

The Hot Spot in Al-Rod Extrusion Investigated by FEM-analysis

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Abstract. FEM-analysis has been used to study thermo-mechanical conditions in an industrial Al-rod extrusion process where long billets are used as stock material. In the analysis, focus is on the conditions in the hot-spot present inside the metal of the billet material as it flows over the die edge in the extrusion process. In this spot strain-rate and temperature in the flowing metal will reach critical conditions if the extrusion speed is set too high. Moreover, when there are overcritical conditions speed-cracking will occur in the metal. The Lagrangian version of the software DEFORM 3D is applied to model the process numerically. It is investigated how the distribution of deformational state-variables is predicted to be here in the hot-spot region, and how they depend on the used extrusion conditions. Through this analysis new information on the issue is obtained.