

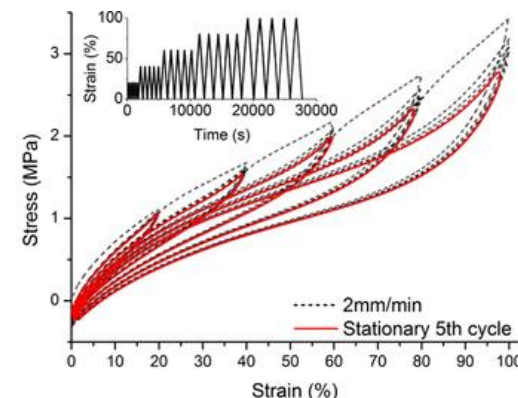
# IMPLEMENTATION OF A HYPERELASTIC AND VISCOELASTIC MATERIAL MODEL FOR ELASTOMERS IN LS-DYNA

## Problem Description

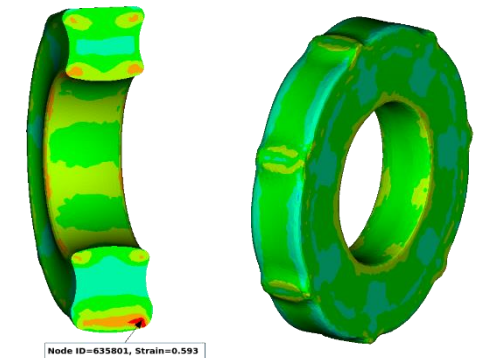
- The material behavior of rubber materials is not only non-linear concerning the strain level, but also strongly influenced by the strain rate and the temperature conditions
- In power tools heavy loaded elastomer parts are used, where the achieved strain levels as well as the occurring strain rates are unusual high
- To be able to predict the behavior of such rubber parts with finite element simulations a complex material model is required
- The available material models in LS-Dyna are limited but more advanced material models are available in science

## Objectives & Tasks

- Implementation of a hyperelastic and viscoelastic material model as “user-defined” material for LS-DYNA
- The material model needs to be applicable for dynamic simulations with explicit time integration, but should also be usable for implicit static simulations
- Validation of the implemented material model by experimental results



Multi hysteresis experiment [Source DIK]



FE simulation of elastomer part