Digimat takes the guesswork out of material replacement with smarter design values, allowables and crash modelling

New release upgrades high fibre content virtual test with 10-100X faster analyses and Melro model placement, and implements progressive damage analysis using the Camanho model

LUXEMBOURG - Nov 12, 2019 – e-Xstream engineering, a market leader in materials simulation software and engineering services and part of Hexagon, announces advanced new capabilities to derive more accurate design values for fibre reinforced composites, model structural crash of Sheet Moulding Compound (SMC) and understand the safety limits of lightweighting using the Camanho method.

Digimat 2019.1 provides mechanical engineers a new approach to determine allowables in safety-critical industries, complementing physical test campaigns to determine material variability and performance through simulation and establish greater confidence in "virtual coupon" tests.

Digimat now implements Prof. Camanho's Progressive Damage Analysis model, making it possible for users to comprehensively model how material choices affect the failure of Continuous Fibre Reinforced Plastic (CFRP) from coupon to manufactured panel and improve the accuracy of composite allowables. Complementary model developments in this software release enable materials professionals to better estimate the effect of defects such as porosity, out of plane waviness and delamination to compute more accurate margin factors and appropriate tolerances.

Philippe Hébert, Product Manager, e-Xstream engineering commented, "Allowables have long been rooted in the safe limits of metals, but as sustainability drives lightweighting we need more accurate simulation of composite failure in manufactured structures. Building on Professor Camanho's extensive research, we can now offer manufacturers powerful tools that complement their physical test campaigns to save cost and optimise material use earlier in the design process."

Material modelling of is also improved for high fibre content CFRP. Microstructure analyses now replace random fibre placement with realistic fibre positions based on the Melro statistical model to enable direct engineering of the material.

Meshing complex geometries to the required density and scale for finite element analysis is rarely feasible. A new Fast Fourier Transform (FFT) solver makes it possible to analyse advanced composite materials microstructures, and computes 10-100 times faster. By eliminating time-consuming meshing and accelerating compute, users can screen more materials and investigate the performance of a material across more dimensions.

Digimat 2019.1 also further advances manufacturing process simulation. Design engineers can now accurately predict fatigue lifetime to design more optimal parts using Short Fibre Reinforced Plastic (SFRP). A new model resulting from continued collaboration with DSM Engineering Plastics enhances fatigue modelling to account for local plasticity in SFRP under constant load amplitude.

An industry-first approach to modelling structural crash applications also now enables design engineers to better understand how common manufacturing issues affect the Sheet Moulding Compounds (SMCs), for example enabling lightweighting at point of design for automotive applications. Built-in modelling accounts for varying anisotropy, damage propagation and weld line weakness.

About Hexagon | e-Xstream engineering
Hexagon is a global leader in sensor, software and autonomous solutions. We are putting data to work to boost efficiency, productivity, and quality across industrial, manufacturing, infrastructure, safety, and mobility applications. Our technologies are shaping urban and production ecosystems to become increasingly connected and autonomous – ensuring a scalable, sustainable future.

e-Xstream engineering, part of Hexagon's Manufacturing Intelligence division, is 100% focused on materials. e-Xstream develops Digimat, the market leading multi-scale material modelling platform and MaterialCenter, the data lifecycle management software. Learn more at www.e-Xstream.com.

Hexagon's Manufacturing Intelligence division provides solutions that utilise data from design and engineering, production and metrology to make manufacturing smarter. For more information, visit hexagonmi.com.

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