

Master's Dissertation at the Div. of Structural Mechanics



FEM MODELLING OF MOLTEN POLYMER FLOWS IN PACKAGE SEALING PROCESS - USING ABAQUS CEL FORMULATION

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Background

In beverage packages, several sealings are made to produce a package that will not leak during its lifetime. The mechanical behaviour of the package sealing is thus crucial for the overall package performance. To develop packages for new applications, a better knowledge of the flow of the molten polymer produced by various types of sealing techniques is needed. Moreover, to optimize the sealing process it is also important to determine what material parameters that is most important for this process. To determine the advantages and the disadvantages of each sealing setup, various setups have to be studied both numerically using ABAQUS as well as experimentally.

Objective

The main aim of the study is to define a FE-modelling strategy for solving molten polymer flow using the recently implemented Coupled Eulerian Lagrangian (CEL) formulation in ABAQUS. CEL-formulation allows simulations of fluid-like flowing materials to interact with solid materials.

The study is divided into the following steps.

- Literature study
- FE-modelling strategy and the procedure of using the Coupled Eulerian Lagrangian formulation.
- Conduct experimental investigations of sealings with various polymers.
- Calibration of material parameters.



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