A STYDY OF THE STRESS STATE IN CURVING SECTION OF THE EXPLOITATION WELL AT THE UNDERGROUND COAL GASIFICATION

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Purpose. Determination of the stress state of rock massif and an estimation of the curving section stability of the exploitation well at the underground gasification by solving the geomechanical problem using a computational experiment.

Methodology. The calculation of the stress state of rock massif containing a curvilinear well made for the Lviv-Volyn coal basin conditions in the software package SolidWorks, which is based on the finite element method. The geomechanical problem was solved in the elastic approach, the obtained stress values were compared with the maximum admissible mine rock values.

Findings. The geomechanical model of the rock and coal massif containing coal seam n_7^b and the exploitation well according to the underground gasification technology has been substantiated and constructed. The increased tensile stresses were determined to concentrate in the roof of the coal seam in the siltstone layer, at the point of entry of the well into the coal seam at a certain angle. The exponential function has been revealed of the tensile stresses value in the roof of the seam from the angle of the producing well entry into the coal seam. The rational angle of a well entry into the coal seam was determined, depending on the boundary to the destruction of the silt strength limit.

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Key words: stress state, gasification, modelling, exploitation well, curvature radius

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ANALYSIS OF THE STRESS DISTRIBUTION CHANGES IN THE ROCK MASS WHILE VARIATING THE GEOMETRIC LAYING PARAMETERS

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Purpose. The goal is to determine the degree and quality of influence of the geometric and mechanical parameters of the laying of the excavated space of the mine workings on the state of the enclosing fine-layered rock mass in the interface area of the excavation and development mine workings provided there is no violation of the integrity of the rock layers by main cracks.

Methodology. The computational experiment consisted in calculating three options for laying the worked-out space of a cleaning development that was passed in a small-layer rock mass. The modeling of the objects of study was carried out in a three-dimensional representation with the realization of the conditions for the mutual slippage of the rock layers.

Findings. The results of calculations of the computational experiment made it possible to determine the nature of the change in the load on the lining of the excavation and cleaning workings under various conditions for laying out the developed space. An analysis of the stress field of the rock massif together with the deformations of the roof of the clearing generation showed the physical essence of the development of the processes of destruction of the rock layers when the geometrical and mechanical characteristics of the bookmark change. The analysis of the deformations of the rock layers made it possible to determine the conditions for the formation of softening zones and the conditions for the formation of main cracks for a particular combination of geological characteristics. Using to determine the effectiveness of the chosen mounting scheme of an integrated multi-criteria approach based on measurements of contour movements and internal