Bachelor / Master Thesis

Evolution and healing of damage during production of semi-finished steel parts using flat rolling

Flat rolling is considered one of the most important forming processes in the production of semi-finished metal parts. During beneficial process conditions hot flat rolling enables not only setting up of the final geometry and mechanical properties but also closing and healing of casting defects like voids and shrinkage cavities. On the other hand adverse load paths during subsequent cold flat rolling may lead to the development of ductile damage in the form of voids. Through sophisticated choice of the process parameters it is possible to optimize the whole process chain in terms of damage evolution resulting in an improved performance of the final part. Through damage reduction the safety margins of final parts can be lowered opening up large potential for lightweight design. For this, profound knowledge on the flat rolling process and the interplay between process conditions and damage evolution is essential. Within this project are multiple possibilities for bachelor or master theses.

Possible Topics

- Simulative und experimentelle Untersuchung von Warm- und Kaltflachwalzen
- Kalibrierung und Anwendung von Schädigungsmodellen auf das Flachwalzen
- Programmierung von Skripten (Python) zur schnellen Mehrskalen-Modellierung

Your skills

- Good English skills
- Motivation, initiative and an autonomous way of working
- Interest in experiments and simulation regarding rolling

Duration: 3 / 6 months  
Start: as of now

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