



SCIENTIFIC RESEARCH OF THE SCO COUNTRIES: SYNERGY AND INTEGRATION

上合组织国家的科学研究：协同和一体化

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这些会议文结合了会议的材料 – 研究论文和科学工作者的论文报告。它考察了职业化人格的技术和社会学问题。一些文章涉及人格职业化研究问题的理论和方法论方法和原则。

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俄罗斯和中国海关合作的创新技术是增加相互贸易的一个因素
**INNOVATIVE TECHNOLOGIES OF CUSTOMS COOPERATION
BETWEEN RUSSIA AND CHINA AS A FACTOR IN INCREASING
MUTUAL TRADE**

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抽象的。该研究主题的相关性在于，俄罗斯和中国之间的合作是全面的，为进一步加强海关当局之间的互动开辟了新的机遇和途径，包括通过引入海关通关和管制的创新方法，并确定其对深化俄中双边贸易产生影响。文章的结论是，有必要制定一项将创新技术引入两国海关合作的计划。

关键词：清关和海关监管创新技术、中俄贸易、促进相互贸易、海关合作、海关合作发展计划、创新技术引进计划。

Abstract. *The relevance of the research topic is due to the fact that cooperation between Russia and China is comprehensive, opens up new opportunities and ways for further strengthening interaction between customs administrations, including through the introduction of innovative methods of customs clearance and control, and determining their impact on deepening mutual trade between Russia and China. The article concludes that it is necessary to develop a program for introducing innovative technologies into customs cooperation between the two countries.*

Keywords: *innovative technologies for customs clearance and customs control, Russian-Chinese trade, promotion of mutual trade, customs cooperation, customs cooperation development program, program for the introduction of innovative technologies.*

With the advent of information and communication technologies, such as automation, digitalization, electronic database systems and their mutual use between countries, customs services around the world are faced with the opportunity to

significantly improve the efficiency and accuracy of customs clearance and control of goods, reduce costs and customs risks, and minimize bureaucratic burden on foreign trade participants.

Despite the fact that customs cooperation between Russia and China permeates all main areas of customs business, the implementation of joint programs and agreements does not highlight the introduction of innovative methods of customs clearance and control as a particularly significant task.

The problem under consideration determines the relevance of the study, the purpose of which is the need to formulate a program for introducing innovative technologies into the practice of customs cooperation between Russia and China, and determine its impact on the deepening of mutual trade between the two countries.

The scientific novelty and practical significance of the work lies in the scientific substantiation of the need to introduce innovative technologies in customs operations and customs control between Russia and China; determining their impact on deepening mutual trade between the two countries. In this study, in order to solve the urgent problem of promoting mutual trade between the Russian Federation and the People's Republic of China, a program for introducing innovative customs technologies into the system of customs operations and control is considered. It is expected that the implementation of this program will ensure the gradual integration of national customs clearance and control systems, will contribute to reducing the time of cargo clearance, simplifying customs operations, transparency of cargo clearance, improving the security of international supplies and increasing the efficiency of mutual trade between Russia and China.

In the modern world, innovation and advanced technologies are becoming increasingly important factors determining success in the economic sphere. Globalization and international trade create new opportunities and challenges for countries, especially in the context of expanding trade relations between countries. Russia and China, two leading economic powers, have great potential for developing mutual trade, and this area is one of the priorities for both countries. The introduction of innovative technologies into the practice of customs clearance and control leads to the simplification of customs procedures and a significant increase in the efficiency of international trade.

Currently, sanctions applied by unfriendly countries pose the task of Russian customs services to increase the volume of foreign trade turnover, simplify customs formalities and the administrative burden on business through digitalization and automation of customs control processes when implementing the "smart" checkpoint model (Fig. 1) [1].

The "smart" checkpoint model provides for the automation of all operations carried out at the checkpoint, including:

- automatic reading of vehicle and trailer numbers and container numbers in information resources;
- automatic detection of radioactive materials;
- automated weight and dimensional control and portal PDM, which allows for control of goods without stopping the vehicle.



Figure 1. Automation of customs control processes when implementing the “smart” checkpoint model

In the context of the tough geopolitical situation in Russia and the imposed sanctions, the development of innovative areas for improving foreign trade with friendly countries, including an important strategic partner China, is a priority task for customs authorities [2]. Studies of statistical data on the volumes of foreign trade between Russia and China inspire hope for the further expansion of mutual trade. According to the General Administration of Customs of the People’s Republic of China, in 2022, trade turnover between Russia and China increased by 29.3%, reaching \$190.27 billion. USA, the Russian Federation accounted for 3% of China’s total foreign trade turnover. In 2023, the foreign trade turnover of the two countries reached \$240 billion. USA.

In this regard, the implementation of joint agreements defined in the Treaty on Good Neighbourliness, Friendship and Cooperation of 2001, which was extended in 2021 for another five years, is particularly significant. The continuation of the agreement was the signed protocols and orders between the Federal Customs Service of Russia and the State Customs Administration of the People’s Republic of China on customs cooperation between the two countries [3]. China’s “Made in China 2025” program includes the use of a new generation of information technology in regulating international trade. Cooperation with Russia in this area and the use of Russian scientific and technical developments will help improve trade and economic relations between the two countries. Due to the introduction of new digital technologies, cus-

toms clearance in China for imported goods in 2022 was 39.66 hours, while the time for exported goods was 2.28 hours, which is a significant reduction (59% and 81% respectively) according to compared to previous years.

China has consistently advocated for increased trade activities with other countries using rail transport, which will help companies solve export and import problems and encourage more companies from countries related to the Belt and Road Initiative to join the authorized economic operators certification program (AEO), supported by the WTO [4]. To simplify the procedure for carrying out export-import operations, China has already signed AEO agreements with 48 countries, including Russia [5].

One of the most important factors determining the deepening of mutual trade is the simplification of trade procedures. In international trade law, recommendations are being developed in documents and guidelines that note the important role of introducing information and communication technologies to simplify customs and trade procedures. In the UNECE Trade Facilitation Practical Guide and the Practical Guide for National Trade Facilitation Authorities: How to Use UN/CEFACT Standards and Tools (2021) (UN/CEFACT - United Nations Center for Trade Facilitation and Electronic Business) an approach to identifying trade facilitation tools has been implemented [6]. UN/CEFACT creates additional potential for the development of digitalization and the use of paperless international trade, the introduction of such innovative tools to facilitate trade procedures as:

- ✓ simplification and harmonization of documents, reducing the number of documents confirming the information of the customs declaration;
- ✓ standardization of electronic exchange of trade information;
- ✓ non-intrusive control technologies;
- ✓ selective control based on customs risk management;
- ✓ mutual recognition of authorized economic operators;
- ✓ introduction of the “green corridor” and “single window” mechanisms.

Articles 6.14 - 6.18 of the Agreement on trade and economic cooperation between the EAEU and its member states, on the one hand, and the PRC, on the other hand, dated May 17, 2018, pay attention to the use of information technologies, in particular, the transfer of advanced technologies and innovations ; development and use of information and communication infrastructure; promoting innovation; development and implementation of national “single window” mechanisms; mutual recognition of electronic documents and information necessary for carrying out foreign trade activities, and the results of customs control within the framework of integrated border management; formation of an organizational, legal and technical framework that allows for information interaction between national “single window” mechanisms; mutual recognition of AEO status, development of customs infrastructure [7].

Such a significant number of trade facilitation instruments allows us to consider it sufficient to form an innovative base for customs cooperation between the two countries. However, this Agreement notes that the Russian Federation and the People's Republic of China use information technologies to carry out customs operations when it is economically feasible and profitable; will strive to form an organizational, legal and technical base that will allow for innovative information interaction between national mechanisms using the existing technical infrastructure of the EAEU Integrated Information System and the platform infrastructure of the Central Electronic Port of the People's Republic of China.

We believe that this document is not about the formation of a special algorithm for the use of information technologies to deepen mutual trade between Russia and China, but only notes their economic feasibility. In this regard, the need to form a program for introducing innovative technologies into the practice of mutual trade, discussed in the article, is justified (Fig. 2). It is logical to sign an Agreement on electronic information exchange on goods and vehicles between the Federal Customs Service of the Russian Federation and the State Customs Office of the People's Republic of China and assign the implementation of this program to the Subcommittee on Customs Cooperation of the Customs Administrations of the Russian Federation and the People's Republic of China.

The basis of the contractual legal framework of the program before the conclusion of the Agreement may be the signed protocols and orders between the Federal Customs Service of Russia and the State Customs Administration of the People's Republic of China on customs cooperation between the two countries.

The main projects being implemented in this program will be:

- ✓ projects “Green Corridor” and “Single Window”;
- ✓ ensuring the security of the supply chain during container transportation;
- ✓ formation of a system of end-to-end control [8];
- ✓ interaction and mutual recognition of the results of customs control of goods transported within the framework of electronic commerce;
- ✓ use of smart locks during the transit of goods;
- ✓ mutual recognition of AEO status.

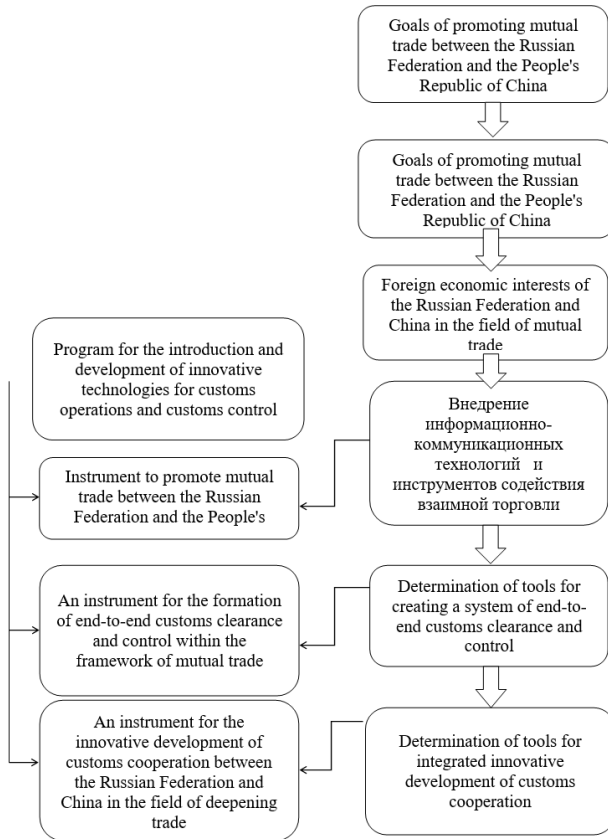


Figure 2. Program for the introduction of innovative customs technologies into the system of customs operations and control as a tool for promoting mutual trade between the Russian Federation and China

Conclusions

Thus, the analysis of innovative technologies used in customs cooperation between the Russian Federation and China allowed us to state that the introduction of innovative technologies should be normatively enshrined in the Agreement on Electronic Information Exchange on Goods and Vehicles Moved across the customs border of the EAEU and China, and implemented under the Implementation Program innovative customs technologies into the system of customs operations and control. According to specialists from the Federal Customs Service of the Russian Federation and the State Customs Office of the People’s Republic of China, the introduction of information and communication technologies, the

joint implementation of the Green Corridor and Single Window projects, mutual recognition of the results of customs control and AEO status will simplify trade and customs procedures and will contribute to the deepening of mutual trade due to the following effects [9]:

- ✓ creation of a unified database for electronic information exchange about goods and vehicles, remote interaction between customs authorities and foreign trade participants, represented by the services of the “Personal Account of a Foreign Trade Participant” on the website of the Federal Customs Service of Russia and the services of the “Single Window System for International Trade of China”;
- ✓ transition to a one-time submission of documents and information by participants in foreign trade activities as a result of the introduction of uniform forms of documents and information;
- ✓ elimination of repeated verification of documents using RMS as a result of the introduction of uniform risk profiles [10].;
- ✓ elimination of repeated application of customs control forms as a result of the introduction of mutual recognition of customs control results and mutual recognition of AEO status [11].

The goals of the program for introducing innovative customs technologies into the system of customs operations of the Russian Federation and the People’s Republic of China are formulated as integration, unification and standardization of customs operations and customs control of the customs services of the Russian Federation and China, and will contribute to the deepening of mutual trade.

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管理数字化转型系统的功能架构
**FUNCTIONAL ARCHITECTURE OF MANAGING DIGITAL
TRANSFORMATION SYSTEM**

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文章摘要。现代条件下管理数字化转型的新方法需要迅速响应业务环境和客户受众偏好的变化，及时分析数字化转型轨迹的各种选项及其相应的变化。由于管理流程的复杂性，现代数字化转型计划的修订和调整周期可能会很频繁，因此建议将规划、管理和调整的过程结合到一个管理链中，包括监控、预测外部因素的影响。企业产品线及相关产品和流程的因素，数字化转型有效性的运营（在线）评估及其实施的相应运营调整。建议以数字化转型管理信息系统（或一组集成组件）的形式将这样一个单一的数字化转型管理链完全或部分自动化，在该信息系统下，除了战略管理、项目管理、开发自动化和管理其他数字组件。本研究制定了现代条件下管理数字化转型的信息系统的功能架构。拟议研究的科学新颖性在于确定了现代数字化转型管理系统的组成部分，该系统能够对业务环境的变化做出及时、敏感的反应，并预测其后果。实用价值在于在实施数字化转型时可以使用开发的功能架构。

关键词：数字化转型、数字化转型自动化、业务环境变化、数字化转型管理信息系统。

Summary of the article. *New approaches to managing digital transformation in modern conditions require a prompt response to changes in the business environment and preferences of the client audience, prompt analysis of various options for digital transformation trajectories with their corresponding changes. Due to the complexity of management processes, the potentially high frequency of revision and adjustment cycles of modern digital transformation plans, it is advisable to combine the process of planning, management and adjustment into a single management chain, including monitoring, forecasting the impact of external factors on the enterprise's product line and on related products and processes, operational (on-line) assessment of the effectiveness of digital transformation and corresponding operational adjustments to its implementation. It is advisable to*

fully or partially automate such a single digital transformation management chain in the form of an information system (or a set of integrated components) for digital transformation management, under which, in addition to strategic management, project management, development automation and other digital components are managed. This study formulates the functional architecture of an information system for managing digital transformation in modern conditions. The scientific novelty of the proposed research lies in identifying the components of a modern digital transformation management system that enable timely and responsive reactions to changes in the business environment, as well as forecasting their consequences. The practical value lies in the possibility of using the developed functional architecture when implementing digital transformation.

Keywords: *digital transformation, automation of digital transformation, changes in the business environment, digital transformation management information system.*

Despite the fact that the tasks of managing and determining the effectiveness of digital transformation are being actively discussed, unified, effective approaches, methods of managing and determining the effectiveness of digital transformation have not been developed [1,2,3,4,5,6,7]. Managing digital transformation often comes down to managing digitalization projects, and measuring the effectiveness of digital transformation is mainly proposed as a calculation of individual indicators that determine the overall condition of the enterprise. The composition of indicators and the intervals for their calculation often correspond to general economic, traditional approaches without taking into account the influence of modern digital technologies, the speed of their changes and impacts on the surrounding business environment, increased competition, and reduced time to market for new products [3,4,6]. As the nature of added value has changed, old management methods, performance assessments that work to evaluate individual projects or automation and digitalization of the enterprise as a whole, are losing their effectiveness. In this regard, it is advisable to make a transition and consider the digital transformation strategy as the main document of the enterprise's strategic planning, and integrate it with the business strategy into one whole. If an enterprise has a traditional customer, a client who can be clearly specified, with clear requirements, then traditional management techniques and digitalization tools using management methods by goals and KPI can be quite effective. However, if there is no targeted customer, the products are aimed at a mass heterogeneous user, then it is advisable to manage using new approaches [8]. For management, a methodology is used in which each product of the enterprise's product line for the mass consumer is designed, monitored, evaluated and managed separately. In fact, each product, its production, development and promotion is considered as a

dedicated separate financial responsibility center (FRC) - a potential profit center. At the same time, the company's operating model is changing - its single, often centralized, functional administrative structure is breaking up into separate central financial districts with their own separate teams. Within the framework of the previous structure, only general supporting units remain, as well as those centralized functional blocks that are associated with those company products that are not subject to digital transformation.

New approaches to managing digital transformation in modern conditions [8] involve a prompt response to changes in the business environment and preferences of the client audience, prompt analysis of various options for digital transformation trajectories with their corresponding changes. Due to the complexity of management processes, the potentially high frequency of revision and adjustment cycles of modern digital transformation plans, it is advisable to combine the process of planning, management and adjustment into a single management chain, including monitoring, forecasting the impact of external factors on the enterprise's product line and on related products and processes, operational (on-line) assessment of the effectiveness of digital transformation and corresponding operational adjustments to its implementation. It is advisable to fully or partially automate such a single digital transformation management chain in the form of an information system (or a set of integrated components) for digital transformation management, under which, in addition to strategic management, project management, development automation and other digital components are managed.

The main users of the expert information system for managing digital transformation in modern conditions are:

- management of the company, its owners or their representatives;
- employees of the project office (or other specialized unit for managing digital transformation) performing work on planning and implementing digital transformation;
- product owners;
- design and production teams for the creation and development of products.

The large-block information system consists of the following components:

- **Main digital transformation pipeline;**
- **Initial planning module** (keeps track of the initial digital transformation strategy as the starting point of its main pipeline);
- **Architecture description repository**(manages the digital twin of the digitalization of the enterprise);
- **Project management;**
- **Module for monitoring changes in the business environment** (monitors changes in the business environment, with each change in the business

environment, calculates the current and forecast (taking into account the forecast of the behavior of factors of changes in the business environment) effectiveness of each product of the company and the enterprise as a whole);

- **Module for monitoring initiatives for changes in product parameters** (monitors initiatives to change the functional and technical parameters of the company's products, monitoring the assessment of the effectiveness of each product, taking into account the implementation of such high-priority (key) or most expensive initiatives (setting the priority level and cost threshold should be carried out in the module settings; ranking by priorities and the initial expert assessment of cost is carried out when forming and replenishing the backlog of the corresponding product));
- **Digital transformation adjustment module** (when the assessment goes beyond the threshold values specified during monitoring, the monitoring modules generate a signal about the need to analyze the feasibility of adjusting the trajectory of the implementation of digital transformation; the assessment results from the monitoring modules enter the analytics module, where, on their basis, materials and scenarios for adjusting the digital transformation trajectory are prepared, carried out calculations of the effectiveness of such adjustments, including taking into account the forecast of changes in the business environment; the results of the adopted adjustments are reflected in the main digital transformation pipeline and in the repository of architecture descriptions);
- Analytics module (BI system).

The scientific novelty of the proposed research lies in identifying the components of a modern digital transformation management system that allow timely and prompt response to changes in the business environment and predicting their consequences. The practical value lies in the possibility of using the developed functional architecture when implementing digital transformation.

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住房供应作为俄罗斯地区人口和社会经济发展的一个因素
**HOUSING PROVISION AS A FACTOR OF DEMOGRAPHIC AND
SOCIO-ECONOMIC DEVELOPMENT OF RUSSIAN REGIONS**

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抽象的。在经济形势变化、外部环境严峻、经济制裁不断出台的背景下，经济可持续发展问题显得尤为重要。本文探讨了该国政府面临的最紧迫的任务——人口状况，以及可能影响人口状况的因素。分析了对人口状况改善有重大影响的国外最佳做法。分析了战后恢复苏联人口的经验，因为正是在这一时期，该国的人口问题最为尖锐。提出了可以采取和实施的措施来改善俄罗斯的人口状况。

关键词：人口学、生育率、住房条件、抵押贷款、再生产、社会经济发展。

Abstract. *In the context of a changing situation in the economic sector, an aggressive external environment, as well as constantly introduced packages of economic sanctions, the problem of sustainable economic development is of particular relevance. This article examines the most pressing task facing the country's government - the demographic situation, as well as the factors that may affect it. The best practices of foreign countries, which have significantly influenced the improvement of the demographic situation, are analyzed. The experience of restoring the population of the USSR in the post-war years is analyzed, since it was during this period that the issue of the country's population was most acute. Measures are proposed that can be adopted and implemented to improve the demographic situation in Russia.*

Keywords: *demography, fertility, housing conditions, mortgage, reproduction, socio-economic development.*

Modern Russia is a country with a high level of demographic problems. For several decades now, the population, fertility rate and standard of living have been declining in Russia, and the population is aging¹. These factors have a negative

¹ Rosstat. Demography. [Electronic source] // Access: <https://rosstat.gov.ru/folder/12781> (access date 10/04/2023)

impact on the economy and social sphere. And solving these problems is becoming one of the priorities for the state.

One of Russia's serious demographic problems is the declining birth rate. In 2023, 1.245 million children were born in Russia, this is a historical minimum since 1999, when the birth of 1,215 children was recorded² (data excluding new territories). In addition, the fertility rate in Russia is 1.42 in 2022, versus 1.505 children per woman aged 15-49 in 2021.[7] This is below generational replacement level³.

Leskina O.N. in his work he suggests that sustainable development is a development that does not jeopardize the ability of descendants to realize their needs, while solving issues and problems in the needs of the present time. The main objectives of the state throughout the life of mankind are to improve the standard of living, the quality of life of the population, and reduce poverty. It is possible to solve the issue of sustainable development only by resolving two main problems such as the limited resources of the planet and the unlimited needs of the population. [6]

Repeatedly in his address, the President of Russia noted the key tasks for achieving these goals:

- 1.strengthening and developing relationships with strategic partners
- 2.growth of manufacturing industry
- 3.strengthening financial sovereignty
- 4.infrastructure development, job creation, increasing investment and business activity
- 5.poverty reduction
6. saving the people, supporting families, protecting motherhood and childhood

To solve the fourth task, one of the most important conditions remains the priority to improve housing conditions and housing construction, as well as the development of mortgage programs, and, as the president notes, mortgage programs must be with government participation. As part of the further implementation of mortgage programs, the President notes the need for a smooth winding down of preferential mortgages, expanding the possibilities of family mortgages, as well as individual solutions for new regions.

The President emphasized that economic growth is directly proportional to the well-being of Russian families, for which highly paid jobs are important, and they should be not only in large settlements, but also in small towns. This requires large industrial city-forming enterprises.

² Russia's demographic challenge. RBC [Electronic source] // Access: <https://www.rbc.ru/newspaper/2023/10/03/651a95509a7947addf136c31> (access date 04.011.2023)

³ Population reproduction and its types. [Electronic resource] // Access: <https://rosinfostat.ru/vosproizvodstvo-naseleniya> (access date 09.11.2023)

The President emphasized that it is necessary to provide conditions for increasing life expectancy, as well as stimulating an increase in the birth rate - this is a very difficult task; this requires an integrated approach. New support measures have already been introduced for families in need, as well as large families. In order to increase life expectancy, it is important to use new technologies in the healthcare system, the introduction of artificial intelligence and telemedicine⁴.

First, let's look at the concept of what demography is. N.B. Alchildieva in her article says that demography as an independent science studies population and population, as well as factors and patterns that determine or significantly influence such phenomena of human life as fertility and mortality, the creation and termination of marriage, as well as the reproduction of the population as a whole. Population is a more common concept and is used when we talk about the population of an area, village, city or country. If we are talking about a large region, such as Africa, Asia, Europe, then the term population is usually used. If we discuss the processes of population renewal, then we are talking about population reproduction [1].

It is not unimportant that the demographic behavior of the population largely depends on the general level of development of the country. An increase in the well-being of the population, an improvement in the structure of housing conditions, and the quality of medical care expectedly leads to an increase in life expectancy, as well as a decrease in mortality.

Demographic studies are carried out both at the level of individual countries and at the international level, which makes it possible to compare and analyze demographic processes in different regions of the world and make objective decisions in the interests of the development of humanity as a whole [9].

The demographic situation is one of the most important factors determining the development of society. Improving demography is a process aimed at increasing the population, improving its health, increasing life expectancy, stabilizing the birth rate and reducing the mortality rate. The need to improve demographics arises in cases where the existing demographic situation negatively affects the socio-economic development of society. For example, such a situation may arise in the case of low fertility, high mortality, a large number of dying out settlements, geographic migration of the population, low levels of public health and other factors. In modern conditions, improving demographics is one of the main directions of the state's social policy. For this purpose, comprehensive programs are being developed that combine measures to improve the health of the population, support

⁴ Six key tasks in the Russian economy for 2023. Transcript of Vladimir Putin's speech at a meeting of the Council for Strategic Development and National Projects. [Electronic source] // Access: <https://rg.ru/2022/12/15/stenogramma-vystupleniia-vladimira-putina-na-zasedanii-soveta-po-strategicheskomu-razvitiuu-i-nacionalnym-proektam.html> (access date 10/12/2022)

young families, and create comfortable conditions for the birth and upbringing of children [10].

The Government of the Russian Federation, in its order No. 2580-dated September 16, 2021, approved an action plan for 2021-2025 to improve the demographic situation in Russia⁵.

One of the main ways to improve demographics is to stimulate the birth rate. To this end, campaigns are conducted to promote family values, large families, pregnancy and childbirth. It also provides for the provision of benefits to those who give birth to children - tax exemption, education in preschool institutions with meals, etc.

Creating comfortable living and working conditions for the population also has a significant impact on improving demographics. This includes the construction of new residential buildings, social facilities and infrastructure development in populated areas.

One example of successful improvement of the demographic situation is Sweden. The reason why the government paid attention to the current situation was the protracted agrarian crisis, and the best solution to it was to increase the consumption of its own products. The housing issue was acute, which did not allow achieving the goals set in terms of increasing the birth rate. Alf Johansson in his works drew a relationship between population movement and housing conditions. Of course, improving living conditions does not directly affect the increase in the birth rate, but is a prerequisite for this. Already in 1932, Alva Myrdal in her article noted the need for government programs aimed at maintaining the construction industry, which in turn will allow the unemployed to find jobs and provide the population with comfortable housing, allowing them to take a responsible approach to the issue of childbearing. In 1934, Sweden first launched a program aimed at promoting fertility, the concept of which was that increasing the number of children in a family would directly increase additional income. Families with children also received social support; the state provided care for children during the period when their mothers were at work, which, in turn, led to an increase in the number of children [11].

The French system also led to an improvement in the demographic situation and an increase in the number of families with children in the post-war period by increasing payments at the birth of children, especially the third and subsequent ones, as well as reducing the tax burden of families [12].

China has waged an intensive population control campaign for many years, but it has been seen to lead to increased depression in women and worsening demographics overall. In 2016, the state switched to two children per family, which had

⁵OrderNo.2580-rofSeptember16,2021,GovernmentoftheRussianFederation,Moscow[Electronic source]// Access: <http://static.government.ru/media/files/QFHNS7LF3pa7KdeiThGuxg90XpAnvYdh.pdf> (accessed 10/24/2022)

a positive impact on the demographic situation, but did not lead to a rapid increase in the birth rate [13].

After the end of World War II, the USSR faced serious demographic problems. During the war years, millions of people were killed, including young and healthy people who could have become potential parents. In this situation, the state took a number of measures aimed at improving the demographic situation [8].

In issue 37 of the *Vedomosti* newspaper dated July 16, 1944, the Decree of the Presidium of the Supreme Soviet of the USSR “On increasing state assistance to pregnant women, large and single mothers, strengthening the protection of motherhood and childhood, establishing the honorary title “Mother Heroine” and establishing the order “was published. Maternal words» and the medal «Motherhood Medal». The decree states that caring for children and mothers has always been one of the most important tasks of the Soviet state and the need for the state to provide financial assistance to pregnant women and mothers, protecting the interests of the mother and child. The decree talks about increasing state assistance to single mothers with many children depending on the number of children, for example, mothers with three children receive a one-time benefit of 1,300 rubles upon the birth of their fourth child. and 80 rubles monthly; upon the birth of subsequent children, the amount of monthly and one-time benefits increases. Benefits were also provided to single unmarried mothers in the amount of 100 rubles. for one child 150 rubles. for two children and 200 rubles. for three children more. This decree also makes changes to the Decree of the Presidium of the Supreme Soviet of the USSR dated November 21, 1941 “On the tax on bachelors, single and childless citizens of the USSR” [2], the tax is imposed on men aged 20 to 50 years, and women from 20 to 45 years old without children⁶. The law was actually repealed due to the collapse of the USSR.

The tax on childlessness was changed several times from 1941 to 1992, although its main essence did not change, namely, it was necessary to restore the country, a young, working population was needed, and for this it was necessary to stimulate the birth rate. The levying of a tax on bachelors and childlessness carried a number of additional reasons: the first was an increase in the birth rate, the second was tax revenues, which were spent, among other things, on the development and restoration of the country, as well as the maintenance of children in numerous orphanages; relationships between men and women, thereby excluding polygamy and extramarital affairs.

S.N. Groshev in his article reveals the taxation of single and childless men as discrimination based on gender. As an example, it is given that the tax was levied on women up to 45 years of age, and on men up to 50, and the tax did not

⁶ Gazette of the Supreme Soviet of the USSR. [Electronic source] // Access: https://lib.tsu.ru/mminfo/2020/000462771/1944/1944_037.pdf (access date 10/04/2022)

apply to unmarried women and military wives, although if a man is married to a military woman and the couple has no children, the man was obliged to pay the tax. The author argues that in modern Russia, as a democratic state, such a tax can be perceived as discrimination, despite the fact that today there are differences in requirements for men and women, such as the obligation of military service upon conscription, the difference in retirement age, etc. [3]

I.A. Grigoriev reflects in his article that the goals of introducing a tax on singles and childless, dictated by the wartime regime, and aimed at the maintenance and development of orphans, were achieved. [4] It is important to note that the application of a tax on bachelors in the USSR was not an innovation; for example, a similar practice was introduced in Bulgaria in 1909 and in Italy in 1926, as well as Romania.

A.V. Belous and N.V. Borodayenko argue that introducing a tax on single and childless people is inappropriate, even despite the growing threat of a demographic crisis; in their opinion, it is better to stimulate the birth rate by creating additional measures of social support for large and single mothers, as well as relaxations in tax legislation. [5]

In general, global experience in improving demographics shows that the key measures are supporting families, strengthening public health, creating favorable conditions for living and working, and developing infrastructure. The combination of these measures can significantly increase the country's demographic indicators and ensure sustainable socio-economic development for many years.

I.N. Afinogenov and E.A. Pindyurina in her article reflects the factors that are decisive in the formation of a family, the need for children and, not least important, the number of children. The authors say that the needs are influenced by such socio-economic factors as lack of confidence in the future, low population levels, insufficient benefits for families with children, due to the need for women to work since the spouse's salary is not enough to fully support the family's livelihoods, insufficiency children's educational institutions (kindergartens, schools and places of additional education), the authors also note an important factor as the high "cost" of children, namely children's goods, as well as maintenance and training costs.

The effectiveness of existing programs to improve demographics can be assessed analytically using statistical data. But a more objective picture will emerge by considering the results of a survey conducted by a public service portal to study the motives and factors that influence the decision to have children or not have them, conducted in mid-2022⁷.

The government services portal presents an analysis of survey participants; in the end, 5% of men and 95% of women answered the questions. This gender

⁷ A survey to study the motives and factors that influence the decision to have children or not have them.

distribution based on the survey results indicates that women are more interested in having children, as well as in making the final decision in procreation due to the fact that it is the woman who is forced to bear all the risks and difficulties associated with pregnancy and childbirth, raising children, and It is also possible to combine it with work. Low involvement of men may indicate a lack of need for family and children.

Considering the age of the survey participants, it is clear that the greatest interest in conveying their position and wishes is expressed by respondents aged 30 to 39 years, which is 63%. This is the main target audience for whom fertility support and stimulation programs are aimed. Deputy Minister of Labor and Social Protection of Russia Olga Batalina in her report said that the number of women of reproductive age will decrease by 33.8% and amount to 7.9 million. Moreover, this age category accounts for 48% of the births of second and third children⁸.

Analyzing their marital status, 76% are women who are in a registered marriage; it is this category that is more ready to give birth and raise children, which indicates the importance of preserving and maintaining the traditional institution of family.

Interesting statistics emerged when answering the question about the number of children: 33% of respondents have one child, 52% have two children, and 11% have three. These are experienced parents who are interested in expanding their family and are ready to have one or more children, subject to certain circumstances.

The desire to have more than one child is confirmed by the results of the answer to the question: How many children would you like to have in your family? And only 8.4% answered that one. The low effectiveness of the ongoing demographic policy is confirmed by the fact that 62.7% of women of childbearing age are not ready to have more than two children. Despite the fact that simple population reproduction requires the birth of 2.1 children per woman, but for reproduction this coefficient must be significantly higher.

Let's look at the circumstances that make it difficult to have the desired number of children: 39% of respondents cite the financial situation of the family, 22% to living conditions, and 17% to health.

Let us note that today all programs to increase the birth rate are aimed at material incentives, and do not show the desired result.

The second most important problem, due to which families are in no hurry to increase the size of their family, is the housing issue, we see a desire to get a discount on the mortgage rate and 53.4% of respondents answered this way, 25.6% noted the need to improve housing conditions through social rent.

⁸ The Ministry of Labor predicts a reduction in the number of women aged 30-39 by 2030 by 33.8%: [Electronic resource] // Access: <https://tass.ru/obschestvo/17868015> (access date: 10/30/2023)

One of the key factors of demographic growth is the provision of housing for the population. This is due to several factors, including creating better conditions for families, increasing population and improving quality of life.

In general, Russia's demographic problems require a comprehensive solution, which includes measures to increase the birth rate, preserve health and prolong life, as well as ensure economic development. It is important that decisions are made jointly by the state, society and business.

In conclusion, housing provision is essential for demographic growth. Providing young professionals with housing under a social rental agreement, with the possibility of subsequent purchase, subject to working at an enterprise that is strategically important for the development of the country's economy. Development of preferential lending, where the mortgage rate will decrease as the number of children in the family increases, the opportunity to extend this support measure not only to the purchase of real estate on the primary market from developers, but also to existing mortgage loans taken for the purchase of finished apartments on the secondary market. This is an important factor that can lead to population growth, combating population aging, improving quality of life and economic development.

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世界各国人口生活质量指标评估
**ASSESSMENT OF QUALITY OF LIFE INDICATORS OF THE
POPULATION OF INDIVIDUAL COUNTRIES OF THE WORLD**

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注解。生活水平指标可以评估国家对社会经济发展的每一个主要优先事项采取的行动的有效性，并允许人们评估国家境内的生活条件等[17, 第17页]。 34]。

本文介绍了确定世界人口生活水平和质量的方法。还研究了“生活水平”和“生活质量”这两个概念的显著特征。介绍了世界人类发展指数的动态和出生预期寿命的动态，作为影响人类发展指数值的指标。选择了一些国家来研究这些国家的生活水平和质量。给出了在国际上处于领先地位的工业国家提高人类发展指数的方向。

关键词：人类发展指数 (HDI)、人类发展指数 (HDI)、生活水平、生活质量、国家社会经济发展、一般指标、私人指标、人均国内生产总值、预期寿命、人类发展分类。

Annotation. *Indicators of living standards can assess the effectiveness of state actions for each of the main priorities of socio-economic development and allow one to assess, among other things, living conditions on the territory of the state [17, p. 34].*

The article presents approaches to determining the level and quality of life of the population in the world. The distinctive features of the concepts: “standard of living” and “quality of life” have also been studied. The dynamics of the human development index in the world and the dynamics of life expectancy at birth, as an indicator influencing the value of the HDI, are presented. A selection of countries was made to study the level and quality of life in them. Directions for increasing HDI in industrial countries that occupy leading positions in the international arena are given.

Keywords: *human development index (HDI), human development index (HDI), standard of living, quality of life, socio-economic development of the country, general indicators, private indicators, GDP per capita, life expectancy, classification of human development.*

The state strives to create favorable living conditions for its citizens. This concept often includes the creation of conditions for increasing life expectancy, increasing the level of well-being, the level of medical care and other conditions. Such actions on the part of the state, expressed in the preparation and development of special programs, should contribute to the socio-economic growth of the state.

Issues related to the creation of favorable conditions for human life, human development, as well as measuring the level of such conditions. Based on this, in modern economic, sociological, and psychological literature, many related terms and interpretations of such concepts as “standard of living” and “quality of life” have arisen. Historically, the theory and methodology of the level and quality of life have been evolutionarily transformed and today have practically acquired mature forms [4, p.141]. Indicators of living standards can assess the effectiveness of state actions for each of the main priorities of socio-economic development and allow one to assess, among other things, living conditions on the territory of the state [17, p. 34]. It is worth noting that there is no precise explanation of what is meant by “standard of living”. The standard of living is often compared with such concepts as “lifestyle”, “well-being”, “quality of life”. However, these concepts do not reveal its essence. The standard of living is a complex socio-economic category that reflects the level of development of physical, spiritual and social needs, the degree of their satisfaction and the conditions in society for the development and satisfaction of these needs [10, p. 26]. Let us explain this definition: these characteristics of the standard of living are, to a large extent, difficult to quantify, so they are often calculated through the availability of resources in the country and through GDP.

The concept of “standard of living” is narrower than “quality of life”. For the first time, the scientific concept of “quality of life” was voiced by John Galbraith in 1958 [7, p. 72]. Assessing quality of life is a complex process and today there are different approaches. Thus, some scientists suggest the use of value judgments and ranking. Ranking can be used to compare regions or countries on this indicator. Moreover, it can be arranged in descending order of rank, in ascending order, from improvement to deterioration. It is necessary to measure over several comparable periods. After this, conclusions can be drawn about deterioration or improvement, for example, “the quality of life in community X has improved over the last decade” [21, p. 261]. In this work, the concept of “quality of life” will be used in the sense of an indicator reflecting the effectiveness of all aspects of human life.

Let us consider this indicator as a generalization of the other two, namely, general indicators and specific ones. Tukhuzheva L.A., Dzhankulaev A.A. described general indicators as an important component of the success of the socio-economic formation of society [14, p.56]. Belov V.I., Novinskaya V.E. They believe that the concept of “quality of life” has intangible indicators, for example, related to the state of the environment, public health, psychological comfort, and so on” [2, p. 23]. Western sources claim that information technology plays an important role. They have significant potential for increasing the social capital of communities and, thus, improving the quality of life of residents [19, p.57]. Also, foreign researchers believe that reflection through leisure can potentially lead to an increase in the quality of life of people in various cultural contexts [22, p.258]. Therefore, both indicators are taken into account when calculating the HDI.

Human Development Index (HDI), formerly called the Human Development Index (HDI). This index was developed and proposed by the UN for use around the world. This index by country has been published annually since 1990 [7, p. 75]. If we talk about how the quality of life in the country is determined, then Ilyasova E.N. claims that the quality of life index is determined through online research, without using official government reports [5, p. 527]. So the data will be based on a population survey. HDI can be not only subjective, but also objective, in which case statistics will play an important role in the calculation. In this case, the final rating is derived on the basis of statistical processing of a fairly wide range of individual indicators, to one degree or another reflecting the social development of society [1, p. 113]. It is important to note that the Human Development Index cannot be measured using a single summary indicator. In the world, with the development of an innovative economy, the Human Development Index is growing, which, in turn, accelerates the development of the economy [3, p.99]. This phenomenon is two-way in nature, that is, HDI will have a significant impact on the state’s economy. This pattern can be observed if you study some countries of the world for HDI.

In Fig. 1. displays the dynamics of the HDI in the World for the period 1990-2021. It is worth noting that in the period from 1990 to 2019, this index increased by 0.138, which is a good result and means that the level and quality of life are growing as the population grows, its needs, and also adapt to the specifics of the period of life.

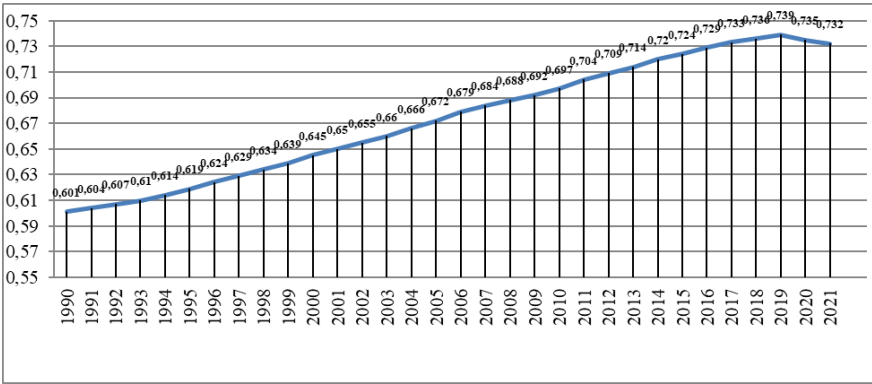


Figure 1. Dynamics of HDI in the world for the period 1990-2021.

Source: according to Eurostat [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Human_development_index_\(HDI\)](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Human_development_index_(HDI))

At the moment, the value of the HDI in the world continues to decline. This trend can be caused by several reasons: ineffective political decisions of global elites, a deepening civilized crisis, a double-circuit production system.

In Fig.2. presents global life expectancy at birth for the period 1990-2021. Note that the indicators from 1990 to 2019 were in constant growth, but in 2020, life expectancy for men began to decline.

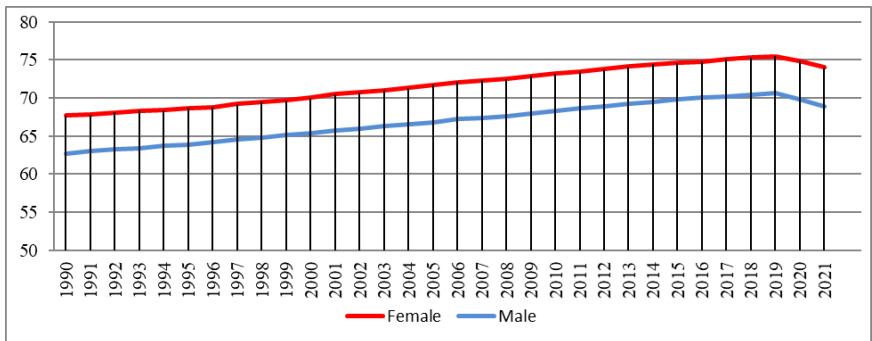


Figure 2. Global life expectancy at birth for the period 1990-2021.

Source: according to Eurostat [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Human_development_index_\(HDI\)](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Human_development_index_(HDI))

The decline in life expectancy in the world may be due to the Covid outbreak. This indicator is taken into account when calculating the HDI. The main factor in increasing life expectancy is a healthy lifestyle [16, p.66].

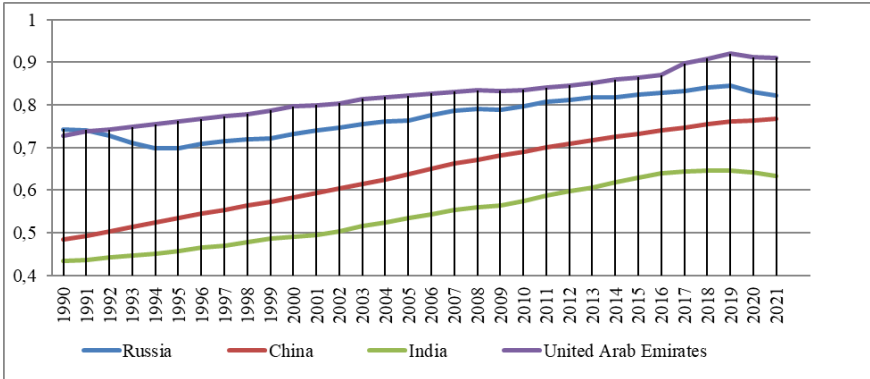


Figure 3. HDI dynamics in Russia, China, India, and the United Arab Emirates in the period 1990-2021.

Source: according to Eurostat [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Human_development_index_\(HDI\)](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Human_development_index_(HDI))

Among the BRICS countries, three countries in terms of available water resources per capita - India, China and South Africa - are among the most problematic, not counting the countries of sub-Saharan Africa, and yet 37.6% of all humanity lives in them [13, p.7]. Today, China’s human development classification is at a high level. India, in turn, is at an average level of human development.

Experts predict that in 45 years the number of inhabitants of the Earth will increase from 6.5 billion to 9.1 billion people, and noticeable changes will occur in the list of the most populous countries [11, p.6]. Such rapid population growth appears to be a huge catastrophe, the scale of which could reach unprecedented proportions. Since natural resources are not designed for rapid population growth, the world created by man can expect cataclysms, which, in turn, can lead to the death of humanity. To prevent this problem, population growth in all countries is under social and cultural control, and in some countries under government control. The graph shows that the gap in the HDI indicators of China and India has always been present, but one can trace the pattern of increasing this gap between one country and another, in this case, China and India. Today, Russia and the AOE, according to Eurostat, have a very high level of human development. However, Rosstat continues to monitor the level of wages of certain categories of public sec-

tor workers to maintain balance [8, p.44]. In turn, the deterioration in the standard of living of Russians, poverty and misery of the population, insecurity of citizens, disappointment and anxiety are not only a significant obstacle to the implementation of economic reforms, but also a real threat to the country’s social security and a decrease in the human development index [15, p. 6] . From 1990 to 2021, the HDI in all countries was in constant development, however, we note that in 2020, during the covid period, the HDI in all countries except China decreased slightly. It is worth analyzing the GDP per capita in these countries in order to confirm the accuracy of the HDI dynamics . From theory it became known that such an indicator as GDP per capita is taken into account when objectively calculating the HDI in a country.

In Fig.3. It can be seen that, as with the dynamics of the HDI, the UAE occupies a leading position. However, the country’s gap from others is much greater than under the HDI. This situation suggests that China and Russia are doing well in other indicators that are taken into account when calculating the HDI. Due to this, these countries have the opportunity to make up for lost time in such an indicator as GDP per capita.

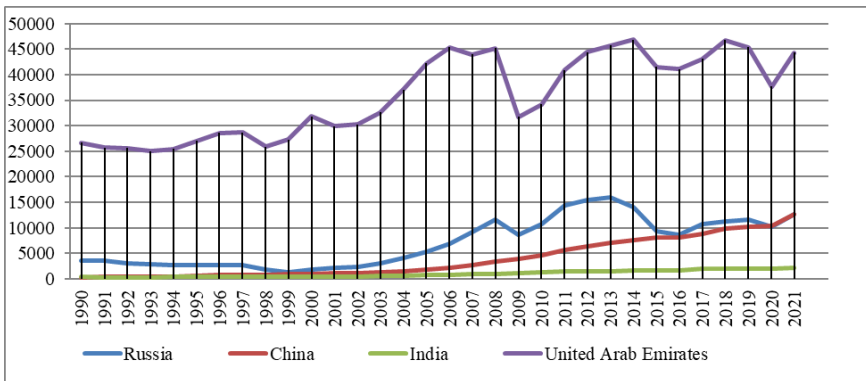


Figure 4. Dynamics of GDP per capita in Russia, China, India, and the United Arab Emirates in the period 1990-2021. (in current US dollars)

Source: According to the World Bank <https://data.worldbank.org/country>

Thus, a comparison between low- and middle-income countries, on the one hand, and industrialized countries, on the other hand, provides a number of new ideas and interesting results [20, p. 209]. Having studied the countries whose HDI level varies from average to very high, we note that in the international arena the ratio of these countries will be similar to what is presented in the graph. However, comparisons of

some countries may be subjective, since the HDI also directly depends on the size of the population. Therefore, when comparing the level and quality of life in a country, it is necessary to focus on how many people we are talking about.

The priority goal of any modern state is to create favorable conditions to ensure a long, healthy and materially prosperous life for people, and consequently, for the socio-economic growth of the country on the world stage [17, p.34]. Since countries can monitor methods for raising HDI in other countries, especially those that occupy leading positions, they can apply them at home, if they suit their specific needs. For example, the Chairman of the Federation Council Valentina Matvienko proposed creating a Ministry of Happiness in Russia, similar to the one that already exists in the United Arab Emirates [6, p.48]. Analyzing the situation in the world, we note that thanks to the HDI, it is possible to some extent trace the correct setting of priorities in the country. Competent management by the elites provides an undeniable advantage in achieving set goals [12, p. 109]. Since 2019, the HDI in the world has decreased, but this phenomenon can be justified by the pandemic that occurred, which reduced all indicators included in the HDI. However, based on the past years, it can be judged that the HDI will increase again.

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法律社会国家：理论与实践

LEGAL SOCIAL STATE: DOCTRINE AND PRACTICE

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抽象的。该著作探讨了与俄罗斯联邦和中华人民共和国有关的法律和社会国家的概念。分析了法律和社会状态的主要法律定义。对法律和社会状态的主要法律定义的形成进行了分析。描述了法律国家和社会国家概念之间的共性和差异。

关键词：一般法理论；人权和公民权利；宪政国家；社会状态；法律定义；宪法；俄罗斯联邦；中华人民共和国。

Abstract. *the work examines the concepts of legal and social states in relation to the Russian Federation and the People's Republic of China. The main legal definitions of the legal and social states are analyzed. An analysis of the formation of the main legal definitions of the legal and social states is carried out. The generalities and differences between the concepts of legal and social states are described.*

Keywords: *general theory of law; human and civil rights; constitutional state; social state; legal definitions; constitution; Russian Federation; People's Republic of China.*

The provisions of the Constitution of the Russian Federation declare that Russia is a rule of law state (Article 1), in which the rights and freedoms of man and citizen are the highest value, and their recognition, observance and protection are the responsibility of the state (Article 2) and establishes (Article 3) that the source of power in the Russian Federation is the people. At the same time, it is established that Russia is a social state (Article 7). Also, in the provisions of the Constitution of the People's Republic of China [10], it is established that the People's Republic of China is a rule of law state: Article 5 indicates this directly, and Articles 1-4 and 13 provide an interpretation of this concept, and Articles 35-56 establish the main human and civil rights. At the same time, Articles 4, 6, 8, 15, 25, 43-45 of the Constitution of the People's Republic of China enshrine the provisions inherent in a social state.

It seems, taking into account the available literary data, that the relationship between these concepts - legal and social states - is complex and ambiguous.

The relevance of the study is determined, first of all, by the development of the Russian Federation as a legal social state, which was indicated on January 16, 2020 by the President of Russia V.V. Putin at a meeting with members of the working group to prepare proposals for amendments to the Constitution [15] and updated by the President of Russia V.V. Putin during a meeting of the Valdai International Discussion Club on October 21, 2021 [14]. The People's Republic of China is moving along a similar path. Thus, the General Secretary of the Central Committee of the Chinese Communist Party Xi Jinping in 2022, in a report to the 20th National Congress of the CPC, indicated that the process of forming a rule-of-law state, which began at the XV Congress of the Chinese Communist Party in 1997, having gone through a number of stages, formed the basis for its formation and strengthening [4]. At the same time, research is being conducted on the legal basis of the welfare state [13].

An analysis of research and publications in the area under consideration showed the absence of a stable legal definition of the concept of "rule of law state" [1; 2; 3; 7; 8; 9; 12], and the concept of "welfare state" [2; 3; 5; 6; 9; 10; 13; 16; 17; 18], the relationships between these concepts are contradictory [2; 3; 9] as well as the described relations of commonality and differences [2; 3; 9].

The purpose of the work is to analyze these concepts and establish their relationship from the position of dialectical logic and system analysis.

The very concept of "state" is conventional and does not have a rigid definition, and each time one or another distinction is used in relation to the topic of reasoning and the position of the author. One of the few well-known documents in international law that defines the concept of "state" is the Convention on the Rights and Duties of States, adopted on December 26, 1933, also known as the Montevideo Convention, which specifies the criteria for a state as a subject of

international law with a permanent population, a certain territory, its own government and the ability to enter into relations with other states.

The literature examines the concepts of “rule of law” and “social state”, which characterize the form of organization and activity of the most structural association of society - the state.

Thus, a rule-of-law state is described as: a state subordinate to the law in its activities and acting within the boundaries defined by the Law to ensure legal guarantees [1; 3; 7]; ensuring equality before the law, strict observance of the rights and freedoms of man and citizen, having a real separation of powers and a formed civil society [8]; recognizing law as a consistently emerging and increasing volume of freedom and justice in the public consciousness, which are expressed in the Constitution, laws and by-laws, and are manifested in the practice of realizing the rights and freedoms of man and citizen [9]; in which a system of guarantees against administrative interference in a self-regulating civil society has actually been formed, there is a significant indicator of state authority, a genuine state system of the rule of law, thanks to which the state ensures the rights and freedoms of man and citizen, is subject to the law in its activities and considers ensuring rights and freedoms as its main goal person [2] and in whose activities the right is a priority instead of political expediency, due to the commitment to the concept of the primacy of innate human rights and freedoms and the priority of the state’s duty to maintain and advocate for the rights and freedoms of man and citizen, while power is exercised by authorized persons within the framework of the established their competence, taking into account the separation of powers and guarantees of judicial protection of the rights and freedoms of man and citizen [11, 12].

When analyzing the concept of “social state” as a type of government system, it is established that both the scientific community and the legislator do not provide either a clear definition or an exhaustive list of its features. At the same time, in the legal literature there are descriptions of the social state that are not united into a single whole, but intersect in separate concepts, and therefore cannot serve as the basis for the definition of the concept in question. Thus, a social state is described as: aimed at creating favorable living conditions for citizens, a high level of social security and the possibility of personal fulfillment [3; 8]; providing the fullest possible social security for citizens and guaranteeing it by adopted regulatory legal acts [13]; acting as a leading factor in social well-being, preserving social peace and parity of interests in society, primarily by ensuring equality and conditions and opportunities for any member of society [17]; which legislates the principles of social justice, solidarity and mutual responsibility [10]; pursuing an active social policy in the name of personal development, well-being, social security and safety of citizens [9] and whose priority is the well-being of citizens, social justice and security [2].

There are also several options for typical models of a welfare state:

- two [6], the first is liberal, which is characterized by: a limited role of the state in the life of a person who is free to choose the directions, forms and content of his own development, and the function of the state is the formation and maintenance of equal basic conditions. It is indicated that minimizing the state's share in regulating the social sphere is fraught with economic inequality and impoverishment of the population. The second model is paternalistic - the prevalence of the state in the public space, control of all social processes in society, when the state determines the social development of the individual. The disadvantages of this model are the low level of economic freedom, limitations both in preference and in achieving social interests, which leads to a decrease in motivation and labor inefficiency.

- three [19]: “positive state” - with minimal state intervention in the spheres of economic and social security, when state social policy acts as a means of control; “the social state itself,” which ensures a guaranteed minimum standard of living and the maximum possible equality of initial opportunities, when social policy is aimed at ensuring the fullest possible employment; a “welfare state” in which a minimum standard of living is ensured, a maximum level of income is ensured, wage differentials are reduced and full employment is guaranteed.

Conclusions on the research carried out and directions for further developments in this direction:

When analyzing the historical (from 1994 to 2023) development in Russia of the conceptual representation of the concept of “rule of law”, a number of, in our opinion, significant trends draw attention:

- the opposition between law and political expediency in the activities of governing the state and its protection of the rights and freedoms of man and citizen has been de-actualized, which appears to reflect the growth of legal awareness, primarily among legal scholars, as well as the recipient of their research, with a clear increase in the level of acceptance of the idea of equality before the law;

- it is commonplace to consider the principles of separation of powers and judicial protection of human and civil rights and freedoms as enshrined in the Constitution and not requiring additional justification, reflecting the rootedness of these concepts among legal scholars and the recipients of their developments.

When analyzing the historical development (2000 – 2023) of the concept of “social state”, the essential dynamics of the concept are not noted either in the means of description or in the content of the concept. This perhaps reflects the adoption of a concept that did not have long-term development in exactly this form, in a specific legal space, and the process of its comprehension takes place simultaneously and in parallel with the process of its formation.

What is common to both concepts – both legal and social states – is:

- 1) priority of human and civil rights and freedoms;
- 2) the priority of legal support for the protection of human rights and freedoms from the citizen;
- 3) exclusion of discrimination on the basis of legally non-significant characteristics (with a tendency in the social state of both models according to A.A. Klishas (2023) to expand the list of legally significant characteristics).

In turn, the differences between the concepts of the legal and social state include the following:

1) the principle of the rule of law in a social state is expanding due to the influence/impact of structures that claim to practically implement the principle of justice, through the redistribution of material and intangible benefits, therefore, there is a need: a) the most complete possible legal regulation of everything related to social justice ; b) assigning the functions of redistribution of material and non-material benefits to government bodies (decisive vote) in interaction with the structures of civil society and social protection bodies (advisory voice); c) expansion and differentiation of specialization of state and non-state social protection bodies;

2) internal contradictions of the welfare state in the form of inconsistency in the level and scope of state regulation of social relations - essentially a contradiction between the liberal and paternalistic models of the welfare state;

3) personal freedom, mutual responsibility of the state and citizen, social security and material equality may come into conflict with each other;

4) the concepts of legal and social states are compatible as long as the functioning of state power “will be limited, balanced, controlled and distributed within the boundaries of respect for fundamental human rights,” and the introduction of the priority of welfare, social security and justice over the basic rights of man and citizen will lead to a contradiction between legal and social state [19, P.152].

Thus, it is established that the concepts of legal and social states, contain common and different, represent a dialectical pair of unity (human and civil rights, their protection and provision of the rule of law and social justice as a priority function of the state) and opposition (concentration of the social state on compensation discrimination, primarily economic, has a negative impact on the state of society, as it creates the possibility of destroying an individual’s motivation to develop their abilities and realize their potential).

According to the above, the direction of further research in this area is the study and development of legal compensation for the opposites between the concepts of legal and social states, while maintaining their basic dialectical unity. This makes us agree with the opinion of a number of authors [6; 9; 15], that the provisions of the Constitution of the Russian Federation in this area should be considered rather as an ideal goal and, at the same time, as a program task.

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咸海地区环境保护与可持续发展的协调：实施欧盟立法的法律视角
**HARMONIZING ENVIRONMENTAL PROTECTION AND
SUSTAINABLE DEVELOPMENT IN THE ARAL SEA REGION:
LEGAL PERSPECTIVES ON IMPLEMENTING EU LEGISLATION**

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概括。 本文探讨了在咸海地区实施欧盟立法的法律方面，重点是环境保护和可持续发展。 对欧盟指令和法规的分析揭示了解决水管理、生物多样性保护、环境影响评估和可再生能源开发等关键问题的全面法律框架。 然而，对哈萨克斯坦、乌兹别克斯坦和土库曼斯坦国家法律和政策的比较法律分析表明，与这些标准有不同程度的一致性，凸显了该地区国家法律与欧盟立法协调的挑战和机遇。

文章强调，协调国家法律与欧盟立法是解决咸海地区环境挑战的关键一步，但需要采取综合方法，考虑到该地区国家独特的社会经济和文化背景。 区域合作和国际支持对于有效实施欧盟立法和实现咸海地区的可持续发展至关重要。

关键词：咸海地区、欧盟立法、协调、环境保护、可持续发展、水资源管理、生物多样性保护、环境影响评估、可再生能源、奥尔胡斯公约、埃斯波公约、区域合作。

Summary. This article explores the legal aspects of implementing EU legislation in the Aral Sea region, focusing on environmental protection and sustainable development. The analysis of EU directives and regulations reveals a comprehensive legal framework addressing key issues such as water management, biodiversity conservation, environmental impact assessment, and renewable energy development. However, a comparative legal analysis of national laws and policies in Kazakhstan, Uzbekistan, and Turkmenistan shows varying degrees of alignment with these standards, highlighting challenges and opportunities for harmonizing national laws with EU legislation in the region.

The article emphasizes that harmonizing national laws with EU legislation is a crucial step towards addressing environmental challenges in the Aral Sea region but requires a comprehensive approach considering the unique socio-economic and cultural contexts of the countries in the region. Regional cooperation and international support are essential for the effective implementation of EU legislation and achieving sustainable development in the Aral Sea region.

Keywords: *Aral Sea region, EU legislation, harmonization, environmental protection, sustainable development, water management, biodiversity conservation, environmental impact assessment, renewable energy, Aarhus Convention, Espoo Convention, regional cooperation.*

Introduction. The Aral Sea, once the fourth-largest lake in the world, has been steadily shrinking since the 1960s due to unsustainable irrigation practices and water mismanagement in the region [1]. The environmental crisis in the Aral Sea region, shared by Kazakhstan, Uzbekistan, and Turkmenistan, has led to severe consequences, including desertification, biodiversity loss, and public health issues [2]. The European Union has been actively supporting the region's efforts to address these challenges through various initiatives and funding programs, such as the EU-Central Asia Platform for Environment and Water Cooperation [3]. However, the effective implementation of EU legislation and best practices in the Aral Sea region requires a thorough understanding of the legal frameworks and harmonization processes [4].

This article aims to explore the legal aspects of implementing EU legislation in the Aral Sea region, focusing on environmental protection and sustainable development. It seeks to answer the following research questions:

What are the key EU directives and regulations relevant to environmental protection and sustainable development in the Aral Sea region?

How do the legal systems of Kazakhstan, Uzbekistan, and Turkmenistan facilitate or hinder the implementation of EU legislation in the region?

What are the main challenges and opportunities for harmonizing national laws with EU legislation in the Aral Sea region?

How can international legal instruments and cooperation mechanisms support the effective implementation of EU legislation in the region?

By addressing these questions, this article contributes to the academic discourse on the legal aspects of environmental protection and sustainable development in the Aral Sea region, and provides insights into the challenges and opportunities for implementing EU legislation in the region.

Methods. This research employs a doctrinal legal analysis approach, examining the relevant EU directives, regulations, and international agreements, as well as the national laws and policies of Kazakhstan, Uzbekistan, and Turkmenistan [5]. The analysis is complemented by a comparative legal study, identifying similarities, differences, and potential conflicts between the legal systems of the three countries and the EU [6]. The research also draws on secondary sources, including academic literature, policy reports, and case studies, to provide context and insights into the practical application of EU legislation in the Aral Sea region [7].

The key EU directives and regulations analyzed in this study include the Water Framework Directive (2000/60/EC) [8], the Habitats Directive (92/43/EEC) [9],

the Birds Directive (2009/147/EC) [10], the Environmental Impact Assessment Directive (2011/92/EU) [11], and the Renewable Energy Directive (2009/28/EC) [12]. These legal instruments were selected based on their relevance to environmental protection and sustainable development in the Aral Sea region.

The national laws and policies of Uzbekistan, Kazakhstan, and Turkmenistan were accessed through official government websites and legal databases, such as the Ministry of Justice of the Republic of Kazakhstan [13], the National Database of Legislation of the Republic of Uzbekistan [14], and the Ministry of Justice of Turkmenistan [15]. The analysis focused on laws and policies related to water management, biodiversity conservation, environmental impact assessment, and renewable energy development.

The comparative legal analysis was conducted by systematically comparing the provisions of the EU directives and regulations with the corresponding national laws and policies of the three countries [16]. The analysis aimed to identify areas of convergence and divergence, as well as potential barriers to the effective implementation of EU legislation in the region.

Results. The analysis of the EU directives and regulations relevant to environmental protection and sustainable development in the Aral Sea region revealed a comprehensive legal framework that addresses key issues such as water management, biodiversity conservation, environmental impact assessment, and renewable energy development [17]. The Water Framework Directive, for example, establishes a framework for the protection and management of inland surface waters, transitional waters, coastal waters, and groundwater [18]. The Habitats Directive and the Birds Directive aim to protect biodiversity by conserving natural habitats and wild fauna and flora [19], while the Environmental Impact Assessment Directive ensures that the environmental implications of projects are assessed before approval [20]. The Renewable Energy Directive promotes the use of energy from renewable sources, setting mandatory national targets for the overall share of energy from renewable sources in gross final consumption of energy [21].

The comparative legal analysis of the national laws and policies of Uzbekistan, Kazakhstan, and Turkmenistan revealed varying degrees of alignment with the EU directives and regulations [22]. Kazakhstan, for instance, has made significant progress in aligning its water management policies with the Water Framework Directive, adopting the Water Code of the Republic of Kazakhstan in 2003 [23]. Uzbekistan has also taken steps to harmonize its environmental legislation with EU standards, introducing the Law on Environmental Control in 2013 [24]. Turkmenistan, however, lags behind in terms of aligning its national laws with EU legislation, particularly in the areas of water management and renewable energy development [25].

The analysis also identified several challenges and opportunities for harmonizing national laws with EU legislation in the Aral Sea region. One of the main chal-

allenges is the lack of institutional capacity and financial resources to implement and enforce environmental legislation. The countries in the region often struggle with insufficient monitoring and inspection systems, as well as limited technical expertise and equipment. Another challenge is the presence of conflicting priorities and interests, such as the need for economic development and the preservation of traditional practices, which may hinder the effective implementation of EU legislation.

Despite these challenges, there are also opportunities for enhancing the harmonization of national laws with EU legislation in the Aral Sea region. The EU-Central Asia Platform for Environment and Water Cooperation, for example, provides a forum for dialogue and cooperation between the EU and the countries of Central Asia, including Kazakhstan, Uzbekistan, and Turkmenistan. The platform aims to support the implementation of the EU's Central Asia Strategy, which prioritizes environmental protection and sustainable development. The International Fund for Saving the Aral Sea (IFAS), an intergovernmental organization established by the five Central Asian countries, also plays a crucial role in coordinating regional efforts to address the environmental crisis in the Aral Sea region.

International legal instruments, such as the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, and the Espoo Convention on Environmental Impact Assessment in a Transboundary Context, can also support the effective implementation of EU legislation in the region. These conventions promote transparency, public participation, and cross-border cooperation in environmental decision-making, which are essential for the successful implementation of EU directives and regulations.

Discussion. The results of this study highlight the complex legal landscape surrounding the implementation of EU legislation in the Aral Sea region. While the EU directives and regulations provide a comprehensive framework for environmental protection and sustainable development, the national laws and policies of Kazakhstan, Uzbekistan, and Turkmenistan exhibit varying degrees of alignment with these standards. This divergence can be attributed to several factors, including differences in legal traditions, political priorities, and institutional capacities.

The challenges identified in this study, such as the lack of institutional capacity and financial resources, and the presence of conflicting priorities and interests, are not unique to the Aral Sea region. Many developing countries face similar obstacles in implementing and enforcing environmental legislation. However, the severity of the environmental crisis in the Aral Sea region, coupled with the transboundary nature of the problem, makes it imperative for the countries in the region to overcome these challenges and work towards harmonizing their national laws with EU legislation.

The opportunities for enhancing the harmonization of national laws with EU legislation in the Aral Sea region, such as the EU-Central Asia Platform for Environment and Water Cooperation and the International Fund for Saving the Aral Sea, underscore the importance of regional cooperation and international support. These initiatives provide a platform for knowledge-sharing, capacity-building, and financial assistance, which are crucial for the effective implementation of EU legislation in the region.

The role of international legal instruments, such as the Aarhus Convention and the Espoo Convention, in supporting the implementation of EU legislation in the Aral Sea region cannot be overstated. These conventions promote the principles of transparency, public participation, and cross-border cooperation, which are essential for the successful implementation of EU directives and regulations. By ratifying and implementing these conventions, the countries in the region can strengthen their legal frameworks and create an enabling environment for the effective implementation of EU legislation. It is important to note that the harmonization of national laws with EU legislation is not a panacea for the environmental challenges facing the Aral Sea region. The effective implementation of these laws and policies requires a comprehensive approach that addresses the root causes of the problem, such as unsustainable irrigation practices and water mismanagement. This requires a concerted effort from all stakeholders, including governments, civil society organizations, and local communities.

Moreover, the harmonization of national laws with EU legislation should not be seen as a one-size-fits-all solution. The countries in the Aral Sea region have unique socio-economic and cultural contexts that must be taken into account when implementing EU directives and regulations. The successful implementation of these legal instruments requires a context-specific approach that is sensitive to the needs and priorities of the local communities.

Conclusion. The environmental crisis in the Aral Sea region has had devastating consequences for the ecosystem and the people who depend on it. The EU has been actively supporting the region's efforts to address these challenges through various initiatives and funding programs, including the promotion of EU legislation and best practices. However, the effective implementation of EU legislation in the Aral Sea region requires a thorough understanding of the legal frameworks and harmonization processes.

This article has explored the legal aspects of implementing EU legislation in the Aral Sea region, focusing on environmental protection and sustainable development. The analysis of the EU directives and regulations relevant to the region has revealed a comprehensive legal framework that addresses key issues such as water management, biodiversity conservation, environmental impact assessment, and renewable energy development. However, the comparative legal analysis of

the national laws and policies of Kazakhstan, Uzbekistan, and Turkmenistan has shown varying degrees of alignment with these standards, highlighting the challenges and opportunities for harmonizing national laws with EU legislation in the region.

The challenges identified in this study, such as the lack of institutional capacity and financial resources, and the presence of conflicting priorities and interests, underscore the need for a comprehensive approach to addressing the environmental crisis in the Aral Sea region. This requires a concerted effort from all stakeholders, including governments, civil society organizations, and local communities.

The opportunities for enhancing the harmonization of national laws with EU legislation in the Aral Sea region, such as the EU-Central Asia Platform for Environment and Water Cooperation and the International Fund for Saving the Aral Sea, highlight the importance of regional cooperation and international support. These initiatives provide a platform for knowledge-sharing, capacity-building, and financial assistance, which are crucial for the effective implementation of EU legislation in the region.

The role of international legal instruments, such as the Aarhus Convention and the Espoo Convention, in supporting the implementation of EU legislation in the Aral Sea region cannot be overstated. These conventions promote the principles of transparency, public participation, and cross-border cooperation, which are essential for the successful implementation of EU directives and regulations.

In conclusion, the harmonization of national laws with EU legislation is a crucial step towards addressing the environmental challenges facing the Aral Sea region. However, it is not a panacea for the problem. The effective implementation of these laws and policies requires a comprehensive approach that addresses the root causes of the problem and takes into account the unique socio-economic and cultural contexts of the countries in the region. By working together and leveraging the opportunities for regional cooperation and international support, the countries in the Aral Sea region can make significant progress towards harmonizing their national laws with EU legislation and achieving sustainable development.

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降低辩护中的专业风险水平
**REDUCING THE LEVEL OF PROFESSIONAL RISKS IN
ADVOCACY**

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抽象的。目前,法律实践与大量风险相关:与调查、司法当局、国家官员干预律师活动相关的风险,以及与其他人和委托人侵犯律师权利相关的风险。为了最大限度地减少这些风险,您需要学习如何管理它们。笔者认为,在专业培训的过程中,在提高律师业务水平的过程中,要学会管理职业风险。笔者还请关注律师职业财产责任保险,这是风险管理的重要内容。

关键词:宣传、宣传、专业培训、专业发展、风险、风险管理、保险。

Abstract. *Legal practice is currently associated with a large number of risks: risks associated with interference in the activities of an advocate by investigative, judicial authorities, state officials, and associated with violation of the rights of an advocate by other persons and clients. In order to minimize these risks, you need to learn how to manage them. According to the author, one should learn to manage professional risks in the process of professional training, as well as in the course of improving the professional level of advocates. The author also draws attention to professional property liability insurance for advocates, which is an important element of risk management.*

Keywords: *advocacy, professional training, professional development, risks, risk management, insurance.*

Currently, many professional activities are associated with risks, this also applies to advocacy. Investigative and judicial authorities interfere in the professional activities of an advocate, and government officials violate the rights of an advocate. The relationship between an advocate and other advocates and clients becomes risky. We should not forget about such risks as professional burnout and professional deformation of an advocate. All these risks, as well as new risks that arise in the process of remote communication and work on the Internet information and telecommunications network¹, complicate and sometimes make it impossible for advocates to provide qualified legal assistance.

In order to minimize risks, you need to learn how to manage them. In this regard, a number of American scientists believe that risk management education should begin at the university. For example, Robert Mullen and Jeffrey Smith note that «few law schools... have developed courses aimed at teaching law students to identify the fundamental errors of law that most often result in malpractice claims, the causes of such errors, or the appropriate methodology to prevent such errors»². They extend the same requirement to mandatory advanced training for advocates.

In the Russian Federation, more attention is paid to the issues of training advocates and improving their professional level. On April 18, 2019, the IX All-Russian Congress of Advocates adopted the “Standard of Professional Training and Improvement of the Professional Level of Advocates and Trainees”³. Clause 8 of the Standard states that during an internship, bar associations of constituent entities of the Russian Federation must ensure that interns study the course “Introduction to the Profession of an Advocate.” We believe that it is necessary to add materials to this course on the topic of risks associated with advocating. It is important to warn future advocates about the risks they may face and talk about existing ways to reduce them. It is also important to provide such lectures as part of improving the professional level of already practicing advocates. Due to the fact that “advocating is characterized by hundreds of subtleties, nuances, “secrets”, various techniques, methods, technologies that come to a professional over the years”⁴, enriching lecture programs for advanced training and for practicing advocates with materials on professional risks, namely on ways to identify and assess them in order to reduce them, is certainly relevant. For example, such lectures can be offered to practicing advocates as part of one of the most convenient ways to improve the professional level of advocates - Webinars, which are organized by the Federal Chamber of Advocates of the Russian Federation. Thus, the Report of the Council of the Federal Chamber of Advocates of the Russian Federation for the period from April 2021 to April 2023 provides information that “The webinars of the FPA RF were viewed by advocates from more than 500 cities and more than 48 foreign countries”⁵.

The proactive aspect of risk management is both to avoid and to prevent unfair practices. However, advocates are often exposed to risks when providing qualified legal assistance in conditions where they have taken all measures to calculate all possible uncertainties and dangers, and do not achieve a result that suits both the advocates themselves and their clients. The reason is that nowadays there are so many risks that it is almost impossible to avoid them. In this regard, we consider it important to pay attention to professional property liability insurance for advocates, which is an important element of risk management.

In the Russian Federation, insurance for advocates is not mandatory. Art. 19 of the Federal Law “On Advocacy and the Legal Profession in the Russian

Federation” stipulates that an advocate must, in accordance with federal law, insure the risk of his professional property liability for violation of the terms of an agreement concluded with the client on the provision of legal assistance, however, this provision of the Law was suspended by the Federal Law of December 3, 2007 No. 320-FZ “On Amendments to Article 7 of the Law on Advocacy and the Legal Profession in the Russian Federation” until the date of entry into force of the federal law regulating the issues of compulsory insurance of professional liability of advocates. For this reason, not all advocates currently carry professional liability insurance. In our opinion, professional property liability insurance for violation of the terms of an agreement concluded with a client for the provision of legal assistance should be mandatory, since it will enable advocates not to worry about unexpected claims from clients and other risks that may negatively affect their professional activities.⁶

Professional liability insurance for advocates is an important element of risk management. Insurance allows advocates to provide qualified legal assistance, minimizing the professional risks of legal practice, and clients to receive such assistance. Professional property liability insurance for advocates may be a significant additional expense, but it is well worth it. Of course, filing a claim does not mean the existence of unfair practices. According to a study of malpractice claims published in 2016 by the American Bar Association’s Standing Committee on Bar Professional Responsibility, about 52% of claims made against advocates over a four-year period were unsuccessful. According to the same study, about 18% of claims brought against attorneys resulted in lawsuits that were ultimately dismissed with a ruling in favor of the defendant attorney. The remaining 29% of claims resulted in compensation being paid to the plaintiff, regardless of whether the claim was filed in court⁷. Although there are many unsubstantiated malpractice claims against attorneys that are ultimately dismissed or unresolved, a simple client allegation of negligence can take up a lot of an attorney’s time in formulating a response to an unfounded claim. “Because the existence of an unfair practice begins as an opinion and then must be proven as a fact, proving innocence can be as costly as valid damages.”⁸

In order to practice law or conduct the business of a law firm in each individual country or its administrative-territorial unit, certain types of insurance may be required, when it comes to professional risk insurance, one should not be limited to the minimum. Because law firms face both the normal risks associated with doing business and the unique risks associated with the legal profession (such as cybersecurity threats and malpractice claims), it is important to invest in a variety of insurance policies to suit specific needs. The right attorney insurance policies can reduce risk and provide peace of mind.

Some scholars believe that the existence of an insurance policy, while intended to protect injured principals, also reduces the incentives for attorneys to exercise

due care by relieving them of the costs of malpractice. Therefore, it should be expected that some advocates who insure their professional property liability for violation of the terms of the legal assistance agreement concluded with the client will provide legal assistance of a lower quality than the same advocates if they were not insured. Of course, this conflict should be taken into account and considered before deciding on compulsory professional liability insurance for advocates⁹.

At the same time, it must be recognized that neither the requirements for compulsory insurance nor the disclosure of information about insurance will be able to fully protect principals. Even if advocates insure their professional property liability for violation of the terms of the agreement concluded with the client for the provision of legal assistance, the insurers will not provide coverage for criminal or intentional acts. Insurers may also deny coverage for other claims for a variety of reasons, including the attorney's failure to promptly notify the insurer of the claim. Even in cases where insurance coverage is available, principals' claims may significantly exceed insurance limits.

Thus, we can come to the following conclusions:

- 1) legal practice throughout the world is associated with risks that must be learned to manage;
- 2) training in managing professional risks in the legal profession should begin during the period of professional training, and continue during the improvement of the professional level of advocates;
- 3) along with preventive measures, namely: training in managing professional risks of advocating in order to minimize them, an important element of risk management is also insurance of professional property liability of advocates.

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关于律师提供免费合格法律援助（无偿）的重要性
**ON THE IMPORTANCE OF LAWYERS PROVIDING FREE
QUALIFIED LEGAL ASSISTANCE (PRO BONO)**

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抽象的。 文章分析了现阶段俄罗斯联邦法律职业的社会和法律职能问题。俄罗斯律师协会是一个自治组织，就所有法律问题向公民和法律实体提供合格的援助。俄罗斯律师协会还向有需要的低收入公民提供免费法律援助和“无偿”法律援助，从而表现出与社会各界的团结，为国家的法治和稳定做出贡献。

关键词： 律师、法律职业、俄罗斯联邦律师协会、宣传、合格的法律援助、社会和法律职能、预期法律援助、免费法律援助、无偿服务。

Abstract. *The article analyzes the issues of the social and legal function of the legal profession of the Russian Federation at the present stage. The Russian Bar is a self-governing organization that provides qualified assistance to citizens and legal entities on all legal issues. The Russian Bar also provides free legal assistance and “Pro bono” legal assistance to needy and low-income citizens, thereby showing solidarity with all sectors of society and contributing to the rule of law and stability in the state.*

Keywords: *advocate, legal profession, The Russian Federal Bar Association (RFBA), advocacy, qualified legal assistance, social and legal function, legal assistance as intended, free legal assistance, pro bono.*

Text of the article: On October 18, 2023, in his keynote speech, the General Secretary of the Central Committee of the Communist Party of China and Chairman of the People’s Republic of China, Comrade Xi Jinping, at the opening ceremony of the 3rd High-Level Forum on International Cooperation within the Belt and Road, said, “It is important to be a friend.” They are “not strangers” to each other, respect and support each other, mutually wish the best. After all, by helping others, you help yourself.”¹.

In his message to the Federal Assembly, President of the Russian Federation V.V. Putin said: “Values such as mercy, mutual support, and solidarity prevail in our society.”²

These simple words from two leaders of great powers contain a positive philosophy of peaceful coexistence, philanthropy and mutual respect.

The legal system of the People's Republic of China belongs to the socialist type and it was on the basis of the Soviet model that the first legal profession in the People's Republic of China was created in 1955.³

The Russian Federation is a social state whose policy is aimed at creating conditions that ensure a decent life and free development of people, which is enshrined in Part 1 of Article 7 of the Russian Constitution.⁴

The social purpose of the state is manifested and specified in its functions, which are usually understood as the main directions of the state's activities to solve the problems facing it.⁵ The purpose of the social function is to implement the constitutional provisions of the state, which provides support for people with disabilities, low-income and elderly citizens, develops a system of social services, establishes state pensions, benefits and other guarantees of social protection for low-income citizens and people with disabilities.

The Bar is an institution of civil society and provides legal and qualified legal assistance to needy and low-income citizens. This has always been important and of paramount importance, both during the times of the USSR and at the present stage of the activity of the legal profession of the Russian Federation.

According to the provisions of the Code of Professional Ethics for Advocates, an advocate is obliged to personally or financially participate in the provision of free legal assistance, to provide free consultation at the same high level and quality as when providing legal assistance paid for by the client (clause 7 of article 15, clause 8 of article 10).⁶

The IBA Declaration of Pro Bono Principles sets out a complete definition of the concept of "pro bono legal assistance", containing all its main features - "the provision of legal assistance with the same level of quality as provided to commercial clients, without remuneration or expectation of remuneration, and links to support for the low-income, vulnerable and marginalized, and the communities and organizations that support them." Pro bono also includes the provision of legal assistance for a reduced fee, free participation in improving legislation, the legal profession, and legal education. "Pro bono is one of the ways to make this world better, kinder, brighter"¹⁹ - this is exactly what the President of The Russian Federal Bar Association (RFBA) Yuri Pilipenko (currently an adviser to the Federal Advocates' Association of the Russian Federation) once said.⁷

An analysis of statistical data for 2020–2022 contained in the Report of the Council of the RFBA regarding the implementation of social and legal functions by advocates shows that in 2020, 32,860 advocates provided defense in criminal proceedings as assigned, in 2021 – 34,831 advocates, in 2022 year – 34,270 advocates. 9,480 advocates participated in civil proceedings as assigned by the courts in 2020, 10,584 advocates in 2021, and 10,283 advocates in 2022.

A lot of work has been done by the legal community to provide free legal assistance to advocates in accordance with the Federal Law of November 21, 2011 N 324-FZ (as amended on June 24, 2023) “On free legal assistance in the Russian Federation” (hereinafter referred to as the Law 324 Federal Law).⁸ Thus, in 2021, the total number of advocates providing free assistance was 20,597 people. Of these, 8,293 advocates worked in the state free legal aid system, 177 advocates were appointed by state legal bureaus. 2,769 advocates participated in the non-state system of free legal assistance, and 9,358 advocates provided assistance on a pro bono basis.

In 2022, the total number of such advocates was 22,332. Of these, 8,480 participated in the state system of free legal assistance, with 79 advocates involved in state legal bureaus. There are 2,977 advocates in the non-state system of the Law Firm, and 10,796 pro bono advocates. The data provided indicate an increase in the number of assigned cases from 2020 to 2022, in which qualified legal assistance was provided by advocates. As for the provision within the framework of Law 324-FZ, over the past two years one can also trace an increase in the demand of citizens for free legal assistance, which is provided by advocates. Thus, in 2021, advocates provided qualified legal assistance within the framework of Law 324-FZ to 42,022 citizens, and in 2022 – to 45,513 citizens.⁹

The given statistical data show that citizens of the Russian Federation are interested in cooperation with advocates on issues of free legal assistance (pro bono), including in the process of implementation of social and legal functions by the legal community.

An important step in improving the effectiveness of free legal assistance was the introduction of the Integrated Information System of the Russian Bar. Now the process of collecting documents necessary for citizens to receive assistance from advocates is carried out through a system of interdepartmental electronic interaction and document flow.¹⁰

In addition to the above, from September 10, 2022, the RFBA, in response to the concerns expressed by the President of the Russian Federation V.V. Putin, the degree of legal protection of citizens of the Russian Federation, took the initiative and on the website of the “Advokatskaya Gazeta” created an all-Russian project “Citizen Advocates” to provide free legal assistance to citizens in need. This project involves advocates from regional bar chambers who are highly qualified and have experience in advising within the framework of the state and non-state system of free legal assistance. The Russian Federal Bar Association (RFBA) provided extensive coverage of the project in the press. As a result, from September 2022 to February 2023, 750 questions were received from citizens from different regions of Russia through the “Advokatskaya Gazeta” website. The project has established itself as an important initiative to implement the socio-legal function

of the Russian Bar on citizens' access to free legal assistance, which increases the prestige and authority of the Bar in society.¹¹

The "Advocates-Citizens" project needs constant advertising, since many people who have the right to receive free legal assistance as part of the implementation of social and legal functions by advocates do not know about such an initiative and become victims of not always qualified advocates or scammers who have begun to use high technologies, including artificial intelligence technologies, replacing video images and faking voices.¹² This challenge poses the task of continuous improvement project "Advocates-Citizens", since fraudsters can already use the video image and voice of an active or well-known advocate for their own selfish purposes - to deceive citizens when conducting remote online consultations.

The capabilities of artificial intelligence technology were demonstrated during a direct line with Russian President V.V. Putin, when one of the questions from a student from St. Petersburg, asked in video format, was generated by a neural network with the image and voice of President V.V. himself. Putin. Answering the question asked, Russian President V.V. Putin said: "It is impossible to prevent the development of artificial intelligence, which means we need to do everything so that we can be one of the leaders in this direction."¹³

In this regard, the Chairman of the People's Republic of China, Comrade Xi Jinping, in his keynote speech at the China-Central Asia Summit, held on May 19, 2023 in Xi'an, Shaanxi Province (Northwest China), said: Global changes are gaining momentum before our eyes. The world, era and historical conditions are undergoing unprecedented changes. The world needs stability and prosperity. It is necessary to provide each other with mutual assistance and support. "Good brotherhood is dearer than wealth."¹⁴

Today, the Russian legal community needs to take into account the ongoing changes in the field of technological progress and be able to adapt new technological solutions to their needs, including in the field of artificial intelligence. The Russian Bar needs to put technical achievements at the service of people, including to provide free legal assistance (pro bono). It is necessary to explain to Russian citizens by all available means how not to become victims of "scammers."¹⁵ This explanatory activity also implements the social and legal function of the Russian Bar Institute. In connection with the existing problem of fraud in private law firms, I consider it necessary, as part of the implementation by advocates of the social and legal function of providing free legal assistance, through the website of the Russian Federal Bar Association (RFBA), the website of the "Advokatskaya Gazeta" and the websites of regional bar chambers, to increase explanatory work to inform citizens about how and where they can turn to receive qualified free legal assistance from advocates, as well as if they are faced with facts of fraud by private advocates or in the event of difficult life situations. This work must be

continued constantly; advocates need to be closer to the people and help those who are in difficult life situations and need legal assistance.

An example of solidarity between the legal profession and the people is the Ho Chi Minh City Bar Association, Socialist Republic of Vietnam. Thus, on August 25, 2023, the “Company of Volunteer Advocates 2023” was launched, in which 240 volunteer advocates took part. Under the leadership of the Chairman of the Committee and advocate Nguyen Van Trung, volunteers divided into 6 groups and went to provide free legal assistance to remote areas of the provinces of Binh Phuoc, Dak Nong, Dak Lak, with the aim of promoting the law and presenting gifts to poor people who find themselves in difficult life situations. Speaking at the departure ceremony, the Chairman of the Youth Advocates Union, Nguyen Van Trung, noted: “The volunteer law firm has become a good tradition, a characteristic activity of the Ho Chi Minh City Bar Association. “Everyone chooses the easy job, but the difficult one knows whom to save.” Thanks to the company’s activities for the benefit of society, advocates are ready to go through difficulties worthy of the title of Ho Chi Minh City advocate.” On the eve of the departure of the advocates, donations in the amount of VND 429,150,000 were collected in the provinces, which made it possible to give 600 gifts to people in the localities where the delegation of advocates came to carry out volunteer work.¹⁶

There are also many remote places in Russia where people live who face legal problems, but they do not have the opportunity to turn to an advocate for various reasons - remoteness or low income. In this regard, the Russian Bar needs to continue to look for ways to provide legal assistance to this category of people.

O.E. Kutafin¹⁷ defined the legal profession as one of the law enforcement institutions that has its specific features, but not as a state organization, but as a voluntary association of persons professionally engaged in advocacy.¹⁸ Based on this, advocates providing free legal assistance to needy and low-income people (pro bono) need to promote respect for the law and law-abiding behavior.

Li Bo, a Chinese poet of the Tang Dynasty, wrote: “A new meeting and good conversation are priceless.” To paraphrase this wise thought of the Chinese poet Li Bo, we can say that for an advocate a new meeting with a person in need of legal assistance and a conversation with him is priceless.

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税控活动中纳税人权利的保护
**PROTECTION OF TAXPAYERS' RIGHTS DURING TAX
CONTROL ACTIVITIES**

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抽象的。本文将税收控制问题视为财政当局与纳税人之间互动的一种形式，以及由于这种关系而产生的在税收控制活动中保护纳税人权利的概念。笔者明确了纳税人保护权行使的类型和方式，并结合受侵害的权利保护措施，明确了纳税人权利落实中的问题。

关键词：税收控制、纳税人、保护权、国家强制措施、财政权力。

Abstract. *This article examines the issue of tax control as a form of interaction between the fiscal authority and the taxpayer, and as a consequence of this relationship the concept of protecting the rights of the taxpayer during tax control activities. The author identifies the types and methods of exercising the right to protect the taxpayer, and also, in correlation with measures to protect violated rights, identifies the problem of implementing such rights.*

Keywords: *tax control, taxpayer, right to protection, measures of state coercion, fiscal authority.*

In accordance with the law, namely Article 2 of the Tax Code of the Russian Federation (hereinafter referred to as the Tax Code of the Russian Federation), an integral part of tax legal relations is the implementation of tax control, which, in turn, occupies a very important place, or rather one of the central ones in the system of tax legal relations. As such, the concept of tax control is also given in the Tax Code of the Russian Federation in Article 82 of the Code, where tax control is defined as activities of authorized bodies to monitor compliance with legislation on taxes and fees in the manner established by this Code [1].

Tax control has a specific goal, namely to streamline tax legal relations. As Adam Sweet wrote in his treatise "An Inquiry into the Nature and Causes of the

Wealth of Nations” “Tax control is not only a way to ensure the financial stability of the state, but also the basis of justice and equality before the law.” [2]

Meanwhile, tax control, as an integral part of tax legal relations, has an important distinctive feature - interaction between taxpayers and the tax authority.

Based on the results of such interaction, the conscientiousness of the fulfillment of tax obligations or the flawed nature of the taxpayer’s tax transactions is revealed, which in itself is the basis for the use of government coercive measures for withdrawals to the budget or the application of tax liability measures for identified offenses.

The form of such interaction can be expressed in the following forms:

1. Tax audits (desk and field);
2. Tax control activities outside the scope of audits:
 - 2.1. Data verification (tax audit);
 - 2.2. Summons to the tax authority to give explanations by the taxpayer;
 - 2.3. Information request;
 - 2.4. Taxpayer accounting;
 - 2.5. Inspection of territories and premises;
 - 2.6. Others.

It is important to highlight that a distinctive feature of tax control is also the inequality of the parties where the powers of the controlling body are exercised in relation to the taxpayer. With this balance of power, any excess of the powers of the fiscal authority during tax control or procedural violations creates a threat to the rights of the taxpayer.

At the same time, tax legislation presupposes the taxpayer’s right to protect rights and legitimate interests. Thus, Article 22 of the Tax Code of the Russian Federation in paragraph 1 says the following: “Taxpayers (payers of fees, payers of insurance premiums) are guaranteed administrative and judicial protection of their rights and legitimate interests.”

Protection of the right, as such, lies in the system of subjective law itself, or rather in the plane of the taxpayer’s legal claims. In his work “Protection of Ownership Rights” Mengliev R.S. indicates that the right to defense is transformed into an independently subjective right from the authority of a subjective right as a result of an offense. [3]

Thus, the concept of “right to defense” can be considered both from the point of view of subjective law and from the point of view of objective law. In the first case, it is implied that the law allows certain behavior of the taxpayer, in the second it is a legal institution, a set of legal norms governing relations related to the protection of the rights of the taxpayer, including both substantive and procedural legal norms.

At the same time, it is worth noting that the concept of protection and the right to protection are not unambiguous. “Protection” implies the implementation of the

“right to defense” and thereby defines itself as a broader concept that includes the concept of “right to defense”.

When carrying out tax control activities, there are several types and methods of exercising the rights to protect taxpayers, which should ensure the legality and fairness of the relationship between the taxpayer and the fiscal authority:

1. Right to confidentiality (the tax authority guarantees the confidentiality of information obtained during tax control activities);
2. The right to protection from illegal coercion (guarantee of protection from illegal coercion by the tax authority during tax control activities);
3. The right to receive information (the taxpayer has the right to receive information about his rights and obligations, as well as about the procedure for conducting tax control);
4. The right to receive qualified assistance (the taxpayer’s right to contact specialists in the field of taxation and law for advice);
5. The right to participate in an audit (the taxpayer has the right to participate in tax control activities, monitor the progress of tax control activities);
6. The right to provide evidence (in order to protect his legal rights and interests, the taxpayer has the right to provide the tax authority with evidence of his position);
7. The right to appeal (if a taxpayer disagrees with the actions of the tax authority, he has the right to file an appeal in an administrative or judicial manner).

From the point of view of tax legislation, the taxpayer is provided with several methods of protection, including: recognition of the illegal action/inaction of an official, self-defense and invalidation of a non-normative act. The taxpayer independently chooses the method of protecting his rights based on the nature of the violation of his rights.

The primary method of protection is self-defense, which from one point of view implies the protection of a violated right without the involvement of an authorized body. This method follows from the provisions of paragraph 11, paragraph 1, article 21 of the Tax Code of the Russian Federation “taxpayers have the right not to comply with unlawful acts and demands of tax authorities, other authorized bodies and their officials that do not comply with this Code or other federal laws.”[4]

From another point of view, in the global understanding, based on the constitutional principles of the right to protect rights provided for in paragraph 2 of Article 45 of the Constitution of the Russian Federation, objections and claims can also be attributed to self-defense. In this part one cannot but agree with V.P. Griбанov that any actual action permitted by law by an authorized person can be understood as self-defense [5].

Self-defense is not an obstacle to the future use of another method of protection, which would involve the assistance of subjects of state protection. This method is an appeal.

In conclusion, I would like to note that to protect the rights of the taxpayer during tax control activities, the following methods are used: recognition of illegal actions/inaction of an official, self-defense and invalidation of a non-normative act.

The effectiveness of applying one or another method of protecting the violated rights of a taxpayer implies the application of measures against the violator of such rights. However, it is not possible to find practice on the application of measures to protect violated rights in relation to employees of the authorized body.

In view of this, the conclusion suggests itself that there are problems in implementing the protection of taxpayers' rights during tax control.

This vicious practice of impunity gives rise to an increase in violations of the rights of taxpayers during tax control activities. From which we can conclude that in order to properly respect the rights of taxpayers during tax control activities, based on their authoritative nature, it is necessary to introduce stricter liability of the fiscal authority for such a violation.

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中国企业环境下人工智能治理的法律框架：创新与责任的平衡
**LEGAL FRAMEWORKS FOR AI GOVERNANCE IN CHINESE
CORPORATE LANDSCAPE: BALANCING INNOVATION AND
RESPONSIBILITY**

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Introduction. The rapid advancement of artificial intelligence (AI) technologies in recent years has led to significant changes in the corporate landscape worldwide. China, being one of the leaders in AI, actively promotes the adoption of this technology in various sectors of the economy, including corporate governance [1]. However, despite the numerous benefits that AI can bring to businesses, there are also serious challenges associated with the legal regulation of the use of this technology [2]. This article is devoted to the study of the legal foundations of AI regulation in the context of corporate governance in China, with the aim of finding a balance between stimulating innovation and ensuring the responsible use of this technology.

Methods. To achieve this goal, this paper employs a comprehensive approach that includes an analysis of the existing legal framework governing the use of AI in China's corporate sector, as well as a comparative analysis with international legal standards and practices. In addition, the article uses materials from expert interviews with representatives of Chinese companies implementing AI in corporate governance processes, as well as with lawyers and legal experts in technology regulation.

Results. The analysis shows that China is making active efforts to create a favorable legal environment for the development and implementation of AI in the corporate sector. In 2017, the Chinese government published a national plan for the development of AI, which emphasizes the importance of this technology for economic growth and enhancing the country's competitiveness [3]. One of the key directions of the plan is to stimulate the introduction of AI in corporate governance and business processes.

To achieve this goal, China has adopted a number of legislative acts and policy initiatives. In 2021, the Data Security Law came into force, which establishes rules

for the collection, storage, processing, and use of data, including in the context of AI applications [4]. The law imposes obligations on companies to ensure the security and confidentiality of data, as well as grants data subjects certain rights, such as the right to access and delete personal data.

In addition, China has industry standards and guidelines for the ethical and responsible use of AI, developed under the auspices of the Ministry of Science and Technology and other regulatory bodies [5]. These documents establish principles of transparency, accountability, fairness, and non-discrimination in the development and application of AI systems in various fields, including corporate governance.

Despite the existence of a certain regulatory framework, the regulation of AI in China's corporate sector faces a number of challenges and limitations. One of the key problems is the attribution of responsibility for decisions and actions taken by AI systems [6]. Current legislation does not provide a clear answer to the question of who should be held liable in the event of harm or damage resulting from the use of AI - the developer, the supplier, or the company that implemented the technology.

Another important issue is ensuring the transparency and explainability of AI algorithms used in corporate governance [7]. Many AI systems are based on complex machine learning models that can be a "black box" for decision-makers. This makes it difficult to assess the reasonableness and fairness of AI recommendations and can lead to unintentional discrimination.

Issues of intellectual property protection and data rights also raise concerns when using AI in a corporate context [8]. There is uncertainty regarding who owns the rights to the results generated by AI systems and how to ensure a fair distribution of benefits from the use of data to train algorithms.

Discussion. The research results presented in the previous section highlight the complex and multifaceted nature of the legal regulation of AI in China's corporate sector. China's approach to AI governance in the corporate landscape reflects a delicate balance between the government's ambitious plans for AI development and the need to ensure responsible and ethical use of this technology [9].

One of the key findings of this study is that China has made significant strides in establishing a legal framework for AI governance in the corporate sector. The government has introduced a range of laws, regulations, and guidelines that address various aspects of AI development and deployment, such as data security, personal information protection, algorithmic transparency, and ethical principles [10]. These legal instruments provide a foundation for promoting responsible AI practices and mitigating potential risks associated with the use of AI in corporate governance.

However, the analysis also reveals that the existing legal framework is not without limitations and challenges. The attribution of legal liability for AI-driven

decisions and actions remains a complex issue that requires further clarification and development [11]. As AI systems become more autonomous and sophisticated, it becomes increasingly difficult to determine who should be held responsible when things go wrong – the developers, the users, or the AI system itself [12]. This uncertainty can create barriers to the adoption of AI in corporate governance and hinder the development of trust and confidence in these technologies.

Another significant challenge highlighted by this study is the need to ensure transparency and explainability of AI algorithms used in corporate decision-making processes [13]. The “black box” nature of many AI systems raises concerns about fairness, accountability, and potential biases [14]. Without clear mechanisms for auditing and explaining how AI systems arrive at their decisions, there is a risk of perpetuating or amplifying existing inequalities and discrimination [15]. Addressing this challenge requires a combination of technical solutions, such as explainable AI techniques, and legal and regulatory frameworks that mandate transparency and accountability [16].

The protection of intellectual property rights in the context of AI-generated inventions and creations is another area that requires further legal clarification and harmonization [17]. The existing patent and copyright laws were not designed with AI in mind, and there are ongoing debates about the eligibility of AI-generated innovations for legal protection [18]. Striking the right balance between incentivizing innovation and ensuring fair access to AI technologies is crucial for fostering a thriving AI ecosystem in China and globally [19].

The expert interviews conducted as part of this study provide valuable insights into the perspectives of industry stakeholders on the legal regulation of AI in China’s corporate sector. The interviewees generally acknowledge the importance of having a clear and comprehensive legal framework for AI governance, but also highlight the need for flexibility and adaptability to keep pace with the rapid evolution of AI technologies [20]. They emphasize the importance of collaboration between the government, industry, academia, and civil society in developing and implementing effective AI governance mechanisms [21].

One of the key themes that emerged from the expert interviews is the need for a balance between state control and industry self-regulation in the governance of AI in the corporate sector [22]. While the government plays a crucial role in setting the overall policy direction and establishing legal boundaries, industry stakeholders argue for a more flexible and adaptive approach that allows for experimentation and innovation [23]. This calls for the development of hybrid governance models that combine top-down regulation with bottom-up self-regulatory initiatives, such as industry codes of conduct, standards, and best practices [24].

The Chinese experience in AI governance in the corporate sector offers valuable lessons for other countries grappling with similar challenges. China’s proactive approach to developing a legal framework for AI governance, coupled with its

strong government support and large-scale investments in AI research and development, has positioned the country as a leader in this field. However, the Chinese model also raises concerns about the potential for excessive state control and the lack of democratic oversight [25]. Other countries can learn from China's successes and challenges in AI governance, while adapting the approaches to their own socio-political contexts and values [26].

Looking forward, the legal regulation of AI in China's corporate sector is likely to remain a dynamic and evolving landscape. As AI technologies continue to advance and their applications in corporate governance expand, there will be a need for ongoing legal and policy developments to address emerging challenges and opportunities [27]. This will require a proactive and adaptive approach to AI governance that involves continuous monitoring, assessment, and adjustment of legal frameworks in light of new evidence and insights [28].

Furthermore, the effective governance of AI in the corporate sector will require a multi-stakeholder approach that engages diverse perspectives and expertise [29]. This includes not only government regulators and industry players but also academic researchers, civil society organizations, and the general public [30]. Fostering open and inclusive dialogues about the ethical, social, and legal implications of AI in corporate governance is essential for building trust and ensuring that the benefits of these technologies are widely shared [31].

Conclusion. The legal regulation of the use of AI in corporate governance is a complex and multifaceted task that requires a careful balance between promoting innovation and ensuring the responsible and ethical application of technologies. China's experience demonstrates possible approaches to solving this problem, combining state support, industry standards, and flexible legal mechanisms.

Further development of the regulatory framework should be aimed at eliminating gaps and uncertainties in areas such as liability for AI decisions, ensuring algorithm transparency, protecting intellectual property, and data rights. It is also important to take into account international experience and best practices in this field, promoting the harmonization of legal approaches at the global level.

The legal regulation of AI in corporate governance is a dynamic and rapidly developing area that requires constant attention from legislators, businesses, and society. Only through joint efforts can we ensure that the potential of AI is realized in the interests of all stakeholders, contributing to the sustainable and inclusive development of the corporate sector.

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罪犯家庭的重新社会化潜力
**THE RESOCIALIZATION POTENTIAL OF THE CONVICT'S
FAMILY**

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注解。 本文探讨了家庭在被定罪者重新社会化过程中的作用。 值得注意的是,影响罪犯矫正和刑满后社会适应的重要因素是家庭。 保持与家庭成员的家庭联系被认为是被定罪者重新社会化的一个重要领域。

关键词: 罪犯重新社会化、社会适应、罪犯矫正、家庭、家庭关系、罪犯家庭关系的保存、恢复。

Annotation. *This article examines the role of the family in the process of resocialization of convicted persons. It is noted that an important factor that influences the correction of a convicted person and his subsequent social adaptation in society after serving his sentence is the family. Preserving family ties with family members is considered an important area of resocialization of the convicted person.*

Keywords: *resocialization of convicts, adaptation in society, correction of convicts, family, family ties, preservation, restoration of family ties of convicts.*

Resocialization of a convicted person refers to the process of his return to society by changing his ideologies and beliefs; formation of the convict's readiness and ability to be included in social processes after serving his sentence, to join the social environment; introducing him to the rules and norms of behavior for a law-abiding citizen.

The resocialization of the convicted person is important because it is closely related to the state of security in society and the state. After all, one of the reasons why former convicts commit repeat crimes is that they were unable to fully adapt to society after their release.

An important factor that positively influences the resocialization of former convicts is the institution of family.

Family and the presence of family relationships among convicts are important stimulating factors that contribute to the correction of convicts, their successful

adaptation after release and integration into society. According to A.S. Mikhlin, “while serving a sentence, moral and often material support comes from the family. But the role of the family after the end of the sentence is especially great for the social adaptation of the released person.”¹

Analysis of statistics showed that at the time of committing a repeated criminal act, 66% of those convicted were unmarried, 15% were married, 12% were in a civil marriage and 7% were divorced². As you can see, people who are not in family relationships are much more likely to commit repeated crimes. Thus, the family plays an important role in the adaptation and correction of the convicted person. In addition, the convicts themselves perceive the family as the most significant factor in their resocialization.

However, what is important here is the resocialization potential of the convict’s family, which is understood as the complex resource that the family has to carry out the resocialization function.

The families of convicts, based on their performance of the resocialization function, can be divided into the following types: 1) families that maintain a stable connection with the convict, i.e. constantly interact with a family member serving a sentence in a correctional institution in the form of correspondence, calls, visits, sending packages and parcels, etc.; 2) families who occasionally maintain contact with the convicted person, i.e. interact less closely with the convicted person; 3) families who distance themselves from the convicted person, i.e. do not maintain contact with the convicted person for any reason (for example, due to the severity of the crime he committed, the presence of conflicts and negative attitudes from family members, the convicted person repeatedly serving a sentence, etc.).

The loss of family ties while a convicted person is in a correctional institution negatively affects the adaptation and correction of the convicted person after his release from prison. In this regard, formerly convicted families who did not maintain contact with them are at greater risk of committing a repeat crime.

Indeed, as research shows, family support has a huge impact on the success of the resocialization of convicts. Emotional support from family is a key factor for the convicted person, which can help him overcome stress and adapt to new living conditions. The support of loved ones helps to strengthen the psychological state of the convicted person and increase his motivation for change; helps the convicted person feel part of society. All this contributes to the successful integration and adaptation of convicts.

Thus, family convicts have a greater opportunity to restore socially positive ties and adapt more effectively to society, using the “resocialization potential of

¹ Characteristics of those sentenced to imprisonment / ed. A.S. Mikhlina. - M.: Lawyer, 2019. P. 12.

² Filippova O.V. General social determinants of recidivism // Bulletin of TSU. - 2020. - No. 457. - P. 261.

the family.” In this regard, more measures should be introduced that will be aimed at preserving or restoring family ties of the convicted person. To achieve this, technical innovations in the use of video communication systems should be introduced in all correctional institutions. Thanks to the use of a video communication system, convicts will be able to communicate more often with relatives, keep in touch with them, take part in raising children, etc. Especially with those who, for one reason or another, cannot personally attend meetings with convicts in a correctional institution.

It is important to note that based on the results of a survey among 600 convicts, it was found that more than 85% of the surveyed convicts supported an increase in the number of visits to meet family members and, in connection with this, the initiative to change the current legislation³.

The author of the work also considers it necessary to amend Article 97 Penal Code of the Russian Federation. According to this provision of the law, those sentenced to imprisonment are allowed long and short-term trips outside of correctional institutions. In Article 97 of the Penal Code of the Russian Federation lists the persons who may be granted visits, the terms and grounds for granting such visits.

The author of the research topic believes that it is necessary to supplement clause The Penal Code of the Russian Federation provides the following grounds for granting a convicted person travel outside the correctional institution: “...and also to maintain family ties with the family and with children for the purpose of exercising parental rights and responsibilities (under the following circumstances: the birthday of a family member, the first of September, the death of a child high school, etc.)”. At the same time, it is necessary to take into account the characteristics of the convicted person and information about his behavior while serving his sentence.

Thus, the introduction of video communication systems in all correctional institutions for communication between convicts and family members, an increase in the number of meetings for convicts to meet with family members, the inclusion of an additional basis in clause “a” part 1 art. 97 to allow a convicted person to leave the correctional institution, the Penal Code of the Russian Federation must allow the prisoner to maintain contact with his family. In turn, this will allow the convicted person to subsequently restore socially positive connections and effectively adapt to society and thereby become a law-abiding member of society.

³ Maletina E.A., Pimenova O.P. Relationships between children and parents serving sentences in correctional institutions // Family and housing law. - 2021. - No. 5. - P. 15.

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确保律师-委托人特权的安全作为律师独立性的保障

ENSURING THE SAFETY OF ATTORNEY-CLIENT PRIVILEGE AS A GUARANTEE OF LAWYER INDEPENDENCE

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抽象的。 本文讨论了确保律师与委托人特权安全的措施，该特权源于律师作为向每个人提供合格法律援助的主体的特殊法律地位，受到俄罗斯联邦宪法的保障。 作者重点阐述了律师的责任，以及律师为维护与委托人关系的保密性而必须遵守的禁止和限制，并分析了律师在提供合格法律援助过程中所享有的基本权利在侵犯律师-委托人保密特权的情况下。 笔者得出的结论是，确保律师与委托人保密特权安全的措施范围是重大的，但是，由于侵犯律师与委托人保密特权安全的企图不断出现，因此不仅需要不断观察和 实施法律和公司行为中规定的措施和建议，但要继续改进和发展，并考虑到外国经验 - 前苏联共和国。

关键词：律师独立性的保障、合格的法律援助、律师-委托人特权、律师豁免权。

Abstract. *The article discusses measures to ensure the safety of attorney-client privilege, arising from the special legal status of a lawyer as a subject of providing qualified legal assistance, guaranteed by the Constitutions of the Russian Federation to every person. The author focuses on the responsibilities of a lawyer, as well as on the prohibitions and restrictions that a lawyer must observe in order to maintain confidentiality in relationships with clients, and analyzes the basic rights that a lawyer has in the process of providing qualified legal assistance in cases of infringement of attorney-client privilege. The author comes to the conclusion that the scope of measures to ensure the safety of attorney-client privilege is significant, however, due to the ongoing attempts to encroach on the safety of attorney-client privilege, it is necessary not only to constantly observe and implement the measures and recommendations specified in the law and corporate acts, but to continue to improve them and development taking into account foreign experience from states - former republics of the USSR.*

Keywords: *guarantees of independence of a lawyer, qualified legal assistance, attorney-client privilege, attorney immunity.*

Qualified legal assistance is a fundamental right of every person, guaranteed by the provisions of Art. 48 of the Constitution of the Russian Federation.[1] However, the implementation of this right would be impossible without endowing the subjects of qualified legal assistance - lawyers, with independence and other guarantees related to their special status.

One of these guarantees is the confidentiality of information provided to a lawyer by persons who have approached him for professional legal assistance.

Attorney-client privilege is any information related to the provision by a lawyer of legal assistance to his client (Part 1 of Article 8 of the Law on Advocacy and the Bar in the Russian Federation).

The Code of Professional Ethics for Lawyers includes such information (clause 5 of Article 6 “Code of Professional Ethics for Lawyers” (adopted by the First All-Russian Congress of Lawyers on January 31, 2003) (as amended on April 15, 2021)):

- the fact of contacting a lawyer, including the names of the Principals;
- all evidence and documents collected by the lawyer during preparation for the case;
- information received by the lawyer from the Principals;
- information about the Principal that became known to the lawyer in the process of providing legal assistance;
- content of legal advice given directly to the Principal or intended for him;
- all legal proceedings in the case;
- terms of the agreement for the provision of legal assistance, including monetary settlements between the lawyer and the Principal;
- any other information related to the provision of legal assistance by a lawyer [2].

The special nature of the fiduciary relationship between an attorney and a principal presupposes a high degree of mutual trust, based on the principal’s confidence in the attorney’s preservation of attorney-client privilege, the inadmissibility of third parties gaining access to it, as well as the attorney’s confidence in the reliability and veracity of the information provided by the principal to him.

Attorney-client privilege is a kind of immunity of the principal and a direct duty of the lawyer, from which he cannot be released unless the principal requests it. However, such consent must be expressed in writing. [3]

Guarantees for an attorney to maintain attorney-client privilege	
1.	The impossibility of a lawyer disclosing information communicated to him by the principal in connection with the provision of legal assistance to the latter, without the consent of the principal.
	sub clause 5 clause 4 art. 6 of the Law on Advocacy and the Bar in the Russian Federation

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2.	Secret cooperation of a lawyer with bodies carrying out operational investigative activities is prohibited.	clause 5 art. 6 of the Law on Advocacy and the Bar in the Russian Federation
3.	A ban on calling and questioning a lawyer as a witness about circumstances that became known to him in connection with an application to him for legal assistance or in connection with its provision.	clause 2 art. 8 of the Law on Advocacy and the Bar in the Russian Federation
	Prohibition on interrogation of a lawyer, defender of a suspect, accused as a witness about the circumstances that became known to him in connection with the application to him for legal assistance or in connection with its provision, as well as about the circumstances that became known to him in connection with the provision of legal assistance.	sub clauses 2 and 3 clause 3 art. 56 Code of Criminal Procedure of the Russian Federation
4.	A ban on carrying out operational search activities and investigative actions against a lawyer (including in residential and office premises used by him to carry out his legal practice) in the absence of a corresponding court decision.	clause 3 art. 8 of the Law on Advocacy and the Bar in the Russian Federation
	Prohibition on the use as evidence of prosecution of information, objects and documents obtained during operational search activities or investigative actions (including after the suspension or termination of the status of a lawyer), if they are part of the lawyer's proceedings in the affairs of his clients.	
5.	Meetings between a suspect or accused and his defense attorney may take place under conditions that allow the detention facility officer to see them but not hear them.	Art. 18 of the Federal Law "On the detention of suspects and accused of committing crimes"
6.	Prohibition on interfering with legal activities carried out in accordance with the law, or preventing this activity in any way.	
	A ban on holding a lawyer liable in any way (including after the suspension or termination of the status of a lawyer) for the opinion expressed by him during the practice of law, unless a court verdict that has entered into legal force establishes the lawyer's guilt in a criminal act (inaction).	

<p>Prohibition on requesting from lawyers, as well as from employees of bar associations, bar chambers or the Federal Chamber of Lawyers, information related to the provision of legal assistance in specific cases.</p>	
<p>Ensuring the safety of a lawyer, his family members, and the safety of their property is the responsibility of the state represented by the internal affairs bodies.</p>	
<p>Criminal prosecution of a lawyer is carried out in compliance with the guarantees for a lawyer provided for by criminal procedure legislation.</p>	

The Russian legal community, represented by the Federal Chamber of Lawyers of the Russian Federation, developed Recommendations for ensuring the safety of attorney-client privilege and guarantees of lawyer independence when lawyers carry out professional activities dated November 30, 2009, establishing additional guarantees for the safety of attorney-client privilege, according to which a lawyer has no right to:

- use information constituting the subject of attorney-client privilege when working on the cases of other clients;
- without the consent of the principal, expressed in writing, communicate information constituting the subject of attorney-client privilege to colleagues to receive advice regarding the conduct of the case;
- talk in detail about the work on the case with family or friends;
- use information constituting the subject of attorney-client privilege for personal purposes, including advertising. [4]

In addition, these Recommendations establish:

- practical measures to protect information that constitutes the subject of attorney-client privilege;
- the need to maintain a unified list (register) of office premises used by lawyers to carry out their activities;
- the need to obtain written permission from the principal to terminate the secrecy regime, thereby giving the lawyer the right to use and even publish (in particular, in scientific or other publications) the relevant information;
- the need to inform bar associations and bar chambers of constituent entities of the Russian Federation about violations of the rights and guarantees of a lawyer when carrying out professional activities;
- the need to appeal illegal actions and decisions to the prosecutor's office or to the court, seeking to eliminate violations by operational search and investigative

bodies, state authorities and local governments of the current legislation providing for the protection of attorney-client privilege;

- the need to contact law enforcement agencies in cases where illegal actions of officials of operational-search and (or) investigative bodies, state authorities and local government are in the nature of a crime.

Thus, attorney-client privilege and guarantees of its safety are regulated by a number of regulatory legal acts of the Russian Federation and corporate acts of the legal community of the Russian Federation, which formulate both the principles and objectives of this institution, as well as recommendations for its preservation and protection. However, despite such extensive legal regulation, the problem of ensuring the safety of attorney-client privilege is still relevant today, due to the fact that there are attempts to encroach on attorney-client privilege by government agencies, law enforcement agencies, and cases of its disclosure by lawyers themselves. Due to the fact that attorney-client privilege is an integral part of guaranteeing the independence of a lawyer, it is necessary not only to ensure compliance with the rules for ensuring its safety, but also to implement all recommendations, which should not be of a declarative nature, but be a mandatory part of the professional activity of every lawyer when providing him with qualified legal assistance. In addition, it is necessary to constantly improve measures to protect attorney-client privilege by developing legislation and strengthening law enforcement practice from use.

One of the possible measures could be the introduction of criminal or administrative liability for obstruction of legal practice, expressed in unlawfully gaining access to information containing attorney-client privilege.

Similar experience exists in foreign countries, in particular, we provide a comparative legal analysis of the legal regulation of liability for infringement of attorney-client privilege and disclosure of attorney-client privilege in the states of the former USSR:

1. Republic of Belarus – art. 22.13 of the Code of the Republic of Belarus on Administrative Offenses - Intentional disclosure of a commercial or other secret protected by law without the consent of its owner by a person who knows such a commercial or other secret in connection with his professional or official activities. [5]

2. Republic of Moldova – art. 320 of the Code - Interference in the activities of the People's Advocate and the People's Advocate for the protection of children's rights in order to influence their decisions on certain appeals, deliberate disregard by an official of appeals from the People's Advocate and the People's Advocate for the protection of the rights of the child, failure to implement such recommendations, obstruction in any other form of carrying out their activities. [6]

3. Kyrgyz Republic - art. 318-1 of the Criminal Code of the Kyrgyz Republic – Obstruction in any form of the realization of the rights and performance of the

duties of a defender under Art. 48 of the Criminal Procedure Code of the Kyrgyz Republic. [7]

4. Republic of Kazakhstan - Article 435 of the Criminal Code of the Republic of Kazakhstan - Obstruction of the legitimate activities of lawyers and other persons to protect the rights, freedoms and legitimate interests of a person and citizen in criminal proceedings, as well as the provision of legal assistance to individuals and legal entities, or other violation of the autonomy and independence of such activities, if these acts caused significant harm to the rights, freedoms or legitimate interests of a person and citizen, the rights or legitimate interests of legal entities, the interests of society or the state protected by law. [8]

5. Republic of Uzbekistan - Article 46 of the Code of Administrative Offenses of the Republic of Uzbekistan - Disclosure of medical or commercial secrets, secrets of correspondence and other communications, notarial actions, banking transactions and savings, as well as other information that may cause moral or material damage to a citizen, his rights, freedoms and legal interests. [9]

In the legislative acts of the Republic of Armenia [10], the Republic of Azerbaijan [11], the Republic of Tajikistan [12] and the Republic of Turkmenistan [13], there is no liability for infringement of attorney-client privilege and disclosure of attorney-client privilege.

Thus, it is necessary to make appropriate changes to the Criminal Code of the Russian Federation, namely to Article 294 of the Criminal Code of the Russian Federation, formulated its provisions as follows: “Obstruction of justice, preliminary investigation, professional activity of a lawyer” with the following content:

“1. Interference in any form in the activities of the court for the purpose of obstructing the administration of justice -

shall be punishable by a fine in the amount of up to two hundred thousand rubles, or in the amount of the wages or other income of the convicted person for a period of up to eighteen months, or by forced labor for a term of up to two years, or by arrest for a term of up to six months, or by imprisonment for a term of up to two years.

2. Interference in any form in the activities of a prosecutor, investigator or person conducting an inquiry, in order to impede a comprehensive, complete and objective investigation of the case, as well as in the professional activities of a lawyer in order to impede the exercise of his professional powers provided for by the legislation on advocacy and advocacy -

shall be punishable by a fine in the amount of up to eighty thousand rubles, or in the amount of the wages or other income of the convicted person for a period of up to six months, or by compulsory labor for a term of up to four hundred eighty hours, or by arrest for a term of up to six months.

3. Acts provided for in parts one or two of this article, committed by a person using his official position, -

shall be punishable by a fine in the amount of one hundred thousand to three hundred thousand rubles, or in the amount of the wages or other income of the convicted person for a period of one to two years, or by forced labor for a term of up to four years with deprivation of the right to hold certain positions or engage in certain activities for a term of up to three years or without it, or imprisonment for a term of up to four years with deprivation of the right to hold certain positions or engage in certain activities for a term of up to three years or without it.”

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专业适应是消防专业学生实践型数学训练的前提
**PROFESSIONAL ADAPTATION AS A PREREQUISITE FOR
PRACTICE-ORIENTED MATHEMATICAL TRAINING OF
STUDENTS OF FIRE-TECHNICAL SPECIALTIES**

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抽象的。 本文专门讨论一年级学生对高等教育的适应问题。 在未来消防安全工程师的数学培训中考虑了有利于这种适应的教学和心理条件。 强调了适应的要素——学习数学的准备、教育动机和职业适应。 建议设计一种基于实践导向的数学教学方法。 事实证明,以实践为导向的方法、组织形式和教学工具将有助于消防技术专业学生成功适应数学教学。

关键词: 数学教学、以实践为导向的学习方法、学习数学的准备、以实践为导向的教学方法、适应。

Abstract. *The article is devoted to the problem of adaptation of first-year students to higher education. The pedagogical and psychological conditions conducive to such adaptation are considered in the context of the mathematical training of future fire safety engineers. The elements of adaptation are highlighted – readiness to study mathematics, educational motivation, and professional adaptation. It is proposed to design a methodology for teaching mathematics based on a practice-oriented approach. It has been established that practice-oriented methods, organizational forms and teaching tools will contribute to the successful adaptation of students of fire-technical specialties to teaching mathematics.*

Keywords: *teaching mathematics, practice-oriented approach to learning, readiness to study mathematics, practice-oriented teaching methods, adaptation.*

In the process of professional training of future specialists in the field of fire safety, a special place is occupied by the mathematical cycle of disciplines. Taking into account the dynamic nature of mathematical models of fire, as well as factors complicating the process of solving such models (the presence of unknown model parameters, uncertainty of initial conditions, complexity of the mathematical apparatus used in solving the problem, the requirement of efficiency of solving the model, etc.), mathematical training in educational institutions of fire-technical

profile should be organized on the basis of a practice-oriented approach to learning. This approach actualizes the formation of students' competencies that ensure the solution of practical tasks of professional activity [8].

When designing the methodology of practice-oriented teaching mathematics to future fire safety engineers, it is important to take into account the basic psychological and pedagogical patterns of the educational process. The development of all structural elements of the teaching methodology should be aimed at the formation of practice-oriented mathematical competence among students [7] and be carried out taking into account the patterns of formation of personality qualities at student age, as well as the psychological characteristics of the professional activities of specialists of fire and rescue units [9].

Many modern pedagogical studies are devoted to the study of the features of mathematical and professional training of future specialists in the field of fire safety. Examples are the works of A.V. Ermilov [9], A.S. Konstantinova [11], I.A. Maly [14], T.V. Malyutina [13], I.S. Morozova [13], Yu.Yu. Osmonov [11], E.N. Trofimets [21] etc. But the pedagogical and psychological conditions conducive to practice-oriented teaching of mathematical disciplines in educational institutions of fire-technical profile have not yet been studied by scientists.

The initial stage of training in an educational institution of higher education for first-year students is characterized by certain difficulties: the amount of information received increases, unusual organizational forms of training appear, the methodology and conditions of training change, the amount of independent work increases, etc. In educational institutions of a fire-technical profile, regulatory conditions are also additional difficulties for students: a regulated internal daily routine, the presence of certain prohibitions due to the nature of official activity, increased physical exertion.

Changing the usual rhythm of life and new requirements of the educational process can lead to the emergence of contradictory beliefs and behavioral attitudes in the minds of students regarding learning. Therefore, special attention should be paid to the professional adaptation of first-year students as the need to adapt to the content and individual components of the educational process, as well as the peculiarities of the chosen professional activity.

Many researchers consider the issues of adaptation of first-year students to study at a university. For example, in [16], the definition of pedagogical conditions for the activation of this process was carried out, and it was also indicated that the process of adaptation of students to learning has a significant impact on the level of formation of their general cultural and professional competencies.

According to L.A. Antipova, the adaptation of first-year students to the conditions of study at a university is an active adaptation of first-year students to the peculiarities of the didactic process in higher education, to a new lifestyle, so-

cial circle, as well as creative self-realization in scientific, social, sports and other spheres [1].

In the study of I.G. Gurova, the main directions in which work should be carried out on the adaptation of first-year students to the educational environment at the university are highlighted: motivational, professional, personal [5]. We agree that the work carried out in these areas will contribute to the adaptation of first-year students to higher education. But we believe that for the successful adaptation of students, it is also necessary to apply modern interactive forms of education, provide pedagogical assistance in case of difficulties in mastering mathematics, stimulate independence in educational activities, and monitor the psychological microclimate in study groups.

In the work of O.E. Dorokhova, the analysis of the causes of difficulties in mastering higher mathematics by students of fire-technical institutions was carried out. The main reasons include: the lack of students' skills to plan the academic load in preparation for classes, the complexity of the educational material, the inability to study in various emotional and physical states (in a state of fatigue after active physical activity or attire) [6].

To overcome these difficulties and ensure the effectiveness of the educational process, the methodology of teaching mathematics should be developed on the basis of a practice-oriented approach. The implementation of such a methodology will contribute to the formation of students' ability to rationally organize mental activity, the need for self-education and self-training of professionally significant personality qualities, awareness of their vocation to the profession of a lifeguard. Professional skills and personal qualities formed in the process of teaching mathematical disciplines serve as the basis for the formation of professional adaptation and productive educational activities in the development of disciplines of the professional training cycle.

The success of adaptation at the university is inextricably linked with the willingness of students to study. Many scientists consider the readiness of applicants to study at a university as the main prerequisite for successful professional development (for example, V.A. Golyakova [2], S.V. Gridneva [4], D.S. Kargamanov [10], V.A. Kagarmanova [10], S.A. Parygina [17], M.A. Stepkina [18], O.A. Tabainova [20] et al.). In psychological research, the concept of "readiness" is defined in a very diverse way. We accept the definition of T.B. Kryukova, who understands readiness as the orientation of consciousness towards the upcoming activity, the mood for a certain behavior, the mobilization of all forces for active and expedient action [12]. According to E.A. Sanina, T.A. Voronko and A.A. Savadova, in the process of achieving success and quality of mathematical education at a university, an important role is played by the formation of readiness for self-educational activities of students in teaching mathematics [19].

In our opinion, the methodology of practice-oriented teaching mathematics to future fire safety engineers should take into account the readiness of students to study mathematical disciplines, as well as for future professional activities, which are often associated with risk situations. A number of psychological factors influence the effectiveness of university education: the student's ability to cognitive activity, independent work, understanding, memorization, educational motivation, etc. A high level of psychological readiness for educational activities is an important factor in the successful adaptation of students to study at an educational institution of a fire-technical orientation.

According to O.A. Tabinova, in order to form the readiness of school graduates to study mathematics at a university, it is necessary to systematize and develop educational and cognitive skills and ways of activity, correct the motives for admission to university and the orientation of the individual towards mastering the profession, form personality qualities that determine the ability to self-regulation [20].

In practice-oriented training, it is essential to form students with special practically significant skills that ensure creative readiness for future professional activity. In teaching mathematics to students of fire-technical specialties, readiness for professional activity is formed by practice-oriented mathematical skills and skills in mathematical modeling in the field of civil protection. The use of special methods and technologies for teaching mathematics contributes to the formation of students' personal qualities necessary to perform official tasks in high-risk situations [3].

The effectiveness of teaching mathematical disciplines in higher education is determined by factors that have a psychological basis: understanding, readiness for independent activity in the learning process, memorization, cognitive activity, educational motivation. To form the readiness of future fire safety engineers to study mathematics, it is necessary to intensify the cognitive activity of students through practice-oriented methods, forms and means of teaching. We agree that the motivation of students and their learning strategy are closely interrelated [15]. When designing methods of teaching mathematics, practice-oriented tasks should be used, the context of which reflects possible operational and tactical situations in the field of fire safety. In the process of solving such problems, students' attention is focused on the field of practical application of the acquired skills in their future practical activities. It is the practice-oriented orientation of mathematics teaching that stimulates the activation of students' cognitive activity, increases their educational motivation, contributes to the better adaptation of students to the educational process, as well as risk situations characteristic of the professional activity of a fire safety engineer.

So, the adaptation of students to learning is a necessary prerequisite for successful practice-oriented mathematical training of future fire safety engineers. In

the context of teaching mathematics, the successful adaptation of students of fire-technical specialties will contribute to the formation of readiness to study mathematical disciplines, the development of independence in educational activities, the use of practice-oriented methods and forms of education. The professional adaptation of students, which takes place in the first years of study simultaneously with the development of mathematical disciplines, is a necessary condition for practice-oriented mathematical training of students. Such adaptation implies the adaptation of students to the structure of higher professional schools, to individual components of the educational process, the internal mode of functioning of the educational institution, the specifics of the future professional activity of a specialist in the field of fire safety, both in normal operation and in risk situations.

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改变家庭教育话语：从“标准化”到“熟悉化”：法国经验
**CHANGING FAMILY EDUCATIONAL DISCOURSE: FROM
“SCOLARISATION” TO “FAMILIARIZATION”: FRENCH
EXPERIENCE**

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抽象的。这项基于话语方法和隐性比较的研究有助于将法国的科学研究经验作为一种看待世界的真实方式，并在学校与家长关系的实际实践中得到体现。吸引原始、真实的科学信息来源，确保将科学界广泛未知的材料和术语引入科学流通。我们认为这些立场扩大了对学校与家长关系演变的科学理解，并将有助于比较教育学领域科学知识的增长。

关键词：教学比较语言学；话语、家庭教育；极化；熟悉。

Abstract. *This study based on a discursive approach and implicit comparison contributes to use the scientific and research experience of France as a real way of seeing the world, expressed in real practices of school-parents relationship. Attracting original authentic sources of scientific information ensures the introduction into scientific circulation of materials and terminology unknown to a wide range of the scientific community. We consider that these positions expand the scientific understanding of the evolution of school-parents relationship and will contribute to the growth of scientific knowledge in the field of comparative pedagogy.*

Keywords: *pedagogical comparative linguistics; discourse, family education; scolarisation; familiarization.*

Introduction

France is one of the few industrial countries which population is growing. Its fertility rate has become one of the highest in Europe with 1,88 births per female

[Volant 2019]. Pro-natalist family policy in France stems from the liberalization doctrine adopted in the late 20-th century and resulted in the government efforts aimed to help parents remain economically active after childbirth and return to their professional activity. Scolarisation is that very phenomenon and social practice in France, which made the combination of professional involvement and parenting in a French family both feasible and honorable. The concept of scolarisation is often viewed in a narrow sense as “school enrollment” or “educational path of a child”. The author is inclined to think that this concept semantics carries far more implications, which relate to the social roles of major actors in the teaching and learning process at school. Historically, school in France has always been one of the major agents of socialization for children along with teaching and educating. E. Durkheim sees school as an intermediary to impart ethical norms and values to the next generations [Durkheim 1922].

Methodology

Today researchers tend to investigate some phenomena using comparative method of analysis, which is able to make up for the shortcomings of other research techniques, leading comparative linguists claim. Non-linear approaches to research objects and phenomena manifest apparent heuristic potential and give ground for employing discursive techniques in this study [Danilova 2021]. The main focus is made on the way discourse interpretation goes beyond the boundaries of a purely linguistic approach and comes close to the poststructuralist broad understanding of discourse as a tool of constructing a linguistic picture of the world. In this case discourse analysis can be applied to a far wider range of issues, including social practices. The author suggests studying family patterns and role of family in the education system from this perspective. A closer look at how educational discourse is implemented in practical situations can give a clear picture of school and family cooperation in different countries across the globe. Therefore, the paper based on the use of new research techniques to identify «tension vectors» in the family-school relationship amid changing European education landscape. Cultural, historical, regional and institutional problems of modern France are interpreted in terms of educational discourse evolution.

Findings

In the second quarter of the 20-th century school educational discourse in France came to dominate the national education environment. It was the time when French school first trumpeted and promoted its interests, simultaneously building contacts with other actors of the educational processes. School concept foregrounding changed educational patterns and school status in society. School became the national pattern-maker – the place, the model, the tool to eliminate social differences and provide equal chances, largely through enhanced education standards. There emerged a new discourse of social partnership – «scolarisation”.

However, in the second half of the 20-th century the role of school as a social ladder in France was overshadowed by the trend of family estrangement from national educational institutions. Trust in school as once the most influential social institution was undermined, the school system was labeled as ineffective inefficient [Bourdieu 1970]. This shift made family one of the major national priorities in France. French families daily face with a lot of challenges, children's teaching and educating being among the basic ones. Even though family life is traditionally considered a private sphere, the growing role of family in France has knitted the parent community together and finally led to family-school confrontation [Orekhova 2020].

The school-family partnership is clearly struggling. Researchers, authoritative experts both in France and abroad speak about this with an anxiety [Dubet 2001, 2015; Perregaux 2016]. The concern about the state of school-parent relations is expressed by representatives of public policy in the country [Rapport d'information; Hussonnois-Alaya]. A fairly long stay of the author of this paper in France, experience as a professor in educational institutions of various levels (from elementary school to university), the opportunity of observation, discussions with French colleagues, as well as a long-term research practice dedicated to education in France, allow to conclude that there is little trust and a lot of suspicion in the school-parent relationship [Orekhova 2018].

Parents are afraid of being judged as a dysfunctional family, as the school bureaucratic apparatus is authorized to impose punitive measures (forcing a child to repeat the grade, offering less prestigious schooling options, etc.) Parents do fear to receive criticism of their children, as it their academic performance often hinges on the school-parents relationship. This rather strict verdict of the French researchers in their works devoted to the problems of school-parents relationship, and the experts from other countries agree with them. [Gauchet 2009; Giles 2015; Neyrand 2018].

Not only parents are suspicious, teachers are also racked by spasms of insecurity: they are afraid of controlling parents (who might be incompetent), are anxious they might be exposed to verbal and even physical abuse. Teachers do feel vulnerable when confronted with parents, they are not always confident in the teaching methods they chose, have doubts about their own professional competence, are fearful of school administration, colleagues, reforms. More than that, they are afraid both to punish and encourage their students. Unfortunately, French social networks are filled with disappointing conclusions of teachers (for example, SkyRock), which is categorically not welcomed by education officials. Practitioners are supported by respected researchers. They indicate the contradictions between the content of existing circulars concerning the role of family education, family-school partnerships, and the strict limitation of such social partnership,

which causes fear and anxiety among all participants in the educational process. [Kubacka 2015; Lawson 2013; Lorcerie 2016].

Parents apparently want to communicate with teachers, using plain and clear language, they do want to be part of school life, and not only in holding events. Parents need the right to be equal partners in their children's education, so they seek traditional teaching patterns, similar to those which their own parents used when helped them with homework. This controversy fuels further tensions between parents and school over home assignments, teaching methods and curriculum both in low- and high-income neighbourhoods. Recent education reforms in France aimed to enhance and upgrade the teacher-training system have had little effect on French educational environment. There is an urgent need for new pedagogical competences to prevent further problems. It is worth paying attention to the publications of the recent past [Meirieu 1997; Montandon 1994] and recent years [Marwan 2011; Merhan 2015] to ensure that even their titles, not to mention the content, eloquently illustrate the above problems.

The shifting educational landscape generates new discourse trends. Scolarisation discourse is gradually morphing into familiarization one. The concept of familiarization emerged in the Russian linguistics in the wake of linguistic and cultural research of M.M. Bakhtin [Bakhtin 1975]. The French pedagogical theory and practice treat this concept as part of daily reality: as a process of learning / of getting used to / adjusting to something or teaching / training / somebody about something, to make sure they start to understand it). This term is commonly used in the French school curricula, teaching guidelines, educational technologies research [Lasson 2007].

The author suggests we look at the familiarization trend in education in terms of a comfortable and safe learning environment, associated with a close-knit family circle. This setting implies easier communication with reduced social distance between teaching and learning actors: family and school. Parents in France badly need education practices to become familiarized, targeted, confidential, they seek support and assistance from school to understand complicated, difficult things. Parents need school to make the unknown familiar.

Naturally, concerns over the consequences of familiarization are emerging and questions are arising. Is familiarization fraught with simplifying and even vulgarizing the educational process? Might it open door to inappropriate, cynical language which will or has already affected communication and behavior patterns in the teaching and learning environment?

Once M.M. Bakhtin said that this new type of communication is public response to some critical events, turning points in social life. Apparently, it is school responsibility to prevent the familiarization trend from going south. We expect school to give a boost to the process of shaping a new discourse and team up with all the stakeholders in education.

Conclusion

The analysis indicated a watershed in the present-day society: we have entered a new stage of global evolution, with family becoming a priority. Despite detected family alienation from the learning institutions, the trend of family involvement in their children's schooling is still on the rise and has a paramount importance for successful educational practices. School and family remain the leading actors in the ongoing processes of education and socialization of the young generation, though the role of this partnership in society is currently being challenged.

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科学流派“健美操理论与方法”作为体育运动领域研究整合的例子
**SCIENTIFIC SCHOOL “THEORY AND METHODS OF AEROBICS”
AS AN EXAMPLE OF INTEGRATION OF RESEARCH IN THE
FIELD OF PHYSICAL EDUCATION AND SPORTS**

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抽象的。文章介绍了新兴科学流派“健美操理论与方法”在体育教育和运动领域的科学研究方向，并介绍了莫斯科城市师范大学在体育教育领域的具体研究实例。科学学校正在发展并继续研究教育系统不同层次健美操课程的科学性、教育性和方法论支持，以及组织运动员健身健美操运动训练的经验。所提供的科学研究实例表明了健美操团队运动训练的高效性，并为教育组织中健康和健美操的发展开辟了机会。

关键词：科学派、健康健美操、运动健美操、科学研究。

Abstract. *The article describes the directions of scientific research of the emerging scientific school “Theory and Methods of Aerobics” in the field of physical education and sports, presents examples of specific research in the field of physical education at the Moscow City Pedagogical University. The scientific school is developing and continues to study the scientific, educational and methodological support for aerobics classes at different levels of the education system, as well as the experience of organizing sports training for athletes in fitness aerobics. The presented examples of scientific research show the high effectiveness of sports training of sports aerobics teams and open up opportunities for the development of health and sports aerobics in educational organizations.*

Keywords: scientific school, health aerobics, sports aerobics, scientific research.

Introduction.

At the Moscow City Pedagogical University (hereinafter referred to as the University), scientific research is carried out as part of the development of the scientific school “Theory and Methods of Aerobics”. The objects of the study are both physical education in general education organizations and physical education classes at the Moscow City Pedagogical University. The network form of organizing scientific research at the University makes it possible to study the use of aerobics as a means of physical education in general education organizations across the entire spectrum of levels of general education.

Currently, at the University, within the framework of the emerging scientific school “Theory and Methods of Aerobics,” topical issues of organizing the sports training of MSPU students for competitions at various levels are being studied. The article summarizes some results of the development of the emerging scientific school “Theory and Methods of Aerobics”, under the leadership of Professor Elvira Ivanovna Mikhailova in the period from 2010 to the present.

Materials and methods.

Within the framework of this study, analysis, systematization and implementation of aerobics means and methods were used to prepare future specialists in physical culture and sports for the Moscow education system, and the organization of sports training for students in the general and higher education system.

Methods were used to systematize the results of scientific research in the form of preparing scientific and methodological manuals for training specialists in the areas of 49.03.01 Physical Education and 43.03.01 Pedagogical Education. The results of sports training of highly qualified athletes were analyzed using the example of the University’s sports aerobics team.

Results and discussion.

Scientific research within the framework of the emerging scientific school is carried out in several directions:

- innovative approaches for designing the content of physical education lessons, providing for the performance of fitness aerobics exercises by students of the general education system;
- management of the processes of sports training of highly qualified athletes during sports aerobics;
- scientific and methodological support for recreational aerobics classes in the system of training scientific and pedagogical personnel in the education system.

The scientific school “Theory and Methods of Aerobics” represents the analysis and integration of the results of scientific research that systematizes the pro-

duction and dissemination of new knowledge in this subject area in the education system of the city of Moscow.

A scientific school is determined by the commonality of such an object of study as aerobics, a type of human motor activity.

Some studies were carried out as part of the design of the content of physical education lessons, when the use of various types of physical education lessons was studied with the predominant use of means and methods of fitness aerobics of a certain orientation (Table 1).

Table 1.
Characteristics of physical education lessons using fitness aerobics

Lesson type	Lesson parts	Duration, 45 min.	Planned heart rate, beats/min
Educational	Circuit warm-up	5–7	90–120
	Stretching	3–5	90–110
	Choreography	20–25	120–130
	Final part	5–10	90–100
Complex	Circular warm-up	5–7	90–120
	Stretching	3–5	90–110
	Basic aerobics	15–20	90–130
	Final part	2–5	90–100
Dance	Circuit warm-up	10–15	90–120
	Dance aerobics	20–25	100–140
	Stretching	2–5	to 110

Classes for students in the experimental group were held three times a week as part of a physical education lesson; the control group also studied three times a week, but according to the comprehensive physical education program of V.I. Lyakh.

Table 2 shows the results of assessing physical qualities after conducting a pedagogical experiment lasting four months. It turned out that the time to run 30 m decreased from 6.2 ± 0.2 to 5.9 ± 0.3 s, which indicates a significant improvement in results in the experimental group ($P < 0.01$). The time of the 3×10 m shuttle run decreased from 9.8 ± 0.2 to 9.4 ± 0.2 s, and the length of the standing long jump increased in representatives of this group on average from 145 ± 6.3 to 156 ± 7.3 cm ($P < 0.01$). The changes obtained are associated with the use in the experimental group of a significant amount of aerobic exercises, performed in the form of running movements and jumping.

Table 2.

Dynamics of changes in test results during the pedagogical experiment

Indicators	Experimental group (n=)				Control group (n=)			
	Before PE	Reliability, p	After PE	Reliability, p	Before PE	Reliability, p	After PE	Reliability, p
Run 30 m, s								
x	6,3	p>0,05	5,9	p<0.01	6,4	p>0,05	6,3	p>0,05
σ	0,2		0,3		0,2			
tcalc	1,5		7,5		1,4			
trp	2,07		2,07		2,07			
Standing long jump, cm								
x	145	p>0,05	156	p<0.01	140	p>0,05	145	p>0,05
σ	6,3		7,3		5,5			
tcalc	2,02		3,8		2,01			
tgr	2,07		2,07		2,07			
Shuttle run 3x10m, s								
x	9,8	p>0,05	9,4	p<0.01	9,9	p>0,05	9,8	p>0,05
σ	0,2		0,2		0,2			
tcalc	1,8		5,6		1,2			
tgr	2,07		2,07		2,07			

In the control group, there was no significant increase in these indicators (Table 2).

The results of the presented experiment indicate that the selection of fitness aerobics exercises in accordance with the proposed methodology for using different types of fitness aerobics lessons had an effective impact on the process of development of the physical qualities of children from the experimental group, improved their preparedness for passing the GTO standards.

Aerobics classes attract a significant number of University students who make up the University's national teams. Let us consider the results of a study of special physical preparedness using the example of the organization of sports training for University students. 8 highly qualified athletes took part in the experiment - KMS - 4, MS - 3, MSMC - 1, aged from 18 to 24 years.

The training was built using the circuit training method, aimed at developing the physical qualities necessary for athletes. At the same time, the average training cycle included a duration of four weeks and the formation of microcycles of the retracting, basic 1, basic 2 and control-preparatory type. Educational and training sessions were held 6 times a week for 4 hours. The ratio of various means

of training changed in such a way that in the first two months technical training was carried out, providing for the development of combinations of aerobic elements of various difficulty groups, the second two months - improvement of the implementation of elements of these combinations with an intensity close to the performance of a competitive composition, the fifth and sixth months the combinations were combined into competitive combination and in the last two months the competitive combination was perfected. At the same time, special physical training was planned, providing for the development of qualities necessary to perform elements of an increased complexity level belonging to group "C", such as jumps: with a turn of 360, 540, 720, 900, 1080 degrees, bent over, in a split, with a change legs; with landing in a prone position, in a split and groups "D" - vertical splits, "libela", turns in a vertical split. At the same time, the mesocycle at the end of the second and sixth months ended with a recovery microcycle.

During the preparation process, the following results were obtained (Table 3):

- average values of dynamic strength indicators in the "explosive frame" exercise increased from 23 ± 1 times to 26 ± 1 times ($p < 0.01$). This means that the athlete can perform a greater number of repetitions of movements that are difficult to coordinate, and, therefore, the reliability of performing a competitive composition increases due to the improvement of the athletes' strength capabilities;

- the number of turns in the angle support increased significantly from 12 ± 1 to 16 ± 1 times ($P < 0.01$). This result was possible thanks to the inclusion in the process of training athletes of exercises such as angle supports, "Venson", and horizontal exercises, as well as the development of elements of the competitive composition of groups "C" and "D", which made it possible to strengthen the abdominal and back muscles;

- indicators in the "tuck jump" test significantly improved, from 26 ± 1 jumps to 28 ± 1 jumps in 30 seconds ($P < 0.01$), achieved by increasing the volume of elements of group "C", including jumps with a turn: bent over, in splits, with a change of legs, a push of one or two, with landing in a split in a lying position;

- indicators in the "Pirouette" test significantly increased from 3 ± 0.3 to 4 ± 0.7 revolutions ($P < 0.01$);

Table 3.

Level of special physical preparedness of athletes at the beginning and at the end of the pedagogical experiment

Test date	Tests (M±σ)					
	Explosive frame, number of times	Rotate at an angle, number of times	Horizontal stop, s	Jump “Tucking” for 30 s, quantity once	Pirouette, number of times	Cross split, cm
10.2016	23±1	12±1	6,7±1,4	26±1	3±0,3	61±1,5
05.2017	26±1	16±1	7,6±1,5	28±1	4±0,7	54,0±1,8
Student’s t-test	6,02	8,02	1,24	6,58	3,71	8,45

- flexibility indicators in the cross-split test significantly increased from 61±1.5 to 54±1.8 cm (P<0.01). This was a consequence of the inclusion in the training of athletes of such exercises that belong to the difficulty group “D” and involve performing high leg swings, vertical splits, “libel”, turns in a vertical split.

The study of this issue showed that the level of development of special physical fitness during educational and training sessions with highly qualified athletes in sports aerobics significantly improved in terms of dynamic strength and speed-strength qualities, along with flexibility indicators. This made it possible to supplement the competitive program with the inclusion of more diverse combinations of traditional aerobic movements and to saturate the program with original transitions and combinations of elements of increased complexity.

Observations made at competitions allow us to conclude that the proposed training program for athletes in this sport should be based on the parallel development of special physical qualities while improving the technique of performing aerobic exercises that make up the competitive composition.

An important result of the activities of the Scientific School was the preparation and publication of educational and methodological aids and a textbook on aerobics, which were published in the publishing houses “Soviet Sport”, Urayt and, of course, in the scientific and editorial publishing center of the University [1-11].

The result of this work was the publication in 2023 of the publication “AEROBICS. Textbook for teachers of physical education”, recommended by the educational and methodological association of the Russian Academy of Natural Sciences for classical university and technical education as a textbook for students of higher educational institutions studying in the field of training 03/44/01 - “Pedagogical Education”, 03/49/01 - “Physical Education”, 03/49/04 - “Sport”.

Continuity in the work of the Scientific School is maintained in the work of the authors of the publication as supervisors of graduation works of students studying at the University:

- master's thesis of the Master of Sports of international class, World Champion in sports aerobics, champion of the Universiade 2019 in Krasnoyarsk, Denis Solovyov on the topic: "Basic physical training of highly qualified aerobists" (scientific supervisor, Professor E.I. Mikhailova);

- Daria Nazarova on the topic: "Methods of conducting sports aerobics classes with children of senior preschool age" (scientific supervisor, E.B. Derevleva);

- Ekaterina Ratnikova - "Methods for developing speed-strength abilities in the initial training group for fitness aerobics" (scientific supervisor, E.B. Derevleva);

- Alexey Logunov "Methods of strength training for men of the first mature age in classes at a fitness club" (scientific supervisor, E.I. Mikhailova);

Within the framework of the scientific school, work is underway with the Moscow State Pedagogical University team, which has become eleven times Champions and multiple winners of the Moscow Student Sports Games in sports aerobics. Three-time World Champion in fitness aerobics, Anna Chudakova, graduated from the Institute of Natural Science and Sports Technologies and received a master's degree; World and European champions, winners of the 2019 Universiade, Honored Masters of Sports Janazyan Garsevan and Janazyan Duhik, International Master of Sports; Ostapenko Ilya and Shurupov Denis are European Champions, Masters of Sports of international class, and a number of other athletes who have the high title of Master of Sports of the Russian Federation: Daria Chernousova, Alexey Belousov; World champion in several categories of aerobics competitions, winner of the Universiade in Krasnoyarsk, Denis Solovyov, Honored Master of Sports.

The results of high-class athletes serve as an example for University students and attract them to aerobics. Boys and girls, bachelors and masters, constantly join the ranks of the University's national team and perform demonstrations at sports festivals and student evenings.

Conclusion.

At the Moscow City Pedagogical University since 2012. At the Institute of Natural Sciences and Sports Technologies, a new scientific school "Theory and Methods of Aerobics" has been formed, headed by Professor E.I. Mikhailova. Within the framework of the school, scientific research is carried out on the study of aerobics as a means of physical education in educational organizations in Moscow, aerobics as a means of sports training for the University team. The results of the study are presented in teaching aids under the general title "Aerobics at School", published in the publishing houses "Soviet Sport", "Urayt" and the scientific publishing center of the University. As part of the scientific school "Theory and Methods of Aerobics", university students carry out research in the field of health and sports aerobics.

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二十一世纪俄罗斯戏剧民族认同的社会文化分析
**SOCIO-CULTURAL ANALYSIS OF THE NATIONAL IDENTITY OF
RUSSIAN DRAMA OF THE XXI CENTURY**

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注解。 本文是对21世纪创新剧作的研究,从社会文化的角度进行思考。 文章在民族认同的背景下分析了现代俄罗斯剧作家的作品,对戏剧进行了详细的描述,揭示了“新”戏剧作为影响观众情感感知的一个因素的比较方法论,识别了戏剧的特征。 戏剧艺术,并将戏剧艺术与舞台体现艺术进行类比。

关键词: 二十一世纪俄罗斯戏剧、戏剧艺术、俄罗斯戏剧艺术、创新戏剧、民族认同和文化、俄罗斯现代剧作家、二十一世纪戏剧。

Annotation. *This article is a study of innovative dramaturgy of the 21st century, considering it in the socio-cultural aspect. The article analyzes the work of modern Russian playwrights in the context of national identity, gives a detailed description of plays, reveals the comparative methodology of the “new” dramaturgy as an element of influencing the emotional perception of the audience, identifies the characteristic features of the art of dramaturgy, and draws an analogy between the art of drama and the art of stage embodiment.*

Keywords: *dramaturgy of Russia of the XXI century, dramaturgical art, theatrical art of Russia, innovative dramaturgy, national identity and culture, modern playwrights of Russia, theater of the XXI century.*

Modern Russian dramaturgy differs radically, in style and manner, from the works of A.N. Ostrovsky, A.M. Gorky, A.P. Chekhov, F.M. Dostoevsky, the dramaturgy of the “thaw” period and the dramaturgy of socialist realism. Of course, a play can be written at the beginning of the twenty-first century, it will use a modern text, the characters will be in the realities of today’s reality, but it is still not the kind of modern dramaturgy that needs to be clarified. The main question is, first of all, how the characters of the play act in accordance with modern norms of morality and ethics, how they react to problems that are in tune with our time. It is clear that dramaturgy has always historically outstripped theatre. A theater

that stages and plays a contemporary play is a separate kind of theatrical art: a different direction, a different acting school, a different audience, and a different kind of criticism. The modern theatre has to answer many questions, first of all for the audience, and if it fails, then modern drama will practically disappear from the stage. Since dramaturgy is primary, and directing is secondary, the playwright has a real opportunity to form the main opinion in his material, based on enriched socio-cultural experience. If the 20th century is characterized by the emergence of new dramaturgy and the development of the theory and methodology of theatrical art (the system of K.S. Stanislavsky, “biomechanics of V.E. Meyerhold, theatrical developments of E.B. Vakhtangov, psychotechnics of M.A. Chekhov”), then the 21st century gave impetus to the development of abstract and experimental theater, thanks to the emergence of innovative dramaturgy. It was dramaturgical innovation, as well as the new century, that turned out to be the niche where the inconspicuous man lived, who was accompanied by a crude and cynical naturalism. Such dramaturgy is replete with complex constructions, young playwrights are fighting for the right, whose play will become a paper projection of the theater of the future. Directors began to compete in “self-expression”, using means of staging expressiveness incompatible with common sense in search of a “new form” - the word lost its true meaning and significance. Modern dramaturgy has become characterized by the so-called trend features: documentary; lack of emphasis on the word; inclusive social theatre based on people’s mental characteristics; Polysensory theater, which affects the viewer’s consciousness beyond the word, allows you to communicate at the level of energy, through the body, with emotional signs. The reasons for the emergence of such dramaturgy lie in the changes in the socio-cultural environment, which is a multifaceted world, which, in turn, is due to drastic changes in the socio-political situation in the country, as well as the desire to overcome the patterns and standards developed by the aesthetics of socialist realism. Now the theater, as well as dramaturgy, is oriented towards the “new audience”. The innovation of freedom in 21st-century drama was initially marked by an aesthetic scandal, although at the moment, modern drama is already setting the tone for a new theatrical aesthetic. Nowadays, Russia is dominated by a special technique of theatrical performance called “verbatim” (from the Latin “verbatim” - “literally”), based on interviews. Plays by the Presnyakov brothers, Maxim Kurochkin, Yevgeny Grishkovets, and Ivan Vyrypaev belong to this direction. For a concrete understanding of the national peculiarities of the new dramaturgy, it is necessary to consider more carefully the technology of its creation.

Modern dramaturgy, to a greater extent, is determined, first of all, by the personality of the playwright himself and his civic position. In his work, Mikhail Ugarov is not afraid of the unknown, sometimes revealing “extremely uncomfortable themes” that destroy classical ideas. In the early 1990s, Ugarov was already at

the forefront of the modern play movement. In 2002, he founded «Theater.doc.», on the stage of which frankly poignant, social and political performances were staged. Ugarov's independent directorial debut in the cinema was the film *The Ch-Brothers*, based on the memoirs of Anton, Mikhail and Alexander Chekhov. The plays "Witches' Kitchen", "Spelling on the Grotto", "Newspaper "Russian Invalid" for July 18...", "A Shabby Man", "April Green Cheeks" are distinguished by strong monologues of the characters. M. Ugarov is a recognized master of the "new wave" of playwrights. To approach everything critically, to make any decision consciously – these are the real, unspoken rules of his theater [9, p. 95]. If we talk about the trends of the "new drama", then, at first, a stake was placed on outright blackmail. This was especially characteristic of Nikolai Kolyada, who shocked the viewer [8, p. 89].

In Russian dramaturgy, the figure of this playwright is not unambiguous. His performances act like a slap, in which he breaks all ethical and aesthetic taboos, this is even a little insulting. Nikolai Kolyada is firmly labeled as a "blackguard" [6, p. 17]. With each of his works, Nikolai Kolyada shows that our ideals of mercy, love for one's neighbor, self-sacrifice for the good of the world are not only constantly beating against reality, but, sometimes, are powerless to change anything. However, it is not necessary to say that only a fool will not understand this truth. It seems that Nikolai Kolyada is not an author for everyone. And there is also a negative assessment of it. The performances of the Kolyada Theatre are called "live" [8, p. 184]. It has its own aesthetics with elements of folk ritual actions, festivals, festivities, it is in the spirit of the traditions of folk art. Nikolai Kolyada's art, both dramaturgical and directing, is wayward and sharp today.

The complete opposite of Kolyada among the new playwrights is the work of Vasily Sigarev, whose dramaturgy is a fictional concept of an event or mass action, in which the dramatic action itself is created by creating and recreating the storyline [3]. Each event becomes a kind of response to the "social order" of society, a response to a certain social phenomenon. Most of Sigarev's plays describe an industrial city in the provinces and a terrible example of Soviet urban planning, when a city with one industry languishes in the tenacious embrace of an industrial monster, in which people are disoriented and demoralized and run away from everyday problems into a fictional, artificial world: "The Pit", "The Gul Family", "Ladybugs Returning to Earth", "Plasticine". For his plays, the playwright always chooses a tragic ending, but the author's sympathy for his characters does not allow the drama to become a theater of cruelty.

The appearance of Evgeny Grishkovets among the playwrights is a new way to the theatrical world with its own style of presenting material. His dramaturgy is like "a medicine for a person tired of everyday races, who needs to look at the reflection of his life" through the prism of the hero's views. In Grishkovets' works,

the inner life of the character, and with him the audience, is depicted and analyzed [1]. Evgeny Grishkovets is one of the reformers of modern dramaturgy, he blurs the border between the personal and the general, the dramaturgy has a narrative character of monodramas: “The Planet”, “The City”, “How I Ate the Dog”, “At the Same Time”, where personal life experience and the desire to curb oneself acquire a theatrical form.

The peculiarity of Alexander Molchanov’s plays is their genre uncertainty, the spread of unusual and experimental forms. Many of his plays are reminiscent of “hot” newspaper reports, they are relevant, but they lack artistry. A. Molchanov’s “New Drama” provides a rare opportunity to develop a relatively new language for describing cultural phenomena based on performativity. In his plays, one can observe the desire to create a holistic portrait of the epoch of the turning point, as well as to depict a special artistic world with the heroes of his time.

In one of her interviews, Elena Gremina described the emergence of the “new drama” in the system of theatrical art as follows: “In the “new drama” we are simply trying to write honestly, to the best of our ability and ability, about the present day. In Olya Mukhina’s play “Yu” there is the following dialogue: “Did the dog bite the guard hard? “As best I could.” Here we are – as best we can” [7].

Among the new generation of playwrights, Oleg Bogaev occupies not the last place. The most popular plays “Russian People’s Mail” are a tragicomedy of our time, when old people are left alone and lead a miserable existence and are not needed by anyone; “Dead Ears” is about the decline of human spirituality; “Terrible SuP” - the author reproduces the biblical legends about the Last Judgment, that the end of the world will come at the same time as the loop of time space, the play “33 Happiness” is a plot from “The Tale of the Goldfish” by A.S. Pushkin, but the author put in completely different proposed circumstances, idea and meaning. Only the familiar characters remained: an old man, an old woman and a fish; “Maryino Pole” is a play about three women, each of whom is 100 years old, they have gone through all the wars, the rapidly changing political structure of their country, living in a large remote village completely alone, but they do not give up hope of meeting their husbands from the war. As a playwright, Oleg Bogaev is distinguished in his works by a special philosophical thought and considers the theater from the point of view as food for the mind.

One of the representatives of the new dramaturgical wave, Konstantin Kostenko, did not immediately discover his theatrical direction: “Diagnosis” and “Claustrophobia” are two worlds with the main goal of forgetting. Kostenko does not show the way out, the viewer decides for himself what conclusions to draw, such plays are not for everyone. The author is interested in writing about people when they are on the very verge of a terrible psychological crisis.

Ivan Vyrypaev’s plays touch upon the global problem of modern man, from his political worldview to love or family problems. Vyrypaev became known in

Europe as the author of a number of projects, theatrical playwright, and director. He gained a reputation as a provocateur – so ambiguous are his plays [10]. The play “Dreams” is a kind of transcript of the heroin’s narcotic delirium, dedicated to her childhood friends; the play “The City Where I Am” is about faith in God, in man, about faith in oneself; the play “Valentine’s Day” was created on the basis of the dramaturgical material by Mikhail Roshchin (“Valentine and Valentina”), only the events in it take place forty years later and during one day - Valentina’s birthday and the day of Valentin’s death; the plot of the play “Oxygen” at first glance seems to be simple: an ordinary day, a young man Sanek walks around the city, looking at people and what they do, sees a red-haired girl, who later becomes “oxygen” for him, without which he cannot live [5]; the play “Genesis No. 2” is a dialogue between a psychiatrist and a patient; The play “July” is the story of an elderly male sadistic murderer. “Explain”, “Dance of Deli”, “Comedy”, “Illusions”, “Dreamworks”, “Summer Wasps Bite Us Even in November” - all these plays, where the action reaches the point of absurdity, are crowned by one of the playwright’s popular plays, the philosophical comedy “Drunk” - about the knowledge of life and truth. In Ivan Vyrypaev’s plays, various themes are raised, and sometimes provocative. The main ideas that Vyrypaev gives are philosophical, those that every person at any age begins to think about.

A special category in the dramaturgy of the 21st century is the St. Petersburg school of new drama, which includes quite famous representatives of this genre: Oleg Yernev, Valentin Krasnogorov, Alexander Zheleztsov, Yuri Lomovtsev, Taras Drozd, these playwrights always raise eternal topical problems in a modern and understandable language for the majority of viewers. In terms of genre, their dramaturgy is diverse: comedies, family dramas, documentary dramas, melodramas, tragedies, fairy tales, historical plays. Modern theater needs modern dramaturgy, because it covers a wide range of problems and topics related not only to the topical and socially significant, but also to the eternal, such as the problem of fathers and sons, honor and dishonor, love and hatred.

In the relatively short course of its development, modern “new drama” has been able to go beyond the boundaries of literature, embracing theater and even cinema, becoming not just an artistic movement, but a peculiar way of thinking. This has led to radical changes in the theatrical and dramatic world of recent decades. It should also be noted that the Russian “new drama” at the present stage has marked a special socio-cultural situation, when dramaturgy for a short time pushed aside the traditional leaders of the literary process – the novel, the short story, the novella, poetry. From that moment on, dramaturgy became a kind of springboard for comprehension of reality after upheavals and a change of formation. Modern drama has the most remarkable feature: everyone sees in it what he wants to see, understands what he wants to understand, what is within the limits

of his consciousness. Contemporary drama or innovative dramaturgy has yet to be understood from many perspectives. Only one thing is clear: any experiment has the right to exist, because it is the path to the truth.

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南奥塞梯共和国爱国区域旅游业的发展前景

PROSPECTS FOR THE DEVELOPMENT OF PATRIOTIC REGIONAL TOURISM THE REPUBLIC OF SOUTH OSSETIA

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抽象的。文章提出了利用区域旅游手段形成南奥塞梯共和国青少年爱国文化的前景。本文对教育系统、青年和旅游组织以及俱乐部具有实际意义。

关键词：区域旅游、爱国旅游、文化历史、南奥塞梯自然古迹。

Abstract. *The article presents the prospects of using the means of regional tourism to form a patriotic culture of young people studying in the Republic of South Ossetia. The article is of practical interest to the education system, youth and tourism organizations, and clubs.*

Keywords: *regional tourism, patriotic tourism, cultural and historical, natural monuments of South Ossetia.*

Introduction.

The Republic of South Ossetia is located on the southern slope of the Main Caucasian Ridge, its area is 3,800 km². The territory of the mountainous republic is rich in cultural, historical and natural monuments that can be used in the education system as a means of forming a patriotic culture of young people studying. The problem of formation of patriotic culture of the studying youth was developed by N.I. Vereshchagina, S. N. Filipchenko, M. A. Mazur, E.I. Nutten and others. Modern teachers use the experience of patriotic education of Soviet teachers A.C. Makarenko, V.A. Sukhomlinsky, V. F. Shatalov, E.N. Ilyin and others. Having analyzed the literature, we can say that in the scientific and pedagogical literature at the present stage there are no studies on the formation of patriotic culture of young people studying by means of regional tourism. This, in our opinion, sufficiently determines the relevance of this article.

The main content.

The problem of the formation of patriotic culture is relevant in modern Ossetian pedagogical science and practice, based on traditional folk pedagogy. Patriotic culture is the highest form of patriotism and requires a thoughtful approach in

using methods and techniques in the process of its formation. Thus, the integrated use of various means of socio-psychological influence on young people, such as mass media, art, folk traditions, as well as means of regional tourism can activate and diversify this process.

Regional tourism in the Republic of South Ossetia allows for the simultaneous implementation of several components of pedagogical impact: education, upbringing, development, health improvement, professional orientation, social adaptation of students. Regional tourism should be understood as tourism activities specific to a particular region, a set of countries, or territories with the same type of conditions for the development of tourism and a similar level of tourist development [4, pp. 31-34]. It is used as a means of active recreation, contributing to the harmonious development of personality, health promotion, formation and improvement of the level of patriotic culture not only for young people studying, but also for people of different age groups.

The analysis of the tourist resource base of the Republic of South Ossetia shows that its territory has preserved a huge natural and well-preserved material from the Neolithic, Antiquity, the Middle Ages to the present day and almost virgin nature. Therefore, we have divided them into two large groups: cultural and historical and natural resources.[6]. The use of these resources is possible for pedagogical purposes for the formation of a patriotic culture of young people studying, for the formation of their historical consciousness, moral, patriotic and aesthetic views. The study of the native land, virgin nature, cultural and historical monuments, natural monuments, architecture, religion forms the patriotic culture of young people studying much more effectively than lectures and conversations on relevant topics.

Patriotic regional tourism in South Ossetia involves traveling to places where important historical events for the state took place, where outstanding representatives of the nation lived and worked. Plunging into history, emotionally experiencing the facts of the heroic struggle of the people for freedom and independence of the republic, the young students not only memorize information, but also form a worldview, patriotic feelings, patriotic culture. At the same time, such forms of work as hiking and excursions are used where important historical events for the state took place, where outstanding representatives of the nation lived and worked. Plunging into history, emotionally experiencing the facts of the heroic struggle of the people for freedom and independence of the republic, the young students not only memorize information, but also form a worldview, patriotic feelings, patriotic culture. At the same time, such forms of work as hiking and excursions are used.

The territory of South Ossetia was the center of settlement of the most ancient people. The famous archaeological complex of Kudaro caves (I, II, III, IV, V) makes a great impression on the participants of the hikes. All caves of this com-

plex are corridor-like, horizontal. In the lower layer of the high-altitude Kudaro I cave, the earliest evidence of human settlement in the post-Soviet space of the Acheulean era (about 1.5 million years ago) has been preserved, unique samples of ancient Stone Age tools, bones of ancient animals, which were mined by pre-historic hunters on the Viy mountains, and Chasaval-hoh. [6]. In Mount Vub. at an altitude of 2,150 m. there is a Paleolithic monument of the ancient Stone period – the Tson cave. It takes two hours to climb to the cave, not counting the approach to the mountain. In 11 layers of this cave, the remains of an ancient man who lived in it almost without interruption for 980 thousand years have been preserved..The impressions of visiting the caves are strong and memorable. On the territory of South Ossetia, there are Neolithic monuments on Mount Jermug. These caves are accessible to visitors and provide young students with opportunities for research activities in geography, history, biology, to form an idea of their native land, about the periods of human development. The capital of South Ossetia, Tskhinval, is also the oldest city in the South Caucasus. It was founded in 262-265 AD, and there are many churches and chapels on its territory

By means of cultural and patriotic tourism, along with patriotic culture, aesthetic culture is formed among young people. Young people, getting acquainted with the works of ancient architecture, learn to see the beautiful in architectural monuments. The architectural monuments largely reflect the history of the Christianization of the territory of South Ossetia. The aesthetics of the architectural monuments of early medieval churches built in the VII-IX centuries is impressive with the preserved frescoes of the monastery in the village of Tshauat, small churches in the villages of Circol (VIII century AD) and Armaz (864). The basilica in the village of Yered (906), the church in the village of Heit (X century), the church in the village of Dodot (X-XI centuries), etc. are brilliant examples of medieval architecture of the IX-XIII centuries. In the XII-XIII centuries, temples of Tigva (XII century), Ikorta (1172), Kaben (IX century), Hopa (XIII century), Larguis (XIII century), Tyre (XIV century), etc. were erected. In the Middle Ages, the Ksani Eristavstvo created a masterpiece of architectural architecture – the Eristavsky Palace. The place of tourist visit is the village of Kornis, where where is the castle and 9 towers built in the XVII century.

One of the most accessible objects of regional patriotic tourism is the National Museum of the Republic of South Ossetia, which is located in Tskhinval. The museum has considerable resources to solve the problems of forming a patriotic culture of young people studying. The specificity of the museum in the system of formation of the foundations of patriotic culture lies in the formation of historical consciousness, historical culture of the studying youth. This process is joined by the process of forming the aesthetic culture of the individual. As E.I. Khitarova points out, the museum acts as a repository, but these are not just valuable objects,

but spiritual values, that is, the memory of the people in the form of a materialized cultural form. At the same time, the form acts as a symbol of the soul of the exhibit, “the positive sensually perceived potential of time in the form of its reference image. If the museum value is perceived as the highest spiritual manifestation, and the external appearance of the object is perceived as a materialized form, then each museum image and the museum as a whole (as a social phenomenon) is perceived as a symbol of the soul of culture of a particular epoch and people” [5].

All of the above-mentioned objects of cultural-patriotic and historical-patriotic tourism are only part of the treasury of material cultural values that our ancestors left us, on which the patriotic culture of current and future generations can be brought up, developed and formed, because the formation of personality culture is closely related to the assimilation of spiritual and material values of national culture. The teacher organizes and makes these values personally significant for the learning youth. A.V. Gulyga notes that value is a shrine, without which a person is simply a representative of the animal world [2]

The nature of South Ossetia is a natural complex of ideal conditions for recreational purposes. There is an abundance of untouched corners of nature, charming mountain landscapes, a temperate healing climate, a large number of sunny days a year, huge amounts of mineral springs, therapeutic mud, bright alpine and subalpine meadows and high-altitude crystal rivers and lakes.[6]. Tourism contributes to the development of the cognitive interests of the studying youth, motivates them to further in-depth study of the culture and history of the Ossetian people. Tourism activity forms socially active, spiritually rich, morally and physically healthy patriotic youth of Ossetia.

Conclusion.

Consequently, the organization of cultural-patriotic and historical-patriotic regional tourism under the guidance of trained specialists will attract a large number of young people and solve the tasks of forming a patriotic culture, at the same time strengthen health, form positive moral qualities, broaden horizons, equip young people with new knowledge. The development of regional patriotic tourism will create the most favorable conditions for educating the youth of South Ossetia on the best national traditions through thematic excursions, cultural and ethnographic expeditions, hiking and walks, through the study of the spiritual heritage of the Ossetian people, their culture, history and nature.

Regional tourism can contribute to the education of an active, creative, responsible and creative personality, oriented by place of residence to solve the problems of socio-economic development of their country, because only those who know and love their native land, native nature, are ready to serve it, protect it, preserve its values for future generations. Cultural-patriotic and historical-patriotic regional tourism in South Ossetia is able to act as a means of forming a patriotic culture of young people studying in South Ossetia.

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隐喻的语言文化价值
LINGUOCULTUROLOGICAL VALUE OF METAPHOR

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抽象的。文章分析了各种类型的语义变化。隐喻和转喻被认为是语义转换的主要类型。以可穿戴物品（衣服、鞋子、帽子等）名称的语义发展为例，研究基于隐喻的语义变化机制的语言文化意义。成员隐喻具有累积功能，积累文化信息。其机制的揭示使我们能够更好地了解人们的心理、评价特征的具体情况以及联想联系的多样性。同时，在对可穿戴物品的名称进行语义分析时，区分隐喻和转喻也很重要。在许多情况下，转喻不再是独立的，因为意义具有其固有的特征和评价功能。变成了比喻。这些转变是根据词汇和短语单位的具体例子来考虑的，并强调了这种现象的国际性。

关键词：语义、语义推导、隐喻、转喻、语言文化学。

Abstract. *The article analyzes various types of semantic change. Metaphor and metonymy are distinguished as the main types of semantic shifts. On the example of the development of the semantics of the names of wearable things (clothes, shoes, hats, etc.), the linguoculturological significance of studying the mechanism of semantic changes, which is based on metaphorical* For example, if you want to be a member Metaphor performs a cumulative function and accumulates cultural information. The disclosure of its mechanism allows us to better understand the psychology of the people, the specifics of its evaluative characteristics, and the variety of associative connections. At the same time, when the names of wearable things are subjected to semantic analysis, it is important to distinguish metaphor from metonymy. In a number of cases, metonymy ceases to be independent, since the meaning has characteristic and evaluative functions that are not inherent in it. turns into a metaphor. These shifts are considered on specific examples of lexical and phraseological units, and the internationality of this phenomenon is emphasized.

Keywords: *semantics, semantic derivation, metaphor, metonymy, linguoculturology.*

The lexical corpus is a complex system that strives to reflect and consolidate the diversity of native speakers' ideas about the surrounding reality. It is also im-

portant that the word as a linguistic sign in many cases not only performs a referential, identifying function, but also contains in its semantic structure characterizing, evaluative components that allow the subject of speech to express his attitude to the named objects and phenomena.

The implementation of this additional (and in some cases the main) function is possible due to the significant semantic capacity of nominative language units. The structure of lexical meaning is so extensive that its periphery can expand almost indefinitely, while explanatory dictionaries can afford (primarily due to purely technical limitations) to fix only the semantic core of a linguistic sign. It is no coincidence that most of the words of the Russian language have multiple meanings. Studying the entirety of the semantics of a word allows you to better understand the paradigmatic and syntagmatic connections of the lexical system, to better navigate in the variety of meanings and, ultimately, to adequately perceive the linguoculturological information that the semantic structure of linguistic units carries.

There are several types of semantic shifts, and therefore several ways of forming figurative meanings. Most often, these types include metaphorization, metonymization, narrowing and expansion of meaning.

Metaphorical transference is possible on the basis of the similarity of individual features of the designated concepts. Thus, in Russian, in the case of *рубашка*, all figurative meanings are formed on the basis of metaphor: on the basis of similarity of function, position in space, or appearance. Metonymy is based on the association of connection or contiguity of phenomena: *вышивка* (process) – *вышивка* (result, object), *silk* (material) – *silk* (*silk* product). Narrowing (the use of the word *powder* in the meaning of ‘medicine’) and expansion (*чернила* is a liquid for writing, in the modern Russian language, regardless of whether it is black or otherwise) meanings in their pure form are quite rare. More often, these processes go hand in hand with metaphorization or metonymization, and their identification as independent types of semantic shifts is rather arbitrary.

In this article, we will consider metaphor and metonymy as the main sources of enrichment of Russian language with new meanings. In addition to the above-mentioned differences in the types of associations underlying the mechanism of semantic derivation (in metaphor it is similarity, and in metonymy it is contiguity), it is necessary to pay attention to a number of other distinctive features of each of these linguistic phenomena.

1. Function in a speech situation. Metonymy identifies an object or phenomenon by its characteristic part, on the basis of belonging, partiality, and contiguity. Discarding everything unimportant, she names something as its distinguishing feature. Conciseness, and therefore greater accuracy, is one of the tasks of metonymy.

Metaphor, on the other hand, characterizes an object or phenomenon, indicates its features and properties. Very often it also contains an estimate of the denotation, for example, when a person is called *a bear* or *a pig*. Here, too, the name of the object is quite concise (and this is the similarity with metonymy). However, not on the basis of any direct correlation, but on the basis of similarity in individual features, character traits, etc. It is this feature of metaphor that has made it one of the most favorite tropes among masters of the artistic word. To accurately reveal the individual essence of an object through another fragment of reality is the task of metaphor, which is perfectly realized in the works of writers and poets.

2. Function in the syntactic structure of a sentence. Since the main task of metonymy is to identify an object, this also determines its position in the sentence. Metonymy, as a rule, occupies the position of the subject: *In our museum there are two Titian and one Rubens* (here the subjects of *Titian's* canvas and *Rubens' canvas* are quite justifiably replaced by metonymy author-work).

The characterizing function of the metaphor predetermines its gravitation towards the position of the predicate: *Lord, this is not a person, but bad weather!* (M. Gorky). An accurate characterization of the object is achieved by means of rather indirect associative transferences, which seem, at first glance, to be irrational. However, it is precisely this “destruction” of standard correlations with certain classes and categories that makes the metaphor attractive. To start from the ordinary view of the world with the help of metaphor, to show the contradiction of thoughts and feelings – this is the goal pursued by many poets.

Even if the metaphor occupies the position of the subject, its compatibility is indicatively different from metonymy. Let's compare two examples. *That old fox won't miss his own*, and *that old fur coat is long gone*. In the first case, the metaphor of *a fox*, and in the second case, the metonymy of *a fur coat* is determined by the same adjective *old*, but in the metaphorical transference, a real denotation is defined (a person called a fox must already be of age), and in the metonymic transference, a fictitious denotation is defined (an old fur coat can be worn by a person of any age). The compatibility of semantic derivatives reflects the functional differences between metaphor and metonymy.

3. The degree of connection to the initial situation and to the initial value. As already mentioned, the metaphor is based on non-standard juxtaposition, and therefore tends to establish distant connections. Metonymy, in turn, is a semantic transfer from one object to another, and these objects are directly related to each other, they are close.

When a person is called *mynouï* ('stupid'), one does not think about how many associative shifts have been made, but at the same time it is a rather complex metaphorical transference (blunt – not sharp – uninsightful – incomprehensible). Metonymy of different types (vessel – content, process – result, material – product made of it, etc.) presupposes a direct connection between objects.

It should also be noted that metonymy, as a rule, fixes a stable, constant connection: *silver* ‘silver cutlery’, send *papers* ‘documents’, a fussy *beard* ‘a man with a beard’. A metaphor, by virtue of its characterizing function, often denotes a transitory, impermanent sign: *time is running*, a storm *is howling*, and so on.

Many cases of metonymic and metaphorical hyphenation can affect the same lexemes: *собирать по рублю с носа и экзамены на носу*. In the first case, the *nose* is the metonymy ‘man’, in the second case, the metaphor *on the nose* is ‘soon’. Not the last place in the series of such parallel hyphenations is occupied by semantic shifts affecting the names of clothes and shoes, that is, the names of portable things.

Most often, in this lexical-semantic group, associations based on metonymy are realized, namely, transfers from part to whole (synecdoche). They are regular and are constantly found both in literature and in spoken language. The identifying function of metonymy here makes it possible to indicate an object through a characteristic detail of clothing: *The mink coat was still walking around the offices, the greasy jacket began to be questioned*, and so on. This technique is often used in fiction:

Читали про конференцию по разоружению? – обращался один пикейный жилет к другому пикейному жилету. (I. Ilf and E. Petrov).

The simplicity and comprehensibility of the metonymic name through the element of clothing can be traced in its frequent use in texts addressed to children. A similar technique is used in the names of modern children’s cartoon characters: *Darkwing Duck* and *SpongeBob SquarePants*. The accuracy and comprehensibility of the reference when using metonymy allows the addressee to adequately perceive the transmitted information.

At the same time, it is the metonymic meanings that often grow into symbolic ones, being saturated with broad imagery, and even sometimes pass into the category of phraseologically related meanings. This is successfully used by the authors of journalistic texts: *Kolchak was smashed with rabbit hats* (*hats* as a designation of partisans), *“Black Shirts” took to the streets* (according to the symbolic clothes of extreme nationalists - *a black shirt*), *Cars for “white collars”* (employees, bureaucrats, office workers, etc.). Moreover, the regularity of the use of quotation marks in such phrases is not always traced, which indicates their desire for usuality.

And this is characteristic not only of the Russian language. If we trace the etymology, we can see that the symbolic synecdoches, *black shirts*, *white collars* are not actually Russian, but are borrowed from other languages (the first is from the Italian *camicia nera*, the second is from English: white-collar worker), sometimes they are international. Cf. the presence of the equivalent of the expression *white-collar* in other languages: in German, *Stehkragen*, *col blanc* in French. The

situation with the Italian language is interesting, where *white collars* are not at all called representatives of the middle class, but priests, since this is a distinctive detail of the costume of a Catholic minister of the church. In Western sociology, other designations are also used: *gray collars* are workers in the social infrastructure and service sectors; *Blue-collar* workers are workers engaged in manual labor, mainly in large enterprises.

More recently, the phrase “*crimson jacket*” was widely used in the Russian language as a designation of the not always well-mannered and educated “new Russians” of the Yeltsin era of 1992-1998. The predilection of representatives of this stratum of society for this element of the wardrobe led to the fact that *the crimson jacket* became a symbol of bad taste, low-grade and mediocrity of the newly-minted nouveau riche, at the same time designating those who wear such jackets, and giving them an appropriate assessment. This notorious attribute of the “new Russians” has widely penetrated into anecdotes, as a symbol of the epoch has been reflected in books and films with plots related to that time. “Heroes” of the post-perestroika era in crimson jackets can be seen in the films “Shirli-myrl!” (directed by V. Menshov), “Zhmurki” (directed by A. Balabanov, in the role of the “new Russian” - N. Mikhalkov), in the television series “Bandit Petersburg” and “Streets of Broken Lanterns”. There was even a book “Crimson Jackets, or All About the New Russians” (by S. Romanov).

In this case, however, metonymy ceases to be independent, since meaning has characteristic and evaluative functions that are not characteristic of it. Metonymy here turns into a metaphor. Such two-stage semantic shifts in the semantics of the names of portable things cannot be called regular, their total number in the modern literary Russian language does not exceed a dozen.

Each individual case of such semantic derivation is very interesting for linguistic and linguocultural research, since the result here is an anthropomorphic metaphor that allows us to identify many important meanings and axiological accents. The identification of these meanings gives a broader idea of the culture of the people, since the usual metaphor is a reflection of the specifics of the associative thinking of a particular ethnos. Shifts in meaning make it possible to discover this specificity, and thus implicitly obtain much-needed cultural information.

The very process of such a change in semantics can be considered by the example of the word *lapot'* (*ланомь*). Obviously, metonymy was possible here at a time when people still wore bast shoes, that is, no later than the beginning of the 20th century. And since bast shoes were an element of the wardrobe of ordinary people, peasants, the metonymic shift undoubtedly led to the fact that bast shoes were called poor representatives of the lower class. Let's say, let's say, the following example: *Ланти потолкались у двери, да и ушли*. Further, the metonymic meaning of the word *lapot'* ‘peasant’ underwent a metaphorical transformation.

Since the peasants were, as a rule, uneducated, people who were not familiar with European culture and etiquette, on the basis of associative transference, *lapot* became a designation of an ignorant, backward person. And here we can clearly trace all the differences between metonymy and metaphor mentioned above. First of all, the metonymy of *lapot* has identified the subject, distinguishing him from others by his characteristic attribute, while the metaphor gives him an apt characterization: *You're just some kind of lapot! Why did you do that?* Secondly, there are different syntactic functions: from the above examples, it is clear that metonymy tends to the position of the subject, while metaphor tends to the position of the predicate. Thirdly, it is on the example of the word *lapot* that one can see the difference in the degree of closeness between the associated objects in different types of semantic hyphenation. If metonymy is possible only on the condition that the named person is shod in bast shoes, then metaphor does not require it. Despite the fact that bast shoes have not been worn for more than a century, we calmly call ignorant people so. And, as we have already noted, if the metonymy of *старый лапотъ* could refer to a person of any age who put on these very old bast shoes, then the metaphor of *старый лапотъ* can only refer to an elderly person, i.e. a real denotation. It is no coincidence that this metaphorical meaning has its own derivatives – *лапотный, лапотник*.

Here's another example. The change of meaning on the basis of metonymy with further metaphorization of the word *шляпа* seems to be due to the peculiarity of Russian national thinking with its specific associative series. Most likely, this semantic derivation occurred here as a result of the fact that hats in the 19th century (and it was then that this word was first recorded) were worn mainly by foreigners who did not know the Russian language and therefore looked incomprehensible and even stupid. In any case, ordinary Russian people did not wear hats (only hats), for them everyone who wore hats was a stranger. That is why the word *шляпа* has the meaning of 'a slacker, a person 'not of this world', absent-minded, lethargic'. Hence in the language the verb *прошляпать* 'to miss, to overlook'. The development of a word's own word-formation nest in a new meaning testifies to the great stability of the new linguistic unit, its rightful entry into usual use. Thus, here the individual components of the lexical background of the word moved from the periphery of the meaning to its core, becoming differential semes in the meaning.

Since metonymy, unlike metaphor, as a rule, does not perform a characterizing function, the result of the semantic shifts that follow on its basis is not always ethno-specific. And even if at the initial stage these metonyms were used in one language, later the obvious connection with it is lost. Typical examples are the *white-collar* and *black shirts* mentioned above. The fate of the expression *blue-stocking* is a confirmation of this.

As long as it was pure metonymy, performing an identifying function (*blue stockings* were the name given in England at the end of the 18th century to representatives of the society of the same name, which gathered at the home of a certain Lady Montagu for learned conversations; the soul of these conversations was the scientist, Benjamin Stellingfleet, who, disregarding the rules of fashion, wore blue stockings with a dark dress instead of white), the expression *blue stockings* didn't have any negative connotations, it wasn't perceived as something special. However, with further metaphorization, a negative evaluativeness appears, which entails an associative transfer by similarity between certain characteristic features of the named objects: pedantry, deliberate scholarship. Bluestockings are disparagingly used to refer to women who are devoid of charm, absorbed in book, scientific, and official interests, and neglectful of home and family. And here this expression already carries a significant linguoculturological load: when we reveal the mechanism of semantic derivation, we learn that there were not just scientific societies in England, but that their participants were women who were completely devoid of femininity, and we learn the assessment given to them by the English themselves. It is the metaphor that allows us to reveal the attitude to the named phenomenon, and, consequently, to better understand their picture of the world of native speakers.

Another thing is that this expression has become an international designation of a severe woman, and has entered, among other things, the Russian language. However, the analysis conducted as described above will not give us ethno-specific information about the Russian people, since this example is rooted in the English language. A Russian person does not even think about any stockings (the generative basis of expression) when using this phrase. And this once again confirms the point we have made above about how much difference there is between metaphor and metonymy in terms of the degree of closeness of the objects associated. In the Russian language, a blue stocking is a typical tracing phraseological unit, and only as such can be considered from the standpoint of Russian semasiology. A similar situation can be observed in other languages where this expression functions. Wed. in German – *Blaustrumpf*, in French and Italian – *bas-bleu*, etc.

In this way, metaphor fulfills a cumulative function, accumulating cultural information. The disclosure of its mechanism allows us to better understand the psychology of the people, the specifics of its evaluative characteristics, and the variety of associative connections. At the same time, when the names of wearable things are subjected to semantic analysis, it is important to distinguish metaphor from metonymy.

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后现代主义如何在世界音乐中实现自己

HOW POSTMODERNISM REALIZED ITSELF IN WORLD MUSIC

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摘要.西方从“现代”走向“后现代”，首先发生于实践领域，然后出现相应的概念和理论，随后二者在相互作用中发展演化。与后现代主义一样，后现代音乐文化是一个复杂的现象。人类的发展不能在符号和虚拟的世界中单项前进，音乐成为人类通过物质性身体与感知，表达原始生命体验的强有力手段。这种感觉的智慧促使艺术家取得非符号性的生命力，用以抵抗后现代世界对人类的异化。文章总结了后现代音乐的大致特征，并列举了代表音乐流派以及作品。

关键词: 后现代, 音乐, 代表作品, 作曲家, 流派.

Abstract. *The transition from “modernity” to “postmodernity” in the West first took place in the city of practice, followed by the emergence of corresponding concepts and theories, and the subsequent development and evolution of the two in interaction. Like postmodernism, postmodern music culture is a complex phenomenon. Human development cannot move forward singularly in a symbolic and virtual world, and music has become a powerful means for human beings to express their primordial experience of life through their material bodies and perceptions. The article summarizes the general characteristics of postmodern music and lists representative musical genres as well as works.*

Keywords: *postmodern, world music, representative works, composers, musical genres.*

Not all social behavior, not all writing, not all artistic behavior in the postmodern period is “postmodernist,” and it would be foolish and unproductive to necessarily categorize them under this umbrella. But “postmodernism” offers a way of understanding, an effective way of understanding, and a context that best connects history and reality. But “postmodernism” offers a way of understanding, an effective way of understanding, and a context that best connects history and reality.

After the Second World War the Western economies grew considerably, creating a high degree of material wealth and a general increase in living standards, but

people did not feel happy and contented as a result. The inherent contradictions of Western capitalist society are further intensified, while turning the entire population passive. Apathetic and ultimately splitting into atoms, traditional loyalties, bonds of interrelationships, and associations loosened and even disintegrated.

In the 1960s and early 1970s, the so-called “hippie” movement was formed by thousands of young people who left the comfort of their families and wandered around in strange clothes, mostly because they were dissatisfied with reality and were unwilling to conform to the traditional way of life, in an attempt to find a new meaning for their lives. The distortion of reality makes the aura of elegance and perfection of traditional art seem pale and feeble, unable to help people restore their faith, while the noisy and frenetic rhythms of postmodern music seem to temporarily adapt to this distorted and bewildering disorientation of the modern humans. So western music and art moved from the temple to the secular, from elegance to the public, and the boundary between art and life gradually blurred. Popular songs, and the free rhythms and improvisational techniques of jazz, were the embodiment of this desire. The acoustics of the period became increasingly dissonant, and the emergence of this art form was a historical necessity of social development.

Obviously, there is no clear definition of postmodern music, but what is clear is that music in the postmodern period is further opposed to rationality, and people’s appreciation of music seems to have become a purely sensory one. At this point, much of the music can no longer be called a “musical work”, but is more in line with the definition of a “musical text”. The emphasis on the text and the detailed notes and explanations are unnecessary, and the emphasis is more on involving everyone, so that different people will have different understandings of the meaning of the music and the emotions it expresses.

As Vladimir Martynov puts it, “The end of European subjectivism, the era in which we live, is the end of the age of the composer.” [1, p. 220, 238] Beginning in the 20th century, composers’ creations were slowly losing their ontological significance and exhausting their religious purpose. We can find the whole history of composition as if it were a history of growing subjectivism, and this process is closely linked to the fate of European subjectivism. Thus, professional music used to be characterized by “heroic themes” and the pursuit of an elite culture. But in modernist music, there is a greater tendency to experience sensual feelings. Finally, postmodernism broke down the boundaries between art and life, and allowed music to develop to an extreme, where music at this point became a purely sensory form of things.

In postmodern music, new, unpredictable fields of exchange are formed between composers, performers, intellectuals, academics, media people of all kinds, and patrons. So, although the role of subjectivism has been growing in the history

of European composition, music always finds a way of surviving in a new worldview that is compatible with the times and will be understood by contemporary musicians and listeners. This is contrary to the above view of Vladimir Martynov.

The era of the composer has not ended, only the goals and tasks have changed. Moments of freedom, unpredictability and out-of-the-box spirit come to the fore. Once, we relied on cognitive models to make sense of the world, but in a postmodern society, the hyper-complexity of culture has rendered past experience dysfunctional. The spirit of postmodern culture becomes a return to practice itself. The way we understand the world has changed so radically, “the creed of the master is defined as the ultimate combination of the stable and the mutable, the known and the unknown, the familiar and the unusual.”[2, p. 192]

And, of course, the performer no longer purely interprets the score, but adds to and even modifies it, improvising in the spirit of the maestro himself and becoming a co-author of the work. For example, pianist David Tudor improvises on the themes of a John Cage piece rather than reproducing the work in the traditional way. It is true that the performance of a work is based on the essential elements of the author’s musical notes. But if the performer merely reproduces the text exactly in form, the essence of the music is lost. For the creative spirit of the composer is a search for the unknown and the mysterious.

In addition, postmodern music was created with the participation of not only the performer, but also the listener joining in the creation.”[3, p. 298] Generation is the phenomenon as much as the phenomenon is the result of birth”. In the theory of Julia Kristeva, there are two types of texts when art is disseminated, namely phenotext and genotext. Although the listener is confronted with phenotext, he will trace the entire process of phenotext generation, transforming genotext into phenotext. The composer’s creative process, therefore, is repeated in the listener’s perceptual process. At this point, the listener reproduces all the stages of the production of meaning within the limits of his subjectivity and produces symbols indefinitely.

Thus, we can distinguish between the notion of “work” and the postmodern notion of “text”.

At one time, a work was a complete work of art, where the creator influenced the viewer and the listener with absolute mastery. With the help of Roland Barthes’ ideas, the work belongs to the external dimension, while the text, on the other hand, fulfills a connotative function. The “work” embodies the author’s influence, worldview, and ideology. And the reader, the viewer, the listener, are forced to submit to the violence of this artistic communication. The “text” is the cultural climate of ideas. The author’s will and consciousness lose their absolute authority in the text, saving the recipient from violence. Thus, in a postmodern society, “in terms of meaning, the text is primary and the work is secondary.”[4, p. 20]

Nowadays, the postmodern “text” is open to endless interpretations because it is “unfinished” and “without boundaries”. Although, postmodern music texts are so complex and difficult to understand that it objectively makes it much more difficult for the listener to derive pleasure from them, and inconsistencies between the expectations and horizons of the receiver and the text produced have become the norm. But at the same time, it is this aesthetic distance that can stimulate the renewal of artistic language. Both this difference and novelty contribute to the fact that the work may not be comprehensible to the listener, because musical language always comes from the future.

Future and present, it is a matter of time in musical communication. In post-modern music, the focus is on the emphasis and dominance of rhythm in composition. Time may have lost its personal dimension, but in music you can hear the multiplicity of time. “In Stravinsky and his followers, musical time is no longer temps-duree, time as duration, but temps-espase, space-time.” [5, p. 20] In Messiaen’s work, on the other hand, it is the end of time, a salute to God’s natural temple. All musical archetypes possess a rich historical lineage behind them, and the composer’s treatment of the temporality of the musical process in a new way clearly demonstrates how the author, by the time-tested musical archetypes, decides on a way of dialoguing with tradition.

So, even in the postmodern society, the composer has not lost his importance. Even from one point of view, postmodern music has rather gained the status of pure art. For the composer is simultaneously free to think and act as he composes, without models, rules or sanctions. As Edison Denisov argues, “There is no crisis in melody, the possibilities of melody are not exhausted, and the field of tonality is now greatly expanded. At the same time, it is important for the listener that the tonal language be full of semantic and emotional content, and that melodies not be artificially imitated, but rather colored by the composer’s vivid personality.”[6, p. 132-135, 140-146]

Let’s focus on the following representative genres and composers of music in the postmodern period:

1) Integral serialism

In Schoenberg’s twelve-tone technique, “Serialism” is usually applied only to pitch. The Twelve-tone Technique is used not only for pitch, but also for tempo, timbre, texture and intensity, etc., which is called “integral serialism”. American composer Milton Babbitt first used sequences in tone and duration in Three Works for Piano (1947). French composer O. Messiaen’s piano piece A Lad of Durations and Intensities (1949) and Quatuor pour la fin du temps (Quartet for the End of the World) represent a mature serialist compositional approach.

The composer’s use of “modes of limited transposition”, to a large extent, it negates the logic of writing based on motifs, unfolding, and natural sounding

harmonies that has been handed down from generation to generation in Western music.

2) Aleatoric music

Whereas integral serialism is an extremely restrained style of musical composition, aleatoric music is an extremely free style of composition. Aleatoric music is music in which there is no control over the creation and performance of the piece, and is created by chance, randomness, and uncertainty.

American composer John Cage wrote the first aleatoric music, *Music of Changes*, for piano (1951), based on the I Ching. The composer relied on coin flips and Bagua to determine pitch, duration, etc., so the piece lacks “listenability.” Beginning in the 1950s, Cage began combining aleatorics with “Mixedmedia” to form “Happening”, which he used to create *Water Music* (1952). The work was written for piano, but the pianist also performed some actions on stage, such as pouring water from jars, whistling in the water, fiddling with radios and playing cards, etc., in an attempt to entertain the audience not only aurally but also visually.

3) Electronic music

Electronic music refers to any music created on the basis of sound generated by electronic means. One of the first representatives of electronic music was the German composer Karlheinz Stockhausen. The composer’s most representative electronic music work is *Song of the youth* (1956), which utilizes both electronic sound and “concrete music.”

In the following years, as science and technology advanced, so did electronic music. In the 1960s, the advent of the electronic synthesizer simplified the process and expanded tonal possibilities. In the 1980s, the development of MIDI keyboards and computers made it easier to create electronic music.

4) Sound collage

The concept of collage was first used in the visual arts to refer to a collage of disparate materials. The idea gradually entered music, usually referring to the combination of several unexpected and incongruous musical materials. It is important to emphasize that it is not new to the 20th century, as it was already present in the French motet in the Middle Ages, but as a musical genre it was introduced in the 20th century.

Among the works of *Sound Collage* by Luciano Berio is the *Sinfonia*(1969). Using Mahler’s *Symphony No. 2* as a backdrop, the symphony’s third movement quotes a large number of the composer’s works, as well as other works by Berio himself.

There is also *Sonata No. 2 “Concord”* (1915) by Charles Edward Ives, *Eight Songs for a Mad King* (1969) by Peter Maxwell Davies, and many others.

5) Minimalist music

In the 1960s, a group of visual artists in New York developed a cyclical and repetitive structure of simple elements that became known as “minimalist art” and

influenced the art of music. Minimalist music focuses on the constant repetition of simple musical material. In the process of constant repetition, the music undergoes subtle changes in melody, rhythm, harmony and orchestration.

Representative works include Steve Reich's Piano phase (1967), Philip Glass' Einstein on the Beach (1976), John Adams' Harmonium (1980) and others.

6) Neo-Romanticism

Some composers in the postmodern society not only have their own individual musical style, but also prefer to incorporate musical materials from different eras into their works. They favor music from the Romantic period, which is why this style of composition has been called "Neo-Romanticism".

Neoromanticism originated in the 1970s and 1980s. In general, compositions are based on traditional harmonies and focus on the expression of emotion. "Neoromantic composers returned to a style characterized by broad lyricism and dramatic expression." [7, p. 26] The music will include frequent references to works by composers of the Romantic period of the 19th century, but also many modern elements. One could say that neo-Romanticism is a combination of music from the Romantic era and contemporary music.

The works include "Excursions, Op. 20" by Samuel Barber (1944), "String Quartet No. 3" by George Rochberg (1971).

7) Third stream

"Third stream" is a combination of art music and jazz in European professional music composition introduced by American composer Gunther Schuller in the 1950s.

This compositional technique can already be seen in the works of such composers as I. Stravinsky, D. Millau, A. Honegger, G. Gershwin and others. However, G. Schuller further refined and developed this method of composition on this basis, forming a style.

Representative work: Gunther Schuller's "Transformation" (1956).

We can follow the following composers who have not formed a single genre. However, they all go beyond traditional instrumental music and seek new timbres. Ionisation by E. Varèse (1931), Threnody to the Victims of Hiroshima by K. Penderecki (1960), Atmospheres by G. Ligeti (1961), Ancient Voices of Children by George Crum (1970).

The above are just a few representative genres and composers with a wide range of influence. They show some ways of realizing music and art in the postmodern society, and also allow us to see the great possibilities of music in the new era. Especially after entering the Internet age, which has completely revolutionized lifestyles and changed the way we think. Although there are aspects of artistic creation that do not follow the changing times, the art world as a community is certainly adapting to the times and leaving its mark.

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东北地区工会运动的特点
(1920年代 - 1930年代初期)

**FEATURES OF THE TRADE UNION MOVEMENT
IN NORTHEAST CHINA
(1920S - EARLY 1930S)**

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注解。 本文考察了20世纪20年代至1930年代初期中国东北工会运动状况的具体特征。 影响中国专业协会活动的特征包括，位于满洲的苏联公民和俄罗斯移民的工会距离它们很近，以及当地军警和占领政权对工会运动的严格控制和干预。

关键词：满洲里、中东铁路、工人、工会、“黄”工会、工会运动。

Annotation. *The article examines the specific features of the state of the trade union movement in Northeast China in the 1920s – early 1930s. Among the features that influenced the activity of Chinese professional associations are the close proximity to them of trade unions of Soviet citizens and Russian emigrants located in Manchuria, as well as strict control and interference in the trade union movement of local military-police and occupation regimes.*

Keywords: *Manchuria, Chinese Eastern Railway, workers, trade union, “yellow” trade union, trade union movement.*

The development of Chinese trade unions and the labor movement in Manchuria in the 1920s–early 1930s was greatly influenced not only by the internal social and economic situation of the region, but also by the complex foreign policy situation. The Chinese Eastern Railway (CER) built here by Russian and Chinese efforts at the beginning of the 20th century became one of the main drivers of the region’s development. However, following the outcome of the Russo-Japanese War of 1904–1905, it was divided into two parts – the branch from Harbin to the cities of Port Arthur and Dalian was ceded to Japan and became known as the South Manchurian Railway (SMR), while the mainline from Russian Trans-

baikalia to Vladivostok, passing through Harbin, remained under the economic control of Russia and China. After the formation of the Soviet Union, this situation was reorganized through new bilateral agreements in 1924. As a result of the power struggle among military and political factions in China following the Xinhai Revolution of 1911–1912, by 1920, the Manchurian provinces, unified as the Three Eastern Provinces Autonomy (TEPA) of the Republic of China, came under the influence of the Fengtian warlord clique led by Marshal Zhang Zuolin. In May 1922, he declared the TEPA to have a nearly independent status, with nominal subordination to the Beijing government. In 1931–1932, Japanese troops stationed on the Liaodong Peninsula occupied the entire Northeast China, establishing the puppet state of Manchukuo, and forcing the USSR to sell its share of CER to it in 1935. Against this historical backdrop, the evolution of the trade union movement in Manchuria unfolded.

Let us note that the trade union movement throughout China since the Xinhai Revolution has acquired a renewed and massive character. With the strengthening of the Kuomintang and the Chinese Communist Party (CCP), the trade union movement became increasingly organized, and from 1921–1922 it became more active in the sphere of political struggle, but it still lacked unity. As follows from the final report of the Eastern Section of the Red International of Trade Unions dated June 16, 1935, “On the work of supporters of the Profintern in China,” prepared for the International Trade Union Conference, in the 1920s - early 1930s. All Chinese trade unions of workers were divided into four main areas.

1). Traditional, taking the form of guild secret societies familiar to the Qing era, which did not seek to get involved in politics. The report stated “that in China, for several hundred years, various old forms of mass organizations on guild or compatriot principles have existed. The most popular of them is the so-called “Qinghongban” (“Blue and Red Group”). It is generally accepted that over 70% of Chinese workers belong to these organizations. <...> In addition, these old organizations exist legally. Currently, these organizations are growing” [3, p. 843]. Such guild associations carried remnants of patriarchal-feudal relations and strict mutual responsibility, and the union elite often had connections with crime or entered into an agreement with employers, which led to their corruption. “Subsequently, this family-clan character became nominal, but the craft principle remained, and the place of the relative was taken by the “sergeant major,” who became an intermediary between the worker and the entrepreneur and has now acquired the appearance of a small contractor supplying labor for the enterprise” [2, With. 57-58] – Soviet researcher V.D. wrote about this. Vilensky-Sibiriyakov.

2). The so-called “yellow” (that is, conciliatory, not independent) trade unions, which were somewhat reminiscent of the workers’ unions created by the head of the Moscow security department S.V. Zubatov in Russia 1901 – 1903. [1, p. 599].

They were organized at the initiative of employers and official authorities, and were controlled by them in order to distract workers from the political struggle.

3). Kuomintang trade unions of workers, which were under the auspices of this party. They operated openly in areas subordinate to the southern Nanjing government.

4). “Red” trade unions, oriented towards the Communist Party of China and the Profintern, worked underground, except in areas occupied by the CCP forces. The influence of the “yellow” and Kuomintang unions gradually declined. So, from 1928 to 1932 their number was halved. However, the “red” unions were replenished slowly due to police repression [3, p. 840-846].

In Chinese trade unions of the 1920s the traditional direction prevailed, which even dominated the “Union of Chinese Workers of Siberia” created on Russian territory under the supervision of the Bolsheviks at the end of 1919. Very soon, the Chinese communists there were “squeezed out” by businessmen and the union executive committees “never became proletarian organizations, but performed the functions of protecting the interests of all Chinese migrants. They actively helped Chinese business and were associated with Chinese organized crime” [11, p. 107]. After the conclusion of the Soviet-Chinese agreements in 1924, the “Union of Chinese Workers of Siberia” was liquidated.

The Russian trade union movement in the CER zone arose and developed dynamically since 1905. The most numerous and influential here was the railway workers’ trade union, which changed its structure and official name several times, but in the 1920s - early 1930s. known as the “Production Union of Railway and Water Transport Workers (Dorprofsozh) of the CER”. In the second half of 1927, during the period of its highest activity, it numbered up to 11 thousand members [7, l. 1], who were Soviet citizens, but in the early 1920s. There were also ethnic Chinese in its ranks, although only a few dozen people [5, l. 80]. Dorprofsozh of the CER was headed by communists and remained the conductor of Soviet policy in Northeast China, so its relations with local authorities were unstable [21].

Actually, Chinese trade unions in Manchuria were not as widespread as in the rest of China. Due to the political strengthening of the “red” and Kuomintang trade unions in the central and southern regions of the country, the development of Chinese trade unions in Manchuria was artificially slowed down by local militarists who also feared the influence of Soviet trade union organizations operating on the Chinese Eastern Railway on groups of Chinese workers. In addition, the ATPV also contained professional associations of Russian emigrants, for example, the anti-Soviet “Union of Non-Party Servants, Craftsmen and Workers of the Chinese Eastern Railway” for Russian workers of this railway [15]. Therefore, the emerging sprouts of Chinese trade unions in Manchuria were under close supervision of the military-police regime and lagged far behind the all-Chinese labor movement

[14, p. 83-86]. Even the order issued in the summer of 1925 by the Supreme Ruler of China Duan Qirui, who then controlled the Beijing government, on the formation of Chinese trade unions in all provinces, was applied by Marshal Zhang Zuolin in the ATWP extremely selectively and only in his own interests [16, p. 23-24].

The consequence of the signing of the Soviet-Chinese agreements of 1924 was a noticeable weakening of the positions of the White émigré “Union of Non-Party People,” to which Zhang Zuolin was cool. But already in the first half of 1925, another, quite numerous and initially “yellow” trade union appeared in the Main Mechanical Workshops of the CER - the “Harbin Union of Chinese Depot Workers and Craftsmen of the CER” (Harbin Union). Functionaries of Dorprofsozh qualified it as “Kuomintang”, which at that time numbered up to 600 members in Harbin and 185 people at Handaohezi station, there were also branches at Mulin and Porganichnaya stations. The road administration contacted him, but did not provide financial assistance. Some Russian workers who had Chinese citizenship also joined this union. Despite police control, this Chinese trade union, under the influence of Soviet propaganda, began to seek rapprochement with the Dorprofsozh of the CER [4, p. 36 ob., 39ob.-40]. The Charter of the Harbin Union was developed and adopted at the general meeting. His goal was to unite Chinese workers and protect their professional and legal interests. The structure of the union apparatus is curious. The head of the Harbin Union was considered to be the chairman and his deputy. The executive body was a board of 25 people. and its own chairman. A secretary and an instructor were chosen to serve them. All positions, except the last two, were elective and unpaid [4, p. 30-31 rev.].

The Dorprofsozh of the Chinese Eastern Railway intensified its work among Chinese workers, which greatly worried the administration of the ATWP. She could not allow the emergence of another pro-Soviet trade union, but a Chinese one. In order to prevent the further evolution of the Harbin Union towards the “left” movement, at the direction of Zhang Zuolin, it was decided to incorporate it into the formally existing on the Chinese Eastern Railway, but no other official Chinese trade union developed. Back in 1923, under the supervision of the Chinese part of the road administration, the “yellow” Chinese “Central Union for the Support of Labor and Industry of the CER” (Central Union), which appeared in Soviet documents as the “Chinese Trade Union of Employees and Workers” began to emerge under its control [19, l. 1-2]. It was to this that the Harbin Union was joined in order to protect Chinese workers from the growing pressure from Dorprofsozh. The Charter of the Central Union was adopted on April 4, 1926, and Hao Yuxi was appointed its chairman. Russian agents of the CER who did not have Soviet citizenship could also be members of the trade union [8, p. 58-62]. In 1926, the Central Union numbered about 4 thousand road workers of Chinese nationality and up to 300 Russian citizens of China. The Union was focused on the

Chinese part of the board of the CER, was encouraged by it and engaged in competition with Dorprofsozh for the ideological and economic support of Chinese and partly Russian workers [6, p. 75 rev]. Thus, in contrast to the large railway cooperative under the auspices of Dorprofsozh KVZD, in 1925, through the efforts of the Central Union, the “Society of Chinese Consumers” was created, which included road agents of Chinese and Russian nationality. However, the Chinese cooperative, which had only a few bench cars, did not gain much influence under the conditions of Soviet dominance on the CER and had difficulty conducting its work until the early 1930s. [17, l. 18-20]. The direct proximity of Soviet and White emigrant trade unions to the Chinese labor movement in Manchuria can be considered a peculiar phenomenon. However, the degree of their cooperation was low due to the opposition of the militaristic authorities.

In Manchuria, the position of the CPC and the unions led by them was very modest due to the tense political situation. In the entire region, by November 1932, there were only 200 poorly educated illegal communists (of which about 20 were on the CER). “The red trade unions in Harbin unite about 80 people. In terms of composition, these are railway workers, tobacco workers, oil millers, printers, etc. Although the Harbin Trade Union Council was created, it was actually in vain; it is an institution that does not exist on the basis of elections among the working masses, but for the most part it consists of party members appointed by the party organization. <...> ...communists do not want and directly refuse to work in trade unions” [3, p. 210, 213] - was indicated in the report of Wang Ming, a member of the Comintern executive committee from the CPC, at a meeting of the Eastern Committee of the organization on November 28, 1932. So in the militaristic ATWP, and then in the pro-Japanese Manchukuo, in the Chinese working environment, initially only a few could legally appear traditional shop organizations or “yellow” trade unions.

Speaking about Chinese trade unions, it is worth mentioning the South Manchurian zone of Japanese responsibility (Kwantung Region and South Moscow Railway), adjacent to the ATWP. A large number of industrial workers, divided along ethnic lines, were concentrated here. At the end of the 1920s there were: Chinese - 120 thousand (of which 38 thousand were temporary workers), Japanese - 7.1 thousand, Koreans - 1.5 thousand. Trade unions here were also divided along ethnic lines. The Yucaikai Japanese Workers' Union operated in southern Manchuria from 1918 to 1920 and as soon as it began to strengthen, it was immediately liquidated by the Japanese authorities administratively. Korean workers in Andong had their own trade union. There were about two dozen Chinese workers' associations (mainly in Dairen), but mostly few: “Dairen Youth Union of Electrical Enterprises”, “Dairen Chinese United Union of Printing Workers”, “Union of Teamsters”, etc. The inter-union association of the largest city of Kwantung The General Government was considered the “Dairen United Union of Like-Minded

People.” In one of the reviews of the office of the board of the CER it was said that all: “Chinese unions lead an extremely closed lifestyle and their activities are almost invisible.” The exception was the Dairen Union of Chinese Workers (DUKR), founded in December 1923, which from time to time actively and successfully fought for the economic rights of the Chinese and their education, which raised its authority [18, l. 1-2]. At first it consisted of no more than 300 members, but at the end of 1926 it already included more than 3 thousand people. The union, although not strengthened organizationally, united workers from different enterprises and was led by a chairman (in 1926 it was Fu Jinyang) and his assistant (Tang Fushan). Structurally, the DSKR was divided into shop committees, headed by their own chairmen with two assistants. Members of the union were required to pay feasible fees. DSKR not only organized strikes, but also acted as a mediator in resolving conflicts. Since 1926, the DSKR collaborated with the All-China General Union of Railway Workers and advocated equal rights and unification with the Japanese workers of Manchuria. However, the methods of action of Chinese trade unions in the Kwantung General Government, where Japanese laws were applied, did not go beyond purely economic requirements and were not distinguished by manifestations of political ambitions, unlike unions in Central and Southern China [18, p. 3-6].

As a counterbalance to workers’ organizations, Japanese entrepreneurs created their own unions of industrialists [18, l. 6-7]. Workers often conflicted with them, sometimes uniting into international communities to achieve their goals. Thus, according to reports in the Japanese press, in November 1927, a serious conflict arose between tailors and clothiers in Dairen. The clothiers’ society decided to reduce the wages of workers at their enterprises by 5–10%. The craftsmen responded by organizing a union (400 Chinese and 60 Japanese workers) and going on strike. The clothiers agreed to yield, but only if the union was dissolved. This compromise ended the conflict [9, l. 143].

During the Japanese occupation of Manchuria, independent and even semi-independent trade unions were liquidated. According to the laws of Manchukuo, the activities of any unions and societies were permitted only under the auspices of the state and for its benefit. All other unions, especially those with a pro-communist orientation, were prohibited as anti-state under the threat of long-term prison sentences (from 10 years in prison) and the death penalty (for leaders) [20, p. 31, 204-208]. The professional communities that were created became, in fact, part of state production structures for the redistribution of goods for the population. These unions and societies were directly controlled by the military administration, and Japanese political ideology was necessarily implanted in them [10, l. 17].

Thus, the trade union movement in Northeast China in the 1920s and early 1930s differed not only in lower intensity than in the central and southern regions of the country. There were reasons for this, due to the local specific features of the trade union movement. Firstly, Chinese professional associations developed in paral-

lel with the trade unions of Soviet citizens and Russian emigrants located in the CER zone. Secondly, the trade union movement here experienced strong control and interference in its affairs from the militaristic cliques and the Japanese occupation regime. Thirdly, progressive forms of trade union activity were hampered by the absence in Manchuria due to repression of well-trained patronage cadres in the party groups of the CPC and the Kuomintang, already small in number.

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雅库特中部地区高产进口奶牛的代谢状态
**METABOLIC STATE IN HIGHLY PRODUCTIVE IMPORTED
COWS IN THE CONDITIONS OF CENTRAL YAKUTIA**

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注解。显示了进口高产牲畜在适应远北极端条件期间的血液学和生化血液参数与新陈代谢水平之间的关系。已经确定,在长期停滞期间,动物血清中的总蛋白水平下降了5.48%,白蛋白水平下降了23.32%,球蛋白水平下降了6.73%,低于生理正常水平。在奶牛中也发现了矿物质代谢的变化,特别是低钙血症。动物生理生化状态的变化表明高产牲畜体内代谢过程的紧张状态。

关键词: 西门塔尔品种、进口牛、生化参数、代谢、血清、总蛋白、白蛋白、球蛋白。

Annotation. *The relationship between hematological and biochemical blood parameters and the level of metabolism in imported highly productive livestock during their adaptation to the extreme conditions of the Far North is shown. It has been established that during a long period of stalling in the blood serum of animals there is a decrease in the level of total protein by 5.48%, albumin by 23.32% and globulins by 6.73%, below the physiological norm. Changes in mineral metabolism, in particular hypocalcemia, were also detected in cows. The revealed changes in the physiological and biochemical status of animals indicate the tension of metabolic processes in the body of highly productive livestock.*

Keywords: *Simmental breed, imported cattle, biochemical parameters, metabolism, blood serum, total protein, albumins, globulins.*

Livestock farming in the Republic of Sakha (Yakutia) has been and remains the main branch of agriculture. In the republic's livestock farming, it is planned to increase the production of meat and milk by improving the breed qualities of the breeding stock [1]. Currently, many farms in the republic are engaged in breeding specialized breeds of livestock. Over the past years, 3683 head of high-yield-

ing cattle have been imported into the territory of Yakutia, including 2377 head (64.5%) of dairy productivity [2].

It is believed that the high genetic potential for productivity of dairy cows, achieved as a result of intensive selection, has caused a number of undesirable side effects associated with disruption of various physiological functions in animals. According to generally accepted opinion, the main reason for these changes is the difficulty of metabolic adaptation of cows to a state of negative energy balance [3].

It is known that one of the main criteria for assessing the body's supply of nutrients is the level of total protein in the blood serum of productive animals [4].

The study of adaptation of highly productive livestock imported from other regions of Russia for breeding in the extreme climatic conditions of the Far North is of particular scientific and practical interest for veterinary and biological sciences.

The purpose of the work is to study the dynamics of hematological and biochemical blood parameters with the metabolic state of highly productive imported cows of the Simmental breed in the conditions of the Central zone of Yakutia.

Materials and methods. The work was carried out at the Department of Physiology of Agricultural Animals and Ecology at ASATU. The basic farm of the individual entrepreneur KFH "Sleptsov A.P." specializes in breeding Simmental dairy cattle. The farm is located in the Namsky district and is part of the Central zone of Yakutia. In 2020, the farm imported 100 head of pedigree cows from the Krasnoyarsk Territory (Glyadenskoye ZAO).

The farm has adopted stall-pasture technology for keeping animals. In winter, long-term stabling is provided, lasting about 210-240 days (7-8 months). The livestock population is 147 heads, including 55.8% cows. Business yield of calves is 76.9%.

Biochemical and hematological studies were performed on PCE 90 vet and BioChem S.A.

Blood samples for research were collected in vacuum disposable tubes with EDTA using disposable needles from the jugular vein, in the morning before feeding the animals.

The resulting digital material was subjected to biometric processing; the reliability of the difference between the values was determined using the Student table, with the calculation of the arithmetic mean and its error.

Research results. When studying hematological parameters in imported cows during the stall period, it was found that the parameters correspond to physiological standards, but there are seasonal differences (Table 1).

Table 1

Hematological parameters of imported cows when kept in stalls

Index	Seasons of the year		Significance of difference, p
	Winter	Spring	
	M1±m1	M2±m2	
Leukocytes, 109/l	5.72±0.75*	5.66±0.85	<0.01
Red blood cells, 1012/l	6.42±1.19**	6.25±1.08	<0.001
Hemoglobin, g/l	107.0±7.3*	96.1±6.3	<0.01

Note: *P<0.001; **P<0.01; NDR – no significant differences.

Thus, in winter, the total number of leukocytes was 5.72±0.75*109/l, red blood cells 6.42±1.19*1012/l, hemoglobin level 107.0±7.3 g/l. However, in the spring, by the end of the stall period, cows significantly decrease: the content of leukocytes - by 1.05% (P<0.01), erythrocytes - by 2.65% (P<0.001) and the level of hemoglobin - by 10.19% (P<0.01), compared with indicators in winter. It should be noted that the most significant decrease in hemoglobin levels to the minimum threshold values may subsequently negatively affect the milk production of animals.

Thus, the dynamics of peripheral blood parameters in imported Simmental cattle is characterized by a significant decrease in hematological parameters to the minimum threshold values, which indicates a significant influence of extreme environmental conditions on the physiological status of animals.

It has been established that imported cows during the stall period are characterized by pronounced seasonal fluctuations in the content of total protein and protein fractions in the blood serum (Table 2).

Table 2

Biochemical indicators of imported cows when kept in stalls

Indicators	Seasons of the year		Significance of difference, p
	Winter	Spring	
	M1±m1	M2±m2	
total protein, g/l	65.28±1.22*	52.93±2.16	<0.001
albumin, g/l	29.05±1.79**	19.17±2.11	<0.01
globulin, g/l	41.76±2.20*	24.91±2.31	<0.001
alkaline phosphatase, units/l	21.60±3.84	22.77±2.24	NDR
potassium, mmol/l	5.19±0.65**	7.17±0.16	<0.01
sodium, mmol/l	29.05±1.79**	19.17±2.11	<0.01
calcium, mmol/l	1.94±0.38	1.63±0.42	NDR
phosphorus, mmol/l	1.45±0.81	1.73±0.44	NDR

Note: *P<0.001; **P<0.01; NDR – no significant differences.

A comparative analysis of the biochemical composition of blood showed that in imported cows in the spring, at the end of the stall period, the content of total protein significantly decreases by 18.91% ($P < 0.001$), compared to the winter period, and amounted to 52.93 ± 2.16 g/l. It should be noted that the total protein level is 5.48% below the minimum physiological threshold values.

In spring, the content of albumins and globulins significantly decreases by 34.01% ($P < 0.01$) and 40.35% ($P < 0.001$), respectively, compared to the winter period. At the same time, the albumin-globulin ratio (AGC) is below standard values. However, despite its low content, in the spring its value increases by 0.11 units, which indicates the activity of protein metabolism in animals during deep pregnancy.

A decrease in the level of protein in the blood serum in the spring by 18.91% compared to the winter period indicates the stress of metabolic processes in the animals' bodies. It is known that a decrease in total protein with a sharp decrease in the amount of albumin can manifest itself in nutritional dystrophy [5].

The content of alkaline phosphatase in the spring is 22.77 ± 2.24 units/l, which is 5.42% higher compared to the winter period (WDR).

A significantly high content of potassium and sodium was revealed in the blood serum of the studied group of cows. Thus, the average potassium level was 6.18 ± 0.40 mmol/l, while its level in the spring increases by 38.15% compared to the winter period ($P < 0.01$). It should be noted that the level of potassium in the blood in the spring is 18.0% higher than the physiological norm. The sodium content, on the contrary, is significantly lower than the standards by 4-7 times. Moreover, its concentration in winter is significantly higher by 34.01% than in spring ($P < 0.01$).

It was established that the calcium content in the blood serum of imported cows in the seasons studied did not meet physiological standards. Thus, the calcium concentration was below standard values from 65 to 77%. The phosphorus content fluctuated within the physiological norm – from 1.45 ± 0.81 to 1.73 ± 0.4 mmol/l. However, its level in the spring exceeded the lower limit of the physiological norm. Consequently, there is an imbalance in the diet in terms of calcium and phosphorus content.

Conclusions:

1. In imported highly productive livestock in the conditions of Central Yakutia, the dynamics of hematological parameters are characterized by a decrease to the minimum threshold values, which indicates a significant negative impact of extreme environmental conditions on the physiological status of animals.

2. In the dynamics of biochemical parameters, there is a decrease in the level of protein in the blood serum in the spring (at the end of the stable period) by 18.91%, albumin by 34.01%, globulins by 40.35%, compared with the winter stable period, which indicates stress of metabolic processes in the animal body.

3. There is an imbalance of mineral elements, in particular, hypocalcemia, which is typical for the biogeochemical provinces, which include Yakutia, in particular the central zone.

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在雅库特境内发现的拜科夫斯基猛犸象 (*Mammutus primigenus* (Blumenbach, 1799)) 的蛔虫卵

ASCARID EGGS OF THE BYKOVSKY MAMMOTH (*MAMMUTUS PRIMIGENUS* (BLUMENBACH, 1799)), DISCOVERED ON THE TERRITORY OF YAKUTIA

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抽象的。世界上70%以上的猛犸象骨骼化石和猛犸象动物群的其他遗迹都集中在雅库特。一般来说，在雅库特发现的猛犸象动物群保存完好。多达 90% 的软组织独特发现都发生在雅库特；此外，仅在雅库特发现了保存有生物体液的动物化石。在研究猛犸象遗骸时，寄生虫的发现是罕见且随机的，这决定了古寄生虫学领域有针对性的寄生虫学研究的相关性。我们研究的目的是检测更新世时期拜科夫斯基猛犸象 (*Mammutus primigenus* (Blumenbach, 1799)) 的线虫卵。在蠕虫学研究中，我们发现了线虫纲蠕虫的卵，特别是蛔虫亚目的蛔虫。蛔虫科拜科夫斯基猛犸象 (*Mammutus primigenus* (Blumenbach, 1799)) 的蛔虫卵直径为 73.25 ± 1.47 ；外壳厚度 4.10 ± 0.20 。

关键词：拜科夫斯基猛犸象、卵、线虫、蛔虫。

Abstract. *More than 70% of the world's reserves of fossil mammoth bones and other remains of the mammoth fauna are concentrated in Yakutia. As a*

rule, objects of mammoth fauna discovered in Yakutia are well preserved. Up to 90% of all unique finds with soft tissues occur in Yakutia; in addition, fossil animals with preserved biological fluids were discovered only in Yakutia. When studying the remains of mammoths, finds of parasites are rare and random, which determines the relevance of targeted parasitological research in the field of paleoparasitology. The purpose of our research was to detect nematode eggs in the Bykovsky mammoth (*Mammutus primigenus* (Blumenbach, 1799)) of the Pleistocene period. During helminthological studies, we discovered eggs of helminths from the class Nematoda, in particular roundworms of the suborder Ascaridata, family. Ascarididae The diameter of roundworm eggs of the Bykovsky mammoth (*Mammutus primigenus* (Blumenbach, 1799)) was 73.25 ± 1.47 ; shell thickness 4.10 ± 0.20 .

Keywords: Bykovsky mammoth, eggs, nematodes, roundworm.

Introduction

The Pleistocene mammoth fauna is a special faunal community that existed in conditions that remain largely unexplored to date, and their study requires special methodological approaches [6].

One of the new locations discovered in 2020 is the site of Cape Muostakh, the Bykovsky Peninsula from the Buor-Khaya Bay and the Laptev Sea. Here, on a beach near a coastline eroded by the sea with steep and partially collapsed shores, paleontological material was collected, some of which was fragmented by ancient man [4,5].

In 2022, the erosional coast of the Bykovsky Peninsula was examined, from the Neelovs Bay, 3 km from the Bykovsky Isthmus. Exploration area 2022 was determined to be carried out in 2021. research on the shore of Neyolova Bay and was a continuation of the general study of the Bykovsky Peninsula in the Bulunsky region, which began in 2020. The discovery of a frozen mammoth skeleton made it possible to carry out excavation work taking into account the thawing of frozen soil. The bones of a mammoth (*Mammutus primigenus* (Blumenbach, 1799)) were recorded frozen on the shore of the bay, the topography of which is represented by numerous mounds of varying heights from 7 to 12 m from the water's edge and at a depth of 24 m from the surface. The moss-lichen tundra in this place is flat, without allas lowlands, with small lakes, numerous deep ravines, cut into the permafrost with varying lengths. On the northern side, 4 km away, is the lowland between Koryakinsky Lake and Omuleva Lagoon, on the southern side, 3 km away, is the Kolychev Isthmus. From the shore of Neelova Bay to the east there is the Ogo-Alyta tract and further, 4 km, Tiksi Bay [6,7].

In Russia, information about the detection of helminths in the tissues of fossil mammoths appeared at the beginning of the twentieth century [2]. More than 100

years later, in 2012, when studying fragments of soft tissue of a young male Sopotkinsky mammoth (muscles, liver, intestinal contents) preserved in permafrost, nematode and cestode eggs were discovered, further identification of which to species or genus was impossible due to violation of their morphology. Nevertheless, the authors concluded that the results of a comparison of modern and ancient parasites, as well as their hosts, can provide new knowledge about the evolutionary and genetic aspects of the formation of the phenomenon of parasitism [3]. These authors note that helminth eggs, being in permafrost conditions in animal corpses, are still exposed to temperature differences and partially change the morphological structure. However, they confirm the data of A.V. Khrustalev, A.B. Savinetsky. (1992) [10] that parasite eggs can retain their shell and even partially their internal structure for tens of thousands of years. Nematode eggs have characteristic morphological structures by which they can be detected, however, with a comparative microscopic assessment of helminth eggs of ancient and modern animals, it is impossible to come to an unambiguous decision in identifying them to species. Research by Glamazdin et al. [3,11] revealed the presence of helminth eggs in mammoths belonging to the types Plathelminthes and Nematelminthes, to the classes Cestoda and Nematoda, respectively.

A review of findings of parasites in the woolly mammoth *M. primigenius* (Blumenbach, 1799), whose remains (including soft tissues and internal organs) are quite often found in permafrost deposits of North-East Eurasia, was carried out by N.V. Serdyuk and Mashchenko E.N. [8].

The discovery of nematode eggs in mammoths of the family Ascarididae Baird, 1853 was reported by T.N. Sivkova and Kosintsev P.A. [9].

These authors conducted a parasitological study of the intestinal contents of two mammoths – Mongochensky (Gydan Peninsula) and Tadibe (Yamal Peninsula). The work was carried out according to a method generally accepted in paleoparasitology using rehydration of residues and subsequent use of a combined and sedimentation method. During a parasitological study of the intestinal contents of the Mongochen mammoth, no parasites were found, while analysis of material from the Tadibe mammoth revealed two nematode eggs. The number of eggs found was small: 1.5 eggs per 1 g of feces. Large size, round shape, and the presence of a thick layered shell made it possible to identify these objects as eggs of representatives of the family Ascarididae Baird, 1853. Most of all, in structure, they resemble the eggs of modern parasitic horses. The egg diameter was 78.68 ± 1.19 and 87.94 ± 0.47 μm , the wall thickness was 4.14 ± 0.29 and 4.48 ± 0.34 μm , which is comparable to similar indicators of modern representatives.

Materials and methods. The research was carried out at the Department for the Study of Mammoth Fauna of the Academy of Sciences of the Republic of Sakha (Yakutia) in February 2024. The material was the contents of the gastrointestinal tract of the Bykovsky mammoth, found in the Bulunsky district on the Bykovsky

Peninsula. The discovery of a frozen mammoth skeleton made it possible to carry out excavation work taking into account the thawing of frozen soil. The samples we needed were taken from June 22 to June 28, 2022 and delivered by research engineer I.S. Pavlov. Since the remains of the mammoth were discovered on a layer of permafrost, the selected material was frozen and well preserved. For helminthological studies, a total of 4 samples, 2 kg in volume, were taken from different parts of the intestine. Due to the fact that after thawing the material was identical to a sample of fresh feces, traditional methods of helminth ovoscopy were used in laboratory studies: the native smear method and the Fulleborn method [1]. Morphometric studies were carried out using an eyepiece micrometer. For statistical processing, the Microsoft Excel application was used.

Results and discussion

Figures 1-4 show mammoth roundworm eggs discovered by the Fulleborn and native smear methods.

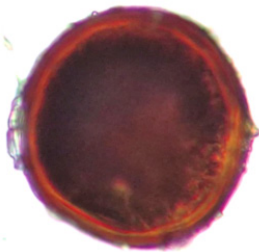


Figure 1. Roundworm egg (Fulleborn method) (x 400 method)

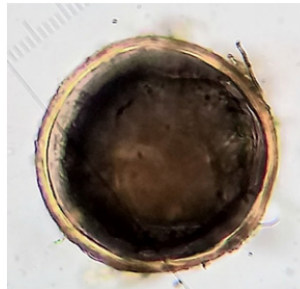


Figure 2. Ascaris egg (diameter - 75.0 microns, shell thickness – 3.75 μm) (x 400) (native smear)

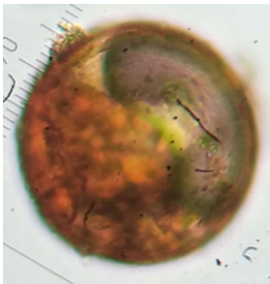


Figure 3. Roundworm egg with larva (x400)

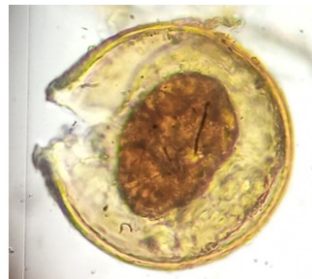


Figure 2. Roundworm egg with a ruptured shell (x 400)

Table 1 shows the sizes of roundworm eggs of the Bykovsky mammoth.

Table 1

Morphometric data of the roundworm egg of the Bykovsky mammoth

No.	Measurements	Bykovsky mammoth
1	Diameter, μm (n=13)	73,25 \pm 1,47
2	Shell thickness, μm (n=13)	4,10 \pm 0,20

The diameter of roundworm eggs of the Bykovsky mammoth (*Mammutus primigenus* (Blumenbach, 1799)) was 73.25 ± 1.47 ; shell thickness - 4.10 ± 0.20 .

The results of our research confirm the data of A.V. Khrustalev, A.B. Savinetsky. [10] that the eggs of parasites, in particular nematodes, can retain their shell and even partially their internal structure for tens of thousands of years.

Conclusion

Paleoparasitology is one of the new areas of parasitology, which deals with the detection of parasites, in particular helminths, in various fossil materials. In particular, we conducted helminthological studies of the preserved contents of the gastrointestinal tract of the Bykovsky mammoth of the Pleistocene period, taken in 2022. During helminthological studies, we discovered eggs of helminths from the class Nematoda, in particular roundworms of the suborder Ascaridata, family. Ascarididae The diameter of roundworm eggs of the Bykovsky mammoth (*Mammutus primigenus* (Blumenbach, 1799)) was 73.25 ± 1.47 ; shell thickness 4.10 ± 0.20 .

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中国地衣研究史

THE HISTORY OF THE STUDY OF LICHENS IN CHINA

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摘要. 本文对中国地衣学在多样性、系统性研究方面进行了综述。文中强调了多样性和系统性研究在自然界地衣资源与研究开发之间的桥梁作用。

关键词: 中国地衣学, 多样性, 系统性

Annotation. *This article reviews the diversity and systematic research on lichenology in China. The article emphasizes the bridging role of diversity and systematic research between natural lichen resources and research and development.*

Keywords: *Chinese lichenology, diversity, systematicity.*

The study of lichens in China has a rich history dating back centuries. Lichens, symbiotic organisms composed of a fungus and an alga or cyanobacterium, have long fascinated scientists and naturalists worldwide due to their unique ecological roles and biochemical properties. In China, the study of lichens can be traced back to ancient times, where they were mentioned in traditional Chinese medicine and poetry.

During the late 19th and early 20th centuries, with the influx of Western scientific ideas, lichenology began to gain more systematic attention in China. Western lichenologists, such as William Nylander and Antonín Vězda, contributed significantly to the field through their studies and publications. Additionally, Chinese botanists and researchers started to explore lichens indigenous to China, documenting their diversity and distribution.

One notable figure in the history of lichenology in China is Shu Chun Teng (Teng Shu-ch'un), a prominent Chinese botanist and lichenologist. Teng made substantial contributions to the study of Chinese lichens during the mid-20th century. He conducted extensive fieldwork across different regions of China, collecting specimens and describing numerous species new to science. Teng's research laid a foundation for the understanding of lichen diversity in China and helped establish a framework for future studies in the field.

In the latter half of the 20th century and into the 21st century, interest in lichenology continued to grow in China. Universities and research institutions across the country established lichen collections and research programs, fostering collaboration among Chinese and international scientists. Advances in molecular biology and DNA sequencing techniques further revolutionized the study of lichens, providing new insights into their taxonomy, evolution, and ecological significance.

Today, China boasts a diverse community of lichenologists and researchers who are actively engaged in various aspects of lichenology, including taxonomy, ecology, biogeography, and conservation. Their work contributes to a deeper understanding of lichen biodiversity not only in China but also globally, highlighting the importance of lichens in ecosystems and their potential applications in fields such as medicine, environmental monitoring, and biomaterials.

The history of lichen research in China has been divided into three stages: the *Materia Medica* period before Linnaeus, the traditional period after Linnaeus, and the modern period. Lichenology research in China during the post-Linnaean traditional period was mainly dominated by foreign lichenologists. As an integral part of mycology, Dai Fanglan, the founder of mycology in my country and director of the Institute of Applied Mycology, Chinese Academy of Sciences, once sent people to study abroad, thus filling the blank subject of lichenology in my country.

1 Diversity

Since the Chinese Spore Flora Editorial Committee of the Chinese Academy of Sciences was established in 1973, especially since the postgraduate system was restored, my country's lichen research team has been expanding day by day, from 3 scientific research institutions and 1 university in the 1970s to 7 scientific research institutions now, and 14 universities. Among them, the number of lichenology researchers has increased from 4 to 40 now, 33 of whom have doctorates. They are engaged in pre-editing research and editing work based on the research of "Lichen Chronicles of China". It is planned to complete the compilation and research of 27 volumes of "Lichen Chronicles of China" in 2021, the first centenary year. Later, on the basis of "Lichen Flora of China", we will continue to expand the content and revise it, and cooperate with international organizations led by the United States to compile and research the English version of "Lichen flora of China". The above progress shows that Chinese lichenology research in the modern period is dominated by Chinese lichenologists. The soon-to-be-published "The Enumeration of Lichenized Fungi in China" includes 3,085 species, belonging to 444 genera, 98 families, 27 orders, 9 classes, and 2 phyla of the fungi kingdom. Among them, there are 418 genera and 3,050 species of lichen-type fungi, an increase of 212 genera and 1,319 species from the 232 genera and 1,766 species in "An Enumeration of Lichens in China" published in 1991, including 415 genera of Ascomycetes, 3,041 species; 3 genera and 9 species of Basidiomycetes. In addi-

tion, there are 26 genera and 35 species of lichen ectophytic fungi marked with an asterisk “*”, including 23 genera and 31 species of Ascomycota; and 3 genera and 4 species of Basidiomycetes. They are widely distributed in the following provinces, cities and autonomous regions in China: Beijing, Heilongjiang, Jilin, Liaoning, Tianjin, Inner Mongolia, Xinjiang, Ningxia, Qinghai, Gansu, Shaanxi, Tibet, Sichuan, Chongqing, Guizhou, Yunnan, Shanxi, Hebei, Shandong, Henan, Anhui, Jiangsu, Shanghai, Hubei, Hunan, Jiangxi, Zhejiang, Fujian, Taiwan, Guangxi, Hainan, Guangdong and Hong Kong. As for the lichens distributed in Macau, there have been no reports so far.

Lichens are stable extracellular symbiotic communities of lichen-type fungi and corresponding algae or cyanobacteria in the ecosystem of the earth's biosphere. The so-called lichen-type fungi refer to those fungi that can only survive in nature when they coexist with corresponding algae or cyanobacteria. Each symbiotic community is composed of a lichen-type fungus as the founder species and a corresponding alga or cyanobacteria as a companion species; some species are also accompanied by gall cyanobacteria; the symbiotic community is sometimes accompanied by growth Exophytic fungi on the surface of the lichen body, endophytic fungi growing on the body of the lichen; sometimes there are other lichens attached to the outside of the lichen as occasional species. Although lichens are a stable extracellular symbiotic community of a group of lichen-type fungi and corresponding algae or cyanobacteria, the scientific name of the lichen-type fungi as the founding species is the scientific name of lichen, and its systematic position in the biosphere belongs to the kingdom Fungi. Therefore, identification of lichen species is based on the attributes of lichen-type fungi. The problem is when identifying the attributes of lichens, how to exclude the attributes of other members of the symbiotic community? Usually stable algae and cyanobacteria as companion species in the symbiotic community, including gall cyanobacteria, are also recognized as attributes of lichens; as for ectophytic fungi and Epiphytic lichens are easily eliminated, but the difficulty lies in the elimination of endophytic fungi, which also produce secondary metabolites. Secondary metabolites have long been one of the important attributes for identifying lichen species. In this way, the secondary metabolites of endophytic fungi may be regarded as one of the attributes of lichen-type fungi.

The ratio of fungi to vascular plants in the Earth's biosphere is estimated to be 6:1 (Hawksworth 1991). There are at least 180,000 species of fungi in China's 30,000 known vascular plant species; among them, only symbiosis with the corresponding algae or cyanobacteria can Lichen-type fungi surviving in nature account for 20% of the fungal kingdom (Kirk et al. 2008). There should be at least 36,000 species of lichen-type fungi in China. The number of known lichen-type fungal species in China only accounts for 8.5% of the estimated number, and 91.5% of the species remain to be investigated and understood.

2 Systematic

According to Darwin's theory of common ancestry, all organisms in the earth's biosphere descend from a common ancestor (Darwin 1872). Therefore, the descendants of different levels and branch systems each have a certain common ancestry (symplesiomorphy). All these descendants are called monophyletic groups, which are the result of differentiation in divergent evolution; where Some of their descendants are called paraphyletic groups. In addition to retaining the common ancestral characteristics of their ancestors, the descendants that differentiate during divergent evolution will derive different new characteristics of the offspring, which are so-called derivative characteristics. Descendants with common synapomorphy but no common ancestry are called polyphyletic groups, which are the result of convergent evolution.

The primary task of taxonomy of lichen-type fungi is to analyze the rich, diverse, seemingly chaotic and constantly evolving species diversity in the earth's biosphere, and classify them according to their genetic relationships through co-ancestral and co-derivative systematic analysis that combines phenotype and genotype. Organize into an orderly hierarchical classification system of species, genus, family, order, class, phylum and kingdom. These hierarchical classification systems serve as information access systems, together with the three major access systems of species prototype specimen access systems and living bacterial and algae culture access systems (Wei Jiangchun 2010), between natural lichen biodiversity and biological resource research and development. plays an indispensable bridging role (Zhang & Wei 2017).

Lichen systematics has moved from the phenotypic research stage in the 20th century and before to the genotypic research stage in the 21st century. The latter conducts systematic research on lichens based on the cluster analysis results obtained by software processing of single genes or multi-gene fragments. In the phenotypic systematic study of Umbilicariaceae, the ascus apex structure and umbilical leaf-like lichen body are the common ancestral features, and the umbilical cord body and single sporangium are common derivation features. *Lasallia*; under the same common ancestry, the genus *Umbilicaria* was delimited by the common derivation of non-umbilical leaf chlamydia and eight sporangia (Wei Jiangchun 1966). This *Lasallia-Umbilicaria* phenotypic system was verified by rDNA polymorphism analysis (Wei Jiangchun and Niu Yongchun 1994).[1]

Overall, the history of lichen studies in China reflects a trajectory of increasing interest and expertise in this field, driven by the contributions of dedicated scholars and researchers. As China continues to prioritize environmental conservation and sustainable development, lichenology is likely to remain a vibrant and important area of scientific inquiry in the country.

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急性肾功能衰竭对不同年龄儿童脉搏动脉压昼夜节律的影响
**THE EFFECT OF ACUTE RENAL FAILURE ON THE CIRCADIAN
RHYTHM OF PULSE ARTERIAL PRESSURE IN CHILDREN
DEPENDING ON AGE**

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抽象的。在急性肾功能衰竭儿童中,未发现昼夜节律中中膜波动、振幅值和PBP波动范围等与年龄相关的显著特征。在婴儿期第21天和22天,出现了因心肌炎和急性心力衰竭导致的心输出量减少的迹象。在3.1岁以上的儿童中,PBP昼夜节律的幅度一般有逐渐降低的趋势,而在幼儿中则有增加的趋势。在第1组中检测到最长的PBP昼夜节律倒置。在第3组中,在第6天全身炎症反应最严重时注意到高循环型血流动力学,并出现急性肾功能衰竭。

关键词: 昼夜节律, 脉搏血压, 儿童。

Abstract. Significant age-related distinctive signs of mesor fluctuations, amplitude values, and range of PBP fluctuations in the circadian rhythm were not identified in children with acute renal failure. In infancy, on days 21 and 22, signs of a decrease in cardiac output due to myocarditis and acute heart failure appeared. In children over 3.1 years of age, there was generally a tendency toward a gradual decrease in the amplitude of the circadian rhythm of PBP, while in young children there was a tendency toward an increase. The longest inversion of the circadian rhythm of PBP was detected in group 1. The hypercirculatory type of hemodynamics was noted at the height of the systemic inflammatory reaction on day 6 with acute renal failure in group 3.

Keywords: circadian rhythm, pulse blood pressure, children.

Relevance. An increase in blood pressure that occurs against the background of pathologies of the heart, kidneys or disorders of the endocrine system, as a result of damage to the heart and disorders of the nervous system, is usually called secondary hypertension. One of the simplest and most accessible markers of vas-

cular damage in arterial hypertension and an increase in their stiffness is increased pulse arterial pressure (PAP). The dependence of the PBP indicator on age, height and body mass index is shown. A connection has been established between high blood pressure in overweight children and signs of vascular wall remodeling. To date, an extensive evidence base has been accumulated regarding the ability of changes in PBP to cause disturbances in the central nervous system, lead to damage and death of neurons, and thereby contribute to the onset and progression of cognitive impairment. Excessive PAP causes disruption of the integrity of the blood-brain barrier, can intensify the production of reactive oxygen species in the central nervous system, lead to endothelial dysfunction, microhemorrhages, and directly stimulate the formation of β -amyloid, the substrate of Alzheimer's disease and dementia associated with it. Due to the important role of elevated PAP in impaired cognitive functioning, an important aspect of the effects of antihypertensive drugs is their effect on PAP and the ability to reduce it, since this may reduce the risk of the onset and worsening of existing cognitive impairment. Therefore, among antihypertensive drugs, according to the authors, the fixed combination of amlodipine/indapamidretard deserves special attention, since it has an evidence base for its powerful potential in reducing PBP in patients with arterial hypertension, which, in turn, can help improve their quality of life. Children often suffer from similar pathologies, as a result of which they experience both abrupt and constant increases in blood pressure. However, in the literature there is insufficient information on the characteristics of the pulse arterial pressure (PAP) response in the oligo/anuria phase of acute renal failure in children depending on age [1-4].

Goal of the work. To study and give a comparative assessment of the reaction of the circadian rhythm of pulse arterial pressure in acute renal failure in different age periods.

Material and research methods. We studied the data of hourly monitoring of body temperature in 33 children with acute renal failure admitted to the ICU of the National Medical Center with oligo-anuria at the age of 6 months to 18 years. All patients underwent hemodialysis under the control of hemodynamics, acid-base balance, respiratory system, supportive, antibacterial, anti-inflammatory, syndromic corrective intensive therapy. The results of the studies were studied in the following age groups: 12 patients aged from 6 months to 3 years (group 1) were in the ICU for up to 30 days. Group 2 combined the results of a study of monitoring data from 14 children from 3.1 to 7 years (in the ICU - 14 days), in group 3 - 7 children aged 7.1-18 years (in the ICU 14 days), subsequently all children were transferred to the Department of Pediatric Nephrology. Tubulointerstitial nephritis was diagnosed mainly before the age of 7 years, amounting to 27% in group 1 and 30% in group 2. In the majority of patients, the severity of the condition was due to MODS (38% of children), mainly in older age. Acute cerebral insufficiency aggravated pathological deviations of homeostasis in 28% of children. In 13% of patients over 7.1 years of age, a chronic disorder of the functional activity of

the kidneys was discovered for the first time. The results of the identified changes in the components of the circadian rhythm were obtained by deducing mesor indicators - the average daily level of the studied indicator, the amplitude of circadian fluctuations, the range of daily fluctuations, indicators of acrophase and bathyphase of the circadian rhythm, the duration of the inversion of the circadian rhythm of the studied hemodynamic parameters. The research data were processed by the method of variation statistics using the Excel program by calculating arithmetic means (M) and errors of means (m). To assess the significance of differences between two values, the parametric Student's test (t) was used. The relationship between the dynamics of the studied indicators was determined by the method of paired correlations. The critical significance level was taken equal to 0.05.

Results and its discussion.

Table 1.
Average parameters of the phase structure of the circadian rhythm of PAP by age in mm Hg.

Groups	Mesor	In acrophase	Batiphase	Amplitude	Daily fluctuation
1	38,9±3,7	56,2±7,6*	24,8±4,3*	17,3±5,9	31,4±8,2
2	42,5±1,6	58,3±7,6*	30,9±2,7*	15,7±6,4	27,4±7,2
3	46,5±4,4	66,9±12,9*	30,9±4,1*	20,4±9,4	36,0±13,6

* - the difference is significant relative to the mesor index.

A significant difference in the PAP indicator in the acrophase in group 1 was revealed by 44%; in the bathyphase, the PAP indicator was less than the average daily level by 36% (p <0.05, respectively). The identified differences confirm the fluctuation of blood pressure in the circadian rhythm.

In preschool age, PAP in the acrophase was 36% higher than the average daily level, and in the bathyphase it was reduced by 27%. At school age, the difference in PAP relative to the mesor in the acrophase was 44%, in the bathyphase – 33%. Thus, no significant age-related distinctive signs of PAP mesor fluctuations, amplitude values, or range of PAP fluctuations in the circadian rhythm were identified (Table 1).

Table 2.
Dynamics of mesor circadian blood pressure by age

Days	1 group	2 group	3 group
1	43±6	44±6	44±4
2	43±4	41±3	51±8
3	40±5	43±3	46±5
4	44±4	39±6	44±8
5	41±4	43±4	50±8

6	43±5	42±5	61±12
7	40±6	41±4	46±10
8	42±6	41±2	53±4
9	44±6	42±5	44±8
10	42±7	42±5	42±7
11	44±7	43±6	40±6
12	45±8	44±6	39±4
13	42±9	41±4	49±12
14	37±8	49±7	43±5
15	42±5		
16	39±6		
17	32±4		
18	33±11		
19	39±11		
20	35±9		
21	25±5		
22	29±5		
23	39±6		
24	37±6		
25	36±5		
26	40±6		
27	37±7		
28	42±8		
29	35±6		
30	36±7		

Table 3.

Average circadian rhythm of blood pressure in age groups

Hours	1 group	2 group	3 group
8	39±7	43±2	49±6
9	34±8	42±5	45±15
10	39±5	42±4	48±11
11	43±8	42±6	45±10
12	39±8	40±4	42±8
13	39±6	44±13	51±11
14	41±7	42±5	48±5
15	37±7	44±5	49±14
16	42±6	44±5	47±6
17	42±8	38±5	51±9
18	40±6	47±7	47±10

19	41±6	43±6	46±7
20	39±5	41±2	45±7
21	38±6	42±5	45±8
22	44±9	42±4	47±8
23	42±4	44±4	50±10
24	40±7	45±7	46±8
1	37±6	41±4	44±10
2	39±8	42±3	43±3
3	39±7	43±5	50±7
4	38±6	44±4	42±3
5	41±6	40±5	44±6
6	40±10	43±5	48±11
7	47±9	43±5	46±8

In infancy, a decrease in blood pressure by 15 mmHg was observed on days 21 and 22. and 11 mmHg. , indicating a decrease in cardiac output caused by myocarditis and acute heart failure (Fig. 1). The increase in PAP on day 6 in group 3 corresponds to the characteristic hypercirculatory type of hemodynamics at the height of the systemic inflammatory reaction in acute renal failure.

The study of changes in the structure of the phase analysis of the average circadian rhythm over the observation period allowed us to state the oscillatory nature of changes in PAP at the lowest level of PAP values at the age of up to 3 years from 34 to 44 mmHg, slightly higher PAP values in group 2 and the highest values average PAP were detected in group 3, which corresponded to age-related differences in cardiac output (Fig. 2).

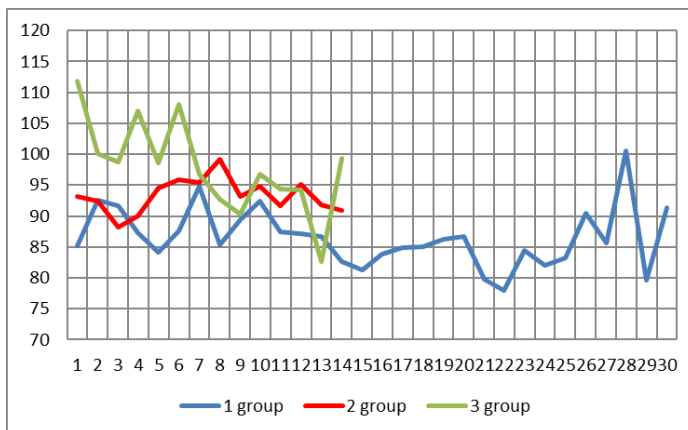


Figure 1. Dynamics of the mesor of the circadian rhythm PAP by age, mm Hg.

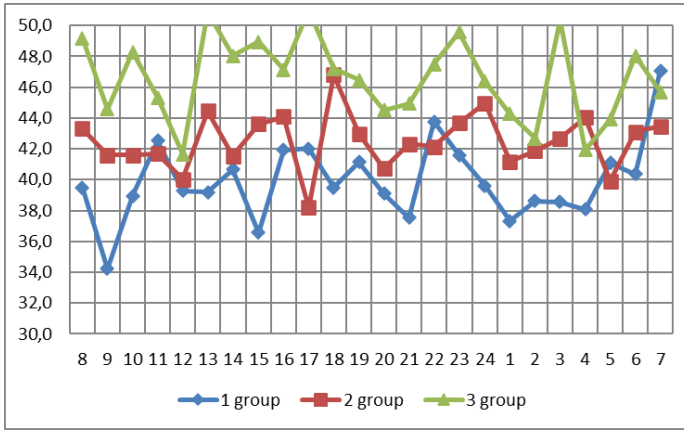


Figure 2. Average circadian rhythm of blood pressure in age groups, mm Hg.

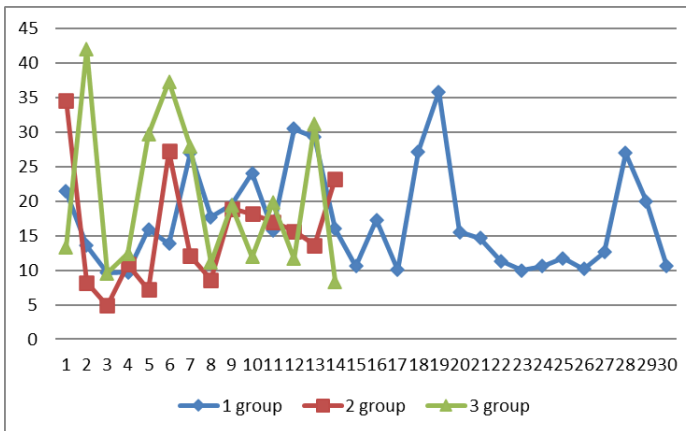


Figure 3. Dynamics of the amplitude of the circadian rhythm PAP, mm Hg.

Changes in the amplitude of the circadian rhythm in dynamics made it possible to identify the most pronounced fluctuations in blood pressure in group 3 on days 2, 6, 13 up to 43 mm Hg, 37 mm Hg, 30 mm Hg. In group 2, the most pronounced instability of the circadian rhythm of PAP was expressed by an increase in amplitude on day 1 to 35 mmHg, on day 6 to 27 mmHg. If in children over 3.1 years of age there was a general tendency towards a gradual decrease in the amplitude of the circadian rhythm of PAP, then in young children there was a tendency towards an increase. Thus, bursts in the amplitude of the circadian rhythm PAP were 22 mm Hg on day 1, 27 mmHg on day 7, 30 mmHg on day 12, 36 mmHg on day 19

. with a tendency to decrease in subsequent days (Fig. 3). The latter indicated the most pronounced instability of the obtained effect of intensive therapy in infants.

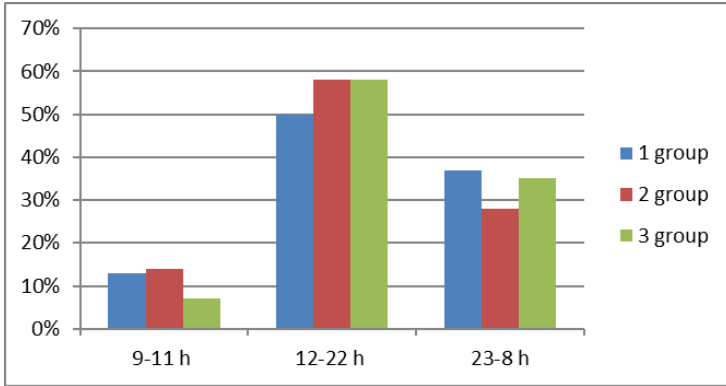


Figure 4. Duration of circadian rhythm inversion PAP

The longest inversion of the circadian rhythm PAP was detected in group 1, amounting to 37% (11 days), slightly less in group 3 35% (5 days), in group 2 28% (4 days) of the total duration of intensive care in the ICU (Fig. 4).

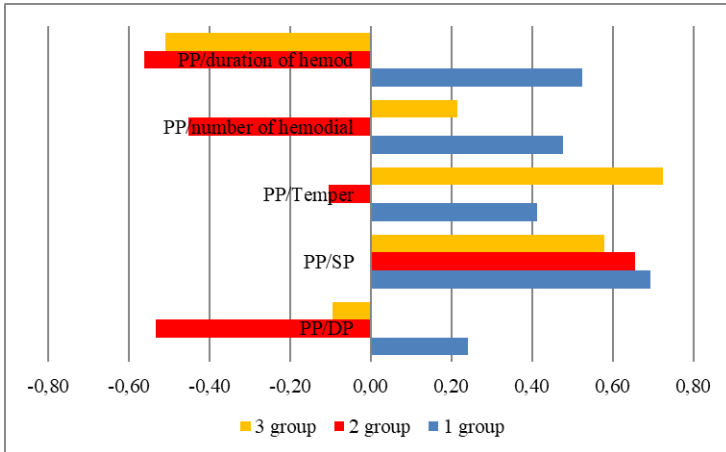


Figure 5. Correlation connections of PAP

A direct relationship between changes in PAP and SAP was noted regardless of age, amounting to 0.69; 0.66; 0.58, respectively. The direct effect of changes in body temperature was detected in children of group 3 (0.72) and in group 1 (0.41).

A tendency towards an increase in PAP with an increase in the duration (0.52) and number of sessions of the extracorporeal method of blood purification (0.48) was found in group 1 of children (Fig. 5). In group 2, an increase in the number of sessions and duration was accompanied by a tendency to decrease PAP (-0.45; -0.56, respectively). A negative downward trend in changes in blood pressure was found in group 3 of children with increasing duration of the hemodialysis session (-0.51).

Conclusion. No significant age-related distinctive signs of mesor fluctuations, amplitude values, or range of PAP fluctuations in the circadian rhythm were identified. In infancy, on days 21 and 22, signs of a decrease in cardiac output due to myocarditis and acute heart failure appeared. If in children over 3.1 years of age there was a general tendency towards a gradual decrease in the amplitude of the circadian rhythm of PAP, then in young children there was a tendency towards an increase. The longest inversion of the circadian rhythm of PAP was detected in group 1. The hypercirculatory type of hemodynamics was noted at the height of the systemic inflammatory reaction on day 6 with acute renal failure in group 3.

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急性肾衰竭患者每搏输出量的变化取决于儿童年龄
**CHANGES IN STROKE VOLUME IN ACUTE RENAL FAILURE
DEPENDING ON AGE IN CHILDREN**

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抽象的。国家医学中心ICU 33例伴有少尿症的急性肾功能衰竭患儿入院当天, 年龄范围为6个月至18岁, 昼夜节律中膜SV指标与年龄标准无显著差异。平均昼夜节律中的每小时 SV 数据与年龄相关值相对应。白天和夜间的SV指标没有显著差异。昼夜节律的幅度波动以周节律发生。在第2组和第1组中, SV 的周生物节律更加畸形。最长的昼夜节律倒置出现在第1组儿童中, 这表明3岁以下儿童发生心功能急性失代偿的风险增加。

关键词: 急性肾功能衰竭, 每搏量, 儿童, 年龄。

Abstract. *On the day of admission of 33 children with acute renal failure to the ICU of the National Medical Center with oligo-anuria, aged from 6 months to 18 years, the indicators of the circadian rhythm mesor SV did not differ significantly from age standards. Hourly SV data in the average circadian rhythm of SV corresponded to age-related values. There were no significant differences in the SV indicator between daytime and nighttime hours. Fluctuations in the amplitude of the circadian rhythm occurred in a weekly rhythm. In groups 2 and 1, the periweekly biorhythms of SV were more deformed. The longest inversion of the circadian rhythm was found in children of group 1, which indicated an increased risk of developing acute decompensation of cardiac function in children under 3 years of age.*

Keywords: *acute renal failure, stroke volume, children, age.*

Relevance. Intensive therapy of acute renal failure in children is one of the most difficult problems in pediatrics, since it involves a complex solution to the problems facing the doctor, requiring both conservative treatment and the use of invasive (hence, aggressive) methods of renal replacement therapy. On the one hand, being an effective method of intensive therapy for children with acute renal failure, hemodialysis (HD) can at the same time cause severe complications, which

in some cases determine the prognosis of the disease. On the other hand, conservative drug therapy, including infusion-transfusion, can also, if used inadequately, cause numerous disorders in the homeostasis system, in turn worsening the course of the pathological process. In this situation, it is very important to objectively assess the child's clinical condition, determine strategic directions of therapy for each day of illness, and not for the entire course of treatment, and strictly justify the indications for prescribing medications and conducting HD sessions. It should be borne in mind that in children with acute renal failure the standard approach to prescribing medications is unacceptable, since many drugs are eliminated from the body during HD, their metabolic transformations can be distorted, and drug accumulation is possible. In addition, the severity of the disease is one of the reasons for polypharmacy, which is extremely undesirable in children with impaired renal excretory function. Predicting treatment results is an opportunity to objectively choose treatment tactics, evaluate the effectiveness of surgical and drug treatment, economically justify the feasibility of a particular therapy method, and also plan healthcare resources. Until recently, the patterns of functioning of the heart and the blood vessels associated with it were still far from being fully understood. This is due to the fact that at present one of the main unsolved problems in the physiology of blood circulation remains the creation of the mechanics of the cardiovascular system as a whole and the study on this basis of the patterns of its control. The circulatory system is a gigantic hierarchy of systems and subsystems that have common and specific features, the functioning of which is subordinated to a single goal - maintaining, in accordance with the principle of optimality in biology, blood flow in the organs and tissues of a living organism.

Researchers have found that in the process of systematically increasing the load, the functional development of the heart occurs due to the expansion of its cavities with simultaneous myocardial hypertrophy with stable changes at the cellular level, which allows maintaining SV at a high level even with a subsequent significant decrease in motor activity. This effect, achieved during muscle training, persists in the future even with a significant decrease in the level of motor activity. Other authors believe that in a number of situations, the increase in cardiac performance in respondents to fluid load is only temporary and is leveled out after a few hours. Before deciding whether fluid resuscitation is necessary, it is important to determine whether the patient will respond to fluid infusion with an adequate increase in cardiac output (CO) or stroke volume (SV). If there are signs of tissue hypoperfusion, it is necessary to decide whether fluid therapy will be effective in increasing CO or whether other methods of therapy, in particular inotropic and vasopressor support, must be used. To date, to assess cardiorespiratory interactions in critical conditions, tests such as variability of systolic pressure, SV, pulse pressure (PP), dynamic arterial elasticity index, distensibility index of the inferior

vena cava or jugular vein, index of collapse of the superior vena cava, occlusion test at the end have been presented. exhalation, tests with increasing PEEP and tidal volume [1-5]. The lack of information on the management of patients with acute renal failure, taking into account anatomical and physiological characteristics in different age periods, prompted us to study and evaluate the effect of intensive therapy on changes in the circadian rhythm of SVD depending on age.

Goal of the work. To study and evaluate the effect of intensive therapy on changes in the circadian rhythm of SV depending on age.

Material and research methods. We studied the data of hourly monitoring of body temperature in 33 children with acute renal failure admitted to the ICU of the NMC with oligo-anuria aged from 6 months to 18 years. All patients underwent hemodialysis under the control of hemodynamics, acid-base balance, respiratory system, supportive, antibacterial, anti-inflammatory, syndromic corrective intensive therapy. The results of the studies were studied in the following age groups: 12 patients aged from 6 months to 3 years (group 1) were in the ICU for up to 30 days. Group 2 combined the results of a study of monitoring data from 14 children from 3.1 to 7 years (in the ICU - 14 days), in group 3 - 7 children aged 7.1-18 years (in the ICU 14 days), subsequently all children were transferred to the Department of Pediatric Nephrology. As presented in Table 1, tubulointerstitial nephritis was diagnosed mainly before the age of 7 years, amounting to 27% in group 1 and 30% in group 2. In the majority of patients, the severity of the condition was due to MODS (38% of children), mainly in older age. Acute cerebral insufficiency aggravated pathological deviations of homeostasis in 28% of children. In 13% of patients over 7.1 years of age, a chronic disorder of the functional activity of the kidneys was discovered for the first time.

Hemodialysis in group 1 was carried out for 18 days, 12 days in group 2, 14 days in group 3, causing restoration of renal function and improvement of clinical and biochemical parameters of patients. Age-related characteristics were manifested in the limitation of the average duration of a hemodialysis session to the greatest extent in infants to 3 hours. While in the older groups the duration of each procedure increased to 5 hours in group 2 on days 7 and 12, in group 3 - on days 1 and 14. The duration of each session of the extracorporeal detoxification method was determined not only by the degree of blood purification and anti-edematous effect, but the limitation of detoxification time was also determined by the state of compensatory resources, which at an early age are characterized by a greater tendency to generalize protective reactions, rapid exhaustion, and a high risk of complications (AHF, ARF, hemorrhagic syndrome, etc.), that is, anatomical and functional features of early age. The obtained results were processed by the method of variation statistics using the Excel program by calculating arithmetic means (M) and errors of means (m). To assess the significance of differences between

two values, the parametric Student’s test (t) was used. The relationship between the dynamics of the studied indicators was determined by the method of paired correlations. The critical significance level was taken equal to 0.05.

Results and its discussion. Analysis of the results of the average values of the parameters of the phase structure of the circadian rhythm of SV, depending on age, revealed a significantly higher indicator of the mesor of the circadian rhythm of SV in group 2 relative to the first by 15 ml, and in group 3 by 25 ml ($p < 0.05$, respectively). In the acrophase, the SV of children in group 2 was greater than in the first group by 19 ml, in group 3 – by 38 ml. In the bathyphase, a significant excess of SV was observed only in children of group 3 by 15 ml (Table 1).

Table 1.

Average values of parameters of the phase structure of the circadian rhythm of SV depending on age, ml

Groups	Mesor	In acrophase	Batiphase	Amplitude	Range per day
1	23±2	36±6	14±3	13±6	22±8
2	38±7*	55±10*	25±8	17±5	30±8
3	48±5*	74±18*	29±5*	27±13	46±17

* - the difference is significant relative to the indicator in group 1

On the day of admission, the mesor circadian rhythm of SV values did not differ significantly from age standards, amounting to 26±5 ml in group 1, 41±5 ml in group 2, and 35±5 ml in group 3. It was found that the volumetric volume in group 2 on day 1 was greater than in children in group 1 by 16 ml. In dynamics throughout the entire observation period, no reliably significant changes in the circadian rhythm mesor indicator SV were detected in groups 1 and 2 (Table 2). Thus, during the first 2 weeks, the mesor indicator of the circadian rhythm of SV of preschool age patients remained higher, reaching 50 ml on the 15th day (25 ml more than in group 1). The mesor indicator of the circadian rhythm of SV at school age corresponded to age standards, significantly exceeding the data in group 1 by 25-21 ml during the first two weeks of intensive therapy ($p < 0.05$, respectively) (Fig. 1). The identified differences corresponded to the anatomical and physiological data characteristic of each age group.

Table 2

Dynamics of the mesor of the circadian rhythm of SV, in ml

Hours	1 group	2 group	3 group
8	23±4	40±9*	49±7 *
9	21±6	35±6 *	48±22
10	24±5	41±9 *	50±11 *

11	24±6	39±9	50±5 *
12	24±5	39±7 *	44±9 *
13	23±4	42±13 *	53±12 *
14	25±4	40±9 *	51±9 *
15	23±4	39±7 *	49±13 *
16	23±5	39±10	48±7 *
17	24±4	40±6 *	51±10*
18	22±5	40±9 *	51±14 *
19	23±5	38±10	44±7 *
20	22±3	37±8 *	41±5 *
21	23±3	40±9 *	44±10 *
22	26±8	38±9	49±13 *
23	25±3	43±9 *	47±11 *
24	22±4	39±9 *	42±8 *
1	20±4	40±9 *	51±16 *
2	23±5	37±8	44±4 *
3	23±4	39±8 *	49±8 *
4	23±5	40±9 *	44±7 *
5	22±6	37±12	45±8 *
6	23±5	42±10 *	51±10 *
7	28±7	41±8	49±11 *

Table 3.
Average circadian rhythm of SV, ml

Days	1 group	2 group	3 group
1	26±5	41±5*	35±5
2	24±3	40±6*	49±11 *
3	24±4	42±5*	46±8 *
4	26±3	39±7*	41±6 *
5	25±3	40±5*	51±6 *
6	25±3	40±7*	56±10 *
7	21±3	39±4*	50±16 *
8	23±3	42±4*	58±11 *
9	22±5	46±6*	49±9 *
10	23±4	42±6*	44±9 *
11	25±4	43±8*	43±6 *
12	26±6	39±7	42±5 *
13	25±8	42±5*	60±15 *
14	23±6	51±10*	44±9 *
15	26±3	24±7	

16	24±6	34±14	
17	20±6	36±13	
18	20±7	18±6	
19	23±6	17±3	
20	20±7	16±3	
21	17±6	28±8	
22	18±3	34±5	
23	23±3	49±8	
24	23±3	55±7	
25	22±4	39±7	
26	22±4	40±	
27	22±3	50±8	
28	21±5	48±12	
29	22±5	44±3	
30	20±4	38±4	

* - the difference is significant relative to the indicator in group 1

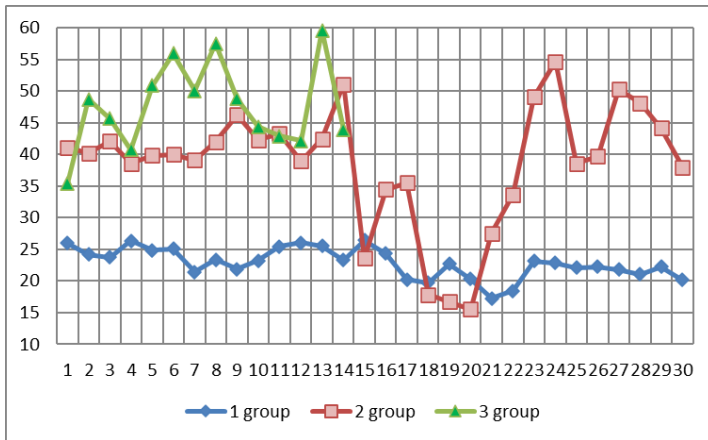


Figure 1. Dynamics of the mesor of the circadian rhythm of SV, ml

Hourly SV data in the average circadian rhythm of SV corresponded to age-related values. Thus, the SV indicator in group 2 exceeded the values in children of group 1 by an average of 16 ± 1 ml, cardiac output in children over 7 years of age was greater than in group 1 by 24 ± 3 ml and by 9 ± 3 ml more than in group 2 (Fig. 2). There were no significant differences in the SV indicator between daytime and nighttime hours.

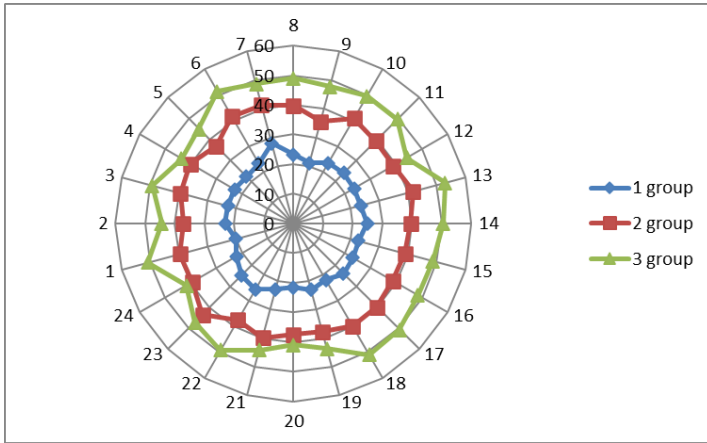


Figure 2. Average circadian rhythm of SV, ml

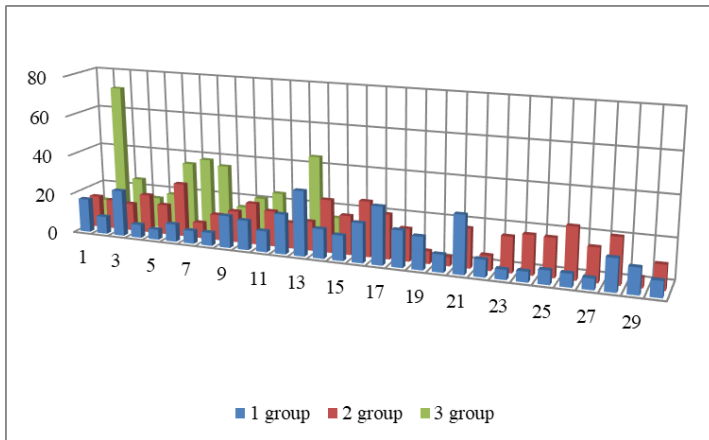


Figure 3. Dynamics of the amplitude of the circadian rhythm of SV in ml.

In dynamics, the amplitude of the circadian rhythm of SV in group 3 turned out to be the most significant, increasing on day 2 to 70 ml, and in subsequent days changing within acceptable physiological values (Fig. 3). Fluctuations in the amplitude of the circadian rhythm occurred in a weekly rhythm. Changes in the dynamics of the range of daily fluctuations in SV also occurred in waves with a period of fluctuation in group 3 of 5, 4, 4 days. In groups 2 and 1, the periweekly biorhythms turned out to be more deformed. At the same time, in group 1, oscillations

tions with a wavelength of 11, 10, and 8 days were observed. In group 2, the wavelength of the periweekly rhythm consisted of 7, 5, 6, 10 daily fluctuations (Fig. 4).

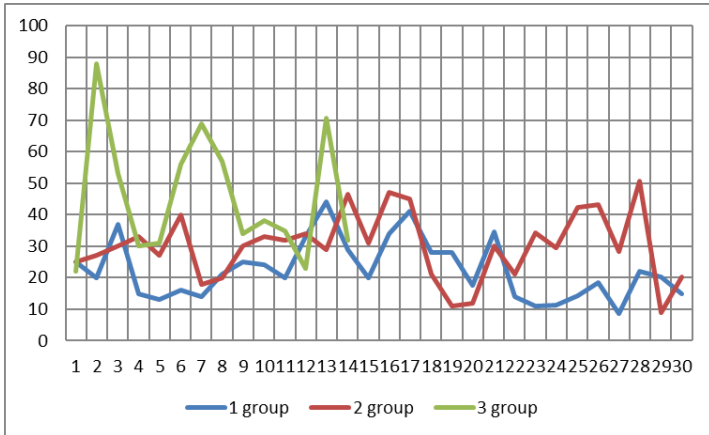


Figure 4. Daily fluctuations in volumetric volume, ml

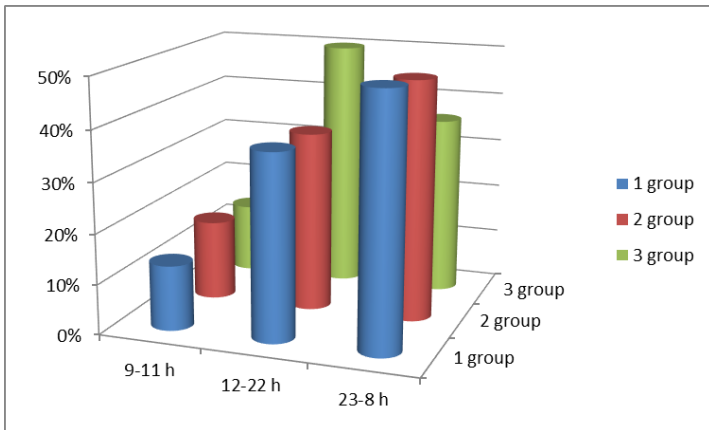


Figure 5. Inversion of the circadian rhythm of SV in % of the total duration of treatment in the ICU

The longest inversion of the circadian rhythm was found in children of group 1, for 15 days (50%), in 2 – 14 days (48%), in group 3 – 5 days (36%) (Fig. 5). Shift in the peak of the circadian acrophase of SV rhythm is characterized by an increase in cardiac output at night, increasing the risk of developing acute decompensation in children under 3 years of age. The feasibility of preventive measures in this age group is very high.

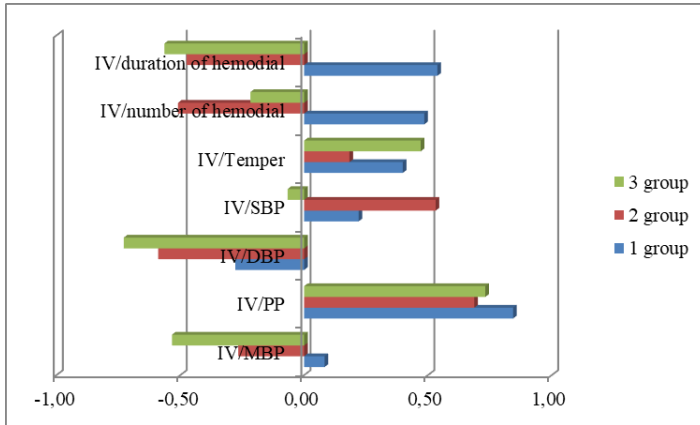


Figure 6. Correlation connections of SV.

A direct strong correlation was revealed between the SV indicator and PBP, which was in group 1 (0.84), in group 2 – (0.69), in group 3 – (0.73). The hyper-circulatory direction of the effect on hemodynamics was noted in the negative correlation of SV and DBP indices in group 3 (-0.73), somewhat less pronounced in group 2 (-0.59) and insignificant in group 1 (-0.28) (Fig. 6). A trend towards an increase in SV was noted with an increase in the duration of the hemodialysis session (0.54) and an increase in sessions of the extracorporeal method of blood purification (0.49) in group 1. In children of preschool and school age, a negative effect on the SV of the frequency of hemodialysis and the duration of each session was found, amounting to group 2 (-0.51), in group 3 (-0.48). The trend towards a decrease in SV with increasing duration of hemodialysis was (-0.56).

Conclusion. On the day of admission, the mesor indicators of the circadian rhythm of SV did not differ significantly from age standards. Hourly SV data in the average circadian rhythm corresponded to age-related values. There were no significant differences in the SV indicator between daytime and nighttime hours. Fluctuations in the amplitude of the circadian rhythm occurred in a weekly rhythm. In groups 2 and 1, the periweekly biorhythms of SV were more deformed. The longest inversion of the circadian rhythm was found in children of group 1, which indicated an increased risk of developing acute decompensation of cardiac function in children under 3 years of age.

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儿童急性肾功能衰竭每分钟血液循环量昼夜节律变化的年龄相关特征
AGE-RELATED FEATURES OF CHANGES IN THE CIRCADIAN RHYTHM OF MINUTE VOLUME OF BLOOD CIRCULATION IN ACUTE RENAL FAILURE IN CHILDREN

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抽象的。 33名急性肾功能衰竭儿童的整个观察期间的平均值,第1组(最多3岁)和第2组(3.1-7岁)儿童中MVB昼夜节律的中值指标结果翻倍与正常情况相比,第三组年龄较大的儿童(7.1-18岁)的儿童出现了下降的趋势。根据年龄的不同,MVB每日波动的幅度和值会增加。尽管7岁以上儿童的MVB昼夜节律中值平均值略有增加,但在该组中,MVB的每日变化最为显著。发现血液透析次数对第1组儿童的MVB(0.63)和疗程持续时间对MVB(0.74)有直接影响,该影响在第2组中显着减弱,在第3组患者中几乎消失。结果表明,MVB增加第1组患者在早期接受血液透析时存在心血管超负荷的风险。

关键词: 昼夜节律,每分钟血液循环量,急性肾功能衰竭,儿童年龄相关特征。

Abstract. *The average for the entire observation period of 33 children with acute renal failure, the mesor indicator of the circadian rhythm of MVB in children of groups 1 (up to 3 years) and 2 (3.1-7 years) of children turned out to be doubled compared to the norm, while in children of the older 3rd group (7.1-18 years old) a tendency to decrease was revealed. Depending on age, an increase in the amplitude and value of daily fluctuations in MVB was revealed. Despite a slight increase in the average value of the circadian rhythm mesor of MVB in children over 7 years of age, it is in this group that the most pronounced daily changes in MVB are noted. A direct effect of the number of hemodialysis sessions on MVB in children of group 1 (0.63) and session duration on MVB (0.74) was found, which significantly weakened in group 2 and practically disappeared in patients of group 3. The results indicated an increased risk of cardiovascular overload in patients in group 1 when undergoing hemodialysis at an early age.*

Keywords: *circadian rhythm, minute volume of blood circulation, acute renal failure, age-related characteristics of children.*

Relevance. The blood circulation can carry out the function of delivering oxygen to the tissues of the body and transferring metabolic products only in the absence of violations of the following components: an appropriate volume of circulating blood with sufficient saturation of hemoglobin with oxygen; normal pumping function of the heart, providing a volume of blood flow that meets the body's needs both at rest and under stress; arterial and venous vasculature, capable of expanding and contracting, allowing blood flow to various organs to be regulated depending on constantly changing needs. Conventionally, researchers distinguish three stages in the development of heart failure (HF): myocardial damage, the inclusion of compensatory mechanisms and the occurrence of clinical manifestations of HF. Of decisive importance in the deterioration of the pumping function of the heart are disturbances in energy utilization caused by changes in the main contractile proteins, manifested by both a decrease in the amount of myofibrillar proteins, including proteins of the actomyosin complex, and changes in the physicochemical structure of myosin, leading to a decrease in its ATPase activity. Impaired diastolic relaxation is one of the earliest changes recorded even before the onset of clinical manifestations of HF. Systolic myocardial dysfunction (deterioration of contractility) develops at a later date. The redistribution of organ blood supply is accompanied by a decrease in it in the vessels of the kidneys. The retention of sodium and water in the body during heart failure changes from an adaptive mechanism aimed at increasing cardiac output to its opposite. Thus, hypervolemia leads to an increase in the degree of cardiac overload, increasing the severity of HF. Sodium and water retention against the background of tissue hypoxia leads to edema. Hypervolemia and increased peripheral vascular tone are accompanied by a violation of the rheological properties of blood and microcirculation, leading to the development of ischemia of organs and tissues, increased peripheral resistance, which increase cardiac overload [1-4]. Due to the lack of information on changes in minute volume of blood circulation (MVB) depending on age in acute renal failure (ARF), the goal was to study the influence of age-related characteristics on the dynamics of the circadian rhythm of MVB in acute renal failure in children.

Goal of the work. To study and evaluate age-related features of changes in the circadian rhythm of minute volume of blood circulation in acute renal failure in children.

Material and research methods. We studied the data of hourly monitoring of body temperature in 33 children with acute renal failure who were admitted to the ICU of the NMC with oligo-anuria at the age of 6 months to 18 years. All patients

underwent hemodialysis under the control of hemodynamics, acid-base balance, respiratory system, supportive, antibacterial, anti-inflammatory, syndromic corrective intensive therapy. The results of the studies were studied in the following age groups: 12 patients aged from 6 months to 3 years (group 1) were in the ICU for up to 30 days. Group 2 combined the results of a study of monitoring data from 14 children from 3.1 to 7 years (in the ICU - up to 30 days), in group 3 - 7 children aged 7.1-18 years (in the ICU - 14 days), subsequently all children transferred to the pediatric nephrology department. Tubulointerstitial nephritis was diagnosed mainly before the age of 7 years, amounting to 27% in group 1 and 30% in group 2. In the majority of patients, the severity of the condition was due to MODS (38% of children), mainly in older age. Acute cerebral insufficiency aggravated pathological deviations of homeostasis in 28% of children. In 13% of patients over 7.1 years of age, a chronic disorder of the functional activity of the kidneys was discovered for the first time.

Results and its discussion. The average indicator of the circadian rhythm mesor of the MVB for the entire observation period in children in groups 1 and 2 of children turned out to be doubled compared to the norm (1.4 ± 0.4 l/min and 2.3 ± 0.6 l/min, respectively) (Table. 1). At that time, in children of the older 3rd group, a tendency to decrease was revealed (norm 5.5 ± 1.1 l/min). The average amplitude of the circadian rhythm of the MVB and the average amplitude of fluctuations per day did not differ significantly in different age periods. Fluctuations in MVB during the day averaged 3 liters/min in young children, changes in MVB in group 2 were 4 l per minute, in group 3 – 5.1 l per minute, characterizing pronounced instability of hemodynamic function in all patients, which served as a precursor and, perhaps, one of the leading factors determining the development of cardiac decompensation against the background of intensive corrective therapy, hemodialysis.

Table 1.
Average values of indicators of the phase structure of the circadian rhythm of MVB

Groups	Mesor	In acrophase	In batiphase	Circadian rhythm amplitude	Range of fluctuations per day
1	2,9±0,4	4,8±1,9	1,7±0,3	1,8±0,8	3,1±1,1
2	4,6±1,0	6,8±1,3	2,8±0,9	2,2±0,7	4,0±1,1
3	4,7±0,7	7,7±1,9	2,6±0,6	2,9±1,4	5,1±1,8

Table 2.
Dynamics of the mesor of the circadian rhythm of MVB

Days	1 group	2 group	3 group
1	3,5±0,8	4,8±0,7	4,1±0,7
2	3,5±0,7	4,8±0,7	4,9±1,3
3	3,2±0,6	5,0±0,7*	4,5±0,9
4	3,2±0,3	4,7±0,9	3,8±1,3
5	3,2±0,4	4,6±0,6*	4,9±1,3
6	3,3±0,5	4,6±0,9	6,9±1,5*
7	2,7±0,5	4,6±0,5*	5,0±1,5*
8	3,2±0,5	5,0±0,6*	5,7±0,9*
9	3,0±0,5	5,2±0,8*	4,5±0,8*
10	3,1±0,7	4,7±0,7*	4,0±0,7
11	3,3±0,6	5,2±1,1*	4,2±0,6
12	3,4±0,8	4,6±0,9	4,2±0,7
13	3,4±1,1	5,2±0,6	5,8±1,5
14	3,0±0,8	6,3±1,5*	4,0±1,0
15	3,7±0,5	2,8±1,1	
16	3,2±0,9	3,9±1,7	
17	2,6±0,8	4,5±1,9	
18	2,5±1,0	1,6±0,6	
19	2,8±0,7	1,8±0,4	
	2,6±0,8	1,5±0,3	
21	2,1±0,7	3,3±1,0	
22	2,4±0,4	4,0±0,5	
23	2,7±0,4	6,4±1,2	
24	2,7±0,5	6,9±1,0	
25	2,6±0,5	4,4±0,9	
26	2,5±0,5	4,7±1,0	
27	2,6±0,3	6,9±1,2	
28	2,6±0,5	6,5±1,6	
29	2,7±0,6	6,0±0,7	
30	2,4±0,5	4,3±0,6	

Table 3.
Average circadian rhythm of MVB

Hours	1 group	2 group	3 group
8	3,0±0,5	4,6±1,2	5,1±0,8
9	2,8±0,8	4,4±0,9	4,2±2,0
10	3,0±0,8	4,7±1,2	5,2±1,3

11	3,1±0,9	5,0±1,5	4,9±1,9
12	3,0±0,6	4,6±0,8	4,6±1,0
13	3,1±0,8	4,8±1,6	6,0±1,1
14	3,1±0,6	4,8±1,3	4,4±1,1
15	2,9±0,7	4,7±0,9	5,6±2,3
16	2,9±0,7	4,7±1,3	4,8±1,1
17	3,2±0,7	4,7±0,8	5,2±1,6
18	2,9±0,7	5,0±1,3	5,2±1,4
19	3,3±0,6	4,3±1,2	4,3±0,9
20	2,8±0,5	4,4±1,1	4,5±0,8
21	3,1±0,5	5,0±1,3	4,3±1,2
22	3,3±1,0	4,5±1,2	5,0±1,4
23	3,2±0,5	5,1±1,2	5,2±1,5
24	2,9±0,5	4,9±1,4	4,3±1,1
1	2,6±0,6	4,7±1,2	4,7±1,5
2	2,9±0,7	4,2±1,2	4,1±0,4
3	2,9±0,5	4,5±1,0	4,7±1,0
4	2,9±0,7	4,7±1,1	3,8±0,6
5	3,0±0,8	4,3±1,5	4,1±0,8
6	2,9±0,5	4,9±1,3	5,1±1,2
7	3,6±1,1	5,1±1,1	4,5±1,0

*-reliably
relative to the indicator in group 1

In dynamics throughout the observation, the mesor indicator of the circadian rhythm of MVB in groups 1 and 2 remained significantly increased. Reliably significantly higher of MVB indicators were found in group 2 relative to the indicator in the first on days 3,5,7-11, 14 by an average of 2 ± 0.4 l per minute (Table 2). The value of the mesor of the circadian rhythm of the MVB in children of group 3 was practically no different from the MVB in the 2nd group. However, the studied indicator turned out to be higher than in group 1 on days 6-9 by 3.6 l per minute, 2.3 l per minute, 2.5 l per minute, 2.5 l per minute ($p < 0.05$, respectively) (Fig. 1).

Fluctuations in MVB in the average circadian rhythm occurred at a higher level of values in children of groups 2 and 3, where the indicator of acrophase was indicated at 13 o'clock, bathyphase at 4 o'clock in the morning only in children of group 3, while in groups 1 and 2 only monotonous the oscillatory nature of changes in MVB during the day and night (Fig. 2).

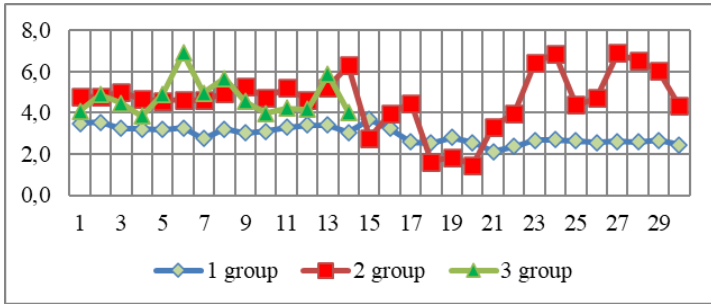


Figure 1. Dynamics of the mesor of the circadian rhythm of the MVB depending on age

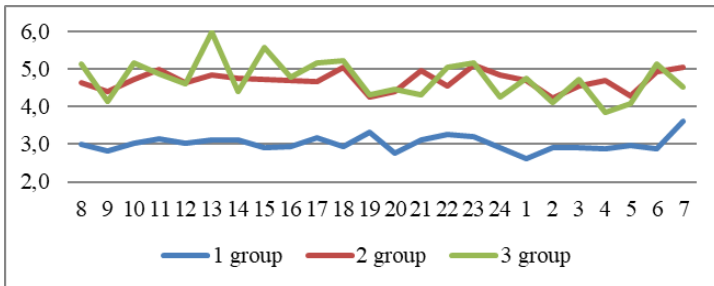


Figure 2. Average circadian rhythm of MVB by age groups

The highest values of circadian rhythm amplitude were found in children of group 3 on days 2, 5, 13, amounting to 6, 6, 4 liters per minute. In groups 1 and 2 of patients, the amplitude of the circadian rhythm of MVB in group 1 on days 13, 17, 21 was about 4 liters per minute. In group 2, the maximum instability of hemodynamics during the day was expressed on days 6, 11, 16 by an increase in the indicator to 3.3; 3.2 pi 2.5 liters per minute. The identified features characterized significant hemodynamic instability in all age groups and indicated a high risk of developing acute heart failure (Fig. 3). The most pronounced change in MVB during the day was detected in group 3, amounting to 8.5 l per minute on days 5, 6; in group 2, the maximum changes in MVB were detected on days 6, 11, 13 amounting to 5.4; 5.5 and 6.3 l/minute (Fig. 4).

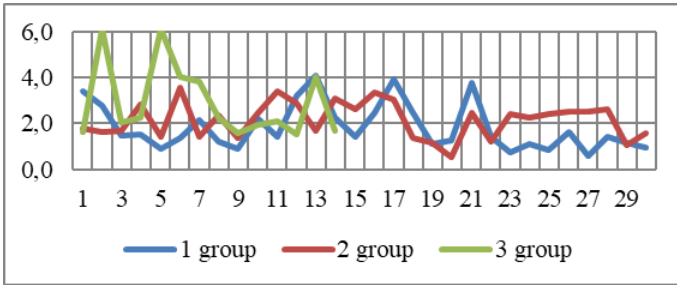


Figure 3. Amplitude of the circadian rhythm of MVB, in liters per minute

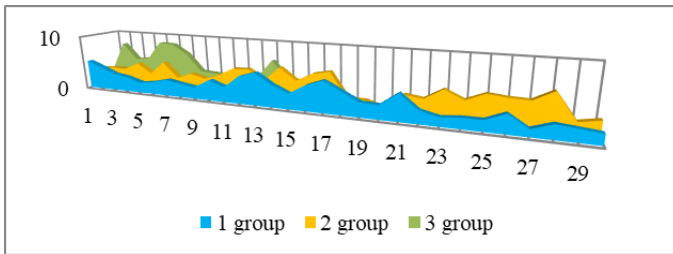


Figure 4. Range of daily fluctuations of MVB, l/min

Thus, depending on age, the amplitude and values of daily fluctuations in the MVB increased. Despite a slight increase in the average MVB in children over 7 years of age, it was in this group that the most pronounced daily changes in MVB were noted (Fig. 4).

The longest inversion of the circadian rhythm of the MVB was observed in group 2 (13 days), in group 1 (10 days), in group 3 (6 days), when the percentage of the duration of treatment in the ICU did not reveal significant differences, amounting to 33% in group 1, in 2 - 44%, in 3 - 43%.

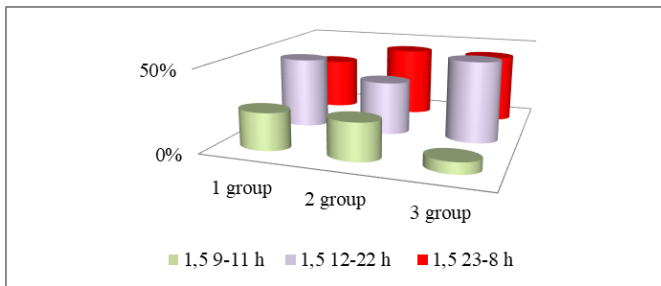


Figure 5. Duration of circadian rhythm inversion of MVB

A strong direct relationship between MVB and SV was revealed in all age groups, amounting to 0.91 in group 1, 0.98 in group 2 and 0.86 in group 3. That is, the change in MVB was primarily associated with changes in cardiac stroke output (Fig. 5). The strong direct correlation between the dynamics of MVB and PBP in groups 1 and 3 was significantly weakened in children of group 2. A direct effect of the number of hemodialysis sessions on MVB in children of group 1 (0.63) and session duration on MVB (0.74) was found, which significantly weakened in group 2 and practically disappeared in patients of group 3. There was a tendency for a negative correlation between the number of sessions and the duration of each hemodialysis session in group 2, amounting to -0.52 and -0.6, respectively. That is, in group 2 of children there was a tendency to decrease MVB with increasing duration and frequency of hemodialysis sessions, in contrast to the results of the study in children of group 1. Apparently, the technical implementation of the extracorporeal method of blood purification should be carried out taking into account the identified deviations, indicating an increased risk of overload of the cardiovascular system in patients in group 1 when performing routine hemodialysis methods at an early age.

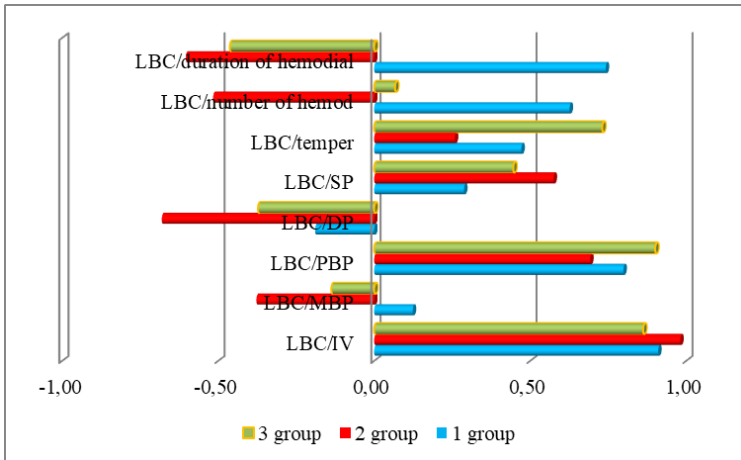


Figure 6. Correlation connections of the mesor of the circadian rhythm of the MVB

Conclusion. The average for the entire observation period, the mesor indicator of the circadian rhythm of MVB in children in groups 1 and 2 of children turned out to be doubled compared to the norm, while in children of the older 3rd group a tendency to decrease was revealed. MVB fluctuations during the day averaged 3 liters/min in young children, in group 2 4 liters per minute, in group 3 – 5.1

liters per minute, characterizing pronounced instability of hemodynamic function in all patients, which is possibly one of the factors determining the development of cardiac decompensation. Depending on age, the amplitude and values of daily fluctuations in MVB increased. Despite a slight increase relative to the norm in the average MVB in children over 7 years of age, it is in this group that the most pronounced daily changes in MVB are noted. A direct effect of the number of hemodialysis sessions on MVB in children of group 1 (0.63) and session duration on MVB (0.74) was found, which significantly weakened in group 2 and practically disappeared in patients of group 3. The results obtained indicated an increased risk of cardiovascular overload in patients in group 1 when undergoing hemodialysis at an early age.

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内镜下粘膜切除术和粘膜下层解剖治疗结肠上皮肿瘤的临床结果。 中间结果。
一分钱体验

**CLINICAL RESULTS OF ENDOSCOPIC MUCOSECTOMY WITH
DISSECTION IN THE SUBMUCOSAL LAYER FOR EPITHELIAL
NEOPLASMS OF THE COLON. INTERMEDIATE RESULTS.
ONE-CENT EXPERIENCE**

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概括。 关联。 内镜下黏膜切除联合黏膜下剥离术 (ESD) 的优点是实现整块切除, 与部分内镜黏膜切除术相比, 局部复发率较低。 分析国内外关于早期结肠癌治疗的文献, 该治疗方法的适应证和禁忌证问题存在矛盾。 我们认为, 缺乏评估这种干预措施有效性的研究。

关键词: 结肠, 组织学, 粘膜切除术及粘膜下层解剖, 全壁切除。

Summary. Relevance. *The advantage of endoscopic mucosectomy with submucosal dissection (ESD) is the achievement of en bloc resection with a lower local recurrence rate compared with partial endoscopic mucosal resection. When analyzing domestic and foreign publications on the treatment of early colon cancer, there are contradictions in the issues of indications and contraindications for this treatment method. In our opinion, there is a lack of studies evaluating the effectiveness of this intervention.*

Keywords: *colon, histology, mucosectomy with dissection in the submucosal layer, full-wall resection.*

Purpose of the study. To present the experience of mucosectomy with dissections in the submucosal layer for benign and malignant tumors, performed in the coloproctology hospital of Sechenov University.

Materials and methods. The experience of treating 269 patients with 274 epithelial neoplasms of the colon and rectum using endoscopic mucosectomy with dissection in the submucosal layer was analyzed.

Results. The mean age of the patients was 64.3 ± 11.4 years (M \pm SD); The average tumor size was 46.4 ± 10.8 mm (M \pm SD); $42.7-50.2$ (95% CI) Mean size was 46.4 ± 10.8 mm (M \pm SD); $42.7-50.2$ (95% CI). Mean operation time was 142.9 ± 122.2 (M \pm SD); $100-144.4$ (95% CI). En bloc resection rate - 90.1% (247/274); histological completeness of resection (R0) - 84.3% (231/ 274); oncological radicality of resection - 57/75 (76%) Table No. 1; Table No. 2.

Conclusions. The ESD method allows the most accurate staging of early cancers that are borderline in depth of invasion, makes it possible to remove tumors en bloc, regardless of size, giving a chance to avoid extensive surgical interventions, especially in somatically burdened patients. Oncological consultations contribute to an objective choice of treatment tactics, which leads to a low frequency of abdominal surgery for benign large epithelial neoplasms.

Introduction

For many years, loop endoscopic mucosal resection (EMR) and surgery were the only available treatments for gastrointestinal neoplasms. Endoscopic submucosal dissection (ESD) was developed in the 1990s to expand endoscopic capabilities, especially for the removal of flat lesions en bloc [1]. The advantage of ESD is the achievement of en bloc resection with a lower local recurrence rate compared with partial endoscopic mucosal resection. Moreover, in the past, surgery was indicated for patients with large tumors extending almost the entire circumference of the rectum, regardless of the depth of invasion, since endoscopic resection of these lesions was technically difficult. Thus, the main benefit of ESD is the significant improvement in the quality of life of patients with large epithelial neoplasms. This method of removal is associated with technical difficulty, longer operative time, and an increased risk of perforation. Endoscopists performing ESD must know the indications for it, the possible technical difficulties associated with its use, as well as complications that can develop both in the intra- and postoperative periods [2].

Correct execution of ESD by an experienced specialist ensures ablative (R0) resection of malignant and benign epithelial neoplasms, regardless of size. When analyzing domestic and foreign publications on the treatment of early colon cancer, there are contradictions in the issues of indications and contraindications for this treatment method [3,4,5]. In our opinion, there is a lack of studies evaluating the effectiveness of this intervention.

Goal of the work

The purpose of the work is to evaluate the results of ESD in the treatment of patients with benign and early malignant epithelial neoplasms of the colon.

Materials and methods

Clinical cases of 269 patients were analyzed in the department of diagnostic and therapeutic endoscopy of the Clinical Hospital No. 2 of the I.M. Sechenov First Moscow State Medical University, Moscow, from January 2019 to January 2024, 274 dissections were performed in the submucosal layer of the colon. The decision to select the removal method was made based on the oncological consultation and complied with the 2019 Japanese Gastroenterological Endoscopy Society (JGES) criteria for the treatment of colorectal cancer. (Fig. 1) We assessed such indicators as: frequency of en bloc removal, oncological radicality of resection (depth of invasion no more than SM1; Lv-; Bd1<), histological completeness of resections (R0), degree of tumor differentiation, presence of early and late postoperative complications, relapse-free period based on endoscopic research methods.

Results

The epithelial neoplasms we removed ranged in size from 10 to 160 mm. (Fig. 2, 3.) The average size was 46.4 ± 10.8 mm (M \pm SD); 42.7-50.2 (95% CI). The average operation time was 142.9 ± 122.2 (M \pm SD); 100-144.4 (95% CI). En bloc removal rate - 90.1% (247/274); histological completeness of resection (R0) - 84.3% (231/274); oncological radicality of resection - 57/75 (76%) Tab. No. 1; Tab. No. 2.

Malignant tumors were removed from 75 patients. Of these, endoscopic removal met the criteria for radicality in 57 (76%). Of 18 (24%) patients with non-radical endoscopic removal, risk factors were a positive vertical margin in 7 (9.3%) patients, invasion into the submucosal layer deeper than 1000 μ m in 17 (22.6%), (Fig. No. 4) dropouts grade 2 or more in 4(5.3%), lymphovascular invasion in 5(6.6%), and a combination of several factors in 5(6.6%). The decision to perform radical surgery was performed in 12 (16%) of them. In 6(8%) cases, dynamic observation was chosen. There were no cases of relapse during observation.

It is worth noting that in the final specimen after radical surgery, in none of the cases were tumor cells found in the bed of the removed tumor. But in 1 case, after surgical treatment, metastases were determined in the examined lymph nodes in 8 nodes out of 44 isolated (in a patient with primary multiple metachronous cancer), that is, in our case, resection was performed in an attempt to preserve the residual part of the left half of the colon. The remaining patients were offered dynamic observation for an average duration of 6, 12, 24 months, depending on the results of the morphological report.

Complications: the incidence of intraoperative perforation was 12.4% (34), delayed perforation 0.7% (2), delayed bleeding and stenosis were 1.4% (4) and 1.6% (5), respectively. The mean size of the wall defect (intraoperative perforation) was approximately 5.5 ± 4.5 mm (M \pm SD). Clip-suturing was most often performed after removal of the drug to avoid deterioration of visibility due to the foreign body-clip. The developing coxyperitoneum was never tense, painful and did not require puncture emptying. In case of such perforations, antibiotic prophylaxis was always performed for 3-5 days.

In two cases, based on clinical data, delayed perforation of the intestinal wall was determined. In the first case, a perforation formed between the clips one day after ESD. An additional examination was required - sigmoidoscopy with strengthening of the wall defect with additional clips, laparoscopic sanitation and short-term drainage of the abdominal cavity. In the second case, due to the onset of local peritonitis, a temporary colostomy was formed.

Table 1
Clinical and pathological characteristics.

Values	Operation quantity (n=274)	
Age, years	64,4 \pm 11,9 (M \pm SD);	
Gender, M/F	132/142	
Average size, mm	46,4 \pm 10,8 mm (M \pm SD); 42,7-50,2 (95% ДИ).	
Localization of epithelial neoplasm, n (%)	Aбс.	%
Right colon	83	30
Left parts of the colon	37	13,5
Rectum	154	56,2
Macroscopic type, according to the Paris classification, and others, n=274 (%)		
0-Is	70	25,5
0-IIa	62	22,6
0-IIa+Is	96	35
0-IIa+IIc	4	1,8
0-IIa+IIc+Is	7	2,5
0-IIc	1	0,3
0-Ip	5	1,8
Nonepithelial neoplasms	12	4
Local residual or recurrent after endoscopic resection	17	6,2

The reason for another urgent intervention was the inability to adequately assess a large area of the muscle layer about 12 cm in diameter - after electrical stimulation for a large LST, removed en bloc. Doubts arose about the subsequent

viability of the wall, and therefore an urgent laparoscopic resection of the rectosigmoid region was performed with the formation of a primary anastomosis without a prophylactic colostomy.

Among all traced cases, only 1% (3) cases of local recurrence of adenoma were recorded. In two cases this was due to the fragmentary method of the final stage of dissection and the size was more than 40 mm and 70 mm. However, these relapses did not present any difficulties for subsequent endoscopic complete removal.

In patients with <90% circumference ESD performed, strictures did not develop. In five cases, balloon dilatation of postoperative strictures in the rectum and sigmoid colon was required after removal of large subcircular or circular tumors. In all cases, the strictures were not extensive, <10 mm. The course of balloon dilatation ranged from 2 to 4 repetitions with an interval of 1-2 weeks.

Table 2
ESD results

Values	Operation quantity(n=274)		
Average time spent, min	142,9 ± 122,2 (M±SD); 100-144,4 (95% ДИ).		
Frequency of removal in a single block, n (%)	247 (90,1%)		
Histological completeness of resection (R0), n (%)	231 (84,3%)		
Radicality of resection from cases verified as cancer, (abs. SM2-3; Lv-;Bd1<), n (%)	57/75 (76%)		
Complications	Abs.	%	
	Intraoperative perforations	34	12,4
	Delayed perforations	2	0,7
	Delayed bleeding	4	1,4
	Stenosis	5	1,6
Frequency of relapses monitored, n (%)	3	1	
Duration of inpatient treatment, days	3±1,54 (M±SD)		
Pathomorphological report	Abs.	%	
	Low grade dysplasia (LGD)	48	17,5
	High grade dysplasia/in situ carcinoma (HGD/in situ)	101 / 48 149	36,8 / 17,5 54,3
	Well-differentiated neuroendocrine tumors (G1)	9	9,3
	Well-differentiated neuroendocrine tumors (G3)	1	0,3
	Adenocarcinomas, well differentiated (G1)	45	16,4
	Adenocarcinomas, moderately differentiated (G2)	11	4
	Adenocarcinomas, poorly differentiated (G3)	3	1
	According to the depth of invasion into the submucosal layer, from all 75 cases verified as cancer	Abs.	%

pT1sm1	21	28
pT1sm2	10	13,3
pT1sm3	4	5,3
pT2	3	4

Conclusions

The results we obtained do not differ significantly from foreign data. The ESD method makes it possible to most accurately stage early cancers that are borderline in depth of invasion, makes it possible to remove tumors en bloc, regardless of size, giving a chance to avoid extensive surgical interventions, especially in somatically burdened patients. Oncological consultations contribute to an objective choice of treatment tactics, which leads to a low frequency of abdominal surgery for benign large epithelial neoplasms.

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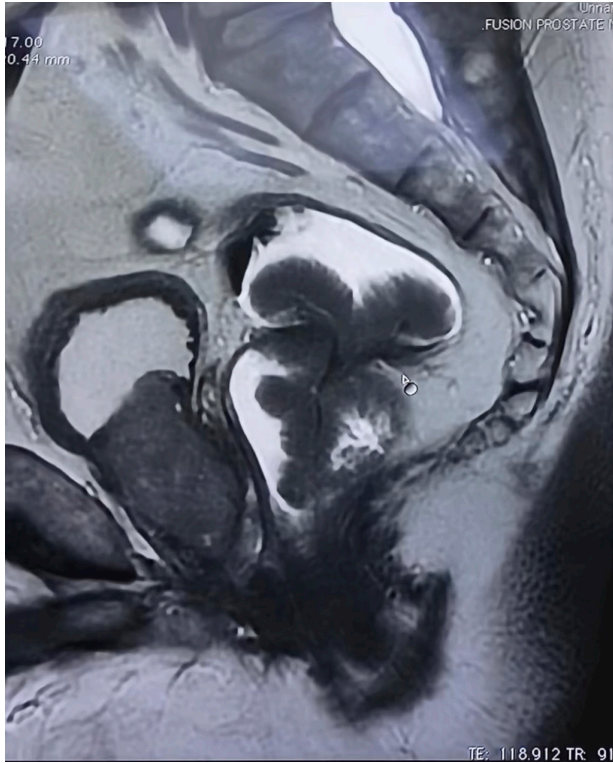


Figure 1. MRI picture of a rectal tumor without reliable signs of invasion into the mesorectal tissue, without lymphadenopathy of the mesorectal and pelvic nodes MRI stage cT1-2, N0, CRM - , EMVI-

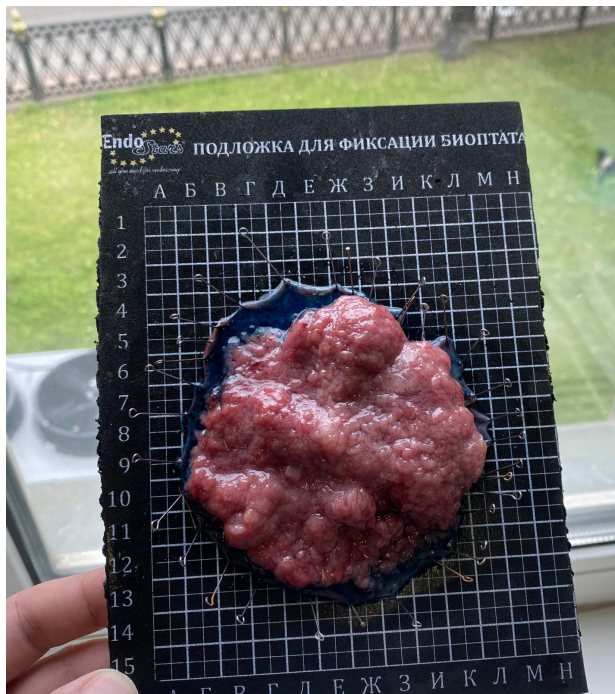


Figure 3. Flat epithelial neoplasm of the rectum, LST GM (type according to the Paris classification 0-IIa+Is)

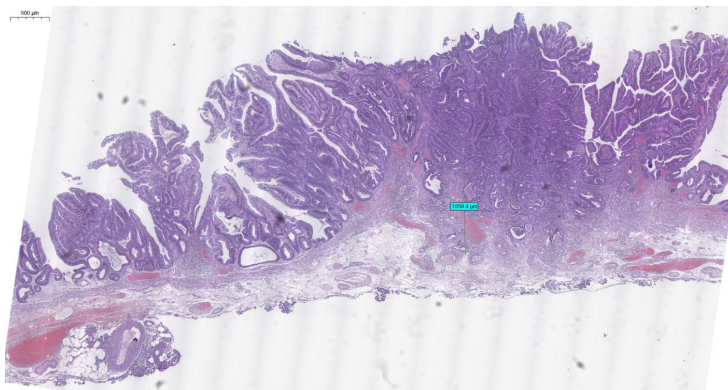


Figure 4. Tubulovillous adenoma of the rectum with areas of well-differentiated adenocarcinoma (G 1) with signs of invasion into the submucosa (pT1sm1) LV 0 Bd 0 R 0

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UDC 621.896 + 06

评估微极性润滑剂在滑动轴承工作间隙中的运动效果

**EVALUATION OF THE EFFECT OF THE MOVEMENT OF A
MICROPOLAR LUBRICANT IN THE WORKING CLEARANCE OF
A SLIDING BEARING**

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抽象的。这项研究的新颖性在于规范了有效径向轴承设计的工程计算方法，该轴承具有减摩聚合物涂层，在轴承套的轴承表面上有轴向凹槽，同时考虑到流变性能的依赖性。微极性润滑剂在湍流模式下对压力和温度的影响，可以估计主要操作特性的值：流体动压、负载能力和摩擦系数，并扩大工程计算模型的实际应用范围。

关键词：径向轴承，耐磨性研究，减摩聚合物复合涂层，凹槽，验证，湍流流态，粘度对压力和温度的依赖性。

Abstract. *The novelty of this research lies in the specification of the methodology for engineering calculations of the design of an effective radial bearing with an antifriction polymer coating with an axial groove on the bearing surface of the bearing sleeve, taking into account the dependence of the rheological properties of the micropolar lubricant on pressure and temperature in turbulent mode, which allows estimating the value of the main operational characteristics: hydrodynamic pressure, load capacity and friction coefficient, as well as expand the scope of practical application of models for engineering calculations.*

Keywords: *radial bearing, wear resistance study, antifriction polymer composite coating, groove, verification, turbulent flow regime, dependence of viscosity on pressure and temperature.*

Introduction

The use of modern high-tech lubricants is a key factor for reducing friction losses in interfaces and increasing the energy efficiency of tribosystems as a whole.

The calculation problem for heavily loaded friction units is based on the non-classical theory of hydrodynamic lubrication, which describes the behavior of non-Newtonian fluids in a thin lubricating film separating the friction surfaces of the tribo-coupling. Given current trends in the production of lubricants and the constant progress in the development of anti-wear and other additives, it is becoming more difficult to develop mathematical models that describe the behavior of lubricants based on lubrication theory, based on the rheological behavior of the lubricant, taking into account the lubricant supply conditions, thermal processes, geometry support node and the totality of all acting loads.

In [1–10], a method of thermal diagnostics was proposed, which makes it possible to determine the functions of frictional heat generation and friction torque from temperature measurements. It has been established that the temperature distribution along the length of the shaft and support is uniform, and the influence of heat transfer from their end surfaces is insignificant and minimal. It is necessary to describe the non-stationary temperature field in the working gap with a two-dimensional heat conduction equation.

The results of the study [11–18] are devoted to the development of mathematical models of thermal processes in sliding bearings, taking into account the generalization of the model for one bearing. For the convenience of engineering calculations, formulas for finding the temperature field in a sliding bearing are found taking into account the assumption of a constant heat flow separation coefficient at the contact boundary between the journal and the bushing.

To determine the behavior of a new lubricant, establish the friction coefficient and force, as well as the thermal power released in the liquid, an elatohydrodynamic theory of lubrication was developed in [19–20], which makes it possible to more accurately and universally calculate the heat release taking into account the phenomena occurring in the lubricant layer.

Currently, when calculating heat release, empirical dependencies [21–24] on geometric parameters, operating conditions and properties of the lubricants used are also used. This circumstance emphasizes the importance of developing new and increasing the accuracy of existing calculation models.

Formulation of the problem

The problem involves considering the turbulent motion of a micropolar incompressible lubricant in the working gap of an infinite radial plain bearing.

In the polar coordinate system (Fig. 1) with a pole in the center of the bearing bushing, we write the equation of the contour of the shaft, bushing and its surface with a polymer coating having an axial groove in the form

$$r' = r_0(1 + H), \quad r' = r_1, \quad r' = r_1 - \tilde{h}, \quad (1)$$

where $H = \varepsilon \cos \theta - \frac{1}{2} \varepsilon^2 \sin^2 \theta + \dots$, $\varepsilon = \frac{e}{r_0}$.

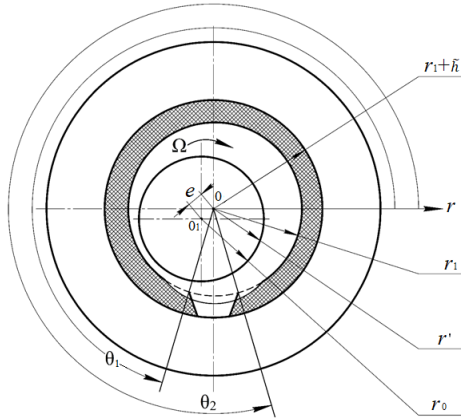


Figure 1. Design diagram

It has been established that the viscosity characteristics of the lubricant depend on pressure according to the following laws [25]:

$$\mu' = \mu_0 e^{\alpha p' - \beta T'}, \quad \kappa' = \kappa_0 e^{\alpha p' - \beta T'}, \quad \gamma' = \gamma_0 e^{\alpha p' - \beta T'}. \quad (2)$$

The initial basic equations taking into account (2) are the equation of motion of an incompressible fluid for a “thin layer” and the continuity equation with the corresponding boundary conditions:

$$\frac{\partial^2 u_i}{\partial r^2} + N^2 \frac{\partial v_i}{\partial r} = \frac{1}{j e^{\alpha p - \beta T}} \frac{d p_i}{d \theta}; \quad \frac{\partial^2 v_i}{\partial r^2} = \frac{v_i}{N_1} + \frac{1}{N_1} \frac{d u_i}{d r}; \quad \frac{\partial u_i}{\partial \theta} + \frac{\partial v_i}{\partial r} = 0; \quad (3)$$

$$v = 1, \quad u = -\eta \sin \theta, \quad v = 0 \text{ при } r = h(\theta);$$

$$v = 0, \quad u = 0, \quad v = 0 \text{ при } r = 0, \quad \theta_1 \leq \theta \leq \theta_2;$$

$$v = v^*(\theta), \quad u = u^*(\theta), \quad v = 0 \text{ при } r = \eta_2, \quad 0 \leq \theta \leq \theta_1 \text{ и } \theta_2 \leq \theta \leq 2\pi;$$

$$p(0) = p(\theta_1) = p(\theta_2) = p(2\pi) = \frac{P_g}{p^*}. \quad (4)$$

Let us add to the boundary conditions:

$$Q = \text{const}, \quad p_3(\theta_2) = p_2(\theta_2), \quad p_1(\theta_1) = p_2(\theta_1).$$

We believe that the functions $u^*(\theta)$ and $v^*(\theta)$ are determined by the relations

$$v^*(\theta) = \frac{1}{h(\theta) - \eta_2}, \quad u^*(\theta) = \frac{\eta \sin \theta}{h(\theta) - \eta_2}. \quad (5)$$

We look for a self-similar solution to problem (3) taking into account boundary conditions in the form

$$\begin{aligned}
 v_i &= \frac{\partial \psi_i}{\partial r} + V_i(r, \theta); & u_i &= -\frac{\partial \psi_i}{\partial \theta} + U_i(r, \theta); \\
 \psi_i(r, \theta) &= \tilde{\psi}(\xi_i); & V_i(r, \theta) &= \tilde{v}_i(\xi_i); & U_i(r, \theta) &= -\tilde{u}_i(\xi_i) \cdot h'(\theta); \\
 \xi_2 &= \frac{r_i}{h(\theta)} \text{ при } \theta_1 \leq \theta \leq \theta_2; \\
 \xi_{1,3} &= \frac{r - \eta_2}{h(\theta) - \eta_2} \text{ при } 0 \leq \theta \leq \theta_1 \text{ и } \theta_2 \leq \theta \leq 2\pi.
 \end{aligned} \tag{6}$$

The dimensionless hydrodynamic pressure in the lubricating layer is determined from the equation

$$\begin{aligned}
 \frac{1}{j\mu_i(\theta)} \frac{dp_i}{d\theta} &= \frac{b_i}{(h(\theta) - \eta_2)^2} + \frac{a_i}{(h(\theta) - \eta_2)^3}, \quad i = 1, 3; \\
 \frac{1}{j\mu_2(\theta)} \frac{dp_2}{d\theta} &= \frac{b_2}{h^2(\theta)} + \frac{a_i}{h^3(\theta)}.
 \end{aligned} \tag{7}$$

Knowing the values of hydrodynamic pressure and speed, we find analytical expressions for the load-bearing capacity and friction force:

$$\begin{aligned}
 R_x &= \frac{6j(2\mu_0 + \kappa_0)\Omega r_0^3}{2\delta^2} \times \\
 &\times \left[\int_0^{\theta_1} \left(p_1 - \frac{p_g}{p^*} \right) \cos \theta d\theta + \int_{\theta_1}^{\theta_2} \left(p_2 - \frac{p_g}{p^*} \right) \cos \theta d\theta + \int_{\theta_2}^{2\pi} \left(p_3 - \frac{p_g}{p^*} \right) \cos \theta d\theta \right]. \\
 R_y &= \frac{6j(2\mu_0 + \kappa_0)\Omega r_0^3}{2\delta^2} \times \\
 &\times \left[\int_0^{\theta_1} \left(p_1 - \frac{p_g}{p^*} \right) \sin \theta d\theta + \int_{\theta_1}^{\theta_2} \left(p_2 - \frac{p_g}{p^*} \right) \sin \theta d\theta + \int_{\theta_2}^{2\pi} \left(p_3 - \frac{p_g}{p^*} \right) \sin \theta d\theta \right]. \\
 L_{\text{тп}} &= j\mu_0\Omega r_0^3 \left(1 + (\alpha p - \beta T) - \frac{(\alpha p - \beta T)^2}{2} \right) \left[\int_0^{\theta_1} \left(\frac{\tilde{\psi}_1''(0)}{(h(\theta) - \eta_2)^2} + \frac{\tilde{u}'_1(0)}{h(\theta) - \eta_2} \right) \times \right. \\
 &\times d\theta + \int_{\theta_1}^{\theta_2} \left(\frac{\tilde{\psi}_2''(0)}{h^2(\theta)} + \frac{\tilde{u}'_2(0)}{h(\theta)} \right) d\theta + \left. \int_{\theta_2}^{2\pi} \left(\frac{\tilde{\psi}_3''(0)}{(h(\theta) - \eta_2)^2} + \frac{\tilde{u}'_3(0)}{h(\theta) - \eta_2} \right) d\theta \right].
 \end{aligned} \tag{8}$$

Research results

As a result of a theoretical study, it was established (Fig. 2) that the load-bearing capacity increases by approximately 10–12%, and the friction coefficient decreases by 9–11% in the range of modes studied (Table 1).

In the process of experimental research, areas of rational application of the resulting models were established. A stable hydrodynamic friction regime was obtained after a 2-minute running-in, while the load increased stepwise 5 times to 24.5 MPa (Table 2).

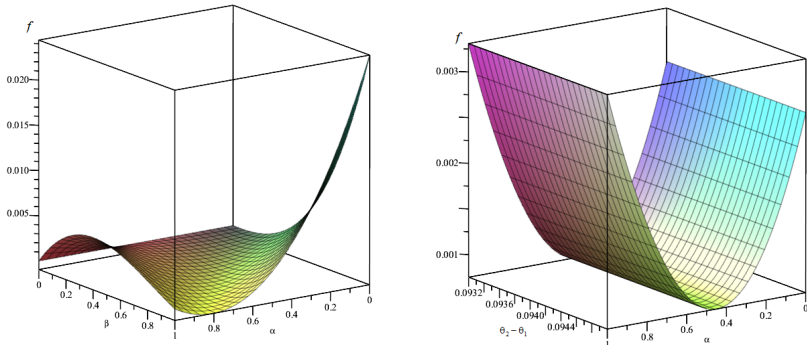


Figure 2. Dependence of the friction coefficient in a bearing with a groove on parameters characterizing the viscosity of the lubricant, temperature and groove width

Table 1
Results of a theoretical study of the surface of a bearing bushing with a fluoroplastic composite polymer coating

No.	σ , MPa	Angular coordinates ($\theta_2 - \theta_1$)				
		5,74	10,03	14,32	18,61	22,92
Friction coefficient						
1	4,9	0,008890	0,0112130	0,009200	0,0060000	0,00333000
2	9,8	0,005590	0,0055910	0,005753	0,0040850	0,00269650
3	14,7	0,002293	0,0023920	0,002306	0,0021705	0,00205700
4	19,6	0,002195	0,0022613	0,002204	0,0021136	0,00203793
5	24,5	0,002097	0,0021307	0,002102	0,0020570	0,00201887

Table 2

Results of a study of the surface of a bearing bushing with a fluoroplastic composite polymer coating

No.	Mode		Friction coefficient				Error, %	
	σ , MPa	V, m/s	Theoretical result		Experimental study			
			Polymer coating	Coating in groove	Coating	Groove cover		
1	4,9	0,3	0,012	0,0107	0,0149	0,0124	5-10	6-11
2	9,8	0,3	0,0070	0,0053	0,0084	0,0052		
3	14,7	0,3	0,0050	0,0031	0,0063	0,0043		
4	19,6	0,3	0,0065	0,0041	0,0087	0,0062		
5	24,5	0,3	0,0105	0,0074	0,0117	0,0088		

Main conclusions

1. As a result of the study, a significant expansion of the possibilities for using in practice such calculation models of a polymer-coated bearing with a groove operating in a hydrodynamic lubrication mode was achieved, allowing for the assessment of its operational characteristics.
2. Calculation models take into account the use of additional lubrication with a polymer coating and a groove on the surface of the bearing sleeve.
3. The use of the studied radial plain bearings with a groove 3 mm wide significantly increases their load-bearing capacity (by 10–12%) and reduces the friction coefficient by 9–11%.

Designations

r_0 – shaft radius; r_1 – radius of the bearing sleeve; \tilde{h} – groove height; e – eccentricity; ε – relative eccentricity; μ_0 – characteristic viscosity; μ' – coefficient of dynamic viscosity of the lubricant; p' – hydrodynamic pressure in the lubricating layer; α', β' – constant experimental value; T' – temperature; I – mechanical equivalent of heat; λ – thermal conductivity of the lubricant; $\eta = \frac{l}{\delta}$ – design parameter; $\eta_2 = \frac{\tilde{h}}{\delta}$ – design parameter characterizing the groove; θ_1, θ_2 – respectively, the angular coordinates of the groove; $u^*(\theta)$ and $v^*(\theta)$ – known functions due to the presence of a polymer coating on the surface of the bearing sleeve; Q – lubricant consumption per unit time; C_p – heat capacity at constant pressure; $h(?)$ – thickness of the oil film.

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油的组成和温压条件对其相态的影响
**INFLUENCE OF OIL COMPOSITION AND THERMOBARIC
CONDITIONS ON ITS PHASE STATE**

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抽象的。该工作以鞑靼斯坦共和国的矿床为例，研究了石油成分和温压条件对碳氢化合物相态的影响。根据文献资料，对鞑靼斯坦共和国主要产层石油的物理性质和化学成分进行了对比，表明其沿剖面存在一定的变化方向。对鞑靼斯坦共和国三个油田石炭系和二叠系沉积物的石油粘度和成分分析显示了这些参数对碳氢化合物相态的影响。

关键词：粘度、温度、温压条件。

Abstract. *The work examines the influence of oil composition and thermobaric conditions on the phase state of hydrocarbons using the example of deposits in the Republic of Tatarstan. Based on literature data, a comparison is made of the physical properties and chemical composition of oil from the main productive horizons of the Republic of Tatarstan, which indicates the existence of a certain direction in their changes along the section. Analysis of the viscosity and composition of oil from Carboniferous and Permian deposits of three fields in the Republic of Tatarstan shows the influence of these parameters on the phase state of hydrocarbons.*

Keywords: *viscosity, temperature, thermobaric conditions.*

The geological rock-forming mineral-organic system is open, exchanging energy and substances with the environment. In geological time on various spatial and temporal scales, when the parameters of the external environment change, this system, according to the laws of its internal time, undergoes a series of phase transformations with a transition at certain stages through fluctuations to qualitatively new states [1].

Geologically, the territory on which the Republic of Tatarstan is located represents a complex geological macro-unit, formed at various stages of its evolution. In the process of geological development, starting from the Middle Devonian and

ending with the Late Permian time, a section of an ancient sedimentary basin was formed here, which was part of the vast Volga-Kama paleobasin [2]. The geological section of the territory of Tatarstan is composed of Devonian, Carboniferous and Permian deposits with a total thickness of 1700–2100 m [3]. Each oil-bearing complex differs to a certain extent in the characteristics of the distribution of deposits and the properties of oil [3].

Oil deposits as geological objects are characterized by certain thermobaric parameters, which depend on the depth of the productive formation (Table 1).

Table 1
Influence of thermobaric parameters on the physical and chemical characteristics of oil and gas in the Republic of Tatarstan [4]

System	Reservoir temperature, 0C	Reservoir pressure, MPa	Department, horizon, tier	Density, kg/m ³	Viscosity, mPa·s	Paraffin concentration, wt. %	Concentration of resins and asphaltenes, wt. %	
Permian	8-10	0,4-0,8	vigorous stone	962	12820	1,40	21,50	
			Barbashinsky	962	274467	1,70	12,72	
			Kamyshlinsky	981	213085	0,57	29,19	
			Sheshminsky	958	28479	1,80	29,29	
			Sakmaro-Artinsky	896	13,24	3,15	9,05	
Carbon	22-23	9-11	average	Podolsky	900	165,20	3,2	19,10
			Kashirsky	919	117,09	3,29	24,70	
			Vereisky	914	95,61	3,01	34,32	
			Bashkirsky	925	186,95	2,89	35,33	
	25	9-11	lower	Serpukhovsky	910	44,36	4,69	21,99
			Aleksinsky	901	27,92	3,41	19,01	
			Tulsky	902	45,63	3,05	27,65	
			Bobrikovsky	898	59,20	3,36	26,74	
			Radaevsky	925	86,75	1,90	17,90	
			Kosvinsky (Elkhovsky)	882	20,54	1,03	7,33	
			Tournaisian	904	46,66	3,18	30,55	
	Devonian	33-39	16-17,5	Domanik deposits	891	24,11	3,21	19,20
				Timansky (Kynovsky)	866	5,29	3,78	23,20
Pashiysky				862	3,62	3,95	20,16	
Mullinsky				858	3,36	4,51	16,93	
Ardatovsky (Stary Oskolsky)				850	3,20	4,32	17,07	
Vorobievsky				850	4,26	3,45	15,83	

A comparison of the physical properties and chemical composition of oil in the main productive horizons of the Republic of Tatarstan indicates the existence of a certain direction in their changes along the section. From the Devonian to the Carboniferous and Permian there is an increase in the density and viscosity of oil.

The group hydrocarbon composition of oil from the Republic of Tatarstan is of the same type. According to the predominant class of hydrocarbons, it belongs to methane-naphthenic oil. Changes in oil along the section are associated with a decrease in the content of light (methane) components and an increase in the proportion of aromatic and naphthenic compounds [3].

Differences in the physicochemical properties of oil from multilayer fields depend on the geological conditions of occurrence and are caused by different conditions of their preservation [2]. Oil properties can vary within the area of one field. The reasons for changes in the properties of oil over the area of the field are in the geological and structural features of the structure of the deposit, chemical, bacteriological, physicochemical processes occurring in the reservoir [3, 5].

A comparison of the physicochemical properties and composition of oil from Permian and Carboniferous deposits was carried out in this study using the example of three fields in the Republic of Tatarstan. The results (Figures 1–2) show that the viscosity of Permian oil significantly exceeds the viscosity of Carboniferous oil under both reservoir and standard conditions.

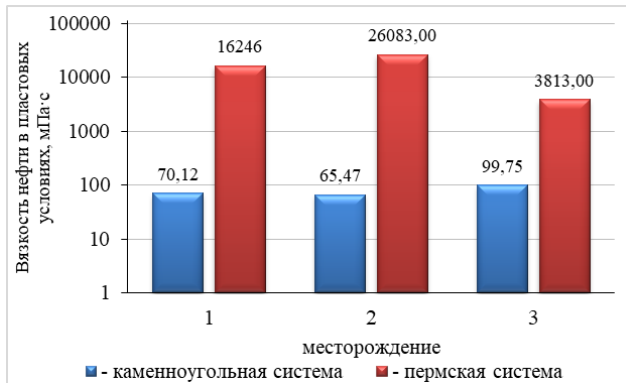


Figure 1. Comparison of the viscosity of oil from Carboniferous and Permian deposits under reservoir conditions

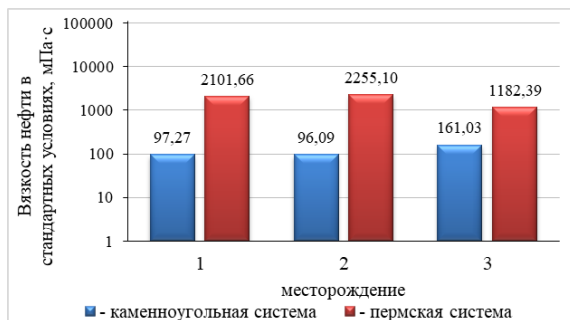


Figure 2. Comparison of the viscosity of oil from Carboniferous and Permian deposits under standard conditions (20 °C)

The viscosity value of Permian oil under reservoir conditions is higher than under standard conditions. For coal system oil, the viscosity value under reservoir conditions is less than under standard conditions. This picture is explained by the ratio of formation and standard temperatures of the deposits under consideration: the average formation temperature of the Permian deposits is 8 0C, the formation temperature for the considered Vereisky horizon and the Bashkirian stage of coal deposits is 20–23 0C. Standard conditions correspond to a temperature of 20 0C.

The average values of the content of asphaltenes, resins and paraffins in the oil of the Carboniferous and Permian sediments given in Table 1 show that the total concentration of high-molecular components in the oil of both systems is comparable. For the three fields under consideration, a comparative analysis of the total concentration of high-molecular-weight components of oil from deposits confined to Carboniferous and Permian deposits was carried out (Figures 3–5).

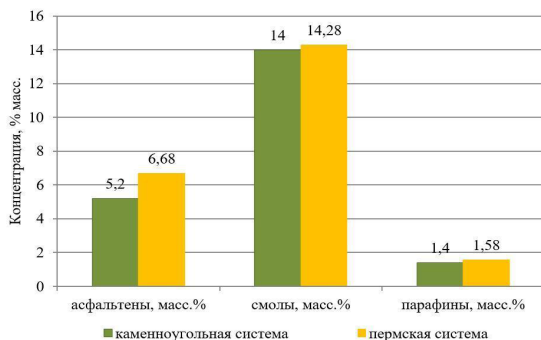


Figure 3. Comparison of the concentrations of high-molecular components of oil from Carboniferous and Permian deposits of the first field

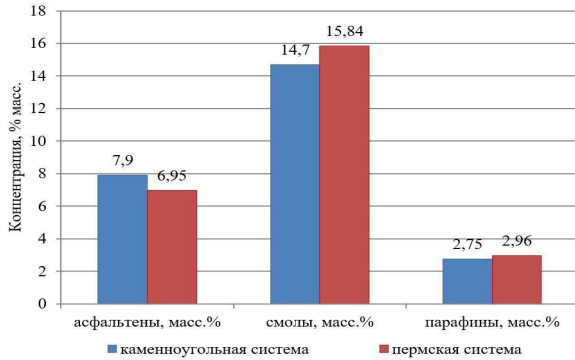


Figure 4. Comparison of the concentrations of high-molecular components of oil from Carboniferous and Permian deposits of the second field

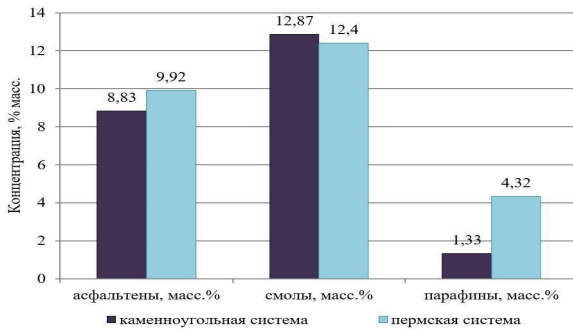


Figure 5. Comparison of the concentrations of high-molecular components of oil from Carboniferous and Permian deposits of the third field

The multiple difference in the viscosity of oil from the Carboniferous and Permian systems is due to the different phase state of hydrocarbon accumulations in these deposits. The phase state of oil from Permian deposits is characterized as frozen (viscoplastic); the development of these deposits requires thermal exposure. Oil from deposits confined to coal deposits in a liquid state.

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萨马拉国立技术大学 (SamSTU) “PCHT 研究所” 开发实施精益生产的模型
**DEVELOPMENT OF A MODEL FOR IMPLEMENTING LEAN
PRODUCTION AT THE “RESEARCH INSTITUTE OF PCHT” OF
SAMARA STATE TECHNICAL UNIVERSITY (SAMSTU)**

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抽象的。通过对某制造企业的分析,阐述了研究“精益生产”概念的现实意义。强调了精益生产的主要方法之一。制定了该模型的实施特征。

关键词:精益制造、质量指标、成本、模型、竞争力、子系统、标签、工作场所。

Abstract. *The relevance of studying the concept of “lean production” is described based on the analysis of a manufacturing enterprise. One of the main methods of lean production is highlighted. Features of the implementation of the model are formulated.*

Keywords: *lean manufacturing, quality indicators, cost, model, competitiveness, subsystem, labeling, workplace.*

Lean production is a management concept based on the constant desire to eliminate all types of employee losses [1,2,4].

The main activities of the research institute “Problems of Conversion and High Technologies” of the Samara State Technical University (hereinafter referred to as “FSBEI HE SamSTU “Research Institute PCHT”) is the manufacture and testing of extended shaped charges (UKZ-P). Currently, such charges are used to perform household tasks (explosive cutting of large metal structures), tasks arising from the disposal or reuse of expired ammunition (explosive cutting of military equipment, ammunition for it), as well as solving special problems of opening armored structures carried out by divisions of the Ministry of Internal Affairs [5].

Due to increased competition in the market for its products, the enterprise is concerned about its competitiveness, which is assessed through quality indicators and cost. In the production of elongated rolled shaped charges (hereinafter referred to as UKZ-P), more attention is paid to the unconditional fulfillment of quality indicators in terms of geometry (geometric dimensions of the tubular workpiece, the angle of rotation of the shaped groove) and physical and mechanical properties (pipe material, ruptures, etc.) and to a lesser extent the processes of organizing production. However, already with the introduction of quality management systems at SamSTU, a connection between the quality of production management and the quality of manufactured products was noticed. This circumstance predetermined the need to develop a production management system that would allow simultaneously managing the quality and cost of products [5].

It is obvious that improving the quality and reducing the cost of UKZ-P is possible through the introduction of modern approaches, which should be aimed at improving the quality of the product, reducing its cost and adapting to the specifics of supplying products to Kazakhstan according to the technical regulations of the Customs Union TR CU 028/2012 .

The relevance of the study is determined by a number of factors, among which the most significant seems to be the possibility of increasing the competitiveness of an enterprise in the industrial sector of the economy through the use of innovative economic tools, leading to a maximum reduction in production losses.

Lean manufacturing can be created by working at all levels of the management vertical, while implementing lean manufacturing tools adapted to the characteristics of the enterprise.

In Russia, attempts to introduce lean manufacturing first began only in 2004. The pioneers in this matter were such large companies as PJSC KAMAZ, GAZ Group, VSMPO-AVISMA Corporation, United Company Rusal, EvrazHolding, Eurochem, etc. Unfortunately, the introduction of lean manufacturing in these The company was provoked by large losses and a growing number of defects at enterprises, but soon, after the first positive results, the companies did not stop there and implemented this system more and more deeply [4].

The most popular lean manufacturing method is:

5S is a set of actions aimed at creating order in the workplace, a systematic approach that increases work efficiency.

The problems caused by improper organization of the production space are not as harmless as they might seem at first glance. Waste of time, which inevitably arises due to clutter in the workplace, most often leads to low productivity.

The main stages of implementation of this method are:

1. Sorting accessories and tools, removing excess;
2. Convenient location of the necessary things;

3. Keeping the workplace clean;
4. Creation of standards to help control results;
5. Continuous improvement.

In 2020, the Federal State Budgetary Educational Institution of Higher Education SamSTU “Research Institute of PCHT” began the gradual introduction of elements of lean production.

As a result of using this method during 2020, the company received:

- visual control - instant visual detection by any employee of deviations from the standard and forms of production losses;
- special marking of equipment (color marking, marking of direction of movement and direction of rotation);
- disciplinary standards [2].

In this regard, there was a need to develop a model that would demonstrate the procedure for implementing lean production methods [3].

The essence of lean manufacturing is presented in Figure 1.

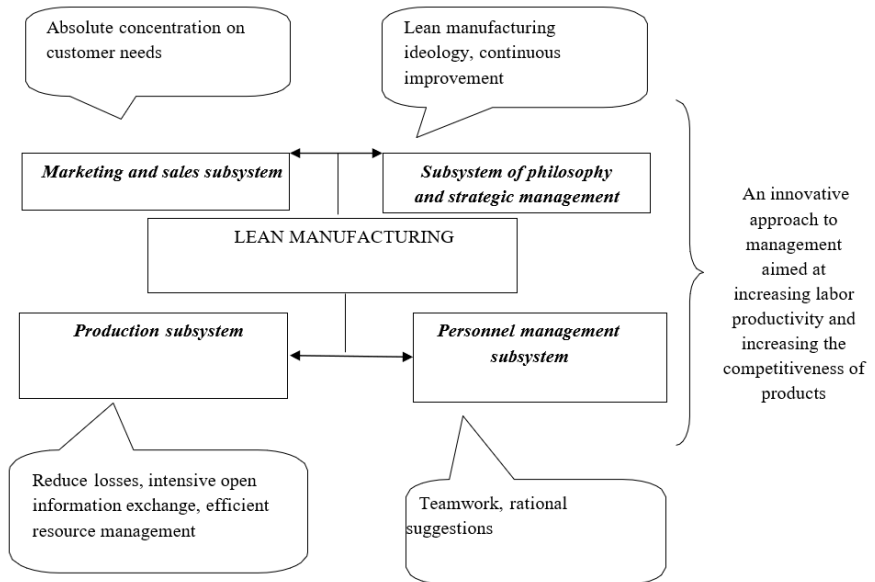


Figure 1. The essence of lean manufacturing

The model for introducing Lean Manufacturing tools at an enterprise is presented in Figure 2.

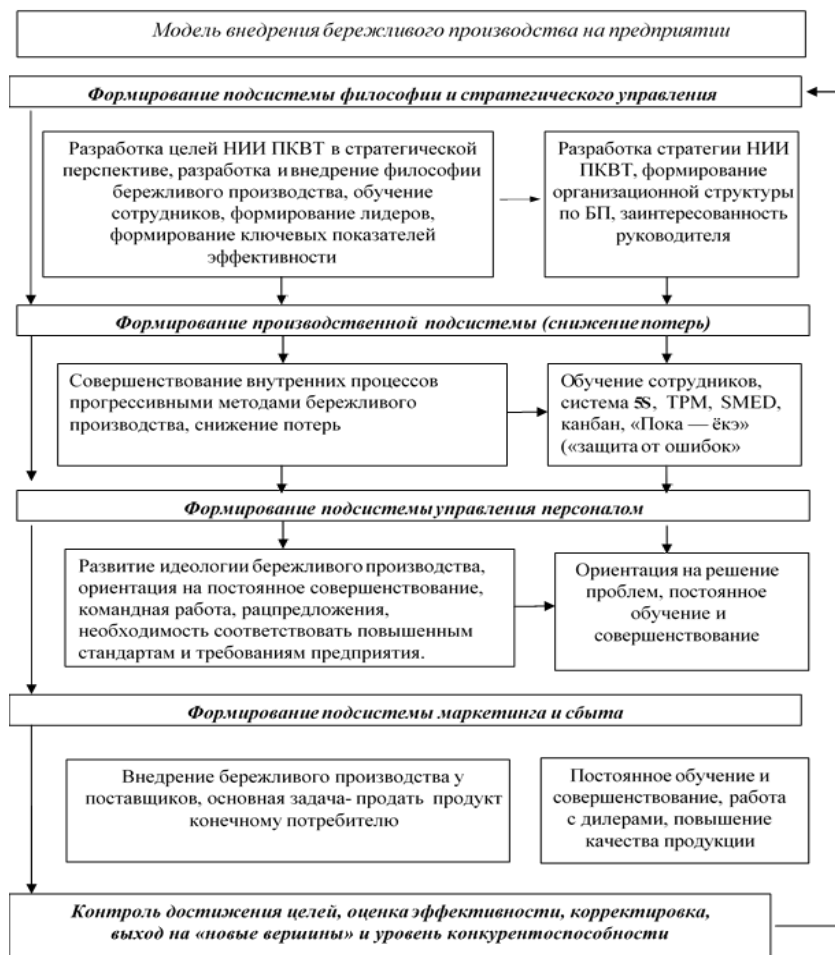


Figure 2. Model for introducing “lean production” at SamSTU “RI PCHT”

This model includes the formation of the main subsystems of lean production, without which the organization itself is unthinkable, namely the philosophy of “lean production”, which is embodied in the strategic management of the enterprise, in personnel management, in working with partners and the activation of organizational processes of “lean production”, continuous learning and improvement [4].

In order to determine reserves for lean production, a model for introducing lean production can also be developed at the regional level, reflecting the factors that are necessary for the development of lean production, and which, unfortunately, are currently not yet available at some industrial enterprises.

In light of the transition of the Russian economy to an innovative path of development, it becomes clear that the introduction of lean manufacturing plays a key role. Leading countries have long realized that the future belongs to the knowledge economy and new management methods. Although in words Russian policy expresses a desire for modernization and innovation, in practice, due to the aging of production assets, the gap between us and the leaders in the field of innovation is only widening.

In 2012, Davydova N.S. in her monograph “Lean Manufacturing” noted that Russia lags behind in the technological sphere by about 45–50 years compared to developed countries. Thus, the measures taken to develop lean production will allow us to unlock the potential of the industrial sector, reach new heights in the quality of products, and build the business reputation of enterprises as world leaders, which in turn will lead to an increase in the investment attractiveness of the region and the expansion of its presence in the world market.

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混凝土基体结晶过程的意义

THE SIGNIFICANCE OF THE CRYSTALLIZATION PROCESS OF THE CONCRETE MATRIX

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抽象的。考虑到亚美尼亚共和国住房建设的活跃增长,文章对混凝土基体结晶过程进行了理论研究。研究表明,由于水泥水化等物理现象,包括水平衡(W/C)变化、凝胶状多孔体体积减少以及弹性晶体共生体生长等过程,允许在混凝土内部形成弹塑性特性,特别是在混凝土在荷载作用下变形时。该工作建立了空气温度和空气湿度对混凝土正常硬化影响的相关性。

关键词: 结晶、混凝土结构、胶状多孔体、水化速率、水灰比、强度。

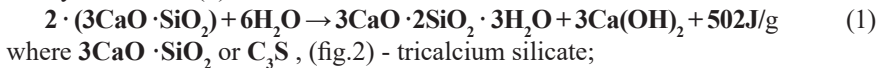
Abstract. *Taking into account the active growth of housing construction in the Republic of Armenia, the article carried out theoretical studies of the concrete matrix during crystallization. It has been revealed that as a result of such a physical phenomenon as cement hydration, which includes processes such as changes in water balance (W/C), a decrease in the volume of gelatinous porous mass, and the growth of elastic crystalline intergrowths, allows the formation of elastic-plastic properties inside the concrete, especially in deformation of concrete under load. The work established the relevance of the influence of air temperature and air humidity to obtain normal hardening of concrete.*

Keywords: *crystallization, concrete structure, jelly-porous mass, hydration rate, W/C ratio, strength.*

The construction industry plays an important role in the development of the socio-economic sphere of the Republic of Armenia. The development of the economy in other efficient related industries of the Republic of Armenia is largely associated with the intensive development of construction. One of the most successful sectors of domestic construction is housing construction. Over the past few years, the construction of residential complexes has noticeably intensified in Armenia. Realtors believe: - this is how the market reacts to demand. The material with which more and more new buildings and structures of a new generation are designed in Yerevan and throughout Armenia, used in various operating conditions,

characterized by a high architectural and construction style, having the possibility of widespread use of local raw materials, and also having environmental safety and operational reliability, which differs from other building materials in its accessible technology, is the oldest complex composite building material - concrete.

The physical process of transition from a liquid state (concrete mixture in a wet state) to a solid crystalline (*hardened concrete*) [2] known as the process of crystallization of concrete - turns into a conditional spatial frame that connects particles of solid matter (small and large fill) called crystal cell. It..... Concrete itself has an amorphous and irregularly ordered structure, which has a great influence on its strength and deformability. During the chemical reaction of cement with water (cement hydration), which results in the formation of crystalline hydrates [1], liquid cement glue (gel) turns into cement stone. When clinker minerals (Fig. 1) are mixed with water, a chemical reaction occurs, i.e. minerals are modified into hydrosilicates (1) and (2), hydroaluminates (3), as well as calcium hydroferrates (4):

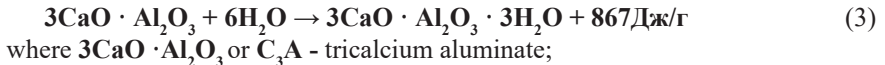


C_3S – alite, clinker contains up to 70%, the composition and structure of which is modified due to the placement of foreign ions in the lattice, especially Mg^{2+} , Al^{3+} and Fe^{3+} . Alite reacts relatively quickly with water and in normal cements, of all phases, plays the most important role in the development of strength; for 28-day strength, the contribution of this phase is especially important.

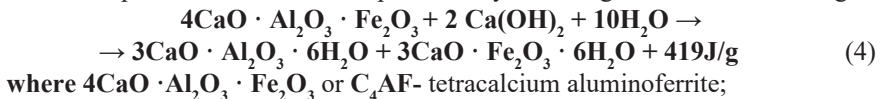


C_2S - *Belite* in Portland cement contains 30%, it is modified by introducing foreign ions into the structure and is usually completely, sometimes partially present in the form β - modification, therefore, slowly affects the strength of concrete during 28 days of age, but significantly increases the strength of concrete in later periods (after 28 days).

After 365 days, the strengths of belite and alite under similar conditions are relatively identical.[5].



C_3A – *cellite (aluminate phase)*, it is contained in clinker up to 10%. In composition, structure and due to foreign ions (Si^{4+} , Fe^{3+} , Na^+ and K^+) cellite is slightly modified, but if not, do not add gypsum to it (setting-controlling reagent), the aluminum phase reacts with water prematurely, resulting in undesirable setting.



C_4AF – brown millerite (aluminum ferrite phase). Clinker contains up to 15%. Between the speeds for alite and belite and at later times, the ferrite phase is *intermediate*.

During reactions, heat is released, which appears when the bonds in the reaction products are broken, i.e. all reactions are exothermic. The rate of hydration (Fig. 3) is influenced by: the mineral composition of cement, as well as the degree of grinding, water for mixing cement, temperature and the introduction of additives [4]. Hydration of cement during the setting period is characterized by the release of heat: at the beginning of setting there is a rapid rise in temperature, and at the end of setting a temperature maximum is observed. According to GOST, normal concrete hardening is carried out at $t = 18-22\text{ }^\circ\text{C}$ and 100% relative air humidity. When the temperature increases by even a small degree Celsius, the rate of concrete hardening increases, and when it decreases, even by a small degree Celsius, the hardening process slows down sharply. At $t=00\text{C}$ and cold, the hardening process stops (Fig. 4). Consequently, one of the most important factors for obtaining normal hardening of concrete is the temperature and humidity of the air.

As a result of the hydration of clinkers, in addition to calcium hydrosilicates and $Ca(OH)_2$ - slaked lime remains in the cement stone and helps resist corrosion of the steel inside the cement stone [3, 4, 7]. Consequently, the degree of hydration is determined by the amount of $Ca(OH)_2$, and the amount of non-hydrated cement, the heat release, the specific *gravity of the cement paste*, and the amount of chemically bound water.

As a result of a chemical reaction (when mixing a mixture with aggregates and Portland cement with water), a gelatinous porous mass (gel) with cement particles and minor compounds in the form of crystals suspended in water is produced.



Figure 1. Clinker Figure

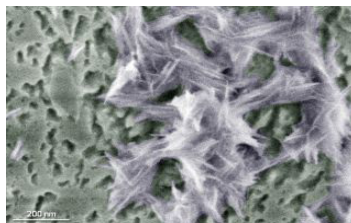


Figure 2. Hydration of C_3S

Fig. 2 shows C_3S with the formation of needle-shaped crystals of lilac-colored calcium hydrosilicate). A greenish color indicates a partially dissolved 3-calcium silicate substrate. Hydration time - 5 hours.

When mixing the concrete mixture, the jelly-like porous mass draws in individual grains of aggregate from all sides, slowly hardens, and the crystals in-

tertwine into crystalline aggregates (grow over time). The gel turns into cement stone, and the first stage of this process is called *setting* or *thickening*, and the second stage is called *hardening* or *hardening*.

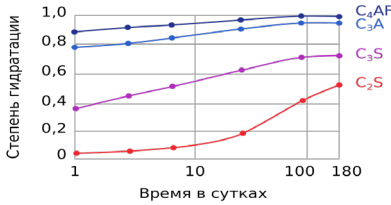


Figure 3. Hydration rate of clinker minerals.

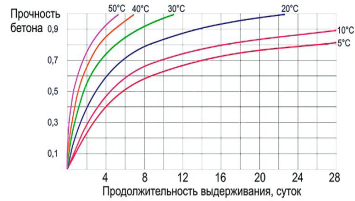


Figure 4. Graph of strength versus temperature

The hardening mass grows into cement stone, which grabs grains of sand and crushed stone into monolithic *concrete* (solid body). An important aspect that everyone knows is that the W/C (C/C) ratio affects the structure and strength of concrete and, according to research, pores occupy about a third of the cement stone, therefore, with a decrease in the W/C, the porosity of the cement stone decreases and the strength of concrete increases. Subsequently, physical phenomena (changes in water balance (W/C), reduction in the volume of gelatinous porous mass, growth of elastic crystalline intergrowths) elastic-plastic properties are recorded inside the concrete, especially in the deformation of concrete under the influence of both load and the surrounding climate. As a result, the hardening of the concrete itself, where the main component is the *hydration* of cement, is the *crystallization* of concrete. After all, crystallization of the concrete matrix reflects a significant process for the strength of concrete. Those minerals in the composition of cement (silicates (1 and 2), aluminates (3), aluminoferrites (4)) form solid and durable compounds when exposed to water. But before the process is completed, the structure will collapse due to excessive load (Fig. 5).

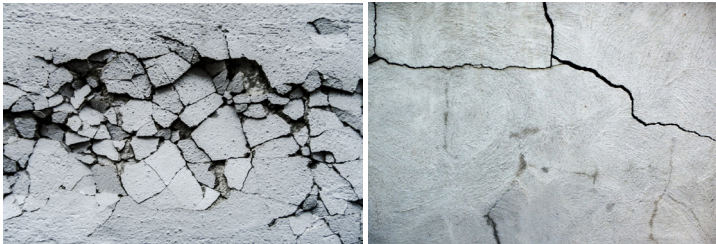


Figure 5. Consequences of disruption of the concrete crystallization process

If crystallization is disrupted, the strength of concrete decreases over time (the crystal lattice may be irregular or incomplete); porosity increases (moisture, chemicals, gases penetrate into large quantities of pores); durability decreases (cracks and corrosion will appear in the concrete), adhesion between concrete and reinforcement deteriorates (weak adhesion leads to damage or destruction of structures); drying occurs unevenly (cracks, destruction and deformation appear). [3, 5, 6].

Conclusions.

The rate of concrete hydration depends on various factors: the composition of the concrete matrix, the ambient temperature, and the level of humidity.

During cement hydration, concrete begins to set, i.e. concrete gradually gains strength and loses its ductility. Crystalline structures grow and multiply (they were formed during the hydration of Portland cement), and the concrete becomes strong, of course rigid, i.e., as a result of crystallization, the concrete hardens.

The process of breaking the crystallization of concrete significantly reduces the mechanical properties of concrete: strength, stability, durability and negatively affects the quality and safety of structures.

The structure of concrete is created heterogeneous due to the cement stone, which, in turn, depends on the size, shape, coarseness of sand and crushed stone grains, and on the presence of a significant number of micropores and capillaries (filled with chemically unbound water, water vapor and air).

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使用晶体装置在 9 厘米距离处聚焦能量为 50 GeV 的质子束
**FOCUSING A BEAM OF PROTONS WITH AN ENERGY OF 50 GEV
USING A CRYSTAL DEVICE AT A DISTANCE OF 9 CM**

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注解。 论文描述了使用晶体装置将能量为 50 GeV 的质子束聚焦在 U-70 加速器上的实验。 该聚焦装置基于使用弯曲平面平行的硅晶片，其中侧面相对于晶面旋转小角度。 光束在 9 厘米的距离处聚焦成一条宽度为 $\sigma = 2.9$ 微米的窄线。 描述了在现代加速器上使用这种短焦设备的前景。

关键词：加速器、晶体沟道、光束聚焦。

Annotation. *The paper describes an experiment on focusing a proton beam with an energy of 50 GeV on the U-70 accelerator using a crystal device. The focusing device is based on the use of bending a plane-parallel silicon wafer in which the side faces are rotated relative to the crystallographic planes by a small angle. The beam was focused at a distance of 9 cm into a narrow line with a width of $\sigma = 2.9$ microns. The prospects of using such a short-focus device on modern accelerators are described.*

Keywords: *accelerators, crystal channeling, beam focusing.*

Currently, studies of collimation and extraction of a circulating beam using channeling in curved crystals are being carried out at several modern accelerators [1–7]. Since the critical channeling angle (Lindhard angle) is quite small ($\theta_L \sim (1/E)^{1/2} = (0.02 - 0.002)$ mrad for protons with energies $E = (100 - 10000)$ GeV,

respectively), the use of crystals is quite effective for controlling the primary proton beam, but to manipulate secondary beams π , K and p, etc., it is necessary not only to deflect them, but also to focus them, since here the beam divergences are much higher [8].

At the moment, crystal focusing devices based on the beveled end face of a curved crystal have been successfully tested [9–13]. Focal lengths of the order of one meter have been achieved. Currently, promising tasks have been formulated in high-energy physics: reducing the beam size in the electron linear collider CLIC [14] and experiments on measuring the magnetic moments of short-lived particles at the LHC and FCC accelerators using spin rotation in a curved crystal [15], where it is necessary to focus particle beams on a distance of several centimeters. The previously used idea of a crystal with a beveled end face is difficult to implement here, since such a short focal length requires an acute bevel angle, about one degree or less (under such conditions, silicon begins to crumble near the sharp edge). We recently proposed a new idea for short-distance focusing based on the use of bending of a conventional plane-parallel silicon wafer, in which the side faces are rotated relative to the crystallographic planes by a small angle. This angle $\text{Miscut} = D / L$, where D is the thickness of the plate, and L is the length of the plate along the beam direction, so that the crystallographic planes coincide with the diagonal direction of the plate (Fig. 1a).

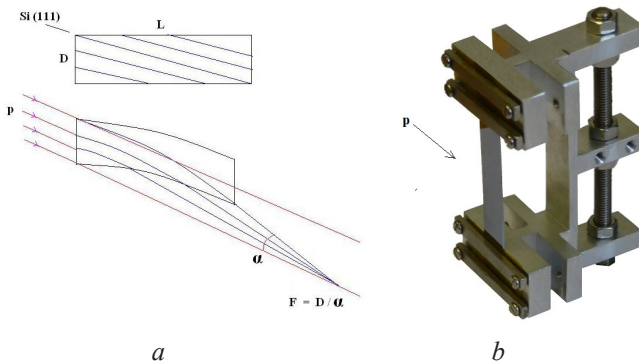


Figure 1. *a* – Schematic of beam focusing with a silicon wafer, in which the crystallographic planes coincide with the diagonal direction in a rectangular section, *b* – appearance of the focusing device

From the geometry of the figure it is clear that when the plate is bent at an angle α , the focal length $F = D / \alpha$ is achieved. In experiments [16, 17] with a new device for focusing proton beams with energies of 50 GeV and 400 GeV, a focal length of 15 cm was achieved. In this work, the device was optimized to reduce the focal length to 9 cm, which is sufficient for applications [14, 15] on modern

accelerators. The work used a silicon wafer 9 mm long and 450 μm thick. When cutting, the side faces of the plate were rotated at an angle of 3 degrees relative to the crystallographic planes (111). The plate was uniformly bent at an angle of 5 mrad in a manner similar to that used in [11]. The bending principle is based on the use of crystal lattice anisotropy. Using a mechanical moment of force, the silicon wafer is bent in the longitudinal direction using a holder (Fig. 1b), while the necessary uniform bend is created in the transverse direction. In this case, the focal length is $F = D / \alpha = 9$ cm. A proton beam of moderate intensity $\sim 10^6$ particles/s was extracted from the U-70 accelerator using a crystal deflector; this technique is described in detail in [18]. The beam had a divergence of $\sigma_x \sim 0.1$ mrad; collimators were used to form a beam profile with sharp boundaries of size $S_x \times S_y = 10 \times 20$ mm².

The geometry of the detectors and crystal in the goniometer is described in [16]. The channeling mode was determined using a scintillation counter telescope. The focusing effect was recorded with EBT3 dosimetric film when the image was processed by a high-resolution digital scanner. Figure 2 shows the results of the experiment. Figure 2a shows an enlarged image of the focused beam on the film in the form of a narrow line. Figure 2b shows the beam profile obtained by digital scanning. It can be seen that the focused beam (peak in the center), which passed through the crystal in the channeling mode, is several times higher in density than the incident beam. This is despite the fact that only $\sim 10\%$ of the incident particles were deflected due to channeling in the crystal. The measured beam size at the focus is $\sigma = 2.9$ μm , as can be seen in Fig. 2b. Under ideal conditions, the beam size at the focus is determined by the value $2 \times \sigma = F \times \theta_L \sim 2.7$ μm . However, it is difficult to accurately measure such a small value, since the resolution of the scanner and film is also at the level of several microns. Therefore, our measured profile overestimates the actual size of the focused beam.

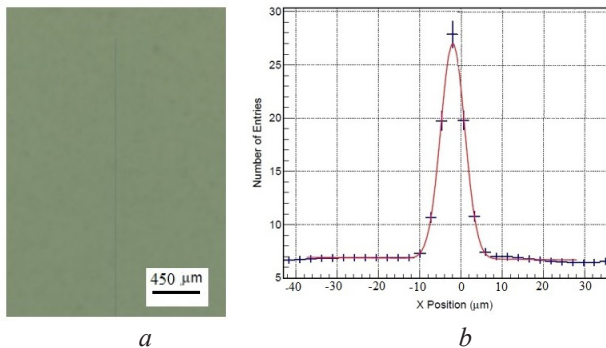


Figure 2. *a* – Image of a focused beam on film (vertical line in the center),
b – beam profile from the scanner at maximum resolution

Thus, in this work, for the first time, the focusing of a beam of high-energy particles by a crystalline device at a distance of 9 cm was experimentally tested. Such a device makes it possible to implement the mentioned proposals [14, 15] more optimally.

In particular, it is possible to reduce the size of colliding beams to the nanoscale at linear electron-positron colliders such as CLIC and ILC (Fig. 3).

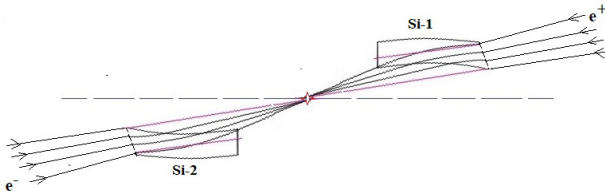


Figure 3. Use of two crystal devices to organize the final focus on the CLIC

In this design, crystals are built into existing magnetic optics, focusing a beam of tens of microns in size down to the nanoscale. Preliminary estimates show that the size of the beam at the focus of x_F crystals can be reduced by several tens of times, and consequently, a gain in luminosity of a thousand times can be obtained ($Lum \sim \frac{1}{x_F^2}$). It should be noted that the final focus on crystals can also be applied in ring colliders with moderate intensity of the circulating beam, for example, in future muon colliders.

Also, using a short-focus crystal device, it is possible to optimize the experiment planned at the LHC [15] to measure the magnetic moments of short-lived particles using spin rotation in a curved crystal (Fig. 4).

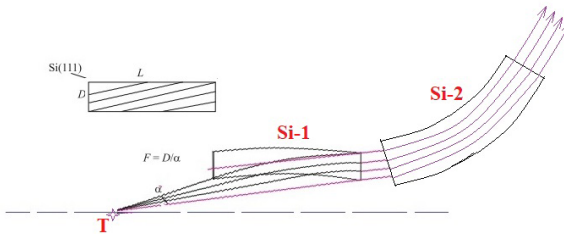


Figure 4. Use of a short-focus crystal to measure the magnetic moment of A_c hyperon at the LHC by spin rotation, T – filamentary internal target on a circulating beam, $Si-1$ – short-focus crystal, $Si-2$ – “ordinary” curved crystal

Here is a two-crystal design consisting of a short-focus and a “regular” deflection crystal. This scheme, in contrast to the proposal adopted at the LHCb facil-

ity with one “ordinary” crystal for spin rotation, increases the yield of deflected hyperons by two orders of magnitude due to the focusing effect (the ratio of the hyperon birth cone angle, about 1 mrad, to the critical channeling angle, about 10 μ rad). This can be a decisive factor in the success of the experiment.

It is obvious that in the future the range of possible applications of a short-focus crystalline device at accelerators will expand significantly, since a simple device works extremely well.

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