

## Achieving a more Accurate Prediction of a Polymer Snap Deformation Pattern

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*Abstract:*

*A variety of polymers are used extensively for both medical applications and consumer products. Most of these polymers exhibit time-dependant behavior which varies significantly with environmental conditions.*

*Injection molding technologies generally offer application design freedom and options for several functions build into each component. Meanwhile analysts are often faced with the difficulties of predicting the response of the final product.*

*Some of the key challenges are:*

- *Defining a material test protocol that captures the loading modes which the component materials are subjected to.*
- *Exploration of different measurement methods and their limitations.*
- *Fitting the material model with test data for general purpose or customized use.*
- *Evaluating available Abaqus material models for different load cases.*
- *Testing tailored UMAT models as an alternative.*
- *Benchmark development for numerical model validation.*

*From simple geometry loading to virtual prototyping, this paper exemplifies the stepwise progress towards a successful match between load case, measurement setup and numerical model validation. It also deals with the gaps at the current numerical model availability and proposes optional enhancements.*

*Keywords: Polymer material modeling, Deformation, Bending, Constitutive Model, Creep, Viscoelasticity, Viscoplasticity, Plasticity, Polymer, Residual Stress, Springback.*