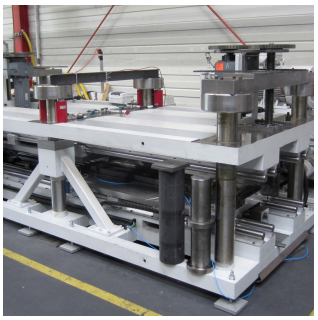
Bachelor thesis, master thesis, project thesis

Inhomogeneous heating in the cross wedge rolling process

Cross-wedge rolling (CWR) is a bulk forming process used for preforming, where the billet is traditionally heated homogeneously. Process stability issues, such as slipping or torsion, arise due to varying material flow paths, leading to rolling defects. Inhomogeneous heating (IH) can adjust these flow properties, enhance stability, and reduce defects.

Additionally, it decreases scaling and improves surface quality but remains largely unexplored. This project aims to analyze its impact on the rolling process to optimize quality and stability. The approach involves initial simulations to assess parameter effects, followed by experimental validation.


Your tasks

As part of the project, you can independently work on the following tasks and research areas:

Simulation

- Numerical modeling (FEM) and parameter variation in the simulation
- Optimization of inhomogeneous heating (IH) for targeted control of material properties

Experimental Planning and Evaluation

- Development of experimental designs for different heating patterns
- Investigation of rolling defects and derivation of optimization measures
- Analysis of process stability through temperature control

Design and Tool Development

- Design of a cross-wedge rolling tool for IH-treated billets
- Adaptation of tool geometry to different heating profiles

Measurement & Analysis

- Development of a measurement strategy for automated temperature distribution detection in the billet
- Surface analysis: Evaluation of surface structure for each heating method
- Determination of scaling rate and component accuracy

Your profile

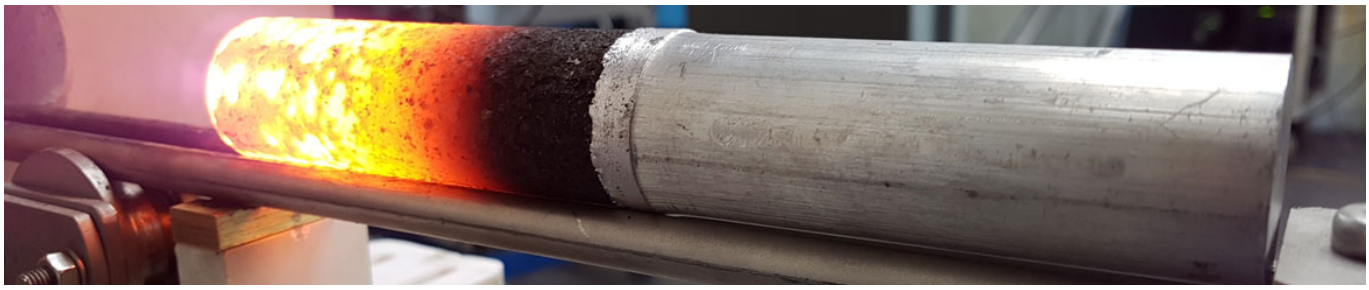
You are studying one of the following fields:

- Mechanical Engineering
- Production & Logistics
- Sustainable Engineering Sciences
- Forming Technology/Material Sciences

You have an interest in forming technology, measurement technology, and simulation/automation.
You have knowledge in FEM, simulation, design, and/or materials technology.
Good German language skills (spoken and written) are required.
Programming skills (Python, C++) are highly desirable.
The work cannot be conducted primarily as remote work.

We offer

- independent work opportunity
- comprehensive supervision of student projects
- flexible working hours
- well-equipped student workspaces
- remote work possible upon agreement
- fully equipped kitchen with a fruit basket
- potential for long-term collaboration



Bitte sende deine aussagekräftige Bewerbung in einer einzigen PDF-Datei an jobs@iph-hannover.de.

Die Bewerbung muss Anschreiben, Lebenslauf sowie Prüfungsleistungen des Studiums / Zeugnisse enthalten.

Contact

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