Bachelor/Master Thesis

Damage control in hot caliber rolling

Topic

Hot caliber rolling is an important metal forming process for the production of half-finished metal rods with various cross section forms. During caliber rolling process, ductile damage in form of voids could be induced, which impairs the performance of the part by evolving into micro cracks. By varying the load path (triaxiality and Lode parameter) damage evolution can be influenced without changing the end geometry of the part.

The aim of this thesis is to investigate the damage variation based on various process designs (load path variation) via FE simulation and experimental approaches. To achieve this damage models should be applied in FE simulation to predict damage evolution. For the validation of the damage models rolling experiments should be conducted which leads to various damage conditions. Methods for damage characterization such as SEM and density measurements should also be applied to the formed material in order to evaluate the damage models.

Your tasks

- Simulation and analysis of damage models in FE simulation
- Experimental validation of the FE model of caliber rolling
- Experimental damage characterization
- Evaluation of damage models

Your skills

- Interests in simulation and experimental tasks
- Prior knowledge with FEM is wished
- Engagement and structured working method

Duration: 3 to 6 months

Start: immediately

Contact: Ms. Shuhan Wang, M.Sc.
Group flat and long products
Room U111
Phone +49 241 80-90120
E-mail: shuhan.wang@ibf.rwth-aachen.de