fleX structures

The Company

fleXstructures GmbH is specialized in development and distribution of innovative high-end technology developed in cooperation with Fraunhofer research and has exclusive worldwide distribution rights of the IPS software portfolio.

The company collaborates in common research projects in the field of numerical simulation (simulation of flexible components such as cables and hoses, spray painting simulation, etc.) with Fraunhofer Institute for Industrial Mathematics ITWM in Kaiserslautern, Germany, Fraunhofer-Chalmers Centre in Gothenburg, Sweden, and industrial partners.

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IPS Cable Simulation has unique selling propositions in the field of automotive and industrial process optimization and quality assurance with respect to cables, wiring harnesses and hoses.

The software has been successfully evaluated and benchmarked by various OEM. It is integrated into the product process of various automotive companies as standard tool for digital mock-up with flexible components.

Moreover, IPS Cable Simulation is integrated into the product process as fast interdisciplinary decision platform. Thus, validated results may be achieved 6 to 8 months earlier.

Due to the close cooperation with industrial partners, in particular in the automotive domain, industrial requirements and demands are constantly captured and implemented into the software development process.
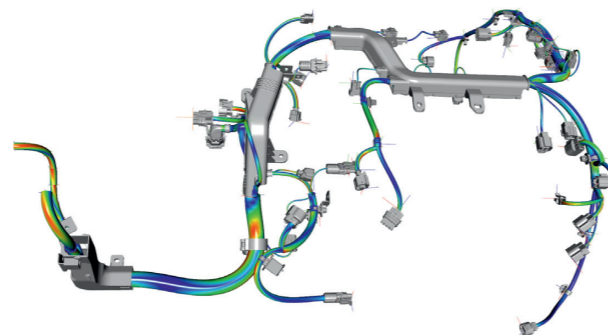
Engineering Projects

Identifying causes for damaged cables and hoses is difficult due to complicated load and strain behavior of the material. Not knowing exact causes of the stress makes efficient troubleshooting almost impossible.
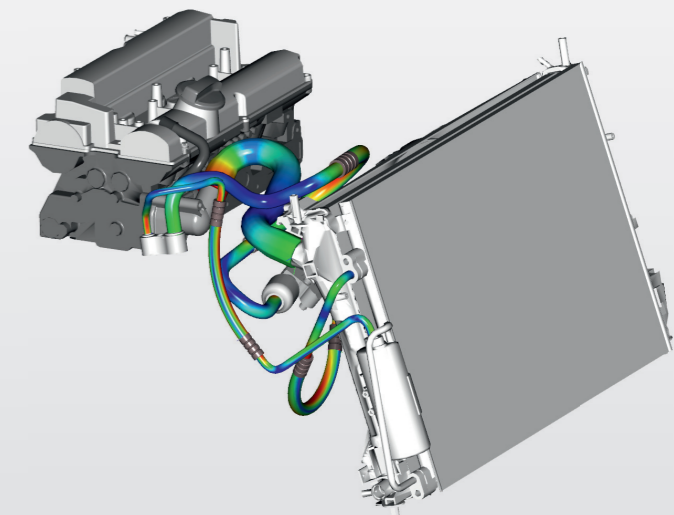
With the capabilities of IPS Cable Simulation and the know-how of our staff, we offer engineering services, diagnostics, troubleshooting and damage analyses for achieving functional reliability and product quality.

Training

In regular intervals or upon demand, we offer training courses for IPS Cable Simulation. These flying-start trainings enable users to work with the software immediately with efficient results.

IPS Cable Simulation

Design Optimization, Virtual Assembly and Digital Mock-up of Cables, Wiring Harnesses and Hoses

IPS CABLE SIMULATION

In cooperation with

Fraunhofer ITWM

**Fraunhofer CHALMERS Research Centre Industrial Mathematics**

Design Optimization

In design processes of vehicles, machinery, etc. finding the optimum shapes, lengths and routings of cables, hoses and harnesses is a crucial issue.

IPS Cable Simulation provides a variety of unique features to design and optimize flexible components using real-time simulation.
/ Automatic cable routing
/ Consideration of realistic material properties and gravity
/ Tolerance, collision and optimization of motions
/ Interactive optimization of cable routing and cable length, based on bending radius and other criteria
/ Calculation of large deformations between moving parts
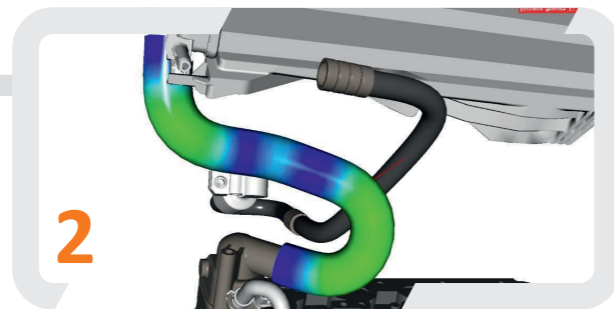/ Design of preformed flexible parts
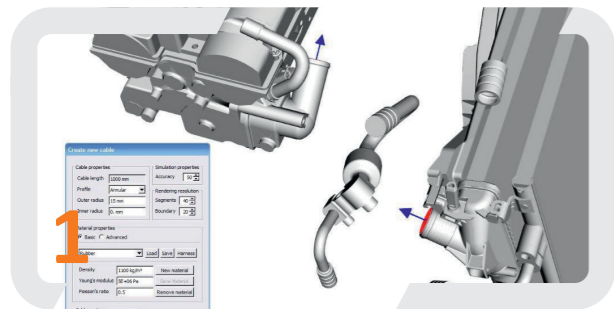
Virtual Assembly

A great challenge in assembly design and processes is to find out whether parts can be mounted or what needs to be done to make it work – without causing inacceptable stresses or even damages.

Instead of running complex, expensive and time-consuming prototype tests, such tasks may be handled interactively with IPS Cable Simulation.
/ Virtual assembly processes and sequences of cables, wiring harnesses and hoses
/ Clips and connections (including clip database)
/ Motion analysis of flexible components in constructed space
/ Adjustment and interactive optimization of flexible parts and clips for assembly-oriented design
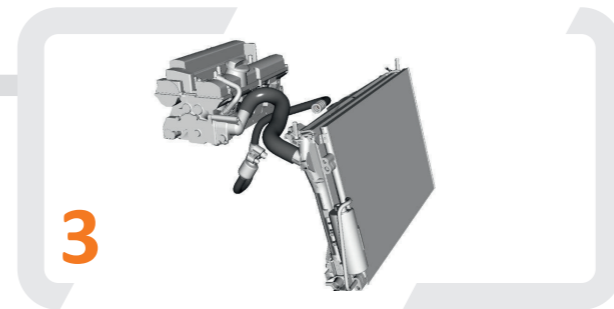/ Tests of incorrect fittings

Digital Validation

IPS Cable Simulation uses physically correct mechanics with new algorithms developed and adapted by Fraunhofer Institute for Industrial Mathematics.

As a consequence, the computing time is considerably reduced while the same accuracy is given. Digital mock-up with IPS Cable Simulation means:
/ Physically correct real-time simulation including various analysis features (normal stress, shear stress, bending radius, etc.)
/ Stress-based design validation
/ Application of realistic material parameters (tensile, bending and torsional stiffness)
/ Contact handling (cable to cable, cable to geometry, self-contact)
/ Analyses, measurements, postprocessing and reports

Process Optimization

Faults at early process stages lead to cost explosions at later stages in the product process.

Integrating IPS Cable Simulation into product design and development processes is profitable for various involved instances and a perfect instrument to be used in interdisciplinary coordination workshops.
/ Interactive troubleshooting and validated results regarding flexibles and related parts early in a product process
/ Considerable cost and time savings due to less prototyping and iterations
/ Quality improvement and quality assurance
/ Interdisciplinary cooperation between departments using a common fast decision platform avoids errors and assures product quality

Autorouting

1

Create cable manually, use the automatic routing or make CAD-geometry flexible easily.

Visualization and Measurements

2

Visualize various analyses like stresses, bending radius, etc. while monitoring critical distances and other measurements.

Variations in Real-Time

3

Find clip types and positions as well as correct length and shape.

Motion Analysis

4

Analyze motions with respect to critical measurements or generate envelopes.