The vendor-neutral Mapping Tool

Mapper provides advanced and robust methods to map, compare and transfer simulation results and experimental data in integrated simulation workflows. Mapper supports a growing number of native file formats and can be used in a variety of engineering applications. Mapper is a standard tool in the engineering departments of most German automotive OEMs and has been validated in the VDA/FAT working group »Formed Chassis Parts« for Forming to Crash workflows.

**Basic Features**

- Automatic mesh alignment
- Robust and efficient mapping algorithms
- Shell-to-shell
- Between solid and shell
- Solid-to-solid
- Validation of mapping quality
Validation of Material Model Parameters – compare Forming Results and Experimental Data

Stringent requirements in feasibility, stability and crash performance require exact models to reflect the specific material behavior. A validation process is supported by comparison of different simulations or experimental results. Mapper has been used to analyse the deviation of results either in a section or for the complete geometry.

Plastic Components

Structural Integrity of Blow Moulded Plastic Components
Within a research project, Mapper was used to transfer local material properties and orientations from the BSim simulation as initial conditions for a subsequent structural analysis. This simulation workflow is essential for a range of standard products: from plastic bottles to complex automotive components like fuel tanks.

Related Automotive Applications

CFRP workflows – Draping to Molding to Structural Analysis
Integration of a virtual engineering workflow for the development of high-performance composite structures like CFRPs is still an open issue. In a research project, KIT Karlsruhe used a customized version of Mapper to link the process steps draping, molding and structural analysis of a prototype trunk lid geometry.

Forming Tools and Material Properties

Lightweight Stamping Tools – use Forming Loads in Structural Optimization
The combination of increased diversity of automotive parts and the pressure for decreased tool development times results in the need for optimization of the structural layout of stamping tools. A number of German OEMs used Mapper to transfer maximal pressure loads from stamping process into a topology optimization. Considering these local maximal loads, improved designs with less total mass but same stability are gained.

Analysis of Experimental Crash Tests
For the validation of crash models a comparison of experimental test results is an essential step. To determine total intrusion of crashed components SCAI developed the GeometryMorpher software comparing measured geometries in undeformed and deformed shape. Through a morphing process the initial geometry gets projected onto deformed shape. Obtained nodal displacements can then be analyzed in common FEM post-processors.