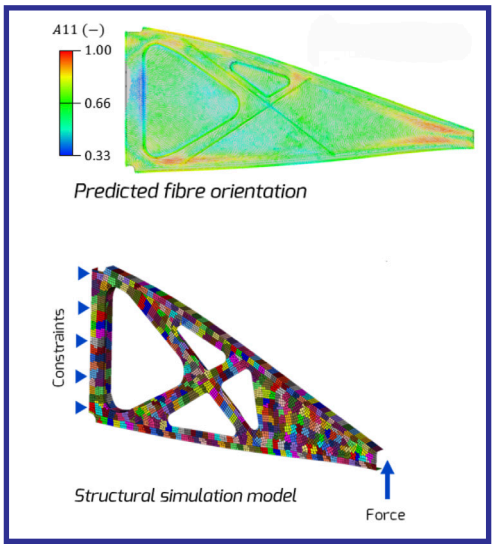
Composites UK Trade Association

HRC Beyond Lightweight

INNOVATION IN COMPOSITE DESIGN

FINALIST: HRC

HRC's Failure in Random Material Architectures (FiRMA) software is a proprietary tool developed to predict the performance of discontinuous carbon fibre (SMC) components. The platform integrates in-house material testing with advanced finite element simulation to capture fibre distribution and orientation within complex part geometries.



The FiRMA workflow includes material characterisation, material card generation and validation, providing a methodology which is scale-independent for a material type that exhibits different properties at different scales due to the finite size of the constituent fibres. By addressing uncertainties in fibre orientation and load-path redundancy, FiRMA gives engineers confidence to design and specify SMC carbon fibre for their products. This technology supports high-yield tooling, significantly lower TAKT time and production costs, optimised material usage with near-zero waste and enables the integration of reclaimed fibres, aligning with industry sustainability goals. Demonstrator components, including an eVTOL wing riblet, have shown strong correlation between simulation and physical testing, confirming FiRMA's reliability.

As demand for lightweight, sustainable composite solutions grows across automotive, aerospace, wind energy, and sporting goods, FiRMA offers a validated workflow that accelerates adoption of discontinuous carbon fibre at scale.

Learn more at: www.grouphrc.com