CENTRE DE MISE EN FORME DES MATERIAUX

UMR – CNRS n°7635

Sophia Antipolis, le

Post-doc position
Centre for Material Forming
Ecole des Mines de Paris

Prediction of the deformation of extruded profiles

The profiles are used in the automotive industry, and the geometry of the section is very precise. After co-extrusion of two polypropylenes, the profile is cooled in classical water tanks. The decrease of temperature and crystallization induce shrinkage. As it is non homogeneous, the profile is submitted to deformations which are unacceptable in certain extrusion conditions.

The objective is to compute residual deformations, with accurate physical models.

A first part of the project will be experimental:

- on-line measurements of temperature, deformations
- characterization of materials: density, rheology in the liquid and solid states, crystallization kinetics.

The second part will aim at computing the evolution of stress and deformation during cooling of the material. The energy equation, including the energy released by crystallization, will be coupled with the mechanical equations (with elastic or viscoelastic behaviour in the solid state, and specific law in the solid – liquid transition).

The project is funded by a sub-contractor of the automotive industry, where part of the work will be carried out (Paris area). The Centre for Material Forming (Cemef) is located near Nice in the south-east of France.

Background of the applicant: Continuum mechanics, numerical simulation, polymer physics

Duration : 1 year

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