AP13268798 "Development and industrial testing of technological schemes for strengthening the weakened zone of rocks at the intersection of a geological disturbance by a preparatory mine" – p.m. Khalikova E.R.

Relevance

One of the main functions of a mining enterprise is the need for periodic reproduction of its capacity during its service life, and such renewal is becoming increasingly expensive, since it is carried out in continuously worsening mining-geological and mining-technical factors of operation, due to the increase in depth and other development conditions. Monitoring shows that the construction of new and reconstruction of existing mining enterprises in most cases will be carried out in difficult mining-geological conditions of development.

Due to the increasing of the depth of mineral deposit development, mining-geological conditions are constantly deteriorating.

Increasing the mine working stability is one of the most important tasks in underground mining of mineral deposits.

The output of scientific and applied work is the possibility of the effective use of the technology of strengthening support around the working, development of technological schemes for conducting workings and support of unstable rocks surrounding it.

The existing technological risks are also reduced due to the use of effective technology, equipment and fastening means for conducting mine workings that allow avoiding the impact of mining factors manifestations on the operational reliability of the execution of the processes of the tunneling cycle.

The output of the work is developing of a technology for strengthening the roof of workings driven through unstable rocks by providing connected fastening bridges using the deformation, design and technological properties of the fastening means and the geomechanical state of the marginal massif when substantiating the parameters for stabilizing the contour of mine workings.

Project objective

Developing the process flow charts for strengthening the weakened zone of rocks when crossing a geological disturbance with a development working that ensures increasing stability of the rocks surrounding the working.

Achieved results

As a result of the project implementation, process flow charts for mounting the developed support were developed that ensure reducing the costs of supporting workings in a disturbed rock massif, commensurate in amplitude with the extracted thickness of the seam, while motivating work to improve safety and efficiency. Coal mining in the mines of the Karaganda basin requires improving methods of preventing the effects of increased rock pressure, predicting geomechanical conditions during the development of coal seams with introducing some promising methods of increasing the mine working stability.

1. Two articles were published in journals from the first three quartiles of the impact factor in the Web of Science database or having a CiteScore percentile in the Scopus database of at least 50.
2. Three scientific articles were published in journals included in the CQASHE database.
3. A monograph in Russian was published by a domestic publisher.
4. A patent was received from the Kazakhstan Patent Office.
5. A certificate of registration of copyright objects was received.




	Research work within the framework of the project at industrial enterprises of the Karaganda region	

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List of publications

1. E.R. Khalikova, V.F. Demin, R.A. Mussin, A.P. Krakovsky, U.Zh. Khanafin. Monitoring of the stress-strain state when driving development workings. Complex Use of Mineral Resources. 2023. No.1. 68-75. https://doi.org/10.31643/2024/6445.08
2. Khalikova E.R., Demin V.F., Demina T.V., Syzdykbayeva .S., Zairov Sh.Sh. Technological conditions for ensuring stability of the enclosing rocks massif when supporting mine workings. Complex Use of Mineral Resources. 2024; 330(3):76-84.

DOI: 10.31643/2024/6445.31
3. Khalikova E.R., Demin V.F., Tanekeyeva G.D., Abdrakhman E.A. The effect of mining technical conditions on the deformation of loose rocks during the mixed fixation of mining materials. University Proceedings. 2023. No. 4. 171-177. DOI 10.52209/1609-1825_2023_4_171
4. Zholmagambetov N, Khalikova E, Demin V, Balabas A, Abdrashev R, & Suintayeva S. (2023). Ensuring a safe geomechanical state of the rock mass surrounding the mine workings in the Karaganda coal basin, Kazakhstan. Mining of Mineral Deposits, 17(1), 74-83. https://doi.org/10.33271/mining17.01.074
5. Demin, V., Khalikova, E., Rabatuly, M., Amanzholov, Z., Zhumabekova, A., Syzdykbayeva, D., Bakhmagambetova, G., & Yelzhanov, Y. (2024). Studying the mine working supporting technology in the zones of increased rock pressure behind the longwall face to ensure safe mining operations. Mining of Mineral Deposits, 18(1), 27-36. https://doi.org/10.33271/mining18.01.027
6. Patent No. 7955 dated April 14, 2023 Rope anchor / Khalikova E.R., Demin V.F., Issakov B.K., Zhumabekova A.E., Demina T.V., Abdrakhman E.A., Tanekeyeva G. D., Balabas A.Yu. -2 s
7. Right to an object protected by copyright Khalikova E.R., Meshcheryakov K.O. “Technological solutions for strengthening rock masses in areas of high rock pressure behind the lava”, Application No. 42660 dated 02/06/2024
8. Geomechanics of the rock massif when driving development workings. Khalikova E.R., Demin V.F., Amanzholov Zh.K. Monograph. Almaty: Evero Publishing House, 2024, 180 pp., ISBN 978-601-13-0061-2

Information for potential consumers

As a result of implementing the project, the technological schemes of mounting the developed support will be proposed that provide reducing the costs of supporting workings in the disturbed rock massif, which is comparable in amplitude with the extractable thickness of the layer, while motivating the performance of work to increase the safety and efficiency of coal mining in the mines of the Karaganda basin.

Scope

Mining production of the coal industry with the dissemination of the obtained scientific and technical potential to underground mining enterprises.

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