WHY WORK WITH US?

The Fraunhofer IWM uses the latest materials science and technology findings to increase material and component performance levels and create innovative functionalities and to improve manufacturing processes.

The institute uses its understanding of material behavior to assess materials and components under a wide range of environmental conditions and loads: this leads to increased durability, reliability and availability of components, systems and entire plants.

The well-established link between experimentation and simulation at the Fraunhofer IWM provides an excellent basis for solving materials technology issues, particularly where resource or energy savings during manufacture and in use are concerned.

For the virtual development and assessment of materials and components, the institute works with advanced multiscale simulations on the nano, micro and macro level or develops the appropriate models.

The development of and changes to material properties along a chain of different manufacturing stages can be predicted for entire manufacturing processes.

FRAUNHOFER INSTITUTE FOR MECHANICS OF MATERIALS IWM

As research partner for industry and public bodies, Fraunhofer IWM develops solutions that can improve energy and resource efficiency during manufacture and use of materials and components and can reduce losses involved in the production, conversion and storage of energy. The solutions lead to greater component durability, longer service life and improved reliability as well as more cost-efficient processes.

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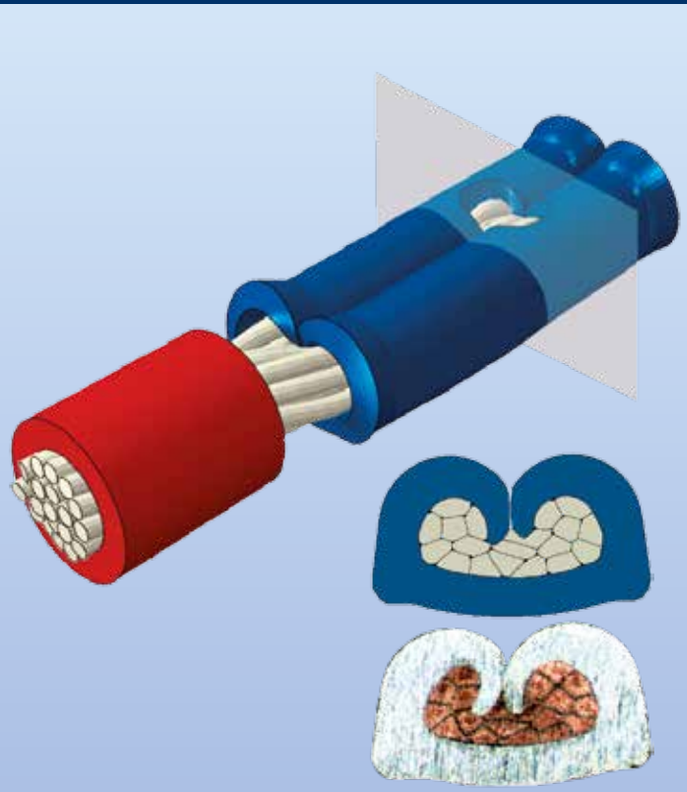
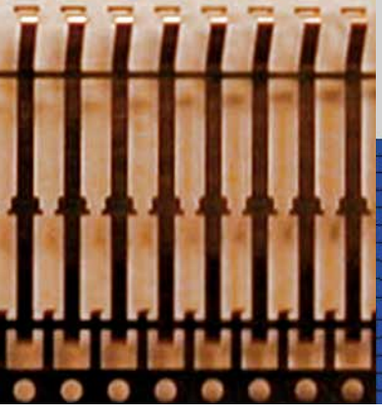
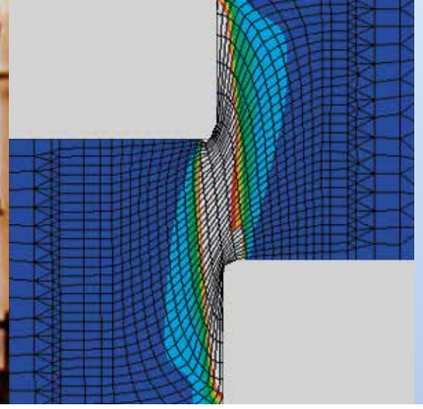
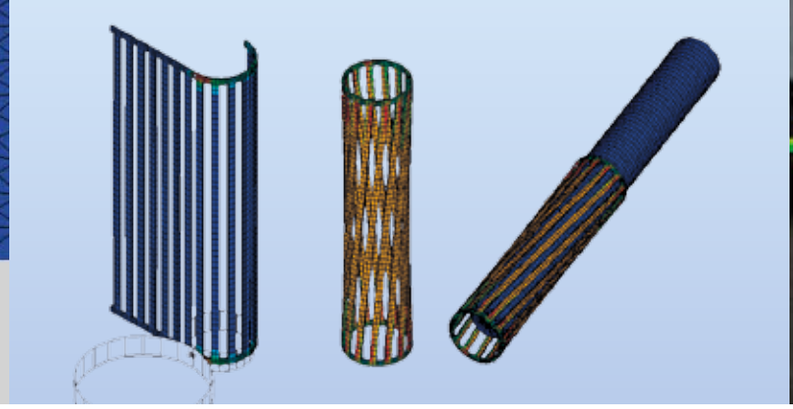
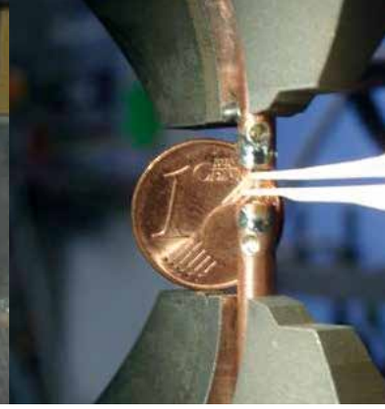
BEST DESIGN OF ELECTRIC CONTACTS





Reliable connector elements

Increasing reliability requirements make development and optimization of electric connectors and contacting techniques more and more complicated and expensive. In addition, the development of new applications brings new challenges concerning operating temperatures, current-carrying capacity and mechanical durability.

The increasing number of electric drive systems in road vehicles not only increases the total number of connectors in every car but also requires new types of connectors. To ensure quality and reliability of those connecting elements in mass production it is of utmost importance if malfunction and breakdowns in daily use must be avoided.

Our services

On the basis of material-related modeling concepts and advanced simulation methods we analyze, evaluate and optimize forming and shaping processes for connector elements including forming tools and according process steps. We look for weak spots in the forming process and evaluate their physical reasons. Thus, they can be eliminated already in the design phase or their effects can be minimized.

Considering the correlations of the microstructure of materials with their engineering properties we are able to simulate modifications of the material behavior during fabrication and, thus, improve the forming processes.

In addition to various bilateral projects with partners from industry, we continously enhance our competencies by initiating of and participating in public research projects.

Simulation of production processes for the optimization of components

- Design of cutting and forming processes
  - Crimping: mechanical and electric functionality
  - Compensation of spring-back
- Simulation of production chains

Simulation of in-service behavior

- Development and application of advanced material models describing:
  - Influence of temperature: Relaxation
  - Vibrations: Durability
  - Electric properties

Material characterization for the simulation

- Determination of material properties from micro-structural analyses up to components testing in dependence of temperature
  - Elastic-plastic deformation behavior including the Bauschinger effect
  - Thermomechanical and thermophysical properties
- Experimental examination of the relaxation behavior
- Experimental examination of the spring-back behavior