MMI ConfidentDesign™ – Digimat Quantitative Modelling

CUSTOMER → Solvay Engineering Plastics

- One of the largest material suppliers for polyamide engineering plastics
- Contributor to the Digimat-MX material suppliers' database

CUSTOMER → Faurecia

- One of the ten biggest automotive suppliers world-wide
- Goal to develop composite solutions that will lend themselves well to mass production

CHALLENGES

- Metal re-emplacement by TECHNYL® polyamide material
- Predictive simulation of failure of short glass fiber reinforced plastic parts

PREDICTION OF STIFFNESS AND FAILURE OF A MULTI-FUNCTIONAL SEAT PAN

Seat pan
Local fiber orientation

① Rib buckling
② Rib failure
③ Failure progression
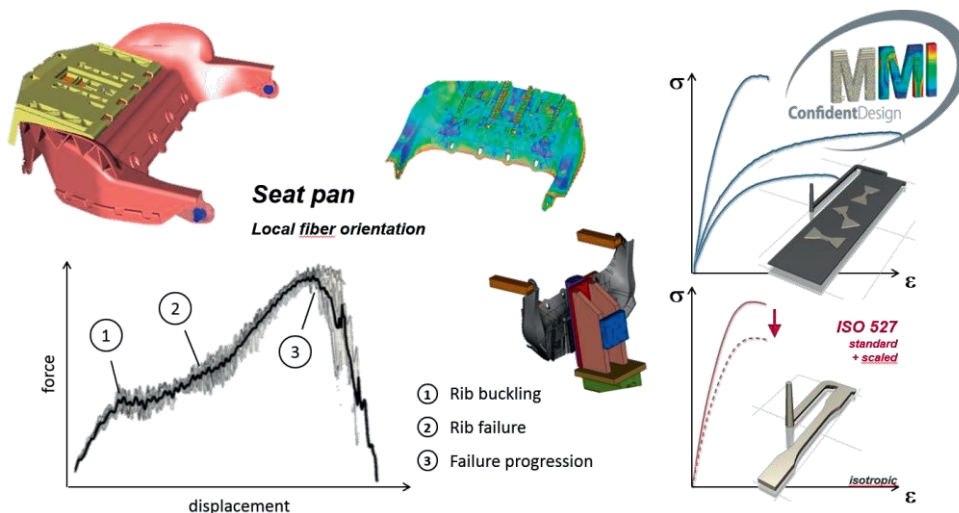
MMI ConfidentDesign™

- Tools, data and expertize for the optimal development of plastic parts
- Predictive Digimat solution and services package for modelling stiffness and failure of injection molded thermoplastic parts
- Result of a successful collaboration between Solvay and e-Xstream

RESULTS

- Three failure events: rib buckling, rib failure and first failure progression
  - Comparison of different modelling techniques

Performance	ISO 527	ISO 527 scaled	MMI / Digimat
STIFFNESS	not o.k. *too stiff*	(o.k.) *global*	o.k. *global + local*
FAILURE	too brittle	wrong timing	o.k.

MATERIALS
Short Fiber Reinforced Plastics

PERFORMANCES
Nonlinear Stiffness & Failure

DIGIMAT
Digimat-MX, Digimat-CAE, Digimat-MAP
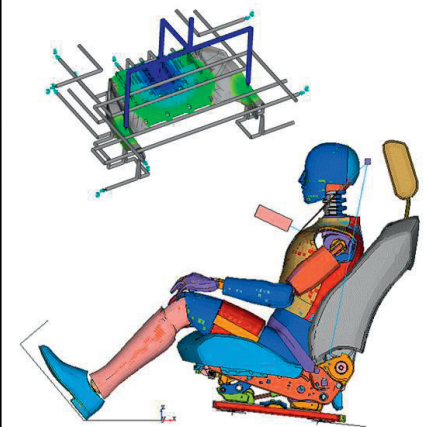
CAE TECHNOLOGY
LS-Dyna, Moldflow

INDUSTRY
Automotive

APPLICATION
Development of a multi-functional seat pan

Injection molded multi-functional seat pan in an explicit LS-Dyna analysis.

"Once more the added value of predictive modelling with an integrative simulation approach was demonstrated.
Thanks to Digimat local material behavior and failure criteria, MMI ConfidentDesign™ was the only method that allowed to capture the right chronology of all failure events in the here presented study."

Olivier Moulinjeune, Simulation Expert, Rhodia Engineering Plastics

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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

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