

Report on the work of the dissertation Council

Dissertation Council on metallurgy and materials science at the Kazakh national research technical University named after K. I. Satpayev on specialties (direction of training):

- 6D070700 - Mining;
- 6D071100 - Geodesy.

1. Data on the number of meetings held – 3 meetings.

Surnames, first name, patronymic (if any) of the members of the dissertation Council who attended less than half of the meetings: the overwhelming majority of the members of the council attended more than half of the meetings.

Carsten Drebensteth - Doctor of Technical Sciences, 6D070700 - Mining (Germany) - attended less than half of the meetings for a good reason.

2. List of doctoral students indicating the organization of training:

- D. Baskanbayeva – KazNRTU named after K.I. Satpayev;
- R.Zhanakova – KazNRTU named after K.I. Satpayev;
- Ye. Aben – KazNRTU named after K.I. Satpayev.

1. Brief analysis of dissertations considered by the Council during the reporting year

№	Full name of the doctoral student	Topics of work	Code and title of specialty
1	Baskanbayeva Dinara	« Development of composite materials for reinforced filling and manufacture of gearbox housings »	6D070700 - Mining
2	Zhanakova Raissa	« Research of combined support structures and ways of their improvement»	6D070700 - Mining
3	Aben Yeldos	Innovative methods of restoration of temporary non-working walls of deep open-pits	6D070700 - Mining

4.1 The analysis of the subject of work of D.Baskanbayeva « Development of composite materials for reinforced filling and manufacture of gearbox housings », submitted for the Ph.D in specialty 6D070700 - Mining science and technology of new materials.

The dissertation paper of the doctoral student of the K.I. Satpayev KazNRTU Baskanbayeva D. is devoted to the problems of increasing the efficiency of mining and metallurgical enterprises by reducing the cost of materials dictates the need to search for new materials with improved characteristics and lower cost, which requires special studies that have been carried out in this work.

The regularity of the change in the impact strength of the reinforced fill from the amount of addition to the mixture of basalt fiber has been established, which makes it possible to design and obtain a fill mass with specified strength characteristics.

A model has been developed for the rational structure of a polymer concrete mixture with an intermittent granulometry of the aggregate, which makes it possible to obtain polymer concrete of high density and strength, which makes it possible to use it as a structural material in mechanical engineering.

The regularities of the influence on the strength of the hardened polymer concrete of the mixing modes (the frequency of rotation of the working body of the mixer, the mixing time of the components), the temperature of the binder (epoxy resin) and the drying temperature of the finished product were established, which made it possible to substantiate a rational technological mode of manufacturing products from polymer concrete.

The connection of the topic of the dissertation with the directions of development of science, which are formed by the Higher Scientific and Technical Commission under the Government of the Republic of

Kazakhstan in accordance with paragraph 3 of Article 18 of the Law "On Science" and (or) state programs. Scientific research on the topic of the dissertation was carried out within the framework of the grant «2018 / AP05131236» on the topic: «Modernization of mining and metallurgical equipment using innovative materials and drive arrangements», for 2018-2020.

Analysis of the level of implementation of the thesis results in practice.

According to the results of the dissertation paper of Baskanbayeva D. 16 scientific papers have been published on the topic of the dissertation, including publications include 5 articles in journals included in the Scopus database (Naukovyi Visnyk NHU, Mining of Mineral Deposits, Eastern-European Journal of Enterprise Technologies, Web of Science, IOP Conference Series: Materials Science and Engineering) with a high quartile Q2; 2 articles in journals recommended by the Committee for Quality Assurance in Education and Science of the Ministry of Education and Science of the Republic of Kazakhstan; 1 article in the journal recommended by the RSCI; 5 reports at International scientific and practical conferences, three of them in the far abroad (Romania); 3 articles in leading scientific journals from different countries.

4.2 The analysis of the subject of work of R. Zhanakova «Research of combined support structures and ways of their improvement», submitted for the degree of doctor of philosophy (PhD) in the specialty 6D070700 - Mining.

The dissertation paper of the doctoral student of the K.I.Satpayev KazNRTU Zhanakova R. is devoted to the problems to present a rational system of fastening and construction of combined supports based on a detailed study-analysis of the features of each of the individual sections of the rock mass and stress-deformation states that arise in mine workings, as permanent fasteners when driving a transport drift at the horizon + 230m (260) of the "Beskempir" mineral deposit. Study of their structural and bearing characteristics, analysis and substantiation of the technical and economic indicators of individual support elements.

Using the method of numerical modeling, determine the zones of distribution of the influence of tectonic faults in the massif through which the transport gallery passes, having studied the strategy and lithological features of the field.

Based on modeling, the interaction and dimensions of the mine workings are determined, taking into account the state of the rock mass, the interaction of the system components in the system "Massive-technology-workings".

Determination of the stability of rocks in the mining area by three independent modern methods (Building code-II-94-80, RMR and Q-rating) and their analysis of determining the stability class of rocks with clear divisions of the boundaries of the driveway attachment areas.

Based on the research materials, a new innovative, safe and economical system of fastening technologies is proposed to ensure the stability of mine workings.

Based on the results of the experiments, recommendations were proposed to prevent rock collapse and eliminate unreasonable margin of strength of the support in areas with increased stability, and in areas with difficult mining and geological conditions to exclude destruction and strengthen the supports as a result of ensuring the bearing capacity of the base (primary) support using additional elements.

The connection of dissertation topics with the areas of science development, which were formed by the Higher Scientific and Technical Commission under the Government of the Republic of Kazakhstan in accordance with paragraph 3 of article 18 of the Law "On Science" and (or) state programs. The main results and subject of the directions of dissertation work the subject «**Research of combined support structures and ways of their improvement**» correspond to the priority direction of development of science and formation of the strategic tasks and priorities aimed at the development of scientific, scientific and technical and innovative activity. They cross an array of rocks with different stability characteristics along their course. At present, only one type of support is used in mine workings to secure complex preparatory workings (gallery, crosscut, and adit), without taking into account frequent changes in mining and geological conditions in the massif, that crosses it along its length.

Analysis of the level of implementation of the thesis results in practice.

According to the results of the work of Zhanakova R.K., 24 publications were published, including: 1 article in the journal 60% percentile included in the Scopus database (Q2/0.24), and 1 article in the quartile journal Q3/0.13 included in the Scopus database, including 9 scientific publications recommended by the Committee for Control in the Field of Education and Science of the Ministry of Education of the Republic of Kazakhstan, 13 articles in the International Scientific and Practical Conference.

4.3 The analysis of the subject of work of Aben Ye. "Innovative methods of restoration of temporary non-working walls of deep open-pits", submitted for the degree of doctor of Ph.D in the specialty 6D070700 - Mining.

The dissertation paper of the doctoral student of the K.I.Satpayev KazNRTU Aben Ye. is devoted to the problems development of a design methodology for the mine development in working areas along the steep walls of deep open-pits, which ensures the de-conservation of non-working walls of the open-pit in the deposits of Kazakhstan.

The developed technology of the safe intensive mine development of the working area along the steep walls allows to eliminate the stripping work lagging in a shorter time than traditional methods. It allows to refuse the formation of temporarily non-working walls to reduce the current volume of stripping operations in deep open-pits. By using powerful excavator and truck system, the proposed order of the mine development of working areas in each technological stages of mining will ensure a consistent rhythmic production of stripping operation and extraction. It will help to create the required reserve of mined ore on the industrial stock-piles of processing plants with a much smaller volume of current stripping and will also simplify the process of ore averaging before its processing in comparison with the well-known analogues of the leading countries of the world.

A 3D model has been developed for the stage-by- stage formation of optimal open-pits in the development of steep dipping round-shaped deposits, on the basis of which a 3D model has been created for oval-shaped open pits. The 3D model of the stage-by-stage open-pits takes into account the shape of the ore deposit and the slope of the walls of the open-pit by using a one-dimensional spline of the second order along the horizontal sections. In describing the side surfaces of the ore deposits a two-dimensional spline is used. The determination of the optimal value of the radius of the contours of the open pit is achieved by the Newton method, when the desired accuracy is obtained after several iterations.

An algorithm has been developed for optimizing of the stage-by-stage open-pits with implementing a new order of the mine development of working area, which achieves an objective assessment of the transition to the development of high benches by transverse panels with two excavation levels when the direction of the working benches of working area is oriented perpendicular to the direction of the steep wall's benches. One algorithm combines mining-geometrical analysis and transformation of its results into an optimal realistically feasible mining schedule. As a result of mining and geometrical analysis, the optimal values of the stage-by-stage volumes of stripping works and ore extraction are obtained. After the transformation of the stage volumes into calendar schedule, it is established what volumes of ore can be extracted by each year and how much overburden must be mined out for this. Thus, it is possible to evaluate the proposed order of mine development of working area, depending on the demand for mineral raw materials at the design stage and to approach from the created dynamic model of the formation of optimal stage-by-stage open-pit to the dynamic model of the mine development of the working area along these stage-by-stage open pits, taking into account the direction of excavators' movement of a certain productivity and tracing of stripping workings.

Connection of the dissertation subject with the directions of science development that are formed by the Higher Scientific and Technical Commission under the Government of the Republic of Kazakhstan in accordance with paragraph 3 of article 18 of the Law "On Science" and (or) state programs. The research is based on the results of fundamental research on the topic No.751 MN.GF.12.17 "Development of a methodology for the optimization and implementation of breakthrough technologies in open pit mines with inclined and steep fall of layers" (2012-2014, scientific supervisor - Doctor of Technical Sciences, Professor Moldabaev S .K.), No.1686/GF4

"Intensification of construction, reconstruction and improvement of the efficiency of open pit operation with the use of two-level development of benches with an equal length of the front of their work" (2013-2015, scientific supervisor - Doctor of Technical Sciences, Professor Moldabaev S. TO.).

Analysis of the level of implementation of the results of the dissertation in practice. 12 publications have been published on the topic of the dissertation, including 1 article in journals reviewed by the Scopus database, 5 articles from the list of scientific journals recommended by the KKSON of the Ministry of Education and Science of the Republic of Kazakhstan. The main provisions of the dissertation work were reported at 6 international conferences, 4 of them abroad (Sweden, Ukraine and Russia).

5. analysis of the work of official reviewers (with examples of the most low-quality reviews)

№	Full name of the doctoral student	Reviewers	
		Full name of the first reviewer (position, academic degree, title, number of publications in the specialty for the last 3 years)	Full name of the second reviewer (position, academic degree, title, number of publications in the specialty for the last 3 years)
1	Baskanbayeva Dinara	Muzgina V.S. - Doctor of Technical Sciences, Professor, LLP "VIST Asia" expert and researcher on science and development	Graf A. Yu. - Candidate of Technical Sciences, Associate Professor, Kazakhstan Nuclear University
2	Zhanakova Raissa	D. K. Bekbergenov - Candidate of Technical Sciences, Head of the Laboratory "Complex Development of Mineral Resources", D.A.Kunaev Institute of Mining	G.K. Samenov - Candidate of Technical Sciences, Deputy Director of Kazakhaltyn Logistic LLP
3	Aben Yeldos	Demin V.F. - Doctor of Technical Sciences, Professor of the Department "Development of mineral deposits" of Karaganda Technical University, Karaganda	Adilkhanova Zh.A. - Candidate of Technical Sciences, Head of the Laboratory of Computer-aided Design of the D. A. Kunaev Institute of Mining, Almaty

All reviewers have research experience, published works in the areas of dissertations and meet the requirements.

5 Proposals for further improvement of the system of training scientific personnel. Increase the requirements for the work of scientific consultants (especially from

Kazakhstan) doctoral students in terms of the proposed topics of dissertation research and their leadership in the training of scientific personnel.

6 Data on the considered dissertations for the degree of doctor of philosophy PhD, doctor of profile

Dissertation Council	Code and title of specialty	Code and title of specialty
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	6D070700 - Mining	6D071100 - Geodesy
Dissertations accepted for defense	3	-
Including doctoral students from other universities	-	-
Dissertations withdrawn from consideration	-	-
Including doctoral students from other universities	-	-
Dissertations that received negative reviews from reviewers	-	-
Including doctoral students from other universities	-	-
Dissertations with a negative decision on the results of the defense	-	-
Including doctoral students from other universities	-	-
Dissertations aimed at completion	-	-
Including doctoral students from other universities	-	-
Dissertations aimed at repeated defense	-	-
Including doctoral students from other universities	-	-

Deputy Chairman of the Dissertation Council on Mining and Geodesy, Doctor of Technical Sciences

Scientific Secretary of the dissertation Council



H.Yussupov

G.Kyrgizbayeva