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Contents

UTILIZATION OF MESH SUPERPOSITION TECHNIQUE FOR SIMULATION OF SINGLE SCREW EXTRUDER

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Keywords: single screw extruder, mesh superposition technique, Ansys Polyflow

As the technology of polymer extrusion becomes more sophisticated, demand on possibility to accurate simulate extrusion process in full 3D rises significant. The single screw extruder (SSE) is one of the most widely used tools, not only in the plastics and rubber industry but also in other areas such as food processing. This paper deals application of Mesh Superposition Technique (MST), to simulate and evaluate the mixing section of SSE. Theoretical background of calculation and adoption of MST for simulation of polymer flow inside extruder barrel is described. In order to simplify the setup of a 3D unsteady SSE simulation and to avoid the use of a remeshing algorithm, technique referred as MST has been implemented in the ANSYS POLYFLOW® software. This robust technique dramatically simplifies the meshing of the geometric entities, avoids the use of any remeshing algorithms and does not present the complexities and limitations of the sliding meshes technique.

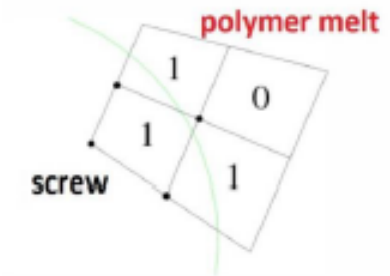

Fig. 1 **Presentation of "Inside" Field for a 2D Finite Element for calculation wit MST**

In practical part a meshing (fig.2), preprocessing setup for calculations (fig.2) is presented with subsequent evaluation of results in ANSYS CFD-Post (fig.3).

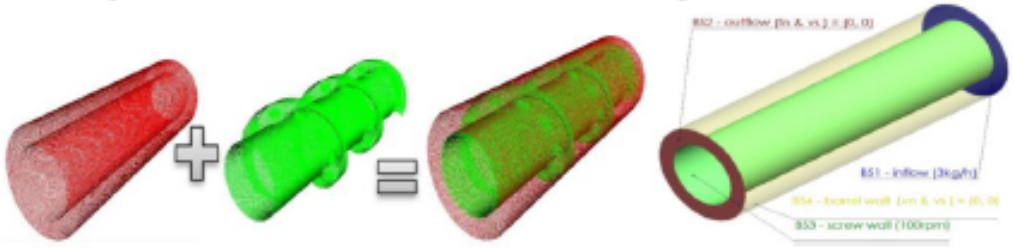

Fig. 2 **Combination of the flow domain mesh and the screw mesh (left) and numerical boundary conditions**

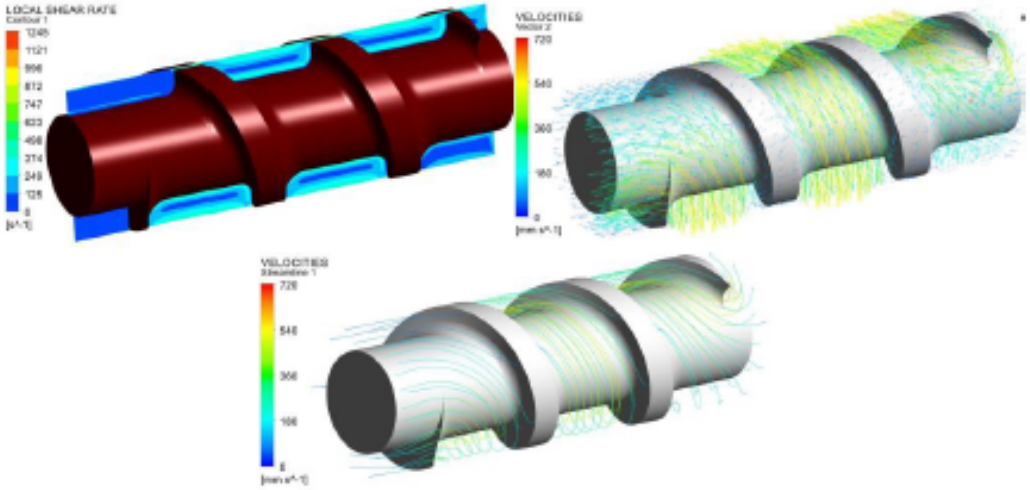

Fig. 3 **Simulation results : Local shear rate, Velocities vectors through flow domain, Flow streamlines with mapped velocities values**

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