ENERGY ANALYSIS OF OPPORTUNITY OF ROCK BURST ON TECTONIC FRACTURE NEAR MINED-OUT SPACE

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Two variants of behaviour of tectonic fracture are studied:

1. A sudden loss of stability and dynamical shear along a weakening surface with returning of elastic energy into kinetic energy of waves;

2. A gradual shear of joint without seismic phenomena (creep).

A friction coefficient on the weakening surface is one of the main parameters determining the opportunity of dynamical shear on tectonic fracture. A limit value of friction coefficient, separating processes of stable and dynamical motions, depends on a concrete geomechanical situation. Conditions of rock burst because of dynamical shear of tectonic fault due to extraction of horizontal ore deposits are studied. The mined- out space with a height of 25 m and with a width of 250 m is at the depth of 1 km near sub-vertical tectonic fracture. The finite element method is used for the numerical modelling. Comparative geomechanical analysis of behaviour of joint is carried out applying to mined-out spaces in a lower side wall and in an upper side wall. A shear strength margin is characterized by a value $\Delta = k\sigma_n - |\tau_n|$ on the weakening surface (k is a friction coefficient, σ_n and τ_n are normal and shear stresses). The curve 1 on the figure illustrates the distribution of Δ for the mined-out space in the lower side wall. A relative shear ($\Delta = 0$) of joint takes place on the 300 m section over mined-out space. The curve 2 shows the corresponding distribution in rock massif without the fault. A comparison of difference of rock massif's elastic energies of the two adduced variants with a work, which is necessary for motion along joint, allows to expose the character of behaviour of rock. A limit value of the friction coefficient is estimated with a number 0.35 for these geomechanical conditions. The dynamical shear is available for smaller values of the friction coefficient. In this case ($k = 0.3$) approximately 10 MJoules/metre return into kinetic energy of waves.