

Case Study:

Biocomposite Wind Turbine Blade



Material Selection

The main shell was built using Biotex Flax 2x2 Twill 400gsm with Biotex Flax Unidirectional 275gsm being used for the belt and root. The blade was built in two halves which were hand laminated and joined using Momentive's RIM 235 epoxy resin.

Background

The SWE (Endowed Chair of Wind Energy) at the University of Stuttgart, Germany, has designed and manufactured natural fibre reinforced wind turbines. SWE's research is focused on improving the reliability of turbines whilst reducing the production costs of wind energy.

Wind turbine blades are commonly made using glass fibre reinforced composites. SWE wanted to familiarise themselves with natural fibres and their performance compared to glass in the use of wind turbine blades. The aim was to design a natural fibre wind turbine blade for its 1kwh rooftop wind turbine, to see if there was a sustainable high-performance alternative to glass.

Testing

The University wanted to learn more about the use of natural fibres and, along with a range of other materials suppliers, contacted Composites Evolution to test fibres with different resins to validate their performance characteristics. It found that Composites Evolution's Biotex Flax correlated best with the performance they needed and it felt they had a good basis to make a lightweight and stiff natural fibre blade.

Why Biotex Flax?

Tests showed that Biotex Flax could be used without sacrificing the integrity of the turbine strength. The Biotex Flax reinforcement's unique twistless technology gave the material the performance characteristics that they were looking for, ensuring the blade was both lightweight and stiff.