

## Report of the Dissertation Council on specialties 6D070700 - "Mining" and 6D071100 - "Geodesy" for 2019

1. Chairman of the dissertation council - doctor of technical sciences, professor Bayan Rakishev, approved by the order of the Rector of NJSC "KazNRTU" dated December 28, 2018, No. 503-P

In the reporting year 2019, the DC held 5 sessions, of which 3 were held to defend dissertations for the Ph. D. degree.D, including:

- 4 on a specialty 6D070700 – "Mining»;
- 1 on a specialty 6D071100 - " Geodesy».

At 3 sessions, the work plan of the Dissertation Council was considered and approved, PhD dissertations were reviewed, the dates of dissertation defenses were approved, the reviewers of dissertation works were approved, etc.

Defenses were held with the necessary quorum of Council members, in the presence of 3-4 doctors of science, candidates of science and PhD in the specialty of the defended dissertations.

2. The vast majority of Council members attended more than half of the meetings.

Carsten Drebenstedt - doctor of technical Sciences, 6D070700-Mining (Germany) - attended less than half of the meetings for a respective reasons.

### 3. List of doctoral students with an indication of the organization.

Table 1 shows data on doctoral students.

Table 1. Information about doctoral students

№	Full name of the doctoral student	Topics of work	Code and title of specialty	Organization of training
1	Jakupov Daniyar Amirkhanovich	Improving the efficiency of various in-situ leaching patterns for complex hydrogenous deposits development	6D070700 - "Mining"	KazNRTU named after K.I.Satpayev
2	Akhmetova Madinur Ismailzhanovna	Comprehensive assessment and ways to improve the quality of operation of quarry dump trucks	6D070700 - "Mining"	KazNRTU named after K.I.Satpayev
3	Sedina Svetlana Andreevna	Geomechanical stability of the quarry sides when it is deepened	6D070700 - "Mining"	KazNRTU named after K.I.Satpayev
4	Utegenova Assem Yerzhankyzy	Justification of a rational transport system based on energy career criterion	6D070700 - "Mining"	KazNRTU named after K.I.Satpayev
5	Orynassarova Elmira Orynassarovna	Improvement of the method of integrated preparation and use of space images in tasks of assessment of sedimentation of industrial surface in the conditions of operation of tengiz oil and gas field	6D071100 - "Geodesy"	KazNRTU named after K.I.Satpayev

### 4. Brief analysis of dissertations

#### 4.1 Analysis of the subject of the reviewed works

The subjects of the dissertations considered by the Council are related to research works of the Departments of "Mining", "Mine surveying and geodesy" KazNRTU named after K.I.Satpayev.

**Topics of dissertations for the Ph. D. degree.D in the specialty 6D070700 - "Mining"**  
is devoted to current problems:

- development of resource-saving technologies for processing complex structural blocks on the basis of their typification by the nature of the mutual placement of ores and waste rocks, forecasting their mining and technological characteristics in the collapse is an urgent and important scientific and technical task;

- research of geomechanical processes occurring in the earth's interior and ensuring the stability of mining operations in the combined development of mineral deposits;

- an important factor in increasing the competitiveness of mining enterprises is the automation of excavation, loading, transport operations and in-quarry quality management of ore raw materials. In the organization of mining and transport operations, each company needs an individual mechanism for operational adjustment, based on the availability of a single database of statistical data and high-quality feedback from all management objects.

Thus, the creation of a comprehensive automated quality management system for training in unstable mining and geological conditions of mining enterprises determines the relevance of the research.

**1. Jakupov Daniyar Amirkhanovich**, dissertation topic – «Improving the efficiency of various in-situ leaching patterns for complex hydrogenous deposits development» the defense was held on 17.05.2019.

**The scientific novelty of the thesis** is as follows:

to increase the efficiency of the uranium PSV by selecting the network and parameters of technological wells depending on the pH value, determining the inter-repair cycle of wells and the content of uranium in the productive solution from the volume of ammonium bifluoride and the use of hydrogen peroxide.

**Practical significance of the work** the thesis is based on experimental and industrial work at the Semizbay mine. The analysis of the research results was carried out on the basis of the mine's laboratory, where devices and installations that passed the state metrological verification during operation are used.

The tabular and graphical data uses units of measurement that meet the metrological rules and norms Of the international system of SI units.

**The realization of the work results.**

Based on the research performed:

- For the Semizbay field, it is recommended to use a row diagram of the location of wells and their drilling network of 25x25x25m, which leads to a stable, uniform flow of the process and rational consumption of reagents.

- The necessary pH values for the effective leaching process are reached after 60-70 days.

- A concentration of 25 kg of ammonium bifluoride per technological well is recommended for carrying out repair and restoration work.

- When using hydrogen peroxide, the required concentration of sulfuric acid in the leaching solution must be at least 13-15 g/l.

**2. Akhmetova Madinur Ismailzhanovna**, dissertation topic – «Comprehensive assessment and ways to improve the quality of operation of quarry dump trucks» the defense was held on 24.05.2019.

**The scientific novelty of the thesis** is as follows:

- the vector of optimal parameters of rational fixing of the available number of dump trucks of various types for excavators providing the minimum loss of time is established;

- complex dependences of dump truck performance on the distance of transportation, speed of movement and time spent on performing operations of loading and unloading of the dump truck, entrance for loading, unloading, waiting for loading are established;

- a new complex for loading has been developed that contains telescopic hydraulic jacks of the appropriate load capacity that are hinged on the dump truck body, which allow increasing the efficiency of the excavator-car complex with the existing vehicle fleet;

- based on the research of the optimal structure of the Park trucks that can optimize the complex whole system of transportation of rock mass by motor transport, and also to optimize the parameters of excavator loading dump trucks that improves the life of tires in 1.5-2 times, and the base metal dump truck 1.5-2.5 times.

**Practical significance of the work.** The use of developed methods and established regularities to improve the efficiency of the fleet of dump trucks, taking into account the structure of cargo flows, can increase the productivity of dump trucks transporting exploded rock mass, by reducing downtime, and justifying engineering solutions to prevent the destruction of dump truck frames.

**The realization of the work results.** According to the results of research, an application for the invention of the Republic of Kazakhstan on the topic "Method for loading rock mass into dump trucks and a set of devices for loading" No. 2018/0090. 1 dated 08.02.2018, confirmed by a positive result of a formal examination.

The act of implementing the results of the dissertation work in the educational process at MSTU named after G.I.Nosov.

**3. Sedina Svetlana Andreevna**, dissertation topic – «Geomechanical stability of the quarry sides when it is deepened» the defense was held on 24.05.2019.

**The scientific novelty of the thesis** is the geomechanical stability of the sides of the quarry during its excavation. The analysis of literature sources in the field of ensuring the stability of sides and ledges of deep quarries allows us to conclude that modern quarries are characterized by a complication of mining conditions due to an increase in the depth of development and involvement in the operation of fields with complex mining and geological conditions. In these conditions, the issues of geomechanical stability of deep quarries are of great importance. In this regard, for the first time, a comprehensive approach to geomechanical stability of quarry sides during its excavation will be proposed.

The following new scientific results were obtained:

- the regularities of changes in the structural structure of the block array (as a dependence of the structural attenuation coefficient on the amount of rock adhesion) and physical and mechanical properties with an increase in the depth of mining operations for the Sarbay quarry based on the results of field and laboratory studies have been established;

- identified areas of possible deformations of the sides of the Sarbay quarry by increasing the depth of its operation on the basis of mathematical modeling, taking into account the blocking structure of the array and changes its physical-mechanical properties in terms of area distribution and depth of the rocks;

- for the first time, a digital database consisting of geological, structural, hydrogeological models and the results of mathematical modeling of stability and stress-strain state was developed for the Sarbay Deposit. It is a three-dimensional geomechanical model that will ensure the stability of the sides and ledges of the quarry when the depth of its mining is increased to 700 meters.

**The practical significance of the work** lies in the development of a single database, represented by a geomechanical model of the field, on the basis of which it is possible to predict the occurrence of deformation processes of the side and ledges of the quarry during its further development.

**Implementation of work results.** The results of the dissertation work were accepted for production by sarbayskoe RU JSC "SSGPO", which is confirmed by the corresponding Act of implementation in the production process.

4. **Utegenova Assem Yerzhankyzy**, dissertation topic – «Justification of a rational transport system based on energy career criterion» the defense was held on 26.12.2019.

**The scientific novelty of the thesis** is as follows:

- in substantiation of the principle of energy assessment of technological processes of transport systems of deep pits, taking into account the universal criterion of specific energy intensity (specific energy consumption per unit of production) in the conditions of growing shortage of energy resources.

The following new scientific results were obtained:

- a method of energy assessment of various types of quarry transport is developed based on the established dependencies of specific energy consumption for the rise of rock mass on the parameters of intra-barrier routes, which allows forming energy efficient transport systems of deep quarries;

- methods for establishing rational slopes of quarry tracks based on the criterion of minimizing energy consumption for lifting the mountain mass have been developed;

- the dependences of the energy efficiency of the quarry transport systems on the depth of the main transport input and the organization of transport according to the "top-down" scheme are established».

**The practical significance** lies in the development of a method for establishing rational slopes of quarry tracks according to the criterion of energy consumption for lifting the mountain mass, in particular for dump trucks with Electromechanical transmission, the optimal guiding slope is determined by the quality of the road surface and is: for roads with asphalt concrete coating 80-100, for crushed stone roads 90-110, for roads without a coating on a rock base 100-120 ‰; for electrified railway and conveyor transport, the optimal slope (the angle of inclination of the conveyor lift) is: when using traction units 40-50, electric traction 30-40, belt conveyors of high performance, their angle of inclination is 170-19°, and for conveyors with a pressure belt 400-600.

Recommendations have been developed for establishing rational longitudinal slopes of the routes of certain types of transport according to the energy criterion, which should be considered as a particular optimum and the lower limit of the slope taken in the design of transport systems. The final decision on the guiding bias should be taken from the global optimum - the specific energy intensity of the entire transport system and economic indicators. Typically in deep open pit mines, the value of the optimal slope of the main modes of transport, established the energy consumption of the transport system, 10 - 25% higher values for the energy consumption of a specific type of transport.

**The realization of the work results.** As a result of the performed research, a new solution to the actual applied problem of increasing the energy efficiency of transport systems of deep pits is given. It consists in developing a method for energy assessment of various types of quarry transport, optimizing the slopes of transport communications, and developing an automated methodology for planning and rationing diesel fuel consumption based on a geo-information database.

**Topics of dissertations for the Ph. D. degree.D in the specialty 6D071100-Geodesy** is devoted to current problems in the field of geodesy and cartography:

- development of a rational method for determining the height of the cross-section of the terrain in conditions of terrain with complex terrain; study of morphometric characteristics of the relief of the earth's surface in order to improve the optimality and differentiation of the height of the cross-section of the terrain; improvement of the methodological basis for creating a DEM by effectively using different sources of information: aerospace, ground, cartographic;

- identify objects, buildings, structures and utilities located on the industrial site of the Tengiz field that may experience negative effects on their bearing capacity from the mining process.

**1. Orynbassarova Elmira Orynbassarovna**, dissertation topic – «Improvement of the method of integrated preparation and use of space images in tasks of assessment of sedimentation of industrial surface in the conditions of operation of tengiz oil and gas field», the defense was held on 26.12.2019.

**The scientific novelty of the thesis** is as follows:

- criteria have been developed for the optimal selection of radar data for the problems of assessing the subsidence of the earth's surface in the conditions of exploitation of the Tengiz field;

- the method of processing satellite images from the radar synthesized aperture from the range has been improved, which allows monitoring of deformation processes in technogenically loaded zones;

- it is established that the use of the innovative IS BASS algorithm allows to eliminate errors associated with the selection of a reference point when monitoring offsets.

**Practical significance of the work.**

ISBAS DInSAR technology was used to monitor soil deformation over the Tengiz oil field in Kazakhstan. A well-defined bowl with a maximum settling rate of -15.7 mm / year was identified as a result of analysis of ENVISAT SAR data for the period 2004-2009. This is confirmed by data from other DInSAR studies and confirmed by leveling data. A clear diagram of ground deformation with a maximum speed of 79.3 mm / year is obtained based on the extended coverage and density of accurate measurements of the ISBAS method, which is achieved without the need to deploy angle reflectors and use an arbitrary control point and does not require absolute ground positioning data, which increases the practicality of monitoring. It has been found that SBAS applications can offer more cost- and time-efficient operational tools for regional, long-term strain monitoring than a conventional ground-based sensor network.

It was found that more detailed and comprehensive measurements of soil movement can better characterize the formation and control it, as well as better understand the associated risk of soil subsidence and reactivation of tectonic disturbance.

Guidelines for the preparation and processing of space data based on experimental studies have been developed.

**The realization of the work results.**

The results obtained were introduced into the educational process during the course of the course, such as Remote Sensing of the Earth. Also, the developed technique for preparing and processing satellite images can be used by the Tengiz oil and gas field and research organizations to perform deformation monitoring using Sentinel-1 and ENVISAT ASAR data. The practical significance of the thesis can be justified by an article published in journals with a high impact factor, included in the web of science, Scopus, and Hirsch database of this article -1.

**4.1.2. Analysis of the level of use of scientific results of the reviewed works, proposals for expanded implementation of the results of specific works.**

Analysis of the use of scientific results of dissertations allows us to draw the following conclusions:

- 0% of the works were performed within the grant funding of the Ministry of education and science of the Republic of Kazakhstan;

- 40% of the work is used in the educational process;

- 60% of the works were put into production;

- 80% of the work completed research is confirmed by the act.

**5. Analysis of reviewers' work (with examples of the most low-quality reviews)**

№	Full name of the doctoral student	Reviewers	
		Reviewer's full name 1 (position, academic degree, title,	Reviewer's full name 2 (position, academic degree, title,

		number of publications in the specialty for the last 3 years)	number of publications in the specialty for the last 3 years)
1	Dzhakupov Daniyar Amirkhanovich	<b>Muzgina Vera Sergeevna</b> – doctor of technical Sciences, Professor, researcher of LLP "WEST Asia" (code of specialty 25.00.22)	<b>Bagasharova Zheniskul Telmanovna</b> - candidate of technical Sciences, chief researcher of RSE " NC KPMS RK "(code of specialty 25.00.22)
2	Akhmetova Madinur Ismailzhanovna	<b>Aben Khairulla Khalidollauli</b> - doctor of PhD, leading mining engineer of KAZ Minerals Management LLP (specialty code 6D070700)	<b>Adilkhanova Zhanna Adilkhanovna</b> - candidate of technical sciences, and about the scientific secretary of the Institute of mining named after D.A.Konaev (code of specialty 25.00.22)
3	Sedina Svetlana Andreevna	<b>Evseev Anton Vladimirovich</b> - candidate of technical sciences, Federal state budgetary educational institution of higher education "Perm national research Polytechnic University" (specialty code 25.00.20)	<b>Muzgina Vera Sergeevna</b> – doctor of technical Sciences, Professor, researcher of LLP "WEST Asia" (code of specialty 25.00.22)
4	Utegenova Assem Yerzhankyzy	<b>Muzgina Vera Sergeevna</b> – doctor of technical Sciences, Professor, researcher of LLP "WEST Asia" (code of specialty 25.00.22)	<b>Adilkhanova Zhanna Adilkhanovna</b> - candidate of technical sciences, and about the scientific secretary of the Institute of mining named after D.A.Konaev (code of specialty 25.00.22)
5	Orynbasarova Elmira Orynbasarovna	<b>Madimarova Gulmira Surabaldieva</b> - candidate of technical sciences. senior lecturer of the Department of Cartography and Geoinformatics of the Kazakh National University named after al-Farabi (specialty code 25.00.20)	<b>Kirgizbaeva Dinara Meirambekovna</b> - Doctor of PhD, RGKP "NKGf" (6D071100 - Geodesy).

The reviewers' reviews reflect the relevance of the topic of the dissertation, the degree of validity and reliability of scientific statements, conclusions and recommendations formulated in the dissertation. Marked in compliance with the set goals and results, dissertation topics and academic disciplines, the content of the thesis and published papers.

Specified:

- relevance of the thesis topic;
- the degree of novelty of the results obtained in the dissertation and the scientific provisions submitted for defense;
- scientific and practical significance of the results of the dissertation with recommendations for their use;
- publication of the results of the dissertation in the scientific press;
- compliance of the thesis design with the requirements of the HAC;
- compliance of the applicant's scientific qualification with the academic degree for which he / she is applying.

The advantages and disadvantages of the dissertation on the content of the design are noted, and the opinion on the work as a whole is given.

The main drawback of reviewers' reviews is that in some places they are not objective analytical, but descriptive.

Generally, reviews meet the requirements of the Ministry of education and science of the Republic of Kazakhstan.

#### 6 . Information on negative decisions made.

There are no negative decisions made on the dissertations being defended.

#### 7. Information on the doctoral students who came to the defense of the thesis (the reason)

№	Full name of the doctoral student	Organization of training	Code and title of specialty	The reason for the absence of protection
1	Toktarov Ayan	KazNRTU named after K.I.Satpayev	6D070700 - "Mining"	Delay in reviewing an article in the Scopus database
2	Kasymbaev Ershat	KazNRTU named after K.I.Satpayev	6D070700 - "Mining"	Expelled for violation of internal
3	Urazaliev Aset	KazNRTU named after K.I.Satpayev	6D071100 - "Geodesy"	Delay in reviewing an article in the Scopus database
4	Kidirbaev Bakhtiyar	KazNRTU named after K.I.Satpayev	6D071100 - "Geodesy"	The final results of the research require further development
5	Nurakynov Serik	KazNRTU named after K.I.Satpayev	6D071100 - "Geodesy"	The final results of the research require further development
6	Taukebaev Omirzhan	KazNRTU named after K.I.Satpayev	6D071100 - "Geodesy"	Delay in reviewing an article in the Scopus database

#### 8. Proposals for further improvement of the system of training scientific personnel

The problem of high-quality training of young scientific and pedagogical personnel is crucial for the development of any country involved in the international division of labor. To solve this problem it is necessary to improve the theoretical level and practical significance of dissertation research, this in our opinion should:

1. The volume and structure of dissertations should strictly correspond to the goals and objectives of the country's policy in the field of science, technology and engineering.
2. Increase the level of interest in research work among young people. It is necessary for young PhD doctors to feel their need in the areas of professional activity in which they specialized and received skills. To do this, it is advisable to develop a system of measures to encourage research by young scientists at the University.
3. The PhD degree should be awarded primarily to those applicants who are conducting research and teaching activities at the time of certification, which will serve to increase the quality of dissertations.
4. To ensure the preservation of continuity of generations.
5. Increasing the scientific and educational potential of the University by strengthening the material and technical base for conducting research, receiving the necessary number of applicants engaged in research activities at the University, at enterprises, in research institutes.
6. To improve the protection procedure it is proposed to increase the requirements for active participation of applicants in scientific seminars of departments.

7. Introduction of a decent payment for the work of reviewers, which will allow you to get a fair scientific examination.

8. Combining educational and scientific (research) processes by involving students in various research activities carried out by Department teachers and research staff.

9. Strengthening interaction with the world scientific community by increasing publications in authoritative peer-reviewed foreign journals with a high impact factor, which will increase the image and prestige of Kazakhstan's science, and strengthen the international authority of dissertations.

**9. Data on the considered dissertations for the degree of doctor of philosophy PhD, doctor in profile**

Dissertation council	Code and title of specialty 6D070700 - "Mining»	Code and title of specialty 6D071100 - "Geodesy»
Dissertations, withdrawn from consideration	0	0
Including removed by DC	0	0
Dissertations that received negative reviews from reviewers	0	0
Dissertations with a positive decision on the results of the defense	4	1
Including those from other organizations	0	0
Dissertations with a negative decision based on the results of the defense	0	0
B Including those from other organizations	0	0
Total number of defended theses	4	1
Including those from other organizations	0	0

*\* In columns 2 and 3, specify only the quantity*

Deputy chairman  
of dissertation council

Scientific secretary



signature

signature

Yusupov H.A.

Imansakipova B.B.