



DESIGN & OPTIMISATION

# COMPUTER-SUPPORTED DESIGN OF MECHATRONICS PRODUCTS

Due to the increased complexity of mechatronic products (more components, functions, technologies, etc.), using models for designing these products has become inevitable. Without supporting tools, designing and analysing product concepts would be difficult and very time-consuming. Flanders Make offers computer-supported design tools that generate various design concepts and adapt and optimise them to meet your specific requirements.

Using our comprehensive expertise in computational design synthesis, we define and set up parameterised dynamic performance models. A key point here is to select the correct model structure in such a way that the necessary design features can be included. In addition, we speed up the conceptual design phase by generating and evaluating design candidates. Through targeted model approaches, we enable the analysis of energy consumption, component loads and NVH performance.

A model-driven design approach benefits both system-level integrators as well as companies designing components. It helps to solve large-scale optimisation problems that arise when designing mechatronic products. The dynamic performance assessment is front-loaded to the pre-prototype stage and companies gain insight in their design 'hotspots'.



**We use various unique software tools in this process:**

- In-house modelling and simulation tools
- In-house optimisation toolboxes



## SUCCESS STORY

**In the VLAIO Baekeland project in collaboration with Picanol, we assisted in improving the design of high-speed weaving looms and succeeded in reaching higher operational velocities with a reduced risk of failure.**

### PROBLEM

Some structural components were not optimal in terms of their operating conditions within the overall system, therefore limiting the overall performance.

### SOLUTION

Through a combination of flexible multi-body simulation and topology optimisation, we were able to improve the design. Using our in-house toolboxes, we were able to set up a state-of-the-art framework enabling structural topology optimisation of a component with an accurate description of its operational loads.

### CUSTOMER VALUE

The toolchain that we developed provides Picanol with a unique approach to improve the design of their components in a market where a few grams here and there make all the difference in building the best performing machines in the industry.