



ONLINE ANALYSIS FOR MINERALS EXTRACTION – OFUR

Task

In minerals mining, the use of online measurement systems for chemical analysis makes generating detailed deposit models feasible. These models reduce the unwanted extraction of waste rock and, hence, result in substantial cost savings.

In this project, a drill rig has been equipped with an online analysis module. During exploration or blast hole drilling, this module allowed a deposit model to be generated simultaneously.

The tough environment for operation requires a high degree of vibration, dust and water resistance.

Method

Rock dust produced while drilling or cutting is withdrawn by suction and analysed chemically directly in the dust stream by laser-emission spectroscopy. The results of this analysis are included into a deposit model and can thereby be used to control the excavation.

At first, this method will be developed for limestone mining. Nonetheless, the technology used can be adapted to other types of mineral and waste rock.

Result

Mounted to a drill rig, a functional testing module was successfully used in a field test of several days' duration to determine the concentrations of silica, magnesia and aluminium in limestone. The results of the laser-emission spectroscopy are highly consistent with results gathered using X-ray fluorescence analysis – the state of the art for analysis of minerals. However, the new method needs no sampling, and results are available within a few seconds, rather than the several days XRF requires.

Applications

This laser spectroscopy method for powdered materials is suitable for raw materials excavation and processing, for example, limestone quarries and cement works, but also for mining of copper or gold.

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Contacts

Dipl.-Phys. Tobias Kuhlen
Phone +49 241 8906-308
tobias.kuhlen@ilt.fraunhofer.de

Dr. Reinhard Noll
Phone +49 241 8906-138
reinhard.noll@ilt.fraunhofer.de

1 Laser outlet at the testing module
with ignited plasma.