

Digmat Quick & Easy Modeling

CUSTOMER → Ticona

- Solutions-driven company and producer of high performance plastics
- Close support of customers during their engineering design process

CUSTOMER → Inteva

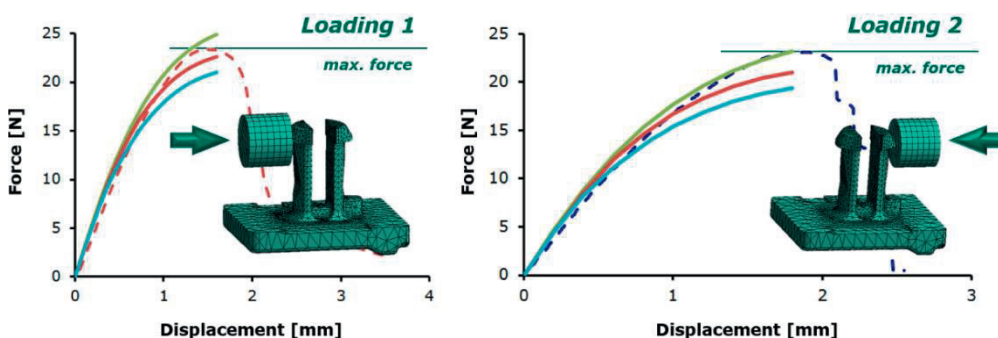
- Global supplier of engineered components and systems to the world's leading (non-)automotive markets
- Uses innovative materials technology, processes, and application of core product knowledge with the drive to excel and grow in global competition

CHALLENGES

- Use micromechanical modeling in an early stage of design based on readily available public material data
- Make coupled analyses accessible to non-material experts

PREDICTION OF THE STIFFNESS OF AN INJECTION MOLDED CLIP BASED ON ISO 527 DATA

QUALITATIVE / SEMI-QUANTITATIVE / QUANTITATIVE



DIGIMAT SOLUTION

- Micromechanical modeling of nonlinear stiffness
 - **Qualitative:** ready-to-run material models in Digimat-MX
 - **Semi-Quantitative:** non-expert reverse engineering of ISO 527 data
 - **Quantitative:** full anisotropic approach

RESULTS

- **Qualitative** modeling reaches **about 15% accuracy** w.r.t. max. force
 - No effort for material modeling (click-and-run)
- **Semi-quantitative** modeling reaches **about 5% accuracy** w.r.t. max. force
 - Minor effort to set up the material model (about 5-10 minutes)
- **Quantitative** modeling reaches **best match with experimental results**
 - Larger effort (can take up to weeks or months)

MATERIALS

Short Fiber Reinforced Plastics

PERFORMANCES

Nonlinear Stiffness

DIGIMAT

Digmat-MX, Digimat-CAE, Digimat-MAP

CAE TECHNOLOGY

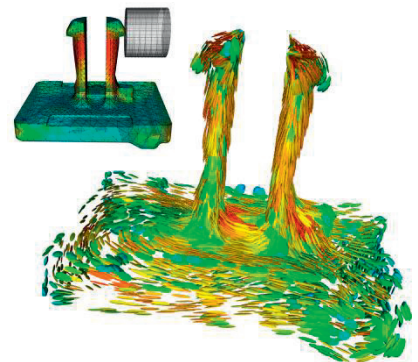
Ansys

INDUSTRY

Automotive

APPLICATION

Generic Material Models
Semi-Quantitative Modeling



Fiber orientation in the injection molded clip (mapped from Moldflow analysis).

"Ticona supports its customers in all stages of Digimat design. This includes measuring anisotropic data for quantitative modeling. In the early stages of design it also has a great value to be able to quickly run coupled analyses based on ISO 527. Such pre-measured data sets are readily available in CAMPUS for a broad range of Ticona products. The case study highlights nicely that even with such limited effort for material modeling great value can be created by using the strategy of coupled analyses."

Ulrich Mohr-Matuscheck, Leader
Design CAE, Ticona GmbH

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.

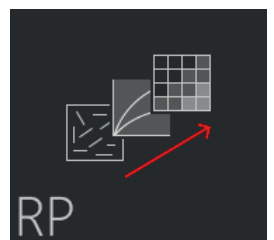
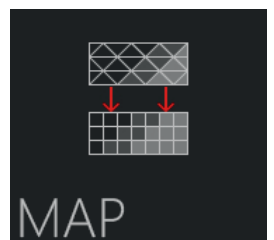
Digimat MX: Material eXchange platform used to prepare, store, retrieve and securely exchange Digimat material models between material suppliers and end-users.

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.



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.