Acoustic signal – new feature in monitoring of rock disintegration process

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A b s t r a c t : A model apparatus adjusted for the imitation of rock disintegration by rotary drilling is used for laboratory experimental research. The device provides rotary drilling of rock samples by small-diameter drilling tools. The experimental drilling stand is equipped with monitoring system providing the scanning, recording and/or computation of input and output variables of disintegration process, such as thrust, revolutions, advance rate, specific disintegration energy, etc. Recently, the system has been enhanced by a microphone placed in defined point in acoustic space, which registers acoustic signal arising during the drilling.
The acoustic signal changes depending on the drilling regime and the task is formed as tracing the patterns of changes, dependencies on other variables characterizing the disintegration process and dependencies on tool and rock parameters. The signal is processed with the Fourier transformation decomposing general inharmonic periodical action into harmonic compounds. The analyses of noise as acoustic behaviour of rock drilling process is presented further in the paper. Acoustic signal possesses the potential to be used for control of rock disintegration process.

Key words: acoustic signal, monitoring, disintegration process, rock

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