Simulation by order of Corvaglia Mould AG

Study of a PE-CAP Injection Moulding Machine with multiphysics simulation in ANSYS Workbench

Task

Corvaglia Mould AG is a leading producer of closure solutions for beverage bottles and other application areas. In order to guarantee both quality and efficiency in an injection moulding machine (Fig. 1), a tight control of parameters such as injection process duration, temperature, cooling efficiency and fatigue strength is of central importance. A way to quickly go beyond the actual state of knowledge on the process had to be found and integrated in a new development strategy by Corvaglia Mould AG.

Fig. 1: Injection moulding machine with caps in blue.

Contact:
Joël Grognuz
P +41 (0) 21 614 80 - 44
joel.grognuz@cadfem.ch
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**Solution**

In order to resolve the physics phenomena in a large assembly of many injection nozzles efficiently (Fig. 1), a multiphysics modelling process has been developed in ANSYS Workbench including fluid (Fig. 2) and structural models (Fig. 3). The cooling efficiency of series and parallel connected channels, the temperature distribution in the whole machine and the evolution of structural stresses were calculated over time at most critical locations (Fig. 4).

The importance and influence of parameters such as the geometry of mechanical components, process parameters, cooling efficiency on component stresses and transient thermodynamic phenomena have been analysed through a parametric study.

**Customer Benefit**

The analysis allowed to rapidly pinpoint the most critical locations and further study the sensitivity of process parameters to variation of control or design parameters.

The utility of CFD and FEM simulations in the development of injection moulding machines has been demonstrated and represent a faster and advantageous alternative to “trial-and-error” experiments or tests.

The modelling know-how, including a customized tutorial, have been transferred from CADFEM to Corvaglia Mould AG, who is now successfully using simulation.

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**About CADFEM**

Founded in 1985, CADFEM provides everything that is required for the success of the simulation from a single source: First-class software and complete, ready-to-use systems; comprehensive services; the latest knowledge. CADFEM is the ANSYS Competence Center FEM in Central Europe.

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