



DESIGN & OPTIMISATION

LIFECYCLE DESIGN

Flanders Make offers a reduction of design uncertainties by translating data from the manufacturing, validation or operational phase into useful design information. With our unique approach, we capture these hard-to-measure data through data-driven digital twins enriched with physics-inspired models.



To improve future designs of your machines and components, we take the different phases of the product life cycle into account. Knowledge and information of manufacturing rules and consequences, assembly processes and the impact on product performance are objectified and used in the product design.

This allows us to:

- optimise the product design by considering different lifecycle aspects such as manufacturability and assembly;
- optimise production process parameters in terms of performance requirements;
- consider information that is captured in design rules when optimising a design. These insights can come from human experience, simulations or digital twins.

We use various unique software and hardware tools in this process:

- In-house developed research codes in Matlab to model (non-linear) finite elements, (flexible) multi-body systems and gear dynamics.
- In-house developed method for process performance optimisation and design for assembly.



SUCCESS STORY

In a recent collaboration with CNHi, we assisted in the development of an improved design process to ensure an accurate assessment of the durability of mechanical components in high-cycle mechanisms.

PROBLEM

In pre-prototype phases, obtaining realistic load conditions for assessing the durability of mechanical components is quite difficult.

SOLUTION

Using a full-system flexible multi-body model as well as advanced technology for efficient deformation and stress extraction, representative component loads for new designs can be obtained efficiently. Starting from concept developments using our in-house toolboxes, we assisted in setting up a process that uses commercial software that can be integrated in the day-to-day engineering practice.

CUSTOMER VALUE

The approaches and toolchains we developed enable CNHi to effectively assess component durability in a pre-prototyping stage and to optimise the design of novel components for improved durability. By using a model-based framework, late design-stage iterations can be avoided and development cost and time can be reduced.