Impact on a Beam

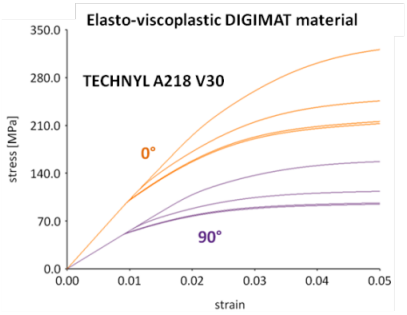
CUSTOMER: RHODIA Engineering Plastics

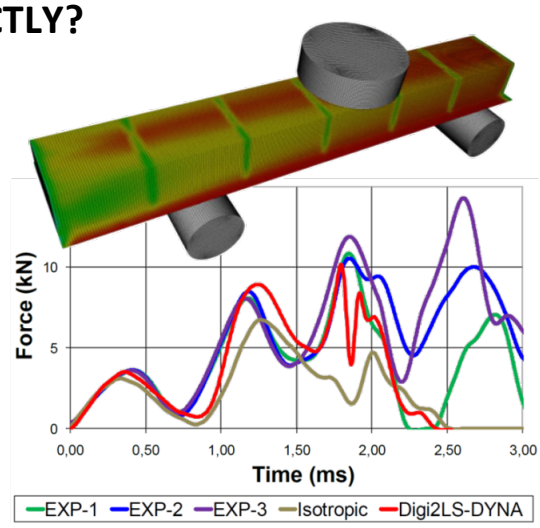
- One of the largest suppliers for polyamide engineering plastics (Technyl®)
- Provider of MMI ConfidentDesign™, advanced simulation service, powered by DIGIMAT
- Contributor to the Digimat-MX material suppliers' database

CHALLENGE

- To support their customers in the design of polyamide parts
- To take into account the influence of fiber orientation for reinforced polyamide material
- To provide the best material data possible to support simulation technologies

HOW TO MODEL THE CRITICAL INFLUENCE OF FIBER ORIENTATIONS CORRECTLY?





DIGIMAT SOLUTION

- Calibration of a strain rate dependent elasto-viscoplastic DIGIMAT material model sensitive to fiber orientation
- Coupling to fiber orientation from Moldflow injection molding analysis by using the Digimat-CAE/LS-DYNA interface

RESULTS

- The Digimat-CAE/LS-DYNA analysis correlates very well with the experimental results
- The peaks' maximum force as well as their occurrence in time is matched well
- It is crucial to take the fiber orientation into account when simulating fiber reinforced plastic parts

MATERIALS
Reinforced plastics

PERFORMANCES
Impact

DIGIMAT
Digimat-MF, Digimat-CAE, Digimat-MAP, Digimat-MX

CAE TECHNOLOGY
LS-DYNA, Moldflow

INDUSTRY
Material supplier

APPLICATION
Beam

"Being predictive in crash simulation is the dream of CAE engineers. The use of short fiber reinforced materials was putting this target out of range, because such materials have a variable anisotropy all over the part, associated to complex matrix behavior. No material model implemented in a code is able to capture this complexity level. Digimat to LS-DYNA does. Associated with the Rhodia material database MMI confident Design™, Digimat-CAE/LS-DYNA is providing the best predictivity level available on the market today. Rhodia is proud to offer this reliability to its customers."

O. Moulinjeune, Simulation Expert at Rhodia Engineering Plastics

Digimat

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**; the **M**ean-**F**ield homogenization software used to predict the nonlinear constitutive behavior of multi-phase material
- **Digimat-FE**; the **F**inite **E**lement modeling of realistic Representative Volume Elements (RVE) of material microstructures
- **Digimat-MX**; the **M**aterial e**X**change platform to reverse engineer, store, retrieve and securely exchange DIGIMAT material models between material experts and end users
- **Digimat-CAE**; the module that gathers interfaces to all major injection molding and structural FEA software codes
- **Digimat-MAP**; the shell and 3D mapping software to transfer fiber orientation, residual stresses, temperatures and weld lines from injection molding simulation onto a structural FEA
- **Micross**; a user-friendly tool for the design of honeycomb core composite sandwich panels based on FE analyses to compute bending and shear scenarios

e-Xstream engineering
MSC Software Company

The Material Modeling Company

e-Xstream engineering is a provider of simulation software & engineering services, 100% focused on advanced material modeling. Headquartered in Louvain-la-Neuve (Belgium) since 2003, today the company presence is worldwide through its branches in Luxembourg, Michigan (USA) and a large network of channel partners in Europe and Asia.

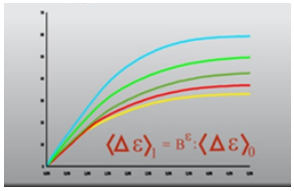
e-Xstream engineering develops and commercializes DIGIMAT – the nonlinear multi-scale material and structure modeling platform that fastens the development of optimal composite materials and parts.

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 & Electronic, Leisure, Defense ...).

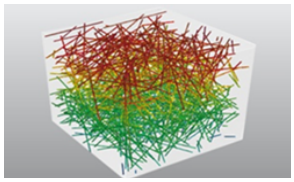
With this important customer base worldwide, e-Xstream combines deep expertise in material modeling and numerical simulations with the business understanding of the large variety of materials used across all industries.

www.e-Xstream.com

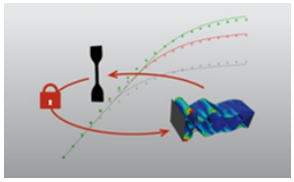
digimat-MF



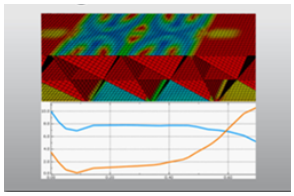
digimat-FE



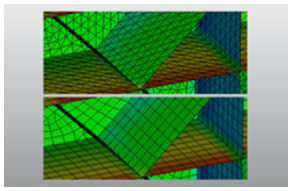
digimat-MX



digimat-CAE



digimat-MAP



micross