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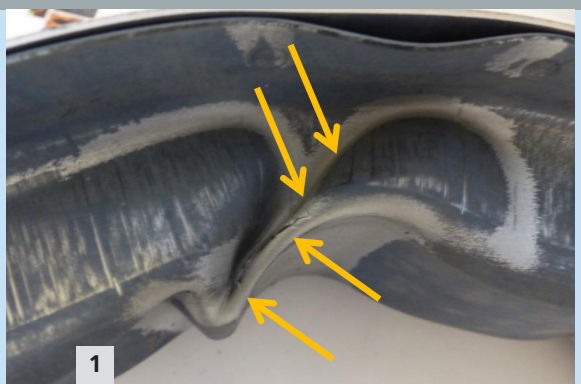

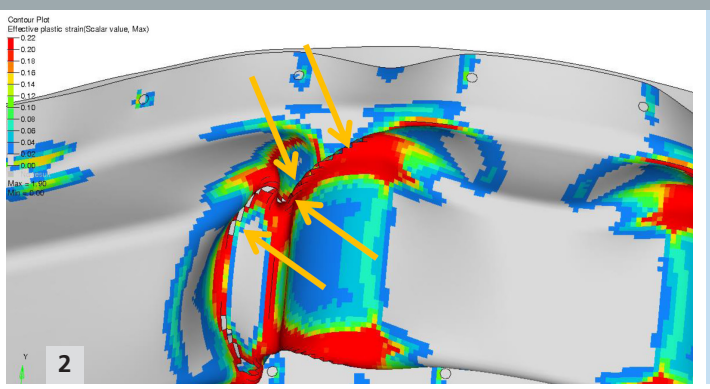

1 *Deformation of a press hardened steel hat-profile after bending test.*
2 *Virtual bending test result of hat-profile using manufacturing history.*

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MpCCI
Mapper

MAPPER

Independent Mapping Tool for integrated Simulation Workflows

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

Simulation Disciplines and Codes	
Forming	LS-Dyna
	PAMStamp
	AutoForm
	RADIOSS
	Indeed
	Forge
Crash	LS-Dyna
	PAMCrash
	RADIOSS
	Abaqus
	ANSYS Mech.
	MSC.Nastran
Welding	Abaqus
	ANSYS Mech.
	Sysweld
Measurement	Argus / Aramis
	Atos
	Autogrid
	STL

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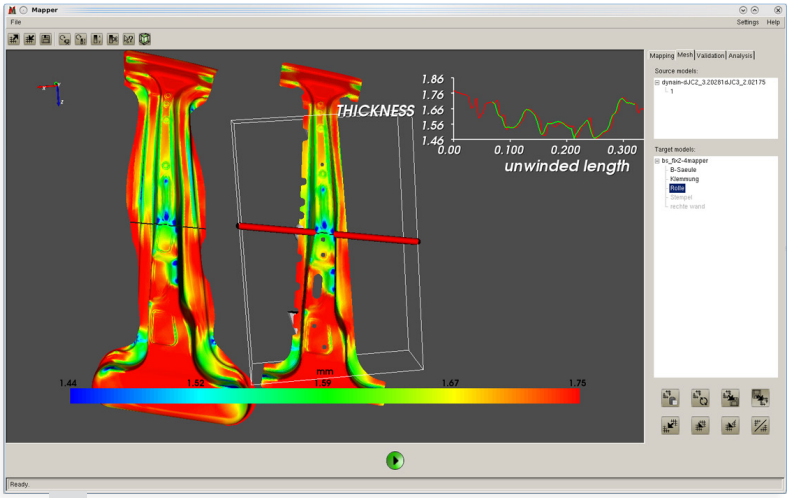

2

1 *Seating system R&D at Faurecia*

2 *Interactive Handling and Visualization*

Supported Quantities	
Mechanical	Thickness
	Stress
	Strain
	Plastic strain
	Pressure
	Local material properties
Thermal	Temperature

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.

Passive Safety

Seating Systems – Massive Forming to Crash

For accurate prediction of structural behavior the manufacturing history must be taken into account. Local thickness reduction, stresses, plastic strain or material properties from single manufacturing steps may have a critical influence on the product behavior of automotive seating systems.

Virtual Painting Workflows – Stamping to Painting to Crash

In the project »VIPROF« Mapper enabled the transfer of mechanical parameters along the process chain of stamping, welding, painting in order to analyze the final product properties in crash simulation. Here Mapper acted as a key technology to realize complex integrated manufacturing workflows.

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.

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.

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.