complementary materials to provide a package of infusion specific products including glass fibre multiaxial fabrics, PVC foams with bespoke perforation patterns for infusion, release agents and epoxy spray adhesives to securely position dry fabrics in the moulds.

"Sicomin's InfuGreen 810's DNV GL certification was a significant factor

Right
All of the SeaBubbles' composite parts were produced using vacuum infusion

Below
Five SeaBubbles water taxi prototypes were launched in June 2017 on the River Seine



during the product selection process," says Décision SA's CEO, Grégoire Metz. "This marine industry standard provides undisputed quality assurance and allowed us to make rapid progress during the initial stages of the build."

Five SeaBubbles water taxi prototypes were launched in June 2017 on the River Seine in Paris. The boats were delivered in record time with material specification, design analysis and production achieved in less than four months.

"SeaBubbles unified a group of companies with eco-friendly ambitions to create a truly innovative concept in transportation," comments Philippe Marcovich, president of Sicomin. "Décision has been the perfect development customer with their experience of creating exceptional quality and performance parts whilst using a wide range of bio-based epoxy resins, natural fibres and core materials. The SeaBubbles team provided us all with the vision to follow."

“SeaBubbles unified a group of companies with eco-friendly ambitions to create a truly innovative concept in transportation”

The SeaBubbles project says it is committed to providing its water taxi service at the cost of regular taxi journey and plans to operate in 50 cities within the next five years. The aim is to help reduce traffic congestion by using urban waterways as alternative transport routes. Following on from the success of this first phase of the project, a larger 15-seater vessel is also planned for construction.

"Our bio-resins are a way to differentiate ourselves from the competition," concludes Denjean. "We have to bring new innovations and technical solutions to the market. The composites industry is interested because most governments and companies around the world want to reduce the environmental impact of resins. We have already succeeded down this path and any progress that can be made is worthwhile."

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