RADICI GROUP
HIGH PERFORMANCE POLYMERS

HEXAGON | eXstream ENGINEERING

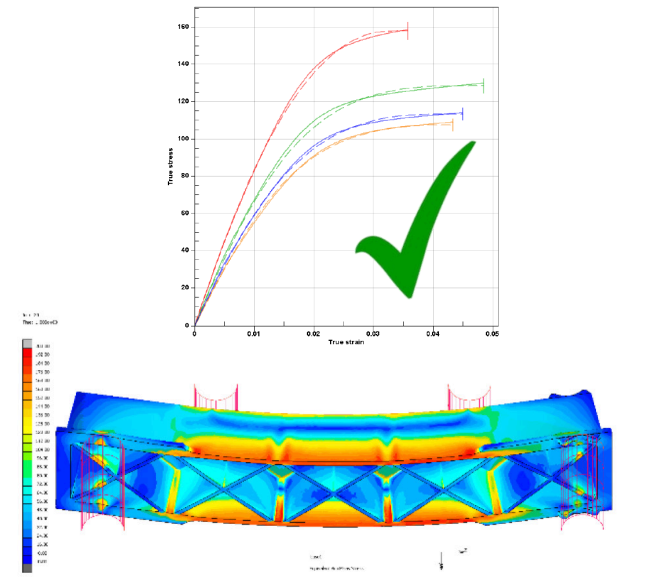
Case Study: Database management for static and enhanced CAE analysis

Digimat offers the Radici Group a technical boost in services

Summary

Radici Group is an Italian privately held company acting worldwide in the chemical, synthetic fibers and engineering plastics sector. In the High Performance Polymer Division, they produce materials for engineering applications. CAE support is often required during this process, where it is crucial to generate and store simulated material cards in an easy to use and reliable manner.

Digimat with its many tools not just offers a powerful solution for reverse engineering experimental data, but also makes that data easily accessible through its own database (Digimat-MX). Thanks to compatibility with all CAE simulation techniques commonly used in the industry, Digimat effectively gives Radici Group a way to handle all their activities within just one unified platform.



4 points testing and failure model

"Digimat offers a good way to perform exchange of information and improve the contact between different companies, customers and providers alike."

- Dr. Riccardo Galeazzi, CAE Service Engineer
Radici Group High Perfomance Polymers

Overview

Radici Group High Performance Polymers is an Italian material producer that offers to its customers full support during all phases of the design process including material testing, anisotropic material card generation and CAE support.

For a CAE Service company one of the key points is to have a platform where they can store all the material cards gained from reverse engineering and then share these cards with customers in a reliable manner. Having a platform that not only has its own CAE capabilities but is compatible with alternative simulation techniques, is also highly desired.

Solution

Digimat offers high accuracy material card simulation due to the anisotropic nature of the simulation model it uses. Mean field homogenization - unique to Digimat – further improves accuracy, taking fiber orientation into account. Of note, for source data, a reverse engineering approach is used (Digimat-MX). All generated data is then stored in a database, easily accessible by all Digimat users.

Once a material card is ready, it can be made either fully public, partially public (exact details and parameters are hidden) or made fully available on-demand by the provider. This flexibility allows the Radici Group to interact with their customers through Digimat in a very simple way, while their customers have the freedom to browse the available material cards in a reliable and traceable manner.

Digimat is compatible with all commonly used CAE simulation tools, meaning that even customers not using Digimat's own CAE tool (Digimat-CAE) can benefit from the generated material cards.

Validation

First level validation done by the Radici Group relies on tensile and three point bending tests performed following respectively ISO527 and ISO178 standards. This first procedure is followed by a second level validation using four point bending (Figure 1). Results show that the material cards generated by Digimat from the reverse engineering data accurately overlap with the experimental data, thus validating the cards used for the simulation. Comparatively, while the discrepancy between the Digimat-simulated data and the experiment is only 2-3%, with the pseudo-isotropic model used before it is ten times (30%) more (Figure 1).

Key Highlights:

Digimat:
Digimat-MF, Digimat-MX, Digimat-CAE

Industry:
High Performance Polymers - Material supplier

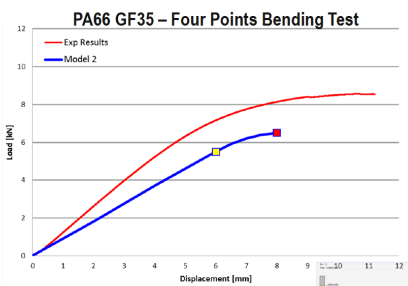
Application:
Anisotropic material card generation

Performances:
Material cards stored in Digimat-MX

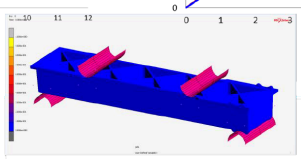
Conclusion

Experimental results at the Radici Group have proved that the material cards are significantly more accurate than relying on a simple pseudo-isotropic model. These validated material cards are stored within the secure Digimat-MX database and can be shared easily, offering the Radici Group a technical boost in the reliability of their offers and services.

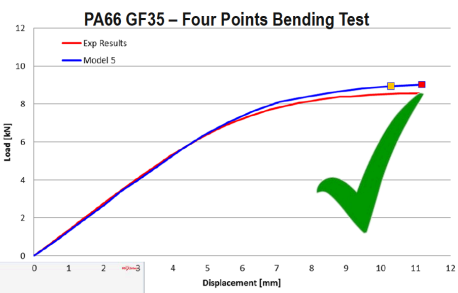
Pseudo-Isotropic elastoplastic material model.



Difference equal to **33%** between Experimental and FEM deflection.



Digimat-MX Anisotropic Elastoplastic with failure material model.



Difference equal to **2.6%** between Experimental and FEM deflection.

Figure 1: Material model comparison

For more information on Digimat and for additional Case Studies, please visit www.e-Xstream.com

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