

Cutting Drum 4.0

The project Cutting Drum 4.0, funded by the Central Innovation Programme for Medium-Sized Businesses (ZIM), deals with the objective of developing an intelligent cutting drum with sensors suitable for mining in order to differentiate between different materials during the cutting process. As a core technology, acoustic emission sensors (AE sensors) are to record signals of fracture events occurring during the cutting process. These signals, which are transmitted as surface waves in the low high frequency range via the cutting elements to the cutting drum, are first converted into a voltage signal by the sensors and then processed by means of various material recognition algorithms on a single board computer. This signal processing is used to interpret the signals and assign them to rocks or other materials. In order to develop such a cutting drum, the relationships between different material classes and the AE signals must first be identified. Cutting tests are carried out at the RockCutting Center on the AMT cutting test bench.

The work in the project includes:

AMT:

- Preparation and execution of cutting tests for material recognition
- Analysis of files and search for correlations between AE signals and material classes
- Development of several algorithms for material recognition
- Validation of algorithms in the laboratory and by field tests

Project partner CAE:

- Development of a single board mining computer for the cutting drum
- Implementation of the algorithms
- Development of a radio link for data exchange

Project partner Krummenauer:

- Development of a cutting drum for the measurement system
- Adaptation of the cutting drum for the radio link
- Development of a self-sufficient energy supply

This cutting drum is intended to ensure efficient extraction of valuable minerals and can be used, for example, to distinguish between coal and rock in longwall mining.

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