Material Under Control: Validation of Material Models using the MUC-Test

Motivation

- To be able to evaluate a material model regarding requirements in terms of accuracy and precision, model execution time, robustness, flexibility or gain of knowledge, a validation is essential.
- No consistent, effective and efficient material model validation method established to date.

Approach

- Systematic, continuous comparison between strain fields and punch forces over the entire forming process between experiments and a digital twin (FEM).
- Scalar assessment of the difference as a measure of the quality of the material model.

Results

- Simple and efficient tests
- Variations in material behavior detectable
- Process-like loads representable
- Benchmark of various materials
- Comprehensive validation of material models.