

**AP13268841 “Development of technology for maintaining preparatory mine workings for conditions of coal mines” – p.m. Zhumabekova A.E.**

**Relevance:** is to provide reasonable technological solutions for determining the parameters of fasteners for its effective operation and can be achieved in the development and implementation of technology and means with justification of fastening parameters, taking into account the stress-strain state of the host rocks, which will reduce labor and material costs in the operation of mine workings, as well as to achieve a high technical and economic effect and improve the safety of underground mining operations.

**The project purpose** is to develop a technology for maintaining preparatory workings based on controlling the stress-strain state of the near-contour rock mass in front of the face.

**Expected and achieved results:**

Results achieved:

The following works were published during the reporting period:

1. Usenbekov M.S., Issabek T.K., Polchin A.I., \*Zhumabekova A.E., Dynamics of methane emission during mining operations in zones of geological disturbances, “Mining informational and analytical bulletin”, 2022;(12):141-151. Engineering Industrial and Manufacturing Engineering rating #244/338, 27th percentile. UDC 622.8:614.8 DOI: 10.25018/0236\_1493\_2022\_12\_0\_141

2. \*Zhumabekova A., Demin V., Abeuov E., Tanekeyeva G. “Mine workings supporting technologies on stress and strain state control basis”, "Scientific-technical and production "Mining Journal of Kazakhstan" #1, 2023, pp. 40-47

3. Zhumabekova A.E., Demin V.F. "Mine workings supporting technologies on stress and strain state control basis", CIP dated 08.06.2023.

4. Issabek T., Ussenbekov M., \*Zhumabekova A. Gas control in mines of the Karaganda basin (republic of Kazakhstan), collective scientific monograph on the theme: “Main directions of complex innovative scientific and technological development of mining regions”, published in English by the European publishing house, DOI: 10.31713/m1208.

5. Patent “Method of Combined Fastening of the Ventilation Excavation of the Mine Pillar” No. 8679.

\*Zhumabekova A., Demin V., Issakov B., Demina T., Tanekeyeva G. Evaluating the Efficiency of the Mine Workings Supporting Technology Application to Increase Contour Stability "Proceedings of the University" No. 1 (94), 2024, pp. 185-195.

Expected Results:

1. At least two (2) articles will be published in journals from the first three quartiles of impact factor in the Web of Science database or having a CiteScore percentile of at least 50 in the Scopus database.

2. At least 2 research articles will be published in journals in the CQAES, RSCI database.

3. a monograph will be published in English in a domestic publishing house.

4. It is planned to obtain 1 patent in Kazakhstan patent office, 1 certificate on registration of copyright objects.

5. The act of introduction on technological developments will be received.

6. A web-page will be created on the university website, where brief information about the project, obtained results, information about the project participants, etc. will be indicated.

7. The results of the research will be used in the preparation of educational and methodological materials on the specialty “Mining” students of bachelor, master and doctoral studies.



**Figure 1 - Carrying out R&D work within the framework of the project at the mine named after Tusup Kuzembayev JSC “Qarmet” CD**

***Research team:***

**Head of the project** - Zhumabekova Ayla Ermekovna, PhD, Senior Researcher at KazMRDI, Senior Lecturer at the Development of Mineral Deposits Department.

Hirsch Index - 4.

Author ID B Scopus: 57209741110

Researcher ID Web of Science: [AAA-6811-2022](#)

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Researcher ID in Publons: [AAA-6811-2022](#)

[Zhumabekova Ayla Ermekovna | Search results | Personal pages of KSTU faculty members \(kstu.kz\)](#)

**Scientific adviser** - Demin Vladimir Fedorovich, Doctor of Technical Sciences, Professor of the Department of "Development of Mineral Deposits".

Hirsch Index - 6.

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### ***List of publications:***

Publications of the head of this project and **members of the research team:**

1. Usenbekov M.S., Issabek T.K., Polchin A.I., \*Zhumabekova A.E., Dynamics of methane emission during mining operations in zones of geological disturbances, Mining Informational and Analytical Bulletin, MIAB. 2022;(12):141-151. Engineering Industrial and Manufacturing Engineering rating #244/338, 27th percentile. UDC 622.8:614.8 DOI: 10.25018/0236\_1493\_2022\_12\_0\_141

2. \*Zhumabekova A., Demin V., Abeuov E., Tanekeyeva G. “Mine workings supporting technologies on stress and strain state control basis”, “Scientific-technical and production “Mining Journal of Kazakhstan” #1, 2023, pp. 40-47

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### ***Information for potential consumers:***

Underground mine workings at the mines of Karaganda coal basin are in unstable condition (by displacements of rocks of the roof, soil and sides), are maintained with significant material costs and labor intensity of works, which is due to the lack of justification for compliance of parameters of their fastening to the conditions of operation in the given mining and geological, technical and production conditions. Adoption of reasonable technological solutions for determining the parameters of fastening and effective operation is necessary geomechanical predictive evaluation of the deformed state of the rocks of the surrounding rock mass around the perimeter of the mine workings. Development and implementation of technology and means with justification of parameters of their fastening with regard to the stress-strain state of the host rocks will reduce labor costs and material costs in the operation of underground mine workings.

Today, one of the urgent directions of development of the coal industry is the development and testing of technological resource-saving methods and active means of fixing workings with stabilization of the rock mass to achieve a high technical and economic effect and improve the safety of mining operations.

### ***Scope:***

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

*Information update date: 05.07.2024.*