

Case Study: e-Xstream engineering

Failure Prediction of hybrid UD/Woven Laminated Pin-Loaded Joints

Digimat to predict failure loads and modes using progressive failure of CFRP for different design of a mechanical joint

Summary

Mechanical joints with fasteners are widely used for aircraft primary structures to assemble composite parts. In the case of a pin-loaded joint, stress concentration takes place on each side of the fastener leading to the apparition of local failure before the final failure of the assembly. Depends on the geometry of the joint, different failure modes may appear.

Although tests are frequently conducted to support the design of such components, the benefits of a simulation tool such as Digimat is obvious if the material modeling used is able to reproduce properly the damage behavior of the composites (unidirectional or woven reinforcement) in order to predict accurately not only the failure load but also the failure mode.

