

Report on the work of the dissertation council
Dissertation council at IJSC " KazNRTU them. K. I. Satpayeva»
by groups of specialties 6D071200-Mechanical Engineering and 6D071600-
Instrument Engineering.

The report contains the following information:

1. Data on the number of meetings held.

Eight meetings were held during the reporting period:

24 Jan 2020 was a meeting of the dissertation council for the defense dissertation work by Arinovoy Dinary Baharovna on the theme "Research and design of centrifugal gyratory mill for grinding ore" submitted for the degree of doctor of philosophy (PhD) on specialty 6D071200 – "Instrument engineering".

25 Sep 2020 held a meeting of the dissertation Council at the choice of the Expert Commission for evaluation of research thesis the doctoral student of the Department "SCaET" Isayeva Irina Nikolaevna on the topic "Research of technological methods to improve manufacturing quality heavy-duty gear drive ball mills".

On October 8, 2020, a meeting of the dissertation council was held to accept documents, approve official reviewers on the dissertation work of doctoral student Irina Isaeva and approve the date of defense of the dissertation work on the topic: "Research of technological methods for improving the quality of manufacturing of heavy-duty gear drives of ball mills", submitted for the degree of Doctor of Philosophy PhD in the specialty 6D071200 - "Mechanical Engineering".

On November 13, 2020, meetings of the dissertation Council for the defense of the dissertation work of Irina Isaeva were held. on the topic: "Research of technological methods for improving the quality of manufacturing heavy-duty gear drives of ball mills".

November 13, 2020 meeting of the dissertation Council at the choice of the Expert Committee to assess research theses of doctoral students of the chair "Robotics and technical means of automation": Alimbayev Chingiz Abduraimovich on ""Development of software-technical complex system of non-invasive cardiognostic"", Ishmuhametova Azamat of Nurlanovich "Development and design of a continuum robot with a cable drive and passive wheels offset" specialty 6D071600 – "Instrument".

23 Nov 2020 held a meeting of the dissertation Council on the admission of documents related to the approval of the official referees of the dissertation work of the doctoral student alimbaeva Chingiz Abduraimovich on ""Development of software-technical complex system of non-invasive cardiognostic"" and doctoral Ishmuhametova Azamat of Nurlanovich "Development and design of a continuum robot with a cable drive and passive wheels offset" specialty 6D071600 – "Instrument engineering".

25 Dec 2020 was a meeting of the dissertation Council on protection of dissertations, doctoral Alimbaev Chingiz Abduraimovich on ""Development of software-technical complex system of non-invasive cardiognostic"" and doctoral Ishmuhametov Azamat of Nurlanovich "Development and design of a continuum robot with a cable drive and passive wheels offset" specialty 6D071600 – "Instrument engineering".

2. There are no names of council members who attended less than half of the meetings.

3. List of doctoral students indicating the organization of training.

№	Full name of the doctoral student	Organization of training
1	Akparova S. A. (6D071200-Mechanical Engineering)	Satbayev University
2	Dzhasinbekov O. A. (6D071200-Mechanical engineering)	Satbayev University
3	Dusebayev I. M. (6D071200-Mechanical engineering)	Satbayev University
4	Nusypali R. K. (6D071200-Mechanical engineering)	Satbayev University
5	Sagytag M.). (6D071200-Mechanical engineering)	Satbayev University
6	Turgunov F. C. (6D071200-Mechanical engineering)	Satbayev University
7	Angarbekov U. D. (6D071600-Instrument engineering)	Satbayev University

8	Alimbayeva Zh. N. (6D071600-Instrument Engineering)	Satbayev University
9	Amangaliev E. Z. (6D071600-Instrument engineering)	Satbayev University
10	Bayanbay N. A. (6D071600-Instrument engineering)	Satbayev University
11	Bekbay A. T. (6D071600-Instrument Engineering)	Satbayev University
12	Bazarbay L. (6D071600-Instrument engineering)	Satbayev University
13	Baurzhan A. B. (6D071600-Instrument making)	Satbayev University
14	Bigaliev Zh. S. (6D071600-Instrument Making)	Satbayev University
15	Vasin K. A. (6D071600-Instrument Engineering)	Satbayev University
16	Gritsenko I. S. (6D071600-Instrument Engineering)	Satbayev University
17	Izabekov Zh. N. (6D071600-Instrument Engineering)	Satbayev University
18	Zikirbay K. E. (6D071600- Instrument Engineering)	Satbayev University
19	Zhetenbayev N. (6D071600- Instrument Engineering)	Satbayev University
20	Rakhmetova P. M. (6D071600-Instrument Engineering)	Satbayev University
21	Tumabayeva A. K. (6D071600-Instrument Engineering)	Satbayev University

4. A brief analysis of the dissertations reviewed by the council during the reporting year, with the following sections highlighted:

4.1 Analysis of the subject of the reviewed works.

4.1.1. Analysis of the work of Kabdoldina Assem Oralkhanovna:

Analysis of the work of Arinova Dinara Bahberovna:

Dissertation topic "Research and development of the design of a centrifugal gyration mill for ore grinding" specialty 6D071200 - "Mechanical Engineering".

The dissertation was completed at Satbayev University.

The protection language is Russian.

Scientific consultants: Vitaly

Vitalyi Povetkin, Doctor of Technical Sciences, Professor at Satbayev University.

Askarov Erlan Seitkasymovich-Candidate of Technical Sciences, Professor at Satbayev University.

Stefan Vöth-Doctor of Engineering, Professor at the Georg Agricola University of Technology, Bochum, Germany. The defense took place on March 13, 2019.

The defense took place on January 24, 2020.

Development of an improved design of a centrifugal gyration mill with intensive grinding of the grinding material, due to the total impact of shock loads, friction and additional abrasion, from the rotation of the grinding elements around its own axis and stabilization of shock loads, which provides a flexible connection of the counterweight attachment with the crank shaft.

Studies on the parameters of a centrifugal gyration mill were carried out. Theoretical methods of modeling, methods of mathematical analysis are mastered. An innovative design of a centrifugal gyration mill is proposed in which the grinding material is intensively crushed due to the combined impact of impact, friction and additional abrasion by rotating the grinding elements around their own axis. As well as the stabilization of shock loads due to the flexible connection of the counterweight attachment by the crank shaft.

A method of static calculation of the crank shaft is proposed, which allows us to justify the stress-strain state from the action of loads transmitted through the shaft, from the inertial forces of moving parts arising during the rotation of the shaft.

The finite element method, which allows to take into account the features of the geometry of the structure and its loading, to analyze the dynamic characteristics of the crank shaft, its multi-cycle fatigue and vibration strength.

4.1.2. Analysis of the work of Irina Nikolaevna Isaeva:

Dissertation topic "Research of technological methods for improving the quality of manufacturing of heavy-duty gear drives of ball mills" specialty 6D071200 - "Mechanical Engineering".

The dissertation was completed at Satbayev University.

The protection language is Russian.

Scientific consultants:

Vitalyi Povetkin-Doctor of Technical Sciences, Professor at Satbayev University.

Dorofeev Vladislav Leonidovich Doctor of Technical Sciences, Professor, Chief Researcher of the State Scientific Center Federal State Unitary Enterprise " Central Institute of Aviation Motor Engineering named after P. I. Baronov.

The defense took place on November 13, 2020.

Modeling and investigation of the manufacturing quality of heavy-duty gears based on the software package AEROFLANK was performed. The dynamics of bending stresses of gears in the AEROFLANK program is calculated with modifications of 11 and 22 microns, which reduces contact stresses to 400 MPa, and bending stresses to 30 MPa. The developed program of calculation of parameters of electric drive control system with the mechanical part of ball mill based on the method of Runge-Kutta 4-th order establishing that a reduction of dynamic load on gear at the expense of the damping ability of the drive shaft and the magnetic drive system. The dynamic analysis by the finite element method in the NASTRAN system is carried out, the amplitude-frequency characteristics of the drive shaft with a gear transmission and the influence of their peak characteristics on the wear resistance of gears are determined. The material of the toothed crown is analyzed, its technological qualities are evaluated, the influence of molybdenum on grain grinding, increase in hardenability and increase in strength is established, which eliminates the tendency to release brittleness, delays the decay of martensite and contributes to the preservation of high hardness during operation.

4.1.3. Analysis of the work of Alimbayev Chingiz Abdraimovich:

Dissertation topic "Development of software and hardware complex of non-invasive cardiognostics system" specialty 6D071600 - "Instrument engineering".

The dissertation was completed at Satbayev University.

The defense language is Kazakh.

Scientific consultants:

Ozhikenov Kasymbek Adilbekovich-Candidate of Technical Sciences, Professor of Satbayev University.

Bodin Oleg Nikolaevich, Doctor of Technical Sciences, Penza State University.

The defense took place on December 25, 2020.

A system of non-invasive cardiognostics has been developed, which provides high noise immunity, guaranteeing the reliability of automatic conclusions in the conditions of free activity of patients. The structure of a multicomponent filter based on the principle of adaptive filter aggregation is developed. Testing and selection of individual filters for various signal-interference situations was carried out within the framework of the implementation of the method of adaptive filtering of electrocardiosignals. Based on the formulated requirements, a detailed functional block diagram of the device was developed and built. After selecting the element base, an electrical circuit diagram of a portable mobile cardioanalyzer was designed. Special attention was paid to the functional composition of the device and its reduced power consumption. Based on the developed electrical circuit diagram, the printed circuit board of the device was designed, which in assembled form is actually a ready-made hardware platform of the cardioanalyzer.

4.1.4. Analysis of the work of Yeshmukhametov Azamat Nurlanovich:

Dissertation topic " Design and Development of Novel Wire-driven Continuum Robot Arm with Passive Sliding Disc Mechanism: Kinematic Analyses and Experiments " specialty 6D071600- "Instrumentation engineering".

The dissertation was made at Satbayev University.

The language of defense is English.

Scientific supervisors:

Seidakhmet Askar Zhunisovich – candidate of technical sciences, associate professor of Kazakh National Research Technical University named after K.I. Satpayev, Almaty, Kazakhstan.

Yoshio Yamamoto – doctor PhD, professor, Tokai University, Tokyo, Japan.

The defense took place on December 25, 2020.

The doctoral dissertation explained a novel type of continuum robot backbone with passive sliding mechanism. Proposed a novel backbone design improved robot manipulation in the space and decreased friction along the backbone. In wire-driven mechanisms suffers from friction, in this research proposed sliding mechanism decreased friction between wire and robot components.

Moreover, this research also proposed a novel pretension mechanism to compensate wire-tension during the robot manipulation. Proposed passive pretension mechanism not only compensates tension also it allows to decrease number of motors twice. Moreover, using mechanism improved robot payload capacity. All of the proposed mechanisms had been tested and verified kinematics by conduction tests and experiments.

4.2. Connection of dissertation topics with national state programs, as well as targeted Republican and regional scientific and technical programs.

4.2.1. Dissertation work of a PhD student in the specialty 6D071200 - "Mechanical Engineering". Arinova D. B., on the theme "Research and design of centrifugal gyratory mill for grinding ore", the issues of structural and technological improvements centrifugal gyratory mill, which justified the service life of centrifugal gyratory mill in conditions of intensive shock loads. High economic efficiency due to low specific energy consumption and metal consumption, high specific productivity, relatively small dimensions of the mill and simple design.

4.2.2. Thesis doctoral PhD on specialty 6D071200 - "Mechanical engineering" Isaeva I. N., on the topic of the thesis "Research of technological methods to improve manufacturing quality heavy-duty gear gear drive ball mills" was executed by the project of the Department "Standardization, certification and technology of machine building", No. 757. Mon. GF. 15.EM.5 "Development of design 10 technological methods of increase of wear resistance of heavy-duty gear gear drive ball mills".

4.2.3. Thesis doctoral PhD 6D071600 - "Instrumentation engineering" H Alimbaev Ch., on "Development of program-technical complex system of non-invasive cardiologic" was carried out in accordance with the commercialization project No. 0281-18-GK - "Portable cardioanalyser" JSC "Fund of science" MES RK.

4.2.4. Thesis doctoral PhD 6D071600 - "Instrumentation engineering" Yeshmukhametov A. N., on the topic of "Development and design of a continuum robot with a cable drive and passive wheels offset" performed a project to develop a new design for continuum robot with movable discs for distributions after all that load the spine evenly.

At the moment, traditional robots with rigid construction do not cope properly for working in cramped and unstructured places for technical and inspection work. Therefore, for such purposes, it makes sense to develop continuum robots. What's more, Continuum robots mostly work with a cable drive that allows the robot to be used in harsh environments such as underwater or in places with high radiation. The project is a prototype for the use of more complex robotic worm-type systems.

4.3. Analysis of the level of implementation of the results of dissertations in practice.

4.3.1. Dissertation work of a PhD student in the specialty 6D071200 - "Mechanical Engineering". Arinova D. B., on the theme "Research and design of centrifugal gyratory mill for grinding ore", implemented at the plant JSC "Axlerod" that received implementation act . They were given:

- method and technology of grinding of centrifugal gyration mill model CGM140 / 320;
- working drawings for the experimental centrifugal gyration mill model CGM 140/320.

Centrifugal single - shaft mill / Patent RK 3988 Kl. V02S 17/08, 1996; Centrifugal single-shaft mill / Patent RK15934 Kl. V02S 17/08, 2005; Centrifugal mill / Patent RF 2346745 Kl. V02S 17/08, 2009; Centrifugal mill / A. S. SU 1080854 V02S, 1984; Centrifugal double-shaft mill / Patent RK 3416 V02S 17/08, 1998; Centrifugal impact mill/ A. with SU 977012 B02C 17/08, 1982; Centrifugal-rocker single-shaft mill / Patent RK 6175 B02C 17/08, 2001.

4.3.2. Thesis doctoral PhD on specialty 6D071200 - " Mechanical Engineering " Isaeva I. N., on the topic of the thesis "Research of technological methods to improve manufacturing quality heavy-duty gear gear drive ball mills" is implemented at JSC Petropavlovsk heavy machine engineering plant Petropavlovsk Heavy Plant (PHMEP) (g. Petropavlovsk, Kazakhstan) and at the plant of JSC "Axlerod" (Shymkent, Kazakhstan), LLP "Scientific innovation center "Almas" (Almaty, Kazakhstan), and the resulting Acts of implementation.

1) Patent of the Republic of Kazakhstan No. 22999. Method for applying protective coatings to the working surfaces of heavy-duty gears. Povetkin V. V., Sushkova O. A., Publ. 15. 10. 2010, byul.No. 10; 2) Patent of the Republic of Kazakhstan No. 23770. Method of strengthening gears. Povetkin V. V., Sushkova O. A. Publ. 14. 09. 2012, Bulletin.No. 9; 3) Innovation Patent of the Republic of Kazakhstan No. 29620. Method for strengthening the gears of the ball mill drive. Povetkin V. V., Sushkova O. A., Ibragimova Z. A. Publ. 16. 03. 2015, Bulletin. №. 3.

4.3.3. Dissertation work of a PhD student in the specialty 6D071600 - "Instrument Engineering" Alimbayev Ch.A., on the topic "Development of a software and hardware complex of a non-invasive cardiodiagnostic system". The current layout of a portable information and measurement monitoring system for determining dangerous cardiac arrhythmias in conditions of free activity expands the functionality of Holter monitoring of EX, is used in the educational process of the Kazakh National Research Technical University named after K. I. Satpayev and is being tested in the city hospital of JSC "Central Clinical Hospital" of Almaty.

4.3.4. Dissertation work of a PhD student in the specialty 6D071600 - "Instrument Engineering" Yeshmukhametov A. N., on the topic "Development and design of a continuum robot with a cable drive and passive displacement disks" in the future can be used both for assembly and for inspections in cramped rooms. The results of the research were included in the educational program in the discipline of biomorphic and anthropomorphic robotics specialty 6B071600 - Mechatronics and Robotics.

5. Analysis of the work of official reviewers (with examples of the most low-quality reviews) - no.

6. There are no proposals for further improvement of the system of training scientific personnel.

7. Number of dissertations for the degree of doctor of philosophy(PhD), doctor by profile in the context of specialties (areas of training):

1) 4 dissertations accepted for defense including doctoral students from other Universities- no;;

2) no dissertations withdrawn from consideration (including doctoral students from other Universities);

3) there are no dissertations that received negative reviews from reviewers (including doctoral students from other Universities);

4) there is no dissertation with a negative decision based on the results of the defense (including doctoral students from other Universities).

Chairman of the dissertation council
Academic Secretary of the dissertation council

Baygunchekov Zh.Zh.
Baktybayev M.K.

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