

Bird strike on an aeroplane underbelly fairing

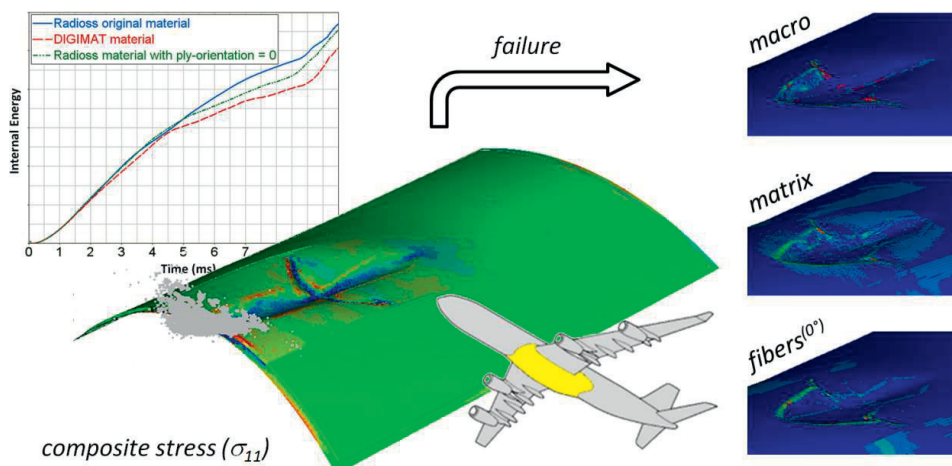
PARTNERSHIP COLLABORATION

- Altair empowers client innovation and decision-making through technology that optimizes the analysis
- e-Xstream is part of the HyperWorks Partner Alliance (HWPAA)

CHALLENGE

- To bring innovation in simulation to the aerospace industry
- To go beyond prediction of failure on the composite ply level
- To take first steps towards bridging draping simulation with structural FEA using micromechanical material models

WHAT IS THE DIGIMAT ADVANTAGE FOR COMPOSITES?



DIGIMAT SOLUTION

- Micromechanical material description based on linear elastic properties for epoxy matrix and transversely isotropic properties for the carbon fibers
- Composite failure definition (Tsai-Wu) for the ply level
- Maximum principle strain failure definition for the matrix phase
- Maximum stress failure definition for the fiber phase (along and transverse to the fiber orientation)

RESULTS

- Full workflow is available between Radioss solver and the micromechanical material description provided by DIGIMAT
- Failure prediction is at hand for the composite (ply) level and/or on the microscopic scale for the matrix and the fiber phases
- In the future DIGIMAT material models can easily be combined with results from draping simulation software to account for the influence of processing

MATERIALS

Woven composites

PERFORMANCES

Stiffness, Failure

DIGIMAT

Digmat-MF, Digmat-CAE, Digmat-MX

CAE TECHNOLOGY

Radioss

INDUSTRY

Aerospace

APPLICATION

Impact

“With DIGIMAT unidirectional composites can be investigated in deep detail on the microscopic level. This brings an additional scale to multi-scale modeling enabling failure prediction beyond the ply level of the composite.”

Dr. Laurent Adam, Leader of R&D, e-Xstream engineering

www.altair.com

www.e-Xstream.com

The nonlinear multi-scale material & structure modeling platform

Digimat material modeling platform means developing innovative, optimized and cost-effective products. As a unique nonlinear multi-scale material and structure modeling platform, Digimat offers:

Digimat MF: Mean-Field homogenization software used to predict the nonlinear behavior of multi-phase materials.

Digimat FE: Finite Element based homogenization software used to model the nonlinear behavior of Representative Volume Elements (RVE) of material microstructures.

Digimat MX: Material eXchange platform used to prepare, store, retrieve and securely exchange Digimat material models between material suppliers and end-users.

Digimat CAE: Digimat linear and nonlinear interfaces to major processing and structural FEA software to enable multi-scale analyses of composite structures.

Digimat MAP: Shell & 3D mapping software used to transfer fiber orientation, residual stresses and temperatures between dissimilar processing and structural meshes.

Digimat RP: Easy and efficient solution for the design of fiber reinforced plastic parts.

Digimat HC: Easy and efficient solution for the design of honeycomb sandwich panels.



The material modeling company

MSC Software Company

e-Xstream engineering is a provider of simulation software & engineering services, 100% focused on advanced material modeling. e-Xstream was founded in 2003 in Belgium and Luxembourg. e-Xstream is an MSC Software company since September 2012 with more than 1100 associates working from over 20 offices around the world.

e-Xstream engineering develops and commercializes Digimat – the nonlinear multi-scale material and structure modeling platform that fastens the development of optimal composite materials and parts.

Digimat customers are material experts and structural engineers who accurately predict the behavior of multi-phase composite materials and structures. Digimat is used by all major material suppliers and users across all industries (Automotive, Aerospace, Electric & Electronics, Leisure, Defense ...).

With this important customer base worldwide, e-Xstream combines deep expertise in material modeling and numerical simulations with the business understanding of the large variety of materials used across all industries.

www.e-Xstream.com

