

Mesh automation of runner systems for injection molding simulations

Christoph Mau

LEGO System A/S

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ABSTRACT

The simulation of the injection moulding process plays an important role in the product development cycle of LEGO bricks. Simulations are used to fulfil the high-quality demands and standards for the products. The simulation of the filling sequence of the runner system and cavities serves the purpose to analyse the filling pattern, pressure drop and temperature distribution in the melt to ensure that all elements in the mould have similar structural and functional properties and fulfil the visual quality and product safety requirements.

There are a few hundred runner simulations carried out per year and a major issue in the process is a reliable automation mesh generation protocol. The previous setup for these simulations required a lot of manual work and time due to lack of efficient automation functionalities. To alleviate this situation, increase flexibility, reduce manual work and lead time for runner simulations, ANSA was introduced as a new mesh tool at LEGO.

Automated tools via Python scripts (Batch Mesh, mesh scenarios, etc), allow LEGO to use the 3D geometry of the runner system without oversimplifying it and to completely automate the mesh generation and facilitate the creation of a ready to run solver file. After the automation implementation, as a result, the pre-processing time for a simulation was reduced from several hours to a few minutes while meeting all solver quality criteria and various challenges like large number of layers.

The protocol and methods used to automate the mesh procedure will be presented in this article/session.
