

FEM ANALYSIS OF ELASTOMER DAMPING ELEMENTS IN HILTI TE-TOOLS WITH A USER-DEFINE MATERIAL

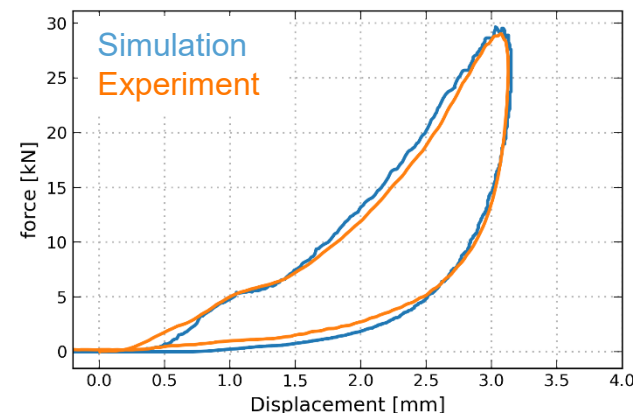


Problem Description

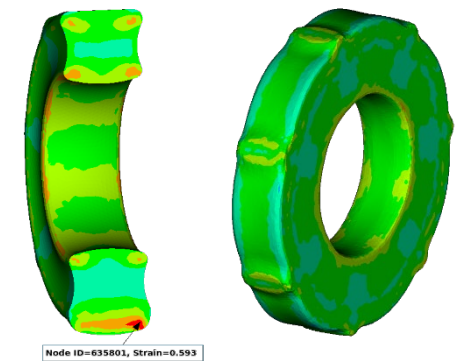
- In hammering tools heavy loaded elastomer damping elements are used to reduce impact loads. The achieved strain levels as well as the occurring strain rates are unusually high
- In a previous work a new material model was developed and implemented in LS-Dyna. The model shows good results for dynamic O-Ring simulations with one specific elastomer
- The numerical effort of the model needs to be reduced to enable its applicability in tool simulations
- The new material model requires also the definition of new evaluation criteria and limits to ensure lifetime robustness of elastomer elements. As a basis existing tools should be re-simulated and evaluated

Objectives & Tasks

- The existing LS-Dyna “user-defined” material model should be improved in terms of numerical efficiency
- Experimental determination of material parameters for additional elastomers
- Find criteria and limits to evaluate the robustness of elastomer damping elements in Hilti TE-Tools



Hysteresis of a dynamic o-ring test



FE simulation of elastomer damping elements