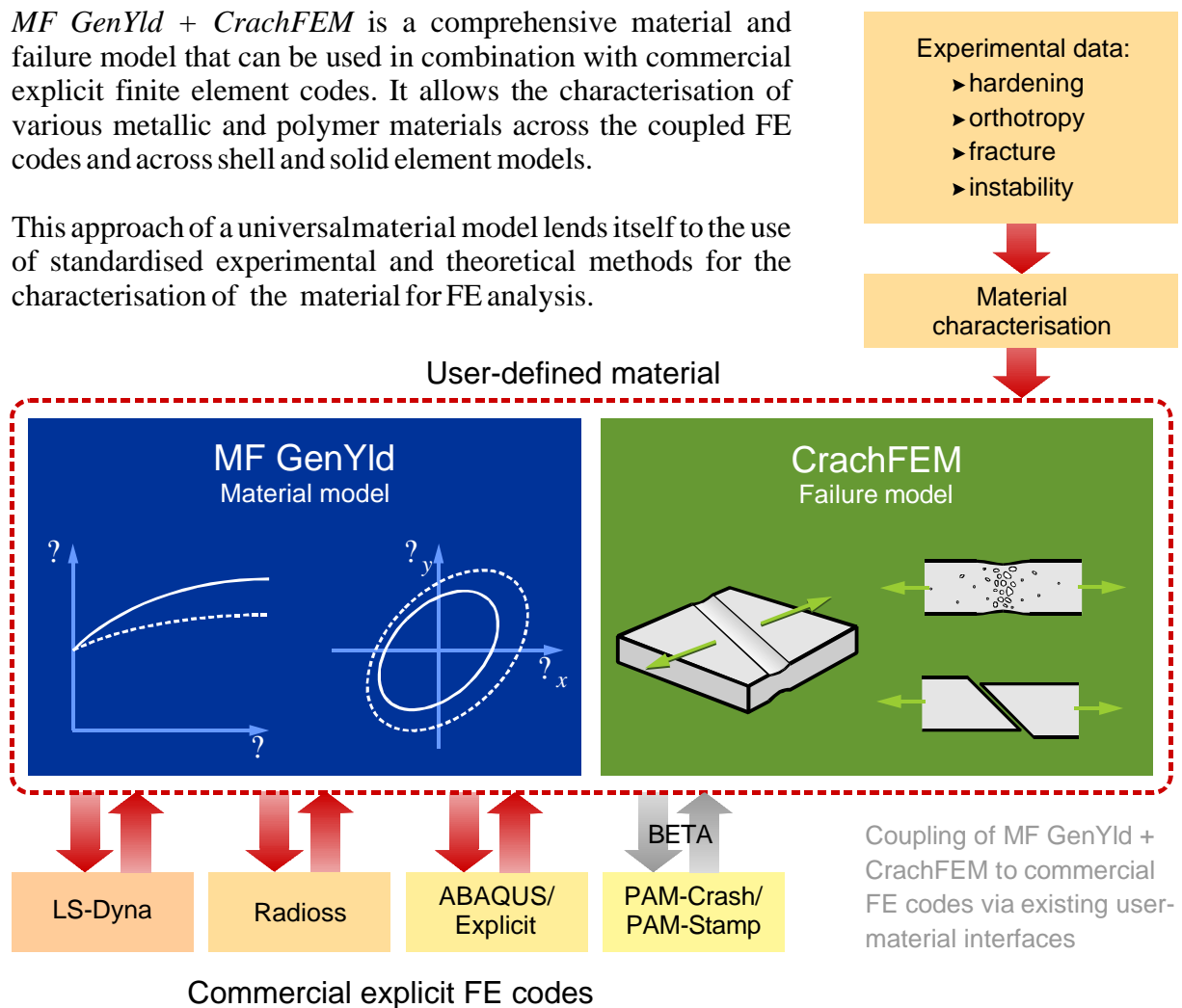


MF GenYld + CrachFEM

Version 3.8

MF GenYld + CrachFEM is a comprehensive material and failure model that can be used in combination with commercial explicit finite element codes. It allows the characterisation of various metallic and polymer materials across the coupled FE codes and across shell and solid element models.

This approach of a universal material model lends itself to the use of standardised experimental and theoretical methods for the characterisation of the material for FE analysis.



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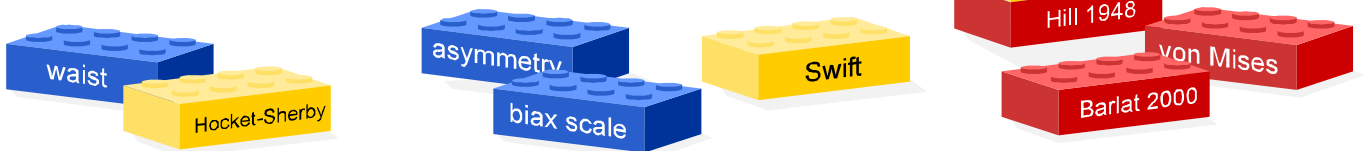


Predictive

MFGenYld + CrachFEM aims to predict the material behaviour under arbitrary load cases. Therefore, a comprehensive suite of well-defined elemental tests should be carried out to feed the material model. This technique is opposed to iteratively adjusting data in calibration cycles of a component simulation.

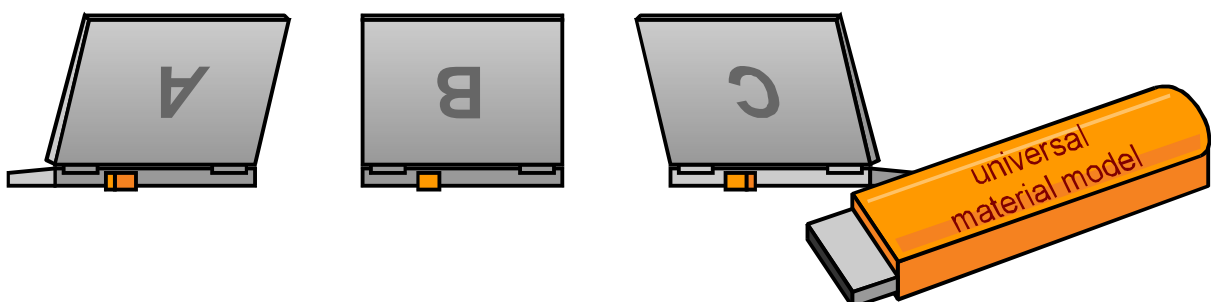
Modular

The principal building block of the material and fracture model *MFGenYld + CrachFEM* is the module. Each module describes one physical property. Modules are independent of each other and may be combined freely depending on the characteristics of the material.



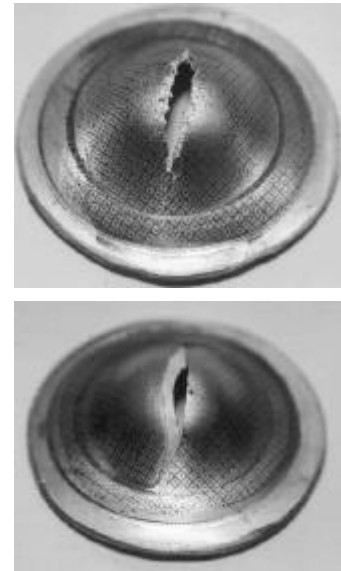
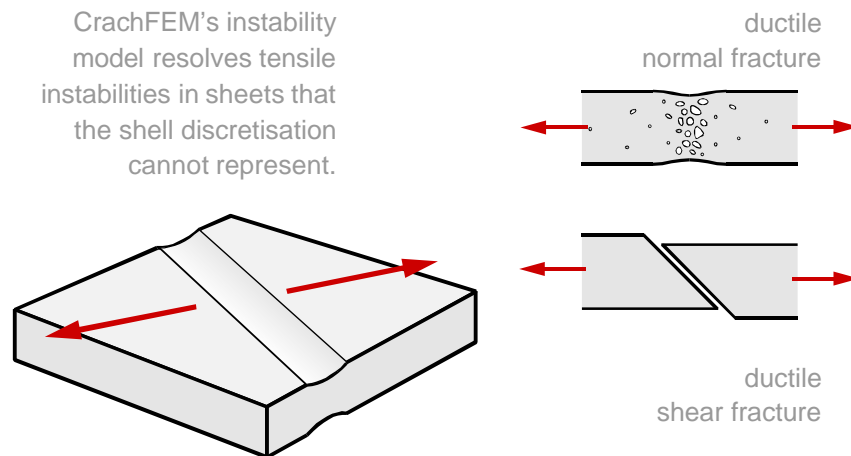
Universal

MFGenYld + CrachFEM may be coupled to various explicit finite-element solvers. Material data is input in the solvers' native format. It can easily be converted, though, and data for one material can be used nearly interchangeably between different solvers: The attached model is the same in all solvers.



Comprehensive failure model

The module *CrachFEM* describes material failure. Ductile normal fracture and shear fracture may be described for two- and three-dimensional elements. In addition, local tensile instability may be described for shell elements. This failure mechanism represents the local necking of sheets which cannot be represented with the regular shell discretisation.



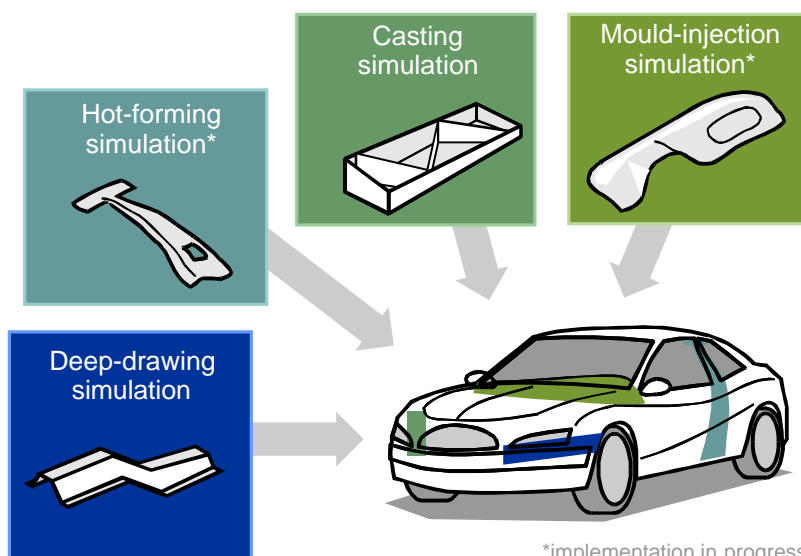
CrachFEM's strength is that it predicts failure risks for arbitrary, non-linear strain paths as they occur in realistic parts.

Failure can be used as post-processing value to highlight critical zones. Alternatively, elements may be eliminated transiently in the course of the simulation according to their failure risk.

CrachFEM can account for two modes of ductile fracture: normal fracture and shear fracture

Process chains

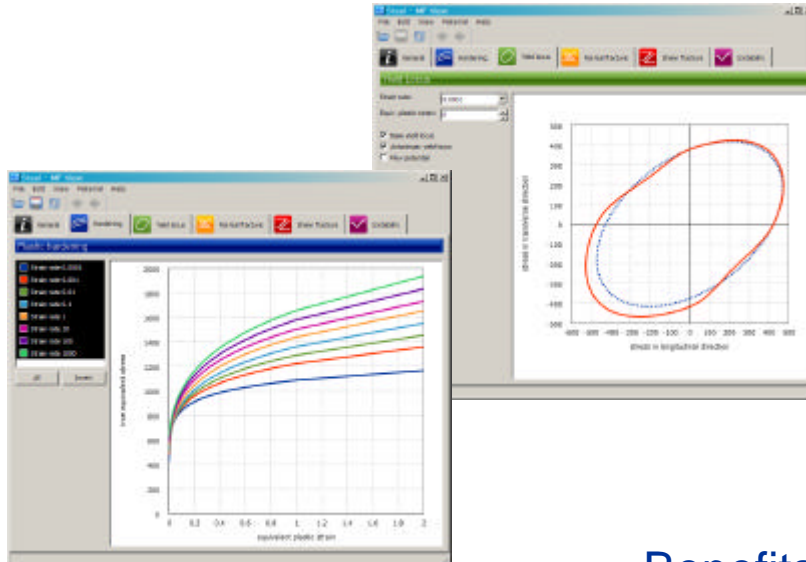
CrachFEM can model the material throughout process chains by mapping results from one stage to the next.



A special initialisation allows to import data from different types of process simulations. (This does not work with all FE solvers at the moment.)

Visualise the model

Together with *MF GenYld* + *CrachFEM*, the material browser *MF View* is distributed. It allows you to quickly scan the input data, find formatting errors and change numbering, unit system or solver format.



Visualisation of strain-rate dependent hardening and yield locus with MF View

All material properties defined on a MF GenYld material card can be displayed in MF View for easy reference

Benefits

MF GenYld + *CrachFEM* offers comprehensive modelling of plasticity and failure for many material classes (metals, polymers, short-fibre-reinforced materials)

The material and failure models are under steady development; new features are being integrated according to our experience with industry and research projects.

Calibrate your material data only once for all solvers and for both shell and solid elements: *MF GenYld* + *CrachFEM* is available for various FE codes. *MF View* facilitates the handling of input for different solvers.

Use the same material data throughout the life-cycle chain of forming and crash.

Customers

The material model *MF GenYld* + *CrachFEM* is in wide use in the industry. Customers include:

Airbus Operations	Alcan Technology & Management AG
BMW AG	Hyundai Mobis
Mercedes-Benz AG	ThyssenKrupp Steel Europe AG

MATFEM are consultant engineers in the fields of materials science and finite element simulation. We are specialised in providing an interface between testing and simulation.

Contact us:

Web: www.matfem.com

Phone: +49 89 15 98 97 95

Fax: +49 89 15 98 97 99