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The ground motions induced by blasting in open-pit lignite mines and its environmental effects

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ABSTRACT

Blasting is the most commonly used excavation technique in mining and civil engineering applications. Blasting induces strong ground motions and fracturing of rock mass in rock excavations. Particularly, high ground motions may also induce some instability problems of rock mass and structures nearby. Furthermore, it may cause some environmental problems due to noise as well as vibrations of structures near the populated areas. Furthermore, flyrocks is another major issue for the safety of people and damage to machinery and equipments when blasting is employed.

In this study, the authors explore the ways how to estimate the ground motions as a function of distance, amount of explosive, number of holes. The ground motions were measured by stand-alone accelerometers developed by the first author and some empirical relations are developed. The effect of ground motions on the instability issues of benches such as sliding, toppling and rockfalls were investigated. Furthermore, the flyrock issue is investigated and some empirical relations to estimate the maximum distance of flyrocks from the blasting relations are compared and discussed.