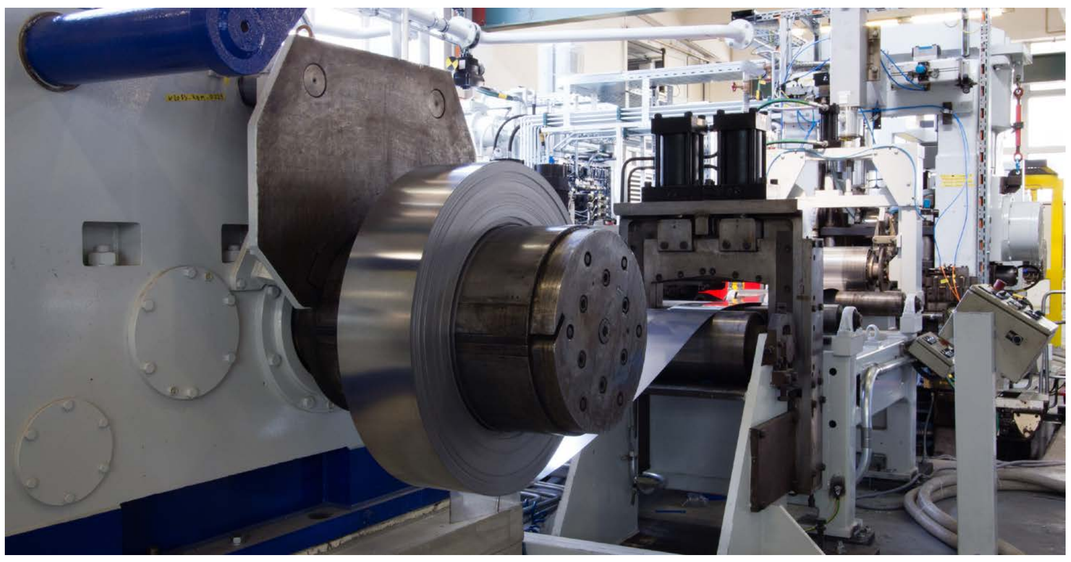
P21 – Online Topography Measurement of Aluminium during Cold-Rolling

AMAP Advanced Metals and Processes

Motivation

Further processing of cold-rolled metal sheets requires a homogeneous 3D distribution of the roughness parameters mostly. The only possibility to react on the rolled surface changes immediately, for instance by strip tension, is an online roughness measurement. But the roughness measurement is a challenge. This is primary based on the non isotropically reflecting aluminium surface and the oscillating strip in an lubricant mist environment.



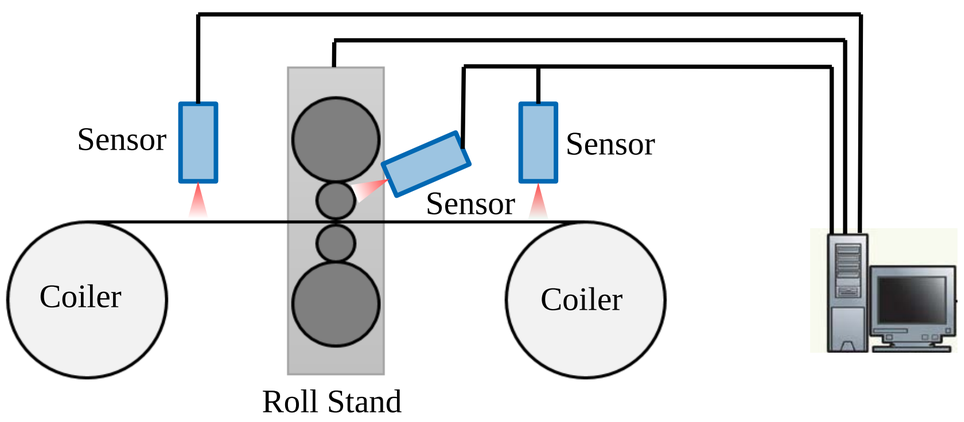
Cold Rolling Mill at the Institute of Metal Forming

Executive summary

The project investigates the feasibility of an industrial-orientated online roughness measurement for aluminium materials. In this respect the recorded measured data will be verified by static topography measurements. After that first rolling tests can be carried out which show the surface modification of the aluminium material during the rolling process.

Experimental Setup

Three sensors are necessary to investigate the generation of the pattern during the rolling process. One sensor measures the surface of the work roll in real time. The two others are located in front of and after the roll gap. The measuring signals are recorded together with other measured values like the rolling force or the strip tension. The roughness measurement of each sensor is based on the light sectioning principle. Due to the short exposure time of 8ns the measurement system is resistant to vibration and suitable for high rolling speed.



Experimental Setup of the Roughness Measurement

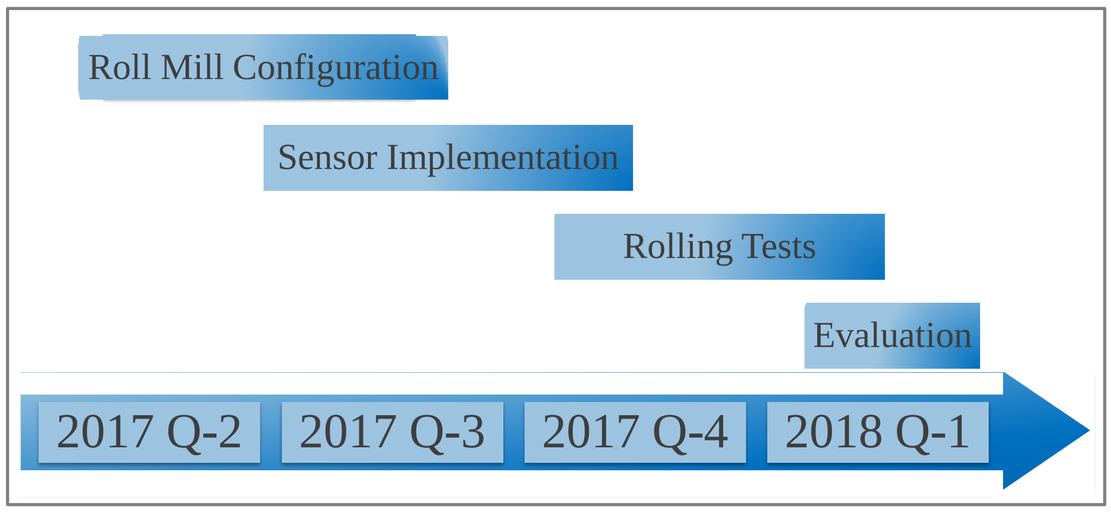
Possible Extensions

- Investigations with of EDT (electro discharged textured) rolls
- Studies of different contributing factors to the pattern generation
- Development of a model to predict the pattern generation
- Development of a controller for a homogenous 3D pattern distribution

Major Work Packages

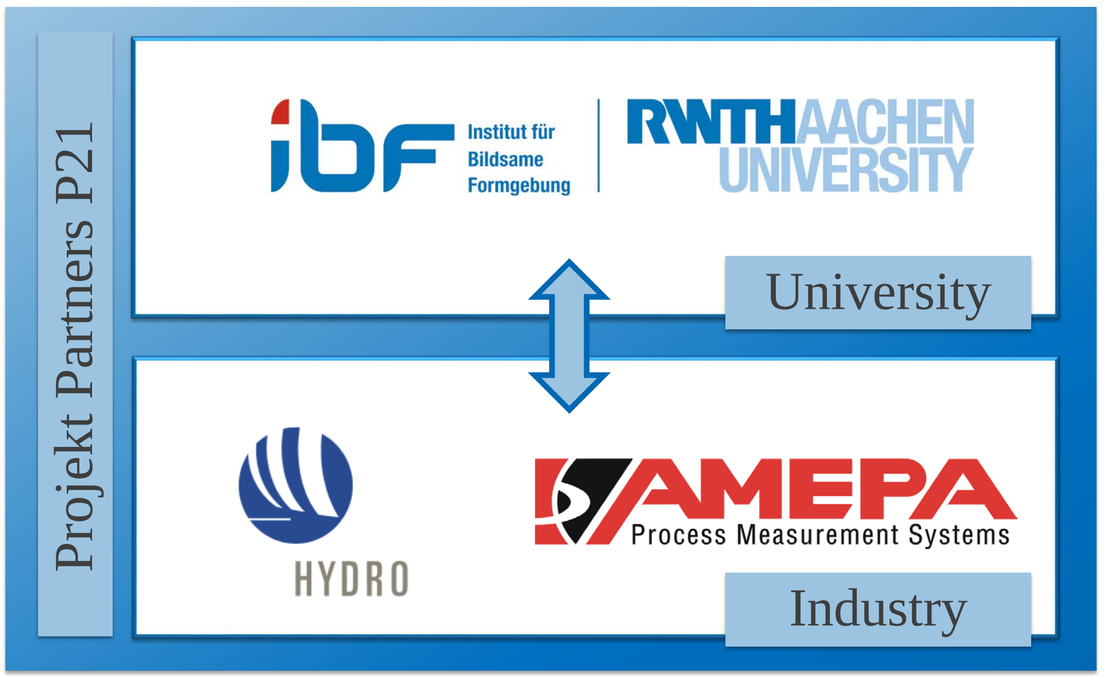
- Configuration of the cold rolling mill for the use of aluminium material
- Implementing optical sensor technology for topography measurement
- Rolling tests with different rolling parameters
- Evaluation of the rolling tests

Timeline



Consortium

The project consortium consists of three partners: AMEPA, Hydro and the Institute of Metal Forming (IBF) of the RWTH Aachen University.



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