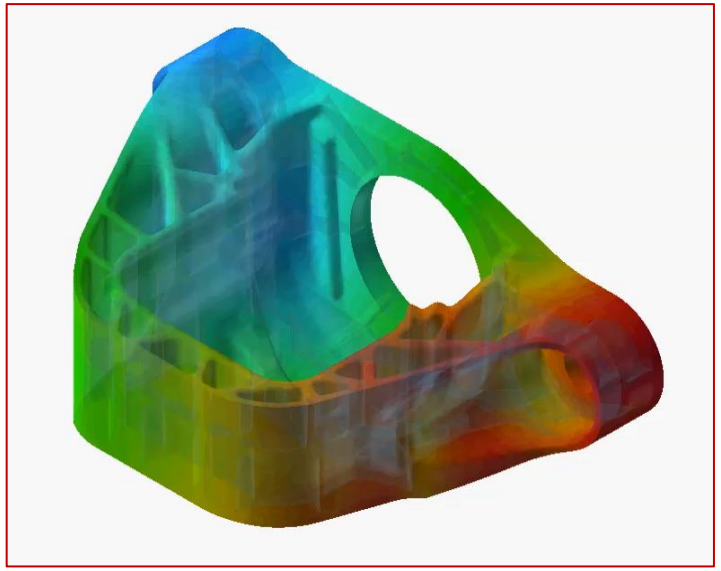
Challenge

- To design a robust Short Fiber Reinforced Plastic part you need to have access to fiber orientation related to injection process simulation, specially when the mechanical performances targeted of your part are high.

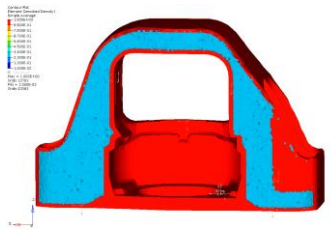
- Access to fiber orientation usually requires help from other departments and take time to get injection simulation done.



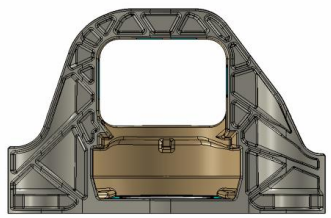
Strength prediction of a SFRP early design part

Sokaris Solution using Digimat

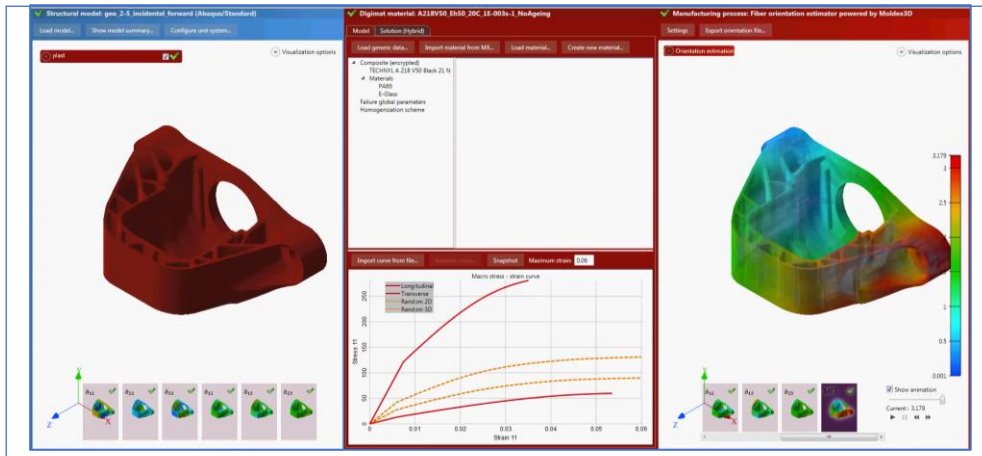
CAO → OPTIMISATION → CAO → PROCESS SIMULTATION → PROCESS SIMULATION + DIGIMAT + FE ANALYSIS



OPTIMISATION



DESIGN



1) UPLOAD MODEL

2) SELECT MATERIAL

3) ESTIMATE FIBERS ORIENTATION

Submit

4) RUN FE COUPLED ANANYSIS

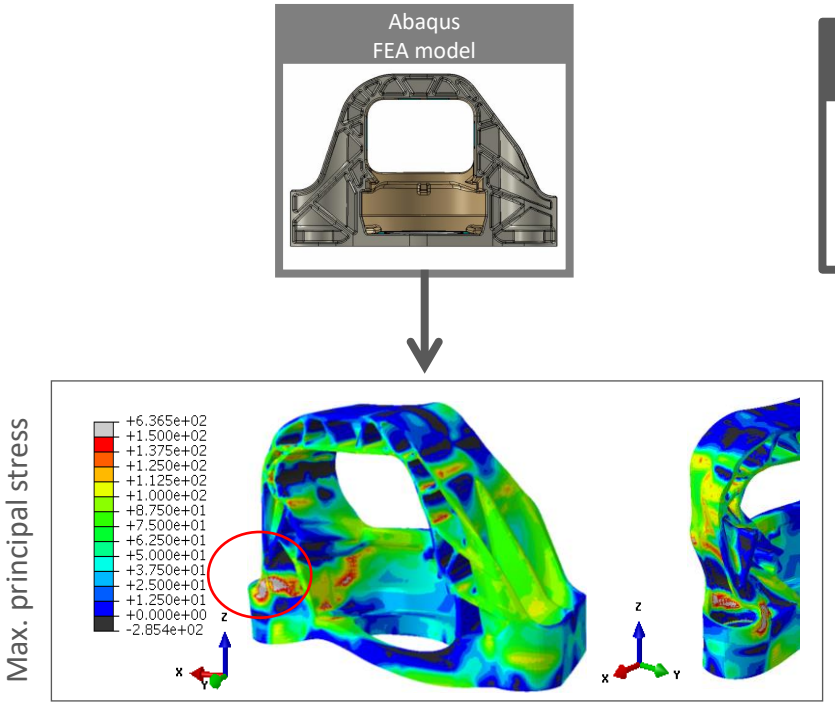
DIGIMAT RP

- Digimat RP solution:
  - **Performance analysis** of reinforced plastics available in **4 clicks**
  - Provide structural engineers an **easy and efficient solution** to access fiber orientation
  - Boost the efficiency of early design → **1h30** from fiber estimation to failure indicator (Abaqus coupling)

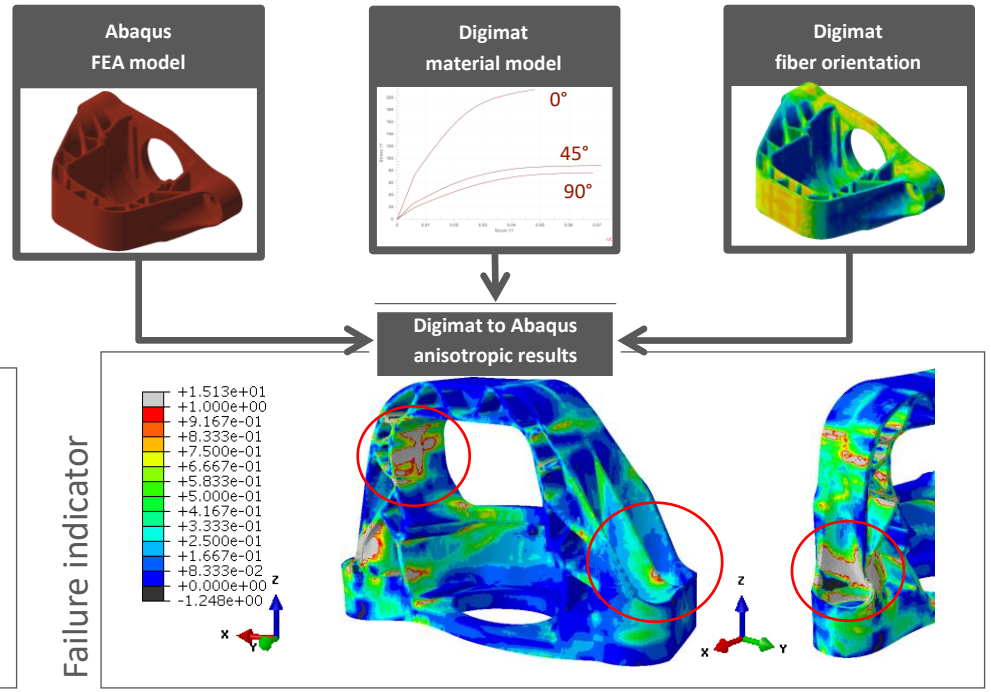
→ Make several design & process iteration in a day!

Results / benefits

Isotropic approach without DIGIMAT



Anisotropic approach with DIGIMAT



- Using Digimat RP with fiber orientation estimator module ensure:

  Shorten development cycle by integrating anisotropic data and rheological simulations at the early phase of the project.

  Account for the **effects of injection molding** and tune weldline positions

  Easy and accurate anisotropic simulation solution **to deployed and used by any engineers;**

- Local fiber orientation highly influences part performance and failure: Digimat to Abaqus solution shows a different stress, strain level and different failure evolution due to the material anisotropy.
- The anisotropic analysis taking into account injection molding able to anticipate weakness areas and provide some optimization perspective.