GEO-ENERGETICS OF UKRAINIAN SHIELD

KHOMENKO Oleh & KONONENKO Maksym
Dnipro University of Technology, Dnipro, Ukraine

The analysis and systematization of geodynamic conditions of underground mining of ore deposits in Ukraine is executed. The issue of description of natural condition of rocks in world practice is enclosed. Classification of methods of rock massifs energy condition is composed and ways of development of new hypotheses, theories and methods are described. The entropy method of a research describing processes of redistribution of the potential energy in the undisturbed massif that represented in the form of thermodynamic system is offered. An inspection of the received results on convergence is conducted.

The analysis of methods of determination of rock strength has allowed expanding classification of methods of a research due to introduction of synergetic group. This group includes entropy, thermodynamic and energy methods that allow to investigate processes of power exchange in rock and natural transformations of one types of energy to others. Improvement of the existing entropy method as a part of the thermodynamic theory and creation of new, energetic, have allowed to investigate the phenomenon of zonal structuring of the massif around mine workings and have allowed to establish exact quantity, the sizes and a shape of energy zones and to reveal sinusoidal-and-fading stresses and ring areas of deformation.

Distribution of entropy in the undisturbed massif rocks of the Ukrainian Crystalline Board proceeds in mutually perpendicular directions that corresponding to vertical and horizontal power streams. On sedate dependences in the massif only a part of potential energy which volume is 50 for the horizontal stresses, and 45% for for vertical ones from the difference of external loadings is redistributed. Increasing of potential energy in the massif of rocks of Kryvorizskyi basin at depths up to 3000 m leads to redistribution on sedate dependences for horizontal stresses already 95%, and for vertical ones is 57% from the difference of external pressure.

References

1. Khomenko, O. (2012). Implementation of energy method in study of zonal disintegration of rocks. Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu, (4), 44-54.

2. Vladyko, O., Kononenko, M., & Khomenko, O. (2012). Imitating modeling stability of mine workings. Geomechanical Processes During Underground Mining, 147-150.

3 Khomenko, O., & Maltsev, D. (2013). Laboratory research of influence of face area dimensions on the state of uranium ore layers being broken. Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu, (2), 31-37.

4. Sudakov, A. Khomenko, O., Isakova, M., & Sudakova, D. (2016). Concept of numerical experimentof isolation of absorptive horizons by thermoplastic materials. Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu, (5), 12-16.

5. Khomenko, O., Sudakov, A., Malanchuk, Z., & Malanchuk, Ye. (2017). Principles of rock pressure energy usage during underground mining of deposits. Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu, (2), 35-43.

6. Khomenko, O., Tsendjav, L., Kononenko, M., & Janchiv, B. (2017). Nuclear-and-fuel power industry of Ukraine: production, science, education. Mining Of Mineral Deposits, 11(4), 86-95.

7. Khomenko, O., Kononenko, M., & Myronova, I. (2017). Ecological and technological aspects of iron-ore underground mining. Mining Of Mineral Deposits, 11(2), 59-67.

8. Khomenko, O., Kononenko, M., & Bilegsaikhan, J. (2018). Classification of Theories about Rock Pressure. Solid State Phenomena, 277, 157-167.

9. Khomenko, O., Kononenko, M., Myronova, I., Sudakov, A. (2018). Increasing ecological safety during underground mining of iron-ore deposits deposits. Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu, (2), 29-38.

SUBSTANTIATING A MECHANISM TO INCREASE THERMAL RESOURCE OF WATER-BEARING LEVELS AT THE EXPENSE OF UNDERGROUND COAL COMBUSTION

SADOVENKO Ivan, INKIN Olexander,
DEREVIAHINA Nataliia & HRIPLIVEC Yuliia
Dnipro University of Technology, Dnipro, Ukraine

Purpose. Objective is to study a mechanism increasing thermal resource of water-bearing levels at the expense of underground coal combustion.

Methodology. The studies were carried out by means of substantiation of models of filtration and heat transfer within the water-flooded rocks representing thermodynamical processes of the proposed geocirculating system operation.

Findings. Long-term mining of coal deposits in Ukraine and liquidation of mines have resulted in the formation of natural and technogenic environment within coal-mining regions; the environment contains substantial reserves of energy resources in the form of remaining and off-grade coal as well as warm mine and underground water [1]. Disturbed rock mass has significant capacitive resource capable of accumulating heat carriers which amount is quite sufficient to mitigate seasonal fluctuations of their consumption.

The developed models of filtration and heat-transfer have become the research basic instrument since they reflect thermodynamical processes of a geocirculating system providing both warming and conditioning of industrial and civic buildings