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参与者的英文报告

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这些会议文集结合了会议的材料 – 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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These Conference Proceedings combine materials of the conference – research papers and thesis reports of scientific workers. They examine technical and sociological issues of research issues. Some articles deal with theoretical and methodological approaches and principles of research questions of personality professionalization.

Authors are responsible for the accuracy of cited publications, facts, figures, quotations, statistics, proper names and other information.

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Foreword

We thank all participants of our conference "Scientific research of the SCO countries: synergy and integration" for the interest shown, for your speeches and reports. Such a wide range of participants, representing all the countries that are members of the Shanghai Cooperation Organization, speaks about the necessity and importance of this event. The reports of the participants cover a wide range of topical scientific problems and our joint interaction will contribute to the further development of both theoretical and applied modern scientific research by scientists from different countries. The result of the conference was the participation of 56 authors from 7 countries (China, Russia, Uzbekistan, Kazakhstan, Azerbaijan, Tajikistan, Kyrgyzstan).

This conference was a result of the serious interest of the world academic community, the state authorities of China and the Chinese Communist Party to preserve and strengthen international cooperation in the field of science. We also thank our Russian partner Infinity Publishing House for assistance in organizing the conference, preparing and publishing the conference proceedings in Chinese Part and English Part.

I hope that the collection of this conference will be useful to a wide range of readers. It will help to consider issues, that would interest the public, under a new point of view. It will also allow to find contacts among scientists of common interests.

Fan Fukuan,
Chairman of the organizing committee of the conference
"Scientific research of the SCO countries: synergy and integration"
Full Professor, Doctor of Economic Sciences,
member of the Chinese Academy of Sciences

前言

我们感谢所有参加本次会议的“上海合作组织国家的科学研究：协同作用和整合”，感谢您的演讲和报告。代表所有上海合作组织成员国的广泛参与者都谈到此次活动的必要性和重要性。参与者的报告涵盖了广泛的主题性科学问题，我们的联合互动将有助于不同国家的科学家进一步发展理论和应用的现代科学研究。会议结果是来自7个国家（中国，俄罗斯，乌兹别克斯坦，哈萨克斯坦，阿塞拜疆，塔吉克斯坦，吉尔吉斯斯坦）的83位作者的参与。

这次会议的召开，是学术界，中国国家权力机关和中国共产党对维护和加强科学领域国际合作的高度重视的结果。我们还要感谢我们的俄罗斯合作伙伴无限出版社协助组织会议，准备和发布中英文会议文集。

我希望会议的收集对广大读者有用，将有助于在新的观点下为读者提供有趣的问题，并且还将允许在共同利益的科学家中寻找联系。

范福宽，
教授，经济科学博士，中国科学院院士，会议组委会主席“上合组织国家科学研究：协同与融合”

促进无形资产作为公司活动效率提高的因素
PROMOTION OF INTANGIBLE ASSETS AS FACTOR OF INCREASE IN EFFICIENCY OF ACTIVITY OF THE COMPANY

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本文致力于研究如何促进无形资产，以提高公司的效率。 无形资产是任何公司的重要方面。 它们的组成，使用性质，对财务状况和经营业绩的影响程度各不相同。 合理管理无形资产，企业可以增强竞争地位，增加市场价值。 公关工具在无形资产管理中的应用是公司战略管理最有前途的杠杆之一。

关键词：无形资产，公司价值，管理，公关工具。

Annotation*. The article is devoted to the study of ways to promote intangible assets in order to improve the efficiency of the company. Intangible assets are an important aspect of any company. They differ in composition, in the nature of use, in the degree of influence on the financial condition and results of operations. Rationally managing intangible assets, enterprises can strengthen their competitive position, increase their market value. The use of PR tools in the management of intangible assets is one of the most promising levers of strategic management of the company.*

Keywords*: intangible assets, company value, management, PR tools.*

The most important characteristic of the market environment in which the commercial activities of enterprises take place is competition. Acquisition, development and maintenance of competitive advantages is one of the basic levers of enterprise management. One of the leading factors of production, affecting the performance and increasing the potential of modern enterprises, creating undeniable competitive advantages, are intangible assets. However, modern domestic enterprises do not pay enough attention to the exploitation of competitive market intangible assets. Strengthening their competitive position for sustainable development, enterprises should orient their business development strategies based on the development of the intangible component. In order to assess the contribution of intangible assets to the implementation of an enterprise's strategy, it is necessary to determine how they generally correlate with the company's strategy and

efficiency.

Analyzing the classification of intangible assets of various sources, it should be noted that heterogeneous in composition, in the nature of use, in the degree of influence on the financial condition and results of economic activity.

Domestic sources of classification of intangible assets are the Tax Code of the Russian Federation (clause 3 of article 258 of the Tax Code of the Russian Federation) and accounting regulations "Accounting for intangible assets" (paragraphs 3, 4 of Accounting Regulations 14/2007) [3,4]. According to them, IA includes: inventions, utility models, industrial designs; trademarks, service marks, appellations of origin; computer programs, databases; integrated circuit topologies; selection achievements; blueprints; models; plans; "know-how"; information resources and operations with them; objects copyright or similar rights.

The main foreign sources containing classifications of intangible assets include IFRS (IAS) 38, IFRS 22 (business reputation accounting), methodological guide No. 8 (valuation of intangible assets) [2].

A number of works of foreign scientists are also devoted to the classification of intangible assets [5], [6].

For example, according to R. Reilly's classification, intangible assets are differentiated according to the following features (Figure 1) [6]:

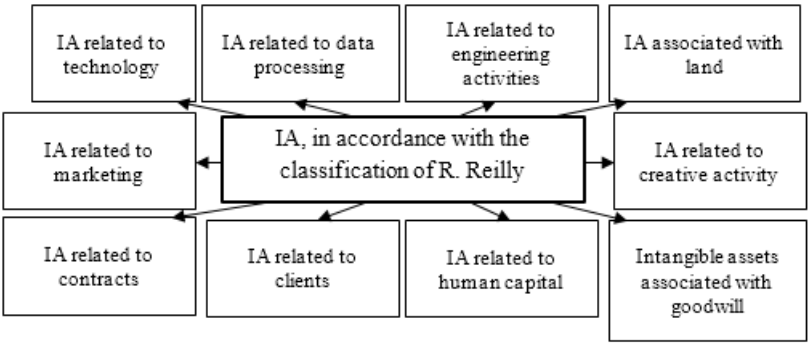

Figure 1 - Classification of intangible assets by R. Reilly.

According to R. Reilly, IAs associated with technologies can exist in the form of patents for technological processes of an enterprise, patent applications, technical documentation, technical know-how, etc. Intangible assets that are associated with data processing may include proprietary computer software, software copyrights, automated databases, and integrated circuit topologies. The intangible assets associated with engineering activities include industrial designs, product patents, production secrets, engineering drawings and schemes, projects, proprietary documentation. IA,

associated with a land plot, an enterprise may have in the form of rental rights, rights to develop mineral deposits, servitudes, rights to airspace, rights to water space. IAs identified with creative activity can exist in the form of literary works, copyrights to literary works, publishing and staging rights, musical works, maps, engravings, etc. Intangible assets associated with marketing include the ownership of trademarks, brand names, trademarks, logos. The IAs associated with contracts include lucrative contracts with suppliers, license agreements, franchise agreements, non-participation agreements. Intangible assets associated with customers (for example, customer lists, contracts with customers, customer relations, open purchase orders) should be considered separately. IA as human capital includes recruited and trained labor, employment contracts, agreements with trade unions. Intangible assets associated with "goodwill" are considered in the form of business reputation of an organization, business reputation of a professional practice, personal reputation of a specialist, celebrity reputation, total value of a business as an operating enterprise.

Also, a number of domestic and foreign researchers identify intangible assets with the intellectual capital of the company [1, 5] (Figure 2).

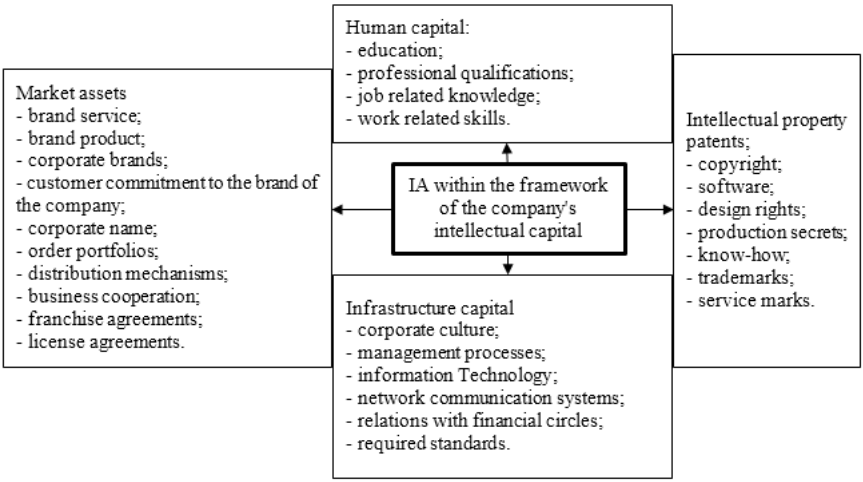

Figure 2 - Intangible assets in the framework of the company's intellectual capital.

Summarizing the above, it is necessary to conclude that the composition of intangible assets of a company can be significantly expanded, rather than identified by regulatory sources [3, 4].

However, all these objects can be estimated in value equivalent. Therefore, they can and should be taken into account in the management of the enterprise, as assets that allow to bring future economic benefits and competitive advantages.

Analyzing the existing classifications, it is necessary to especially note that domestic companies need to pay attention not only to identifiable and evaluated intangible assets, but also unidentifiable, which, however, affect the efficiency of the company.

The rational management of such assets involves the use of modern means of managing companies. By identifying, taking into account and managing intangible assets that are not taken into account by official documents (such as goodwill, brand, intellectual capital, etc.), you can increase the efficiency of the company, its market value. However, just owning such assets is only part of the deal. To build up your competitive advantages, it is necessary to inform the market (potential counterparties) about the advantages you have that are not available to competitors. To do this, you need to properly manage them, that is, to market. Marketing tools come to the rescue, such as, for example, PR.

According to research, the cost of modern successful Western companies consists of two components: tangible and intangible assets, and the latter have undeniable advantages. All investments, for example, in the brand of the company bring real returns. That is why one of the main tasks of the PR departments of large corporations is to develop an effective and long-term PR strategy to promote the brand and other IA companies.

Based on this, we can conclude that one of the most important areas of modern management is the management of intangible assets, such as brand, business reputation, product and corporate brands, etc., as well as their promotion.

For example, reputation management is very important in a highly competitive market. No company can insure themselves against the scandal started by competitors. And any negative information about the company based on the claims of consumers, the actions of competitors, errors of controlling structures or the consequences of natural disasters, can cause significant harm to the company. Consequently, the formation of a positive business reputation is not only an investment in the promotion of your goods and services, an increase in the value of an enterprise, but also a certain level of protection for business from unfair competition.

One of the promising areas of implementation of a set of measures for reputation management is usually referred to as SERM (Search Engine Reputation Management). In Russia, the direction of "Reputation Management" as a service began to actively develop about three years ago.

The initial stage of this process was Yandex.Market, which focused on user feedback. Therefore, at that moment, Russian companies began to monitor the demand for services, trying to understand why potential customers, when entering the site, did not place an order. After a while, it came to the realization that it is impossible to ignore the fact that users (end users) read reviews about the company on the Internet. As a result, Reputation Management has become a popular service

in the B2B market.

At the moment, in the process of reputation management, a company can work with several systems, such as the SERMometer, IQBuzz, SemanticForce, BrandSpotter and others.

For example, SERMometer is a service for monitoring reputation in Yandex and Google. This tool allows you to determine if a search engine page is in sight of the search engines, and if the review is located at the beginning or end of the page. The service determines the tone of the review (negative, neutral, positive), marking them accordingly and collecting screenshots.

Of course, it cannot be said that the use of this or other automatic monitoring services is possible without the help of experts in the field of reputation management. But the use of automatic monitoring tools, such as IQBuzz, Opiner, YouScan, Kribrum, working as small search engines, significantly increases the efficiency of the company's reputation management process.

When working with reputation management on the Internet, it is necessary to evaluate such indicators as coverage and involvement. Coverage refers to the number of users who have viewed a post, and engagement is characterized by the number of users who have somehow participated in the discussion. The same applies not only to comments, but also likes and reposts.

The main goal of the company's reputation management is to identify negative reviews and reduce their negative effect. It is important to neutralize the development of coverage by veering negative discussion into a non-public channel of communication. For example, to offer customers to resolve a negative issue in personal correspondence, by e-mail, by phone.

In the process of promoting intangible assets, the company should also pay great attention to business relationships that you have. According to many entrepreneurs, “Business ties are the same money.” Evaluating a partner’s contribution to a business in the form of business connections, their effectiveness, it is possible to compare with a contribution equivalent to money, property, knowledge, business reputation, skills, abilities, etc. In the business field, it is important to seek and maintain the necessary contacts.

Studies by Western economists and politicians show that there is a direct dependence of the company's value on the effectiveness of its public relations. However, in Russian practice, the use of such a promotion tool is obviously not for everyone.

Indeed, networking is not only an activity aimed at solving complex business problems and tasks as quickly as possible with the help of a circle of friends as quickly as possible (example: finding customers, hiring the best employees, attracting investors). Networking can and should be used to promote your products, services, your brand.

And this is not about official meetings with fellow businessmen, but about various informal events. As an example, the foreign practice of inviting a special person to a banquet who is well-versed in relevant financial information, updated with the latest business news, as well as rumors, can be cited. This specialist can recommend a list of required invited guests, who with whom to place next to the meeting. This allows you to maximize the opportunities to solve mutual issues of the guests. As a result of such informal events, strategic issues of cooperation are resolved, and then the partners meet formally in order to settle formal issues and sign an agreement.

Such meetings can be organized not only at banquets, but also at other informal events. For example, to invite a potential partner to a sports match or to the theater, combining business and hobby. The informal setting allows you to communicate more freely and on the other hand does not commit to anything. Invitations can receive both existing and potential customers, as well as managers with whom you would like to get to know better. Such events help to develop a business and expand the network of useful contacts.

You should always pay attention to everyone you deal with. You should not rush to conclusions if it seems to you that your acquaintance does not belong to your business environment. He may know other people, including your potential customers. By communicating with different people, you can promote your products and services to different target segments. It is possible that this will increase your target consumer segment.

Word of mouth, Word-Of-Mouth marketing is another effective promotion channel. You can and should acquaint your colleagues, so they can be useful to each other and to you. On this network you can run information that goes on "by itself". In response, you can get the right dating, new ideas, opportunities and suggestions.

A key success factor in networking is self-reminding, follow-up contact. It is important not only to get acquainted with a potential partner, but also to find an opportunity to exchange contacts, remind yourself after a short time. For example, in the form of an e-mail with a brief description of a few moments of the meeting, to invite to any of your event. Thus, the necessary connections must be maintained, consolidated and developed.

In addition to networking, another effective modern promotion tool is customer interaction, namely, customer loyalty. A consumer who regularly buys a product, while experiencing emotional affection and deep satisfaction with the brand, becomes loyal to him.

In addition, loyalty programs are becoming more closely integrated with other business processes of the company related to customer contacts.

The main strategic goal of a modern company is to create a new customer

experience that can combine various channels of interaction between the brand (and other intangible assets of the company) and the buyer. The possibility of real management of the loyalty of the company's customers is based on the expansion of the scope of programs. Traditional schemes in their pure form, such as charging and writing off bonuses for purchases, confirm the ever lower efficiency. As modern means of increasing customer loyalty, the following can be noted:

– for example, programs on the "piggy-bank" principle, which imply accrual of incentives (bonuses, points) with each subsequent purchase of goods or services. Such schemes are one of the most flexible, almost any buyer can join, there is no link to the achievement of certain amounts of purchases and time limits. Thus, the more a client spends, the better the reward he receives.

– program on the principle of "club", which does not provide for upward movement. The client reaches a certain level, respectively, becomes a member of the club and receives the entire set of privileges. Thus, the club is a program for the elite.

– accrual of additional bonuses, receiving discounts for reposts in social networks. Thus, we again return to the effect of “word of mouth” (WOM marketing), when customer confidence is not born on the basis of promises of advertising, but is based on the opinions of customers who acquire the brand and are loyal to it.

However, such schemes are most appropriate for a wide client base.

It should be noted that the value of remuneration for buyers is not determined only by its value. Sometimes it is enough to show attention, to understand the desires and needs of customers.

This study allows to conclude that the structure of intangible assets of the company can be significantly expanded by the assets of the company, which can not be taken into account according to existing regulatory and legal sources. However, with such assets, the company can significantly improve its performance by identifying, accounting for and managing them. Using modern tools to promote such assets, informing the market and, in particular, consumers, about the advantages of the company, they thereby increase their competitive advantages, expanding the sphere of their influence.

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研究住房负担能力与人口收入和支出的关系
STUDY OF THE DYNAMICS OF HOUSING AFFORDABILITY IN RELATION TO INCOME AND EXPENSES OF THE POPULATION (on the example of the Kabardino-Balkar Republic, Russia in 2010-2015)

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注解。 该研究致力于根据CBD人口的社会经济差异来确定和分析住房负担能力的动态，不仅考虑到收入，还考虑到不同层次人口的消费支出，这提高了准确性和 结果的可靠性，而不是联邦目标计划的标准值，等于54平方米，作者使用研究期间房地产交易中已实现对象的面积（和成本）的实际指标（ 2011-2015）基于统计数据的登记，反映了关于KBR经济潜力的最完整，最可靠的信息。 这些标准提高了可靠性，是研究的新手。

关键词：住房价格与收入比，可达性指数：运营与社会； 联邦目标计划（FTP） - 2015-2020联邦目标计划“众议院”，人口的社会经济差异。

Annotation. *The study is dedicated to identifying and analyzing the dynamics of housing affordability based on the socio-economic differentiation of the population of the CBD, taking into account not only income, but also consumer spending of the population of different layers, which increases the accuracy and reliability of the results, also instead of the standard value of the federal target program, equal to 54 sq.m., the authors use the actual indicators of the area (and cost) of realized objects in real estate transactions for the study period (2011-2015) based on statistical their data register, reflecting the most complete and reliable information about the economic potential of the KBR. These criteria increase reliability and are new to research.*

Keywords: *housing price to income ratio, accessibility index: operational and social; The Federal Target Program (FTP) - the federal target program "House" for 2015-2020, the socio-economic differentiation of the population.*

The real estate market is central to any economic system, acting as an essential

component of the national economy. The indicator of the provision of population with residential real estate is one of the most important indicators of the well-being of the population. Thus, in developed countries, 44.4 m^2 per inhabitant, in the Russian Federation – 23 m^2, in KBR in 2016 this figure was 19.1 m^2 [4].

Housing affordability is the most important socio-economic indicator that reflects the demographic, socio-economic characteristics of the current level of welfare of the population, the parameters of the budget-regulatory and credit-financial system, pricing and tariff policies in the field of housing.

Used in international and Russian practice, the concept of affordability means the ability to purchase housing by the consumer and is determined by the share of expenses of the total family income for the purchase of housing and annual payments on interest rates of the bank for a loan.

Analysis of the literature on the studied problem shows that there are many approaches to the study of housing affordability by foreign and domestic authors.

In UN practice [8], the housing price to income ratio is used to estimate housing affordability, which is calculated as the ratio of the median housing cost to the median size of household income for the year. The value of this indicator corresponds to the number of years during which the family can save up for an apartment under the assumption that all money income received will be deferred for the purchase of an apartment.

Abroad, for example in the USA or in the framework of the UN housing program [8], when calculating this indicator, the values of the median market price of housing and the median annual household income are used.

In Russia, due to the lack of data on median incomes and median housing prices, the housing affordability factor is in accordance with the FTP "House" method [5] and is calculated based on the values of the following indicators: the average price of 1 square meter. meters of housing, average per capita cash income multiplied by 3 (a family of three), and the social standard of the housing area corresponding to this family size is 54 sq. m.

In connection with these contradictions of the lack of data on median prices in Russia for housing, we in our study propose to use the average value of the area based on the sales transactions made, differentiating them by different types of real estate: residential premises, land plots, buildings, construction in progress for the study period, which, in our opinion, will increase the accuracy of measurements.

Also, to improve the reliability and accuracy of determining the affordability of housing and its dynamics, housing affordability is established in conjunction not only with per capita incomes, but also with population expenditures based on the socio-economic differentiation of the population. These criteria underlie the novelty of our research.

The objective of the research: to identify the availability of housing in KBR

and to establish its dynamics in conjunction with the average per capita incomes and expenditures of the population for the study period 2010-2015.

The subject of the research is a set of indicators characterizing the affordability of housing for the population in KBR: social, operational accessibility, purchase and sale transactions of various types of real estate objects: land plots, residential premises, construction in progress and buildings for the period under study.

Housing affordability for the population is an integral category in which the main socio-economic, demographic characteristics of the region, the parameters of the credit and financial system, etc. are combined.

In domestic and foreign theory, different approaches are determined for studying and determining the level of housing affordability, but the solution to the problem of providing the population with housing depends primarily on the solvency of consumers in the housing market. The solvency of consumers, in turn, is determined by the ratio and dynamics of population income and housing prices. The ratio between prices in the housing market and incomes of the population characterizes housing affordability and can be calculated as an indicator of affordability that determines the population's ability to purchase housing.

The basis of the housing policy of the Russian Federation is the UN-HABITAT method [8], in which the housing price to income ratio (ИДЖ) is determined by the number of years required for the average family to accumulate funds for the purchase of the average housing, provided that all income households will be directed towards these goals [4]:

$$\text{ИДЖ} = \text{С}/\text{Д}\ , \qquad (1)$$

where ИДЖ — housing price to income ratio;

Д — average household income, consisting of one person, rubles / year;

С — average cost of housing, rub.

Social stratification obliges to distinguish between the concepts of commercial and social affordability of housing. The criterion of commercial affordability of housing is the ability of a household to pay, when applying for a long-term loan, an initial installment, which amounts to about 30% of the cost of purchased housing and make loan payments, which should not exceed 35% of total income. The concept of social affordability applies to the part of households where, due to low income, there is a discrepancy between the accepted minimum standard of living, the minimum housing standard of living and real living conditions. Indicators of social accessibility characterize the possibility of receiving free or partially free housing and can be expressed as a percentage of the number of people waiting in a row who receive free housing during the year, and the total number of citizens queuing up to receive free housing [1].

Of practical interest is not only the assessment of housing affordability during its acquisition, but also at the operational stage, that is, the assessment of not only

investment, but also operational affordability of housing. At the operational stage, accessibility should be assessed by comparing the current costs of housing maintenance and the current household income:

$$Ид = Зэ/Д , \quad (2)$$

where Зэ — the average cost of operating housing, tax payments, current operating costs (repairs and maintenance), the cost of servicing credit obligations [3].

Consider the method of assessing the affordability of housing in the Federal Target Program "House". In it, due to the lack of data on median incomes and median housing prices, the UN method is used to calculate housing affordability. It is assumed that the household consists of 3 people, and the average cost of housing is determined by calculating the average cost per square meter and the total area of housing 54 m^2 [7, С. 107–112].

$$ИД = (См . 54) / Дсд * 3*12 , \quad (3)$$

where ИД — housing affordability index;

См — cost of 1 m^2 of housing, rubles.;

Дсд — per capita monthly income, rubles.;

54 — conditional apartment area, m^2;

3 — number of household members, people.;

12 — number of months in a year.

In FTP "House" two corresponding indicators are proposed:

housing affordability ratio, the proportion of families who have the opportunity to purchase housing that meets the standards for providing housing with their own and borrowed funds.

These techniques are simple to calculate, but not without some disadvantages. In particular, accessibility indicators, given the significant differentiation of citizens in terms of income, should be calculated by individual income groups. It is also important to take into account consumer spending of the population, changes in income, housing costs and other parameters when assessing the real investment opportunities of the population.

$$Ид = С/ (Д–П) , \quad (4)$$

where П — household consumption expenditure.

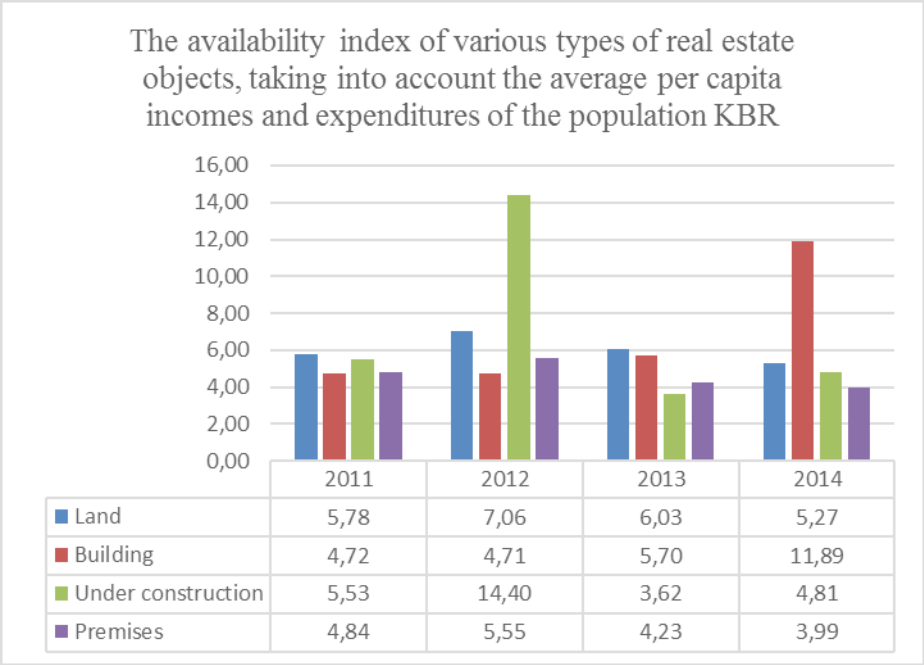
In our study to assess the affordability of housing in KBR, taking into account consumer spending of the population instead of the standard value of the area, equal to 54 sq.m under the FTP program, we use indicators of the area of realized types of real estate (residential premises, plots, buildings, construction in progress) in their dynamics for the study period 2011-2015 based on the Federal Register, reflecting the most complete and reliable information about the economic potential of KBR, which is the novelty of our research.

$$ИД=(См*54)/(Дсд-Др)*3*12 \quad (5)$$

According to the assessment of housing affordability on the basis of the differentiation of realized properties, the following results were obtained for the study period.

As can be seen from Figure 2, the number of years required by an average family of 3 people to buy an apartment of 54 sq.m. Taking into account expenses, it is significantly higher than without taking it into account, but it answers more to the realities of life than it is of greatest interest in our study.

According to the obtained results, the least accessible in the acquisition are buildings (in 2014 ИД = 11 years) and construction in progress (in 2012 ИД = 14 years) in a different time range (chart 1), but we will exclude them, since they are for the average family, and generally not of interest.



	2011	2012	2013	2014
Land	5,78	7,06	6,03	5,27
Building	4,72	4,71	5,70	11,89
Under construction	5,53	14,40	3,62	4,81
Premises	4,84	5,55	4,23	3,99

Figure 1. Identification of ИД based on per capita income and expenses

The housing affordability index is decreasing by 2012 by 2014, reaching a value of 3.98, which indicates an increase in housing affordability. But, it should be noted that the real indicator of affordability of residential premises in 2014 is lower than that planned under the state program "Provision of housing and utilities for the population of the Kabardino-Balkarian Republic" until 2025, according to which the ИД in 2014 is. According to preliminary estimates, it should be equal to 3.2 years, and the real indicator is 3.99, thus the number of years needed to

accumulate funds for the purchase of residential premises in 2014 is higher than planned by 0.79, respectively, housing affordability is lower than planned by the state project.

According to the assessment of housing affordability on the basis of the socio-economic differentiation of the population by average per capita cash income, the following results were obtained for the study period 2010-2015.

In 2011, when the subsistence minimum of the population was 4891 thousand rubles, 14.6% of the population, whose salary is below 7,000 rubles, could not expect to buy a living space with an area of (S = 51.7 sq.m).

Population categories of 19.7% with incomes (from 7,000 to 10,000 rubles), slightly above the subsistence minimum, were necessary for the accumulation of funds of 21.95 years.

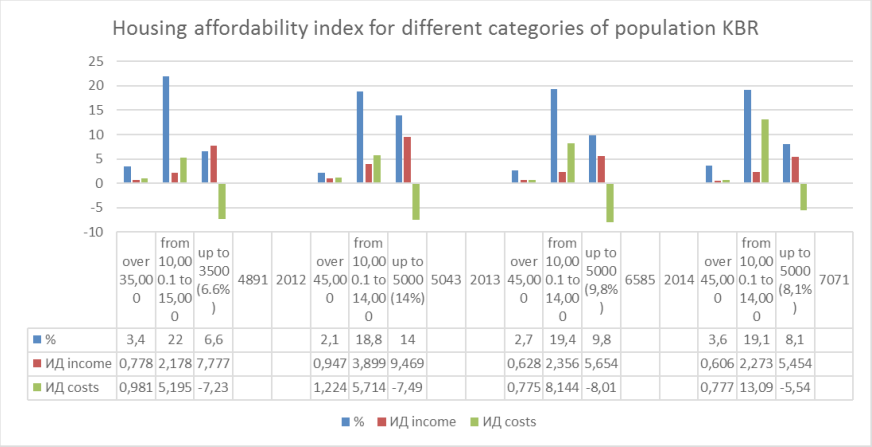


Figure 2. ИДЖ based on the socio-economic differentiation of the population

For the majority of the population at 22% with the average per capita cash income in the range from 10,000 to 15,000 rubles, it took 5.19 years to accumulate the necessary funds for the purchase of an average apartment, taking into account current prices (18,146.84 rub/sq.m) And expenses (Figure 2).

The population of 18.5% with income from 15,000 to 25,000 rubles. for the accumulation of funds for the acquisition of the average housing required 2.14 years, taking into account the total income of a family of 3 people.

A small population with high per capita incomes in the range from 25,000 to 35,000 (5.7%) and above 35,000 (3.4%) to purchase an average apartment of 51.7 sq.m it took on average less than a year (1.19) and (0.98), respectively (the graph

does not reflect all, but individual research data).

Thus, as a result of a study on the affordability of housing under the FTP program in our modification, social and operational, the following **conclusions were made**:

In 2011 to accumulate funds for the purchase of an apartment with a living minimum of 4891 rubles, the vast majority of the population of 30.7% required 21 years, taking into account real estate prices at that time and indicators of average per capita incomes and expenses. In 2012, for the majority of the population at 46.1% with an average per capita cash income of 70,000 to 9,998 rubles, housing affordability increased and the ИДЖ was 17 years, i.e., both the accessibility indicators and the percentage of the population that have the opportunity the accumulation of funds during the specified period of time, the cost of living also increased, reaching 5043rub. This echoes the data of the Register of Registers, according to which the maximum number of residential sale and purchase transactions (15258) was established in 2012. In 2013, with a living wage of 6585 rubles, the percentage of the population with indicators of per capita cash income from 7000 to 9999 rubles. decreased, reaching 39%, as well as housing affordability indicators. For this category of population, ИДЖ was 25 years old. In 2014, housing affordability increased, reaching 19 years, but for a small percentage of the population at 34.8%.

Indicators of housing affordability in the primary market increased, but only slightly. The commissioning of housing for the study period increased and, if in 2013 these figures were lower than those planned under the state program (Тпр = -5.3), then in 2014 the real indicators of housing construction surpassed the planned total for KBR (Тпр = 21.8) our research.

The indicators of **operational** availability decreased due to the increase in the average cost of housing operation, tax payments, current operating costs (repair and maintenance), the cost of servicing credit obligations (see table and diagram of operational availability). This indicates high costs with low incomes for the majority of the population and the need to address them.

Indicators of **social accessibility** have increased due to state support of the population, which was in the queue for the purchase and improvement of housing conditions.

Thus, the indicators of housing and operational accessibility have decreased, and social accessibility has increased due to state support of the population for various federal projects, which indicates different state programs in support of improving the living conditions of the population, but at the same time, it is necessary to note the insufficiency of these programs due to the excess of expenses over income most of the population and the need to resolve them to prevent the growth of the identified social stratification.

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在数字化背景下评估该区域的经济安全，作为制定其发展战略的基础
ASSESSMENT OF ECONOMIC SECURITY OF THE REGION IN THE CONTEXT OF DIGITALIZATION AS A BASIS FOR THE DEVELOPMENT OF ITS DEVELOPMENT STRATEGY

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The realities of modern development are such that the further development of the Russian Federation and its regions should be based on the challenges of the digital economy, as evidenced by the practical implementation of the Digital Economy Program, as well as by the May decree of Vladimir Putin, President of the Russian Federation. of May 7, 2018, No. 204 “On the national goals and strategic objectives of the development of the Russian Federation for the period up to 2024”.

The Bryansk region should rightly be attributed to the leaders in the implementation of digital competencies and technologies. Digital transformation is actively taking place in healthcare, agriculture, and the real sector of the economy. In the region, a center of digital competencies has been created on the basis of the Bryansk State Engineering and Technology University, which deals with projects in the field of blockchain technologies and machine learning and has a base of real projects to improve the efficiency of the economy, and in March 2018 the first conference in the region devoted to challenges Digital economy, which brought together scientists, representatives of business, government, telecommunications companies with a view to developing proposals for the further development of the Bryansk region.

It should be noted VI Slavic International Economic Forum, which was held in Bryansk on November 2, 2018 and was the main area for the exchange of experience in the field of digital technologies. Its main topic was “Economics in the digital ecosystem”, which also confirms the hypothesis — the digital economy is

a strategic vector of development of regions and the state in the coming decade.

In the rapidly transforming conditions of modern economy, the ability to ensure the security of regions and the state in particular, from the impact of internal and external threats determines the degree of competitiveness and the dynamics of socio-economic development. Digital economy sets new trends in socio-economic development, but at the same time entails a number of threats, especially with regard to information and economic security, both of the state and of a single region [1].

The term "regional security" is used in studies of elements of the international space that have been identified for any reason. So, Bashkunov A.A. regional security is formulated as a state of security of a homogeneous (in the system of a mono-national state) and a heterogeneous (in a system of a multinational state) geosociopolis.

Blinichkina N.Yu. Regional economic security is considered in the context of countering the threats of a region that includes the states of Central Asia: Tajikistan, Kazakhstan, Turkmenistan, Uzbekistan, and Kyrgyzstan [2].

At the same time, the authors understand the "regional economic security" as the identical concept of the "economic security of the region". For example, Dyachkovsky D.K. notes: "For the subjects of the Federation, regional economic security reflects, first of all, the state of opportunity and the ability of authorities and society to ensure sustainable development within the regional economy, taking it as an integral and complete structure, which is characterized by the specificity of living conditions and habitats of the region's population compared to the general conditions of the state to which this region belongs." In the Concept of Regional Economic Security, this concept is considered as a preventive system - a system for preventing a crisis in the region in advance.

"According to Cheremisina N.V., the region's territory and all elements of its economy within this territory are the objects of economic security in the region. From the context of the author's article, it follows that under the region it is considered a subject of the Russian Federation "[4].

It should also be noted that in the definition formulated by the author, the territory does not distinguish as an object. Under the economic security of the region Cheremisina N.V. understands the ability and ability of its economy to improve the quality and standard of living of the population, to resist the influence of internal and external threats, to ensure the socio-economic and socio-political stability of the region. Returning to the second part of the objects of economic security proposed by Cheremisina N.V., to the elements of the economy within the territory, and comparing them with the definition, the absence of a single basis in understanding the essence of the concept of "economic security of a region" and its objects becomes apparent.

We will conduct a comparative analysis of methodological approaches to assessing the level of economic security of a region in the conditions of digitalization of the economy. For this we turn to the data presented in table 1.

Considering the modern developments of domestic scientists and economists, we can conclude that the economic security of the region, as a definition, has not been fully studied.

Table 1- Methods for assessing the economic security (ES) of the region

The authors	The essence of the methodical approach	"Narrow places"
Senchagov V.K. Glazyev S.Yu. Voronin P.M. Novikova I.V. Krasnikov N.I. Kopytov A.V. Makeeva F.S. Denezhkina I.E. Suzdaleva D.A. Kalina A.V. Savelieva I.P.	The technique is easy to use. Gives an idea about the dynamics of the indicator ES relative to the threshold value.	The lack of a system of indicators of ES regions with certain threshold values.
Buyanova M.E., Dyatlov D.A.	The main focus is on assessing the financial security of the region. The technique gives an idea of the dynamics of ES.	There are no thresholds in this technique..
Mityakov S.N. Mityakov E.S. Romanov N.A. Kopytov A.V. Makeeva F.S.	The methodology is based on the ranking of indicators depending on the distance from the threshold values. The final score is more accurate, because all indicators are saved, problem areas and growth points are visible	Complex formulas for normalization of indicators
Goncharenko L.P. Utkin E.A. Denisov A.F.	The possibility of forecasting the level of ES in the future based on the qualitative measurement of damage	This technique is more suitable for an individual enterprise, and not for a region.

Dyuzhenkova N.V.	Accurate assessment of ES level based on multivariate statistical analysis. It provides an opportunity to compare regions not only for each indicator of ES, but also for the general state of ES.	The calculations are cumbersome. Methods of mathematical analysis can not always serve as a reliable tool for assessing the state of socio-economic processes occurring in the region.
Guk S.V.	This system of assessing the state of ES will allow monitoring of threats in order to prevent them from reaching a critical state..	There are no thresholds; there is a high probability of subjectivity, the inability to prove the results obtained on its basis with exact characteristics.
Tretyakov D.V.	The methodological approach is based on an assessment based on an integral indicator. The transition to a single dimensionless value, which is very important for the system of proposed indicators that have different units of measurement.	Methods of mathematical analysis can not always serve as a reliable tool for assessing the state of socio-economic processes occurring in the region.

Subject to discussion approaches to understand the essence of this system, structural elements, risks, threats. In particular, it should be noted that the proposed methodological approaches to assessing the economic security of the region, especially in the conditions of digitalization, make it impossible to obtain incomplete estimates, which makes it difficult to develop strategic directions for development, make adjustments to socio-economic development programs, and analyze planned targets.

In order to make sure of the reliability of our judgments, we will analyze the level of economic security of the Bryansk region in comparison with other subjects of the Central Federal District according to the method of Tretyakov D.V. We will use official statistics for 2010-2016 as an information base for the study.

The data of values of integral indicators are presented in Appendix B. The assessment of the levels of economic security of the regions of the Central Federal District for 2010 has the following values; the following regions have a low level of economic security: Belgorod, Kostroma, Lipetsk, Moscow, Orlovskaya, Smolensk, Tver, Tula, Yaroslavl regions as well as a city of federal significance, Moscow, and all other regions of the Central Federal District were at a crisis level of economic security.

We will carry out a more detailed structural analysis of economic security in-

dicators, using the example of the Belgorod, Bryansk and Kostroma regions for 2011-2015.

Assessment of the economic security of the Belgorod region for 2011-2015 presented in table 2.

A comparative analysis of the level of economic security of the Bryansk, Belgorod and Kostroma regions showed that each region is characterized by a huge number of threats to economic security. Especially in the field of the state of scientific potential, the dependence of the regional economy on the import of the most important types of products. On the whole, 2015 can be described as a systemic crisis in all regions.

Assessment of economic security in the context of the Central Federal District regions for 2016 according to the methodology Tretyakova D.V. presented in the figure.

According to the figure, we can conclude on the following distribution of levels of economic security in 2016. Thus, at the critical level of economic security there was one region - Kostroma, at the crisis level the following regions: Ryazan, Vladimir, Tver, Bryansk, and all remaining subjects of the CFD in 2016 were at a low level of economic security.

Table 2 - Comparative analysis of the level of economic security of the Bryansk region

Year	The ability of the region's economy to sustainable growth	Ensuring food independence	Financial System Resilience	Support of scientific potential	Dependence of the regional economy on the import of major products	The level and quality of life of the population	Demography	Total
Bryansk region								
2011	high	crisis	crisis	critical	critical	high	low	crisis
2012	low	low	normal	critical	critical	normal	low	low
2013	low	low	high	critical	critical	normal	low	low
2014	normal	low	low	critical	critical	normal	low	low
2015	low	low	low	critical	critical	normal	low	crisis
Belgorod region								
2011	high	low	low	critical	critical	low	normal	low
2012	high	low	high	critical	critical	low	low	low
2013	high	low	high	critical	critical	low	low	low
2014	normal	low	low	critical	critical	low	normal	low
2015	low	low	crisis	critical	critical	low	normal	crisis
Kostroma region								
2011	low	crisis	high	critical	critical	low	low	low
2012	low	crisis	crisis	critical	critical	low	low	low
2013	low	low	high	critical	critical	low	low	low
2014	low	low	high	critical	critical	low	low	low
2015	low	low	low	critical	critical	low	low	crisis

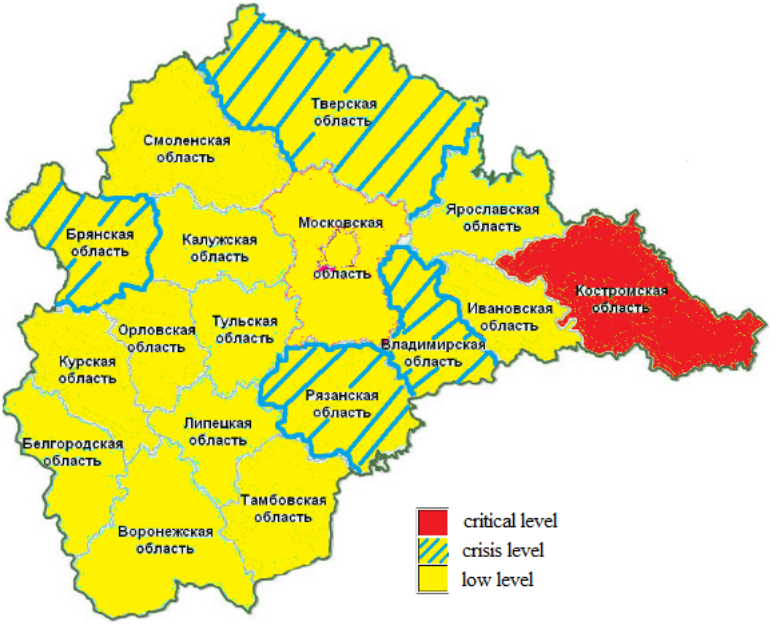

Fig.1. The level of economic security of the subjects of the Central Federal District in 2016

The results confirm the feasibility of adjusting the strategies of socio-economic development, the search for new innovative management tools in the conditions of digitalization. For example, consider the possibilities of machine learning to improve the efficiency of socio-economic systems and increase their level of safety [2]. At the same time, it is necessary in strategies to pay attention to the target indicators of the digital economy program and their linkage with the indicators of the economic security of the regions. One of the leading roles in this case is assigned to project management in the regions.

It should also be understood that the economic security of the region has pronounced features due to natural resources, geographical location, climate, population, infrastructure development, etc. The existing strategies for ensuring the economic security of regions require new methods, mechanisms and tools adequate to modern economic conditions. in particular the challenges of the digital economy.

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博客作为俄罗斯劳动力市场中一种新的自营职业形式：发展史和前景
BLOGGING AS A NEW FORM OF SELF-EMPLOYMENT IN THE LABOR MARKET IN RUSSIA: HISTORY OF DEVELOPMENT AND PROSPECTS

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注解。 本文描述了“博客”的特征，提供了它的分类，以及作为一种职业的这种活动的收入形式。
关键词：博客，博主，营销影响力
Annotation. *The article describes the features of the "blogger", provides its classification, as well as forms of income from this activity, as a profession.*
Keywords: *blog, blogger, marketing influence*

“Tired of hard routine work for pennies and you want to change - create your own blog, which will become a source of good earnings, and in the future even be able to generate multimillion-dollar incomes”: “obtrusive advertising” in all social networks and search engines replete with such slogans. Creating YouTube videos, Instagram photos and Twitter messages in recent years has turned from a hobby for young people into a prestigious and fashionable high-income profession - every year more and more Internet users see it as their main source of income.

Millions of users bring money to bloggers, subscribing to their channels and personal accounts. So, if you spend a little time on the “promotion” of your blog, the profit will not make you wait - this has already been proven by popular bloggers from Russia. But what are the peculiarities of this type of self-employment or how it is classified by the sphere of the labor market - structural unemployment.

First you need to define the word blogger. A blogger can be defined as a person who has a personal account in one of the popular networks (determined by the number of officially registered users) and with the actual frequency chosen places informational content (of various forms: video, photo, text, etc.). In turn, a blog is a form of an electronic diary for which hosting is required on the Internet, which can be accessed by an unlimited number of people [1, p.23].

Typically, a blog has only one topic, but sometimes people lead them on sev-

eral topics, recording all their thoughts or responding to the needs of the subscribers themselves. In the new version of Instagram, the new "question-answer" and "polling" features have made this form of building up the content structure much more convenient.

At the very beginning, blogs were simple forms of keeping an electronic diary, they were very convenient because they were on the Internet. It was not necessary to take a notebook and write it manually for a long time, periodically buying a new one. In a blog situation, a person went online and described what was happening in a day, usually for a long time. The authors of the electronic diary, as a rule, wanted to learn how to express their thoughts, better understand their life, set goals for the future, etc. Many people kept a diary on the recommendation of a psychologist, or it was a fairly prolonged habit left from school years. Only then did bloggers understand that with this activity you can make money.

And here it is necessary to figure out how a blog can bring money to its owner and what its commercial success is based on, what are the features of using a marketing strategy to promote a product or service through a blog.

In modern economic literature, this method of product promotion is called "marketing influence" [2, p. 18]. This concept is not just created, but already uses an impressive historical period of influence on the masses. In the 60s of the last century, this technology of "influence marketing" began to be used by large international brands, which had solid financial resources to attract well-known personalities. An example of this is the large-scale campaigns of tobacco corporations, whose face was Clinton Eastwood, as well as other stars who convinced the whole world that smoking is a sign of masculinity and personal maturity.

Today, influence marketing is experiencing its rebirth, but in a modernized form - through social media channels on mobile devices. Today, influence marketing has grown into a whole research and practical area that has its object, subject, methods, business agencies for consumers and the latest Internet platforms for collecting and analyzing statistical information about the success of existing blogs in Russia and around the world.

The following types of bloggers can be distinguished depending on the type of main employment:

- Business bloggers are bloggers who by all means promote their electronic diary for making money. They are doing everything possible to increase traffic to the blog, attract advertisers, find a profitable affiliate program or sell the blog itself, and so on. Almost all bloggers are currently pursuing this goal, because very few people want to just express their thoughts and talk about their lives, if there is an opportunity to earn a good amount. Although there are people who do not agree with this statement, but in this case it is very difficult to argue their opinion - websites are created to make money, no matter how beautifully they are deco-

rated, the same applies to blogs. Unfortunately, most blogs are abandoned after a failed attempt at making money: someone heard about the possibility of earning, failed to do this, the blog was completely abandoned, and there were thousands of such cases. Of course, we can say that this type of bloggers is combined with other types;

- Hobby bloggers (describing their hobbies) are people who are addicted to something and share their achievements with others. For example, a boxer may talk about holding certain combinations and racks in order to quickly win. But such bloggers before, at the beginning of their activities, did not have the goal of making money. Now every second posting contextual advertising on its resource. In most cases, you can see affiliate programs, such as a boxer, can advertise a store with equipment or fitness clubs and gyms with competent coaches. In rare cases, you can see a similar blog without ads;

- Celebrity bloggers are people who have created a blog for one purpose only - to become famous on the Internet and attract the attention of a huge number of people. Do you often see funny videos on YouTube? All this is done with the aim of earning and attracting attention. In our country, it is enough to take a couple of funny and scandalous videos, post some photos, and they will begin to recognize you on the street. With this blog, you can earn good amount, if attendance is very high. You can also get into any interesting project of like-minded people and, again, earn good money. But such a blog is only suitable for unique and fearless people [3, p.39].

Bloggers can also be divided according to the following classification criteria:

- by content type: video bloggers, photo bloggers, etc.;
- by the social network used as the main channel in which they are “published”: Instagram, YouTube and others;
- on the subject of the blog: "gym bunny", travelers or the blog of "my pet" (conducted on behalf of a cat or dog) and others;
- audience reach: from 100 people to several million.

Income blogger depends on attendance, the more people, the more money. At the same time, the outflow of the audience or its negative reaction to the content of the blogger's message is a potential cause of the collapse of the blogger-worker and the total deprivation of his blog income.

The main forms of earning a blogger are as follows:

- sale of advertising spaces. A blogger can sell advertising, he searches for an advertiser through websites, and then places it on a blog;
- custom posts. In this case, the blogger uses articles with hidden advertising, so that visitors do not get angry at the sight of the article, but rather read it carefully and go to the advertiser’s website. The cost of such articles depends on how high your attendance is, and what the subject of

the blog;

- blog development with subsequent sale. The format is exactly similar to the business scheme associated with the development of a business, its development to relatively large profit indicators and the subsequent sale to another person or agency, only in the place of a businessman blogger, and instead of a business, in this case a blog;
- selling links. All site optimizers buy links in huge quantities to promote the site, so at any moment a blogger can sell links from a blog;
- use of sponsor funds. If a blog has an interesting topic and it is commercial, then a blogger can find a sponsor who will follow the work of the blog, pay for hosting and much more.

A blogger can receive payment for his services in various forms: monetary (most often, transactions are carried out using cashless payments through online banking, which in turn makes it easier for government structures to track the profit channels of people engaged in “blogger activity” or in the form of payment in kind or as it is called in the network environment "advertising by barter", i.e. The advertiser sends the goods to the blogger gratis for receiving positive reviews about the product in the form of advertising aimed at a large audience of the blogger. Also today, the facts of payment for blogger activity in the form of bitcoins (digital money) are noted, but at this stage in the development of blogging in our country it is more of an exception to the rules than the established trend.

The rates of blogging in the Russian Federation are as follows (table 1) [4].

Speaking of bloggers, we can say that this is not only a trend among young people or the mass media, but also a global institution of the new time, which in turn already today has its own legitimate statistical and information agencies involved in collecting information in this area.

Table 1 - Blogger rates based on user reach.

Audience	Income
4-10 thousand people	500-1000 rubles
20-30 thousand people	2000 - 5000 rubles
50-100 thousand people	10,000-30000 rubles
100-500 thousand people	50000-250000 rubles
500-1mln person	500000-1000000 rubles
1 million-10 million people	1500000-5000000 rubles
Over 10 million people	From 100000000 rubles

An example of such a specialized agency is the Russian Bloggers Research Agency (RIAB) - an independent analytical agency for the study of trends in social media. The task of the agency experts is to capture the dynamics of the develop-

ment of the blogosphere and social media in Russia and the world. [5].

RIAB was founded by the Association of Bloggers and Agencies in 2016. It collaborates with six independent opinion agencies on the Internet. The expert team includes leading sociologists and experts in the field of media analytics.

RIAB publishes various ratings and not only among bloggers of the Russian Federation and the world, but also ratings of representatives of show business, companies, statesmen and others.

The rating among bloggers for Q1 2018 according to the RIAB version is as follows (table 2) [6].

Wylsacom has become the richest RBRA blogger. Observer technical innovations managed to increase advertising revenue by 4 million rubles. In the first half of 2018, Valentin Petukhov earned almost 28 million rubles. The products advertised by the blogger correspond to the themes of his YouTube channel: these are smartphones, online stores, applications and games for the phone.

On the second line of the rating is the author of the “Hach Diary” project Amiran Sardarov. The blogger's profit increased 2.2 times and amounted to 27.3 million rubles. Sardarov advertises banks, business forums and entertainment venues.

Three leaders closed the "newcomer" ranking Nikolai Sobolev. According to experts, over the past six months, the video blogger has earned 26 million rubles from advertising in social networks. Sobolev cooperates with online stores, cashback services and online games.

Table 2 - The rating of income of bloggers on the Internet for the first half of 2018

№	Nickname (blog name)	Income for the second half of 2017	Income for the first half of 2018	The main form of the blog as a source of income
1	Wylsacom (Valentin Petukhov)	23890000	27920000	YouTube
2	Amiran Sardarov	12620000	27300000	YouTube
3	Nakolay Sobolev	beginner	26000000	YouTube
4	Yuri Dud	beginner	17600000	YouTube
5	Sasha Spilberg	18840000	17450000	YouTube
6	Oblomoff	beginner	14500000	YouTube
7	Marie Senn	6450000	11550000	YouTube
8	This is Хорошо (Stas Davydov)	14052000	9300000	YouTube
9	Kate Clapp (Ekaterina Trofimova)	12840000	9190000	YouTube
10	Maryana Ro (Maryana Rozhkova)	16575000	8500000	YouTube

On the fourth line is a new research participant - Yuri Dud. However, his advertising revenue is significantly inferior to the income of the top three. The journalist earned 17.6 million rubles. Separately, it is worth noting that in November it was announced that Yury Dud had become an ambassador (representative) of Alfa-Bank for 2018.

In fifth place is Sasha Spielberg. The blogger earned one million less - almost 17.5 million rubles.

Another newcomer to the ranking has become the culinary blogger Oblomoff. The income from advertising restaurants, cafes and banks amounted to 14.5 million rubles.

On the seventh line beauty blogger Marie Senn. On advertising cosmetics in social networks, she managed to earn more than 11.5 million rubles.

Stas Davydov ranked eighth. Leading “This is Хорошо” earned - 9.3 million.

In ninth place is Kate Clapp. The income of this videoblogger was just over 9 million rubles, compared to almost 13 million in the first half of the year.

Maryana Ro - tenth place. The blogger's advertising revenue amounted to 8.5 million rubles. The downward trend may be associated with the decision of the girl to leave YouTube and retrain in the singer.

Thus, it is necessary to ascertain that, by now, blogging has turned from a phenomenon into an ordinary type of activity, widespread, having its own laws of development and being one of the types of self-employment of workers.

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对石油和天然气公司进口替代方案实施情况的分析性审查

ANALYTICAL REVIEW OF THE IMPLEMENTATION OF PROGRAMS OF IMPORT SUBSTITUTION OF OIL AND GAS COMPANIES

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注解。 本文专门讨论俄罗斯在引入经济制裁方面进口设备和产品的问题。 为了研究这个问题，我们考虑了在石油和天然气行业引入进口替代计划的可能性。 指出了减少国家进口依赖性的条件，并考虑了可能的风险。

关键词：进口替代，石油，天然气，燃料和能源综合体，采矿，现代化，制裁，技术，设备

Annotation*. The article is devoted to the problems of import substitution of equipment and products in Russia in connection with the introduction of economic sanctions. To investigate this problem, the possibility of introducing an import substitution program in the oil and gas industry was considered. Conditions for reducing the country's import dependency are indicated and possible risks are considered.*

Keywords*: import substitution, oil, gas, fuel and energy complex, mining, modernization, sanctions, technologies, equipment*

Analytical review of the implementation of import substitution programs by oil and gas companies

Even before the adoption of the import substitution program by the Gazprom PJSC, an innovative program was adopted in 2011, in accordance with which significant funds are allocated to finance research and development (R & D). The main goal of the Program is to continuously increase the technological level of Gazprom to maintain its position as a technology leader in the global energy business.

More than half of the funds allocated for the implementation of technological priorities. Thus, the development of solutions for the production of helium concentrate using membrane-cryogenic technologies was completed, which allows reducing the energy consumption for extracting the concentrate in comparison with

traditional cryogenic technology. A technological scheme was developed for the development of the Kovykta field, work continued on an industrial technology for the production of synthetic liquid fuels from natural gas.

Gazprom continued to increase the share of domestic high-tech equipment in the supply of material and technical resources, as well as to replace foreign machine-building equipment with Russian. In particular, the implementation of the "road maps" concluded with the Voronezh, Omsk and Tomsk regions was carried out in order for local enterprises to develop promising technologies and equipment interesting for Gazprom. Together with the Association of Gas Pumping Equipment Manufacturers, the company implemented a project to create a unified gas pumping unit (GPU) with a capacity of 16 MW. This solution allows to reduce the costs and timing of projects, to improve the efficiency of maintenance and repair of GPU. As a replacement for Western counterparts of Gazprom, Russian complexes of underground equipment for the extraction of gas and oil by the fountain method in a corrosion-resistant design are successfully used.

The program is executed with a high degree of efficiency. As part of the work on innovative development, Gazprom continued the cooperation of RUSNANO OJSC. In particular, joint work was carried out to introduce corrosion-resistant protective nano-coatings at the facilities of the Astrakhan gas processing plant, conducted tests of thermoelectric generators and DC systems on lithium-ion batteries.

Cooperation with 11 leading foreign companies in the energy sector was continued. With three of them, in 2013, the programs of scientific and technical cooperation were signed, which include, inter alia, 13 projects.

The interaction was conducted with nine Russian support universities. Cooperation agreements were concluded with them, on the basis of which three-year research and development programs were formed. In addition, joint programs to improve the quality of education and training were successfully implemented.

Work continued on improving the intellectual property management system, as well as the standardization system.

LUKOIL PJSC, as part of the implementation of measures for import substitution, has increased the volume of purchases of products from oilfield services companies of the Tyumen Region. Over the past 2 years, their cumulative volume increased by half and amounted to almost 1.5 billion rubles in 2016.

LUKOIL has been actively cooperating with residents of the West Siberian Innovation Center (Tyumen Technopark) since its foundation, participating in an expert assessment of the prospects for innovative developments and in the formation of an industrial cluster of the Tyumen Region [2].

Rosneft PJSC is a leader in the process of quality modernization and innovative changes in the Russian oil and gas industry. The company's efforts are aimed

at developing the intellectual and technological potential of the industry based on the powerful foundation of the Russian oil and gas school - one of the best in the world - and in partnership with leading companies in the international oil business.

The fulfillment of tasks on the growth of the technological potential of the company is enshrined in the Innovative Development Program for the period 2011-2015. (approved by the decision of the Board of Directors of the company dated April 1, 2011, minutes No. 34). The document was developed in accordance with the requirements of regulatory legal acts and strategic planning documents of the national, regional and corporate levels. The goals and objectives of the Program support the implementation of the Company's Long-Term Development Program.

The program consists of the following main blocks:

- targeted innovative projects;
- target programs of modernization and increase of production efficiency;
- measures to improve innovation.

Innovative projects of the Program focus on the following
main areas:

- geology and development of hard-to-recover reserves;
- gas production and processing;
- development of offshore fields;
- oil refining and petrochemistry;
- information technology and management innovations.

Innovative activity of the Company is aimed at creating
and the introduction of new technologies to achieve the following goals:

- Block Exploration and production:
- replenishment of hydrocarbon reserves at a level of at least 100% of current production;
- an increase in hydrocarbon recovery rates at new fields, the development of systematic measures to increase oil and gas output at developed fields;
- ensuring the efficient use of associated gas - 95%;
- development of technologies for cost-effective involvement in the development of the use of unconventional and hard-to-recover hydrocarbon reserves.
- Block Recycling:
- increase the depth of oil refining;
- the introduction of new technologies for the processing of heavy residues, petrochemical;
- development of own catalysts (import substitution) [3].

In 2015, in accordance with the instructions of the Government of the Russian Federation No. ДМ-П36-6057 of 09.08.2014 and No. ДМ-П 36-7563 of 07.11.2015, and also in connection with the completion of the implementation deadlines of the current Program (2011-2015), the Company initiated the process

of updating the Innovative Development Program for the period 2016-2020 [4].

The volume of the Company's innovative costs in 2015 amounted to 116.9 billion rubles, while R & D costs amounted to 36 billion rubles. All planned activities for 2015 are fulfilled.

In 2015, the growth of patent activity was continued, special attention was paid to the implementation of the obtained results of R & D and the consolidation of intellectual property rights. Following the results of the implementation of targeted innovation projects in 2015, the Company filed 69 applications for obtaining security documents, including 5 abroad.

Preliminary results of the program implementation show the following. According to the indicators of scientific and technological potential and innovation activity, the group of the largest VIOCs is singled out, especially Gazprom, Gazprom Neft and LUKOIL. They are the undisputed leaders in terms of R & D expenditures (3.2 billion rubles from Gazprom Neft, 5.8 billion rubles from Lukoil and 10.8 billion rubles from Gazprom), and possess the largest scientific and technological complexes with the number of R & D employed in several thousand people (more than 2.3 thousand for LUKOIL and about 2.5 thousand for Gazprom).

Very significant indicators of the size of the scientific and technical potential are demonstrated by AN Bashneft PJSC (R & D costs 1.15 billion rubles), Tatneft PJSC (657 million rubles) and Sibur Holding PJSC (587 million rubles).

Finally, significantly less significant indicators of investments in R & D were recorded in the companies of the closing group: Zarubezhneft (317 million rubles), Russneft LLC (236 million rubles), and very low from INK LLC (about 2 million rubles.).

According to the number of registered patents and patent applications, the leaders are Gazprom and Tatneft. Each of them is patented annually by more than 200 objects of intellectual property. Sibur, LUKOIL and NOVATEK (from 30 to 57 patented inventions) follow with a considerable lag. Even less inventions (less than 15) are patented annually by Zarubezhneft, Gazpromneft and AN Bashneft. Finally, the closure group includes companies whose patent activity is close to zero —INK, Rusneft.

Innovative activity of companies is not limited to activities related to patenting. Lukoil announced the introduction in 2014 of 37 technological innovation projects, as well as the development of 31 new technological processes for the company. Gazprom has identified 13 technological priorities for future development and implementation. Tatneft announced the conclusion of cooperation agreements with 6 research institutes and 6 universities [5].

Analysis of the implementation of the program of import substitution in LLC Gazpromneft-Vostok LLC.

General characteristics of Gazpromneft-Vostok LLC.

Gazpromneft-East was established on September 14, 2005. Gazpromneft-Vostok is 100% owned by Gazprom Neft PJSC.

The main activities of the company are the extraction and processing of oil and associated petroleum gas in the territory of the Omsk and Tomsk regions.

Gazpromneft-Vostok operates at such fields as:

South-Western part of the Krapivinskoe field (Tarsky district of the Omsk region);

Shinginskoe and Yuzhno-Shinginskoye fields (Tomsk region);

Urmanskoye field (Tomsk region);

Archinskoye field (Tomsk region);

East Myginskoye field (Tomsk region)

South Tabaganskoye field (Tomsk region)

Smolynoe deposit (Tomsk region)

Kulginskoe field (Tomsk region)

Solonovskoye field (Tomsk region)

West-Luginetsky and Nizhneluhinsky deposits (Tomsk region).

Additional growth rates of oil production in the company (Figure 1) were provided by the accession in June 2015 of Archinskoye LLC to Gazpromneft-Vostok LLC [6].

In 2014, Gazpromneft-Vostok increased oil production by 18.2% to 1.78 million tonnes. In 2015, we managed to increase oil production by 11.2%. In 2016, oil production increased by 6.3%. Gas production in 2014 increased by 28%, and in 2015 decreased by 11.1% compared to 2014. In 2016, the company increased gas production by 50% [7].

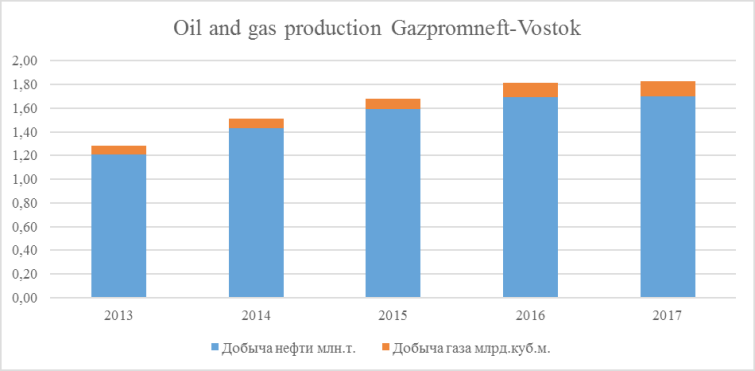

Figure 1 - Gazpromneft-Vostok Oil and Gas Production

In addition to mining activities, the Company also deals with such activities as:

- Capital construction in terms of production drilling (production drilling, well development, geophysical works / services);
- Capital construction in terms of field development;
- Exploration work (seismic exploration, exploration drilling);
- Research and pilot works;
- Work / services in oil production (maintenance and operation of exploration and production wells, collection, transportation, preparation, delivery and release of oil, repair of wells and operations to improve oil recovery);
- Works / services for the extraction of common minerals;
- Works / services for the extraction of groundwater.

The company's activity is financially efficient, which is illustrated by the growth of key financial indicators (table 1).

Financial indicators are taken from PJSC Gazprom reports due to the fact that Gazpromneft-Vostok LLC has this information confidential, as mentioned earlier, Gazpromneft-Vostok LLC is 100% owned by PJSC Gazprom [8].

Table 1 - Financial Results (for Gazprom)

Financial results (mln. rub.)	2016	2017
Revenue including duties (sales) *	1 695 764	2 003 575
Adjusted EBITDA **	456 198	550 967
Profit attributable to shareholders of Gazprom Neft PJSC	200 179	253 274

* Revenue inclusive of duties (sales) includes revenues including export duties and excise from sales

** EBITDA is an additional financial measure that is not defined by IFRS. The calculation is presented in the Appendix.

Results for 2017 compared to 2016:

The total revenue in 2017 increased by 11%. This was mainly due to rising prices for oil and oil products on world markets. Growth in revenue from sales in the international market by 71.6 billion rubles. due to an increase in sales of oil by 72.1 billion rubles. due to the growth in oil exports (+ 26%, 2.3 million tons).

Revenue in the domestic market in 2017 is higher by 57.6 billion rubles. comparing with the previous year. The main indicator of growth is the growth of revenue of petroleum products by 98.3 billion rubles. due to rising prices for petroleum products in the domestic market. Reduction of revenue from oil sales in the domestic market by 49.5 billion rubles. due to a decrease in sales volumes by 43% due to the growth in sales of oil on the international market due to higher sales efficiency [9].

The total number of employees is more than 630 people.

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远东地区高级发展领土（TAD）的前景及其对该地区社会环境的影响
PROSPECTS OF THE TERRITORY OF ADVANCED DEVELOPMENT (TAD) OF THE FAR EAST TOP AND THEIR IMPACT ON THE SOCIAL ENVIRONMENT OF THE REGION

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注解。 本文致力于考虑先进社会经济发展领域（TAD）的业务发展特点和前景。 分析了作为特定地区居民的企业所带来的优势和机会。 TAD功能的具体问题受到影响。

关键词：先进社会经济发展领土（TAD），居民，经济特区，税收优惠，税收优惠。

Annotation*. The article is devoted to the consideration of the features and prospects of business development in the territories of advanced socio-economic development - (TAD). The advantages and opportunities created for a business as a resident in a given territory are analyzed. The specific problems of TAD functioning are affected.*

Keywords: *territory of advanced socio-economic development (TAD), residents, special economic zone, tax preferences, tax incentives.*

The study was carried out with the financial support of the Russian Foundation for Basic Research and the Subject of the Russian Federation in the framework of the research project No. 18-410-020024.

The process of designing preferential regimes for investors in the Far East for almost three years. Today, in the Far East there are 18 territories of advanced development and the current regime of the Free Port of Vladivostok (FPV) in five regions. The dynamics of growth in the number of residents reflects the demand for the regimes of priority development areas and the Free Port of Vladivostok on the part of business, and, consequently, their effectiveness. In 2016, 229 companies received the status of residents of TAD and FPV. By the end of 2017, there

were three times more of them - more than 600. In the current year, the number of residents is expected to double, thus, their number should exceed 1,200 [2].

The key principle of TAD is large-scale tax incentives and preferences, simplification in terms of government regulation and reduction of bureaucratic barriers. The management company TAD in the Far Eastern Federal District is currently OJSC "Corporation for the Development of the Far East" and its subsidiaries operating directly in the territories of advanced development. It is important to note that investment agreements in TAD and FPV with the Corporation for the Development of the Far East have already been signed by over 1,100 companies. The volume of announced investments is close to 2.8 trillion rubles. The social mission entrusted to TAD is difficult to overestimate, namely: more than 105,000 jobs are planned to be created by residents. At the same time, manufacturing industry is the most sought-after industry - 78% of the total number of residents TAD and FPV implement their projects in this particular area [3]. Residents of TAD Corporation provides the land required for the implementation of projects. Residents FPV - helps in obtaining them, interacting with federal, regional and municipal authorities. The management company also creates engineering and transport infrastructure in the territories of advanced development, if there are applications from residents. The TAD regime in the Far East today implies a substantial reduction for residents of mineral extraction taxes, profits and property during the first years of operation, preferential connection to the infrastructure, a special procedure for using land, preferential rental rates and much more.

The Free Port of Vladivostok also implies a vacation in taxes on profits, property and land, a fast regime for crossing the border in international trade, a simplified visa regime, a significant reduction in the duration of fiscal inspections and other preferences.

The size of enterprises, countries of origin of investment, industry sector residents are very different. In one TAD, one can see both megaprojects and micro enterprises. All residents are entitled to an identical set of preferences, benefits and support of the management company. Moreover, personal and free support of all investment projects is a kind of calling card.

TAD is not only an industrial platform, it is a large territory, which is formed with the prospect of development for 70 years. Such development requires an integrated approach.

Today, more than 130 new enterprises are already in operation, by the end of 2018 there will be almost 200 of them. 215 projects are at the stage of construction and installation, 180 for engineering design or equipment procurement. The remaining part is in the process of preparation for the active implementation stage (registration of land plots, attraction of investment resources, adjustment of schedules). And this despite the fact that more than half of investors became residents

less than a year ago. Despite the multiple growth in the number of people wishing to obtain resident status in 2018, the Far East Development Corporation strictly adheres to the deadlines for processing investors' applications: 15 days to make a decision on a project, 10 days to send it to the applicant. The achievement of impressive results is promoted both by the constant optimization of information systems and the procedures for interaction with the investor.

Primorsky Krai, Kamchatka, Khabarovsk Krai and Yakutia lead in terms of the number of TAD residents. As for FPV residents, the largest number of investors in the Primorsky Territory. The TAD and Free Port regimes play an important role in the development of Chukotka. In general, TAD and FPV residents have already invested 260 billion rubles in the region's economy, and about 14,000 jobs have been created and modernized [4].

As noted above, in terms of investment and the number of jobs created, the most popular among residents and TAD is the mining industry, which is represented by investment projects in the field of mining and processing of mineral resources. In second place are logistics and transport, then manufacturing, food industry. As for agriculture, including the fish industry, there are currently more than 50 investment projects with a total investment portfolio of more than 91.9 billion rubles (of which 21.7 billion rubles are in various stages of implementation in the priority development areas and in the free port of Vladivostok). already implemented) and plans to create about 6,300 new jobs (of which 995 were created). Ten enterprises have already been launched and are producing meat and dairy products, growing vegetables and greens, forage for animals, the rest are at the stage of design and construction and installation works. Sakhalin, for example, is ahead of the rest of the TAD in terms of tourism. Of course, the construction sector is involved, which is also one of the main sectors in which the TAD and FPV residents implement projects [5].

For example, the FPV resident - Terminal Aquatika LLC plans to launch a high-speed maritime transport system in Primorye using an ekranoplan. The project, worth 93 million rubles, is being implemented in cooperation with Soyuzmortrans LLC, under the auspices of the Russian Scientific and Technical Society of Shipbuilders named after Academician A.N. Krylov. It is planned that the exploitation of transport lines in Primorye will begin in the second quarter of 2022. WIG combine the properties of aircraft and ships. The principle of movement with the effect of dynamic maintenance ensures amphibiousness, an unprecedentedly low level of energy consumption, ecological cleanliness of operation and all-season navigation. The formation of a regional sea communication using WIG in Primorye will be phased in: first, coastal infrastructure will be created and high-speed transport route lines Vladivostok - Slavyanka, Vladivostok - Bolshoy Kamen and Vladivostok - Nakhodka will be launched. Transportation will be carried out on

domestic models. The FPV resident has already tentatively agreed on the joint construction of the Ekvolga and Navigator family of WIGs, as well as on the training of specialists and the training of pilots in Vladivostok.

It should be noted that among the residents of TAD and FPV are more than 70 companies with foreign participation. The most active investors are from China, Japan, South Korea. The interest of foreign investors is recognition of the competitiveness of the Far East in the market of the Asia-Pacific region and the effectiveness of those state support measures that are implemented by our country. And the interest in TAD and FPV modes is growing. Thus, 32 projects worth $ 4.2 billion have been transferred to the practical stage of implementation in the territories of priority development and in the free port of Vladivostok with the participation of Chinese capital. These are 7% of investments attracted to the Far East. Also in the framework of the new tools in the Far East, 1375 new projects are being implemented for $ 61 billion with the participation of investors from more than 10 countries, and a large proportion of foreign investment is in China.

The timing of the entry of infrastructure objects is synchronized with the needs of residents in it. The created infrastructure in many respects will be able to provide applications and potential investors of territories of priority development. In the three TADs, the Corporation builds production and administrative buildings for leasing to MS residents on preferential terms.

Despite positive trends and active development, TAD residents often face a number of problems that require difficult solutions. One of the most acute problems for residents is attracting the necessary funding. The rates on loans offered by banks are too high. To address this issue, the Ministry of Foreign Development of the Russian Federation has developed an interest rate subsidization mechanism for TAD and FPV residents. According to the head of the Far East Development Committee, the launch of this mechanism is expected in 2019.

The main complaints of residents of the free port of Vladivostok are caused by the inoperability of the preference for obtaining a land plot without an auction. In this case, on the one hand, a radical increase in the efficiency of the regional and municipal authorities is required without devaluing the residents 'legal rights to the plots, on the other hand, entrepreneurs themselves have increasingly begun to use this preference to create advantages in unfair competition. To overcome such situations, a number of amendments to legislation have been prepared, which are currently being approved by the executive authorities.

Today, the idea of how territories will develop in 10, 20, 40 years is fully formed. In the future, plans are planned for integrated development of territories, aimed at creating a comfortable living environment. Together with innovative enterprises modern housing complexes, sports and cultural facilities, schools, hospitals, kindergartens should be built. All this will greatly increase the competitive-

ness of our TAD.

On September 11, 2018, a session of the Territory of Advanced Social and Economic Development and the Free Port of Vladivostok: Present and Future was held at the Eastern Economic Forum. It was shown that despite the growing popularity of the TAD and FPV regimes, it is necessary to increase their competitiveness in the international arena and to constantly improve existing instruments. The high efficiency and demand for most of the preferences have already been proven, but the series has proven not to be applicable in practice. In certain territories and industries, the existing support measures were not sufficient for the effective implementation of projects. Necessary decisions were discussed at the session together with the business.

Significant for the long-term development of such projects as TADy is the staffing of highly qualified specialists. Special attention should be focused on making every effort and implementing a qualitative breakthrough in the economic development of the region, in training in the province of its worthy professionals who will take up the newly created jobs.

The existing experience of the functioning of zones with special economic regimes of developed countries shows that they really are a significant factor in economic growth and set an acceleration of economic development, both during the crisis period and at the stage of financial and economic stabilization.

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基于协同效应的使用，企业的财务稳定性是有效整合的关键因素之一

FINANCIAL STABILITY OF THE ENTERPRISE AS ONE OF THE KEY FACTORS OF EFFECTIVE INTEGRATION BASED ON THE USE OF SYNERGETIC EFFECT

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注解。 本文考虑了企业在现代条件下融合过程中金融稳定的作用。 基于协同效应和金融稳定性识别的整合模型，允许确定作为整合基础的企业，增加整合中的协同效应，以及提高整合的有效性。 提出了一个整体。

关键词：金融稳定，企业，现代条件，协同，整合，效率，模型。

Annotation*. The paper considers the role of financial stability of the enterprise in the process of integration in modern conditions. The model of integration based on the use of synergetic effect and identification of financial stability, which allows to determine the enterprises that are the basis of integration, to increase the effect of synergy in the integration, as well as to improve the effectiveness of integration as a whole, is presented.*

Keywords*: financial stability, enterprises, modern conditions, synergy, integration, efficiency, model.*

"Who knows how to stand firmly-that can not be overturned.
Who knows how to lean-that can not be dumped»
Lao Tzu

In modern society, when the phenomenon of globalization is an objective reality, and for national economies, the issue of successful development in the rapidly changing, difficult to predict, often aggressive conditions of the external environment, the solution to the problem of achieving the ability to resist, avoid and neutralize risks of various kinds, in particular foreign economic, lies in the plane of effective integration based on the use of synergetic effect.

In our opinion, it is the financial stability of the enterprise, understood by us as a relative (to the value of net assets) characteristic of the financial capabilities of the enterprise, determined by the formation of free cash flow, to maintain and

increase net assets over time [1; p.24], is one of the key factors contributing to effective integration, actively using the synergetic effect and ultimately aimed at ensuring a high standard of living of the population, its social well-being.

Integration (from lat. integer - whole), from the economic point of view, which is an association of economic entities, the deepening of their interaction, the development of relations between them (takes place both at the level of national economies of whole countries, and between enterprises, firms, companies, corporations) and manifested in the expansion and deepening of production and technological ties, the joint use of resources, the unification of capital, and in creating favorable conditions for each other's economic activities, the removal of mutual barriers [3], in quite a number of cases, it acts as one of the tools to achieve a given stable result that lasts for a long time. This uses the phenomenon of synergy (from Greek. syn-together, ergos-acting, action) - increasing the efficiency of activities as a result of connection, integration, merging of individual parts into a single system due to the so-called systemic effect, emergence [3].

The integration model based on the use of synergetic effect is presented in Fig. 1.

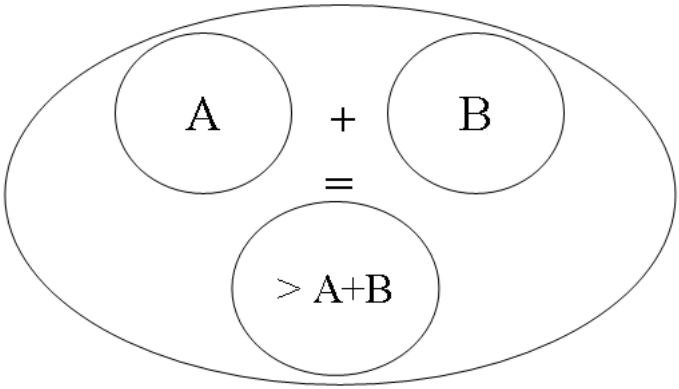

Fig. 1. Integration model based on the use of synergetic effect

At the same time, we believe that emergence will be manifested most fully (as fully as possible) only when the individual parts to be connected and integrated into a single system will be as reliable and efficient as possible. The designated characteristics quite successfully reveals the concept of "financial stability".

The legendary ancient Chinese philosopher-thinker of VI-V centuries BC - Lao Tzu in his treatise "Dao de Jing" wrote: "Who can stand strong, that can not be overturned. Who knows how to lean, that can not be dumped. Sons and grandchildren will always keep the memory of him. Who perfects [the Dao] within yourself, virtue will be genuine. Who perfects [the Dao] in the family, in fact, virtue

becomes abundant. Who perfects [the Dao] in the village, the virtue will be wide. He who perfects [the Dao] in the Kingdom becomes rich in virtue. Who perfects [the Dao] in the middle Kingdom, that virtue becomes universal.

Enough to know others; one family you know the rest; in one village, you know the rest; one Kingdom we can know others; one country can be known with all people. How do I know that the whole of China is like this? Act so."[2].

The proposed model of integration, based on the use of synergetic effect and financial stability, is presented in Fig. 2.

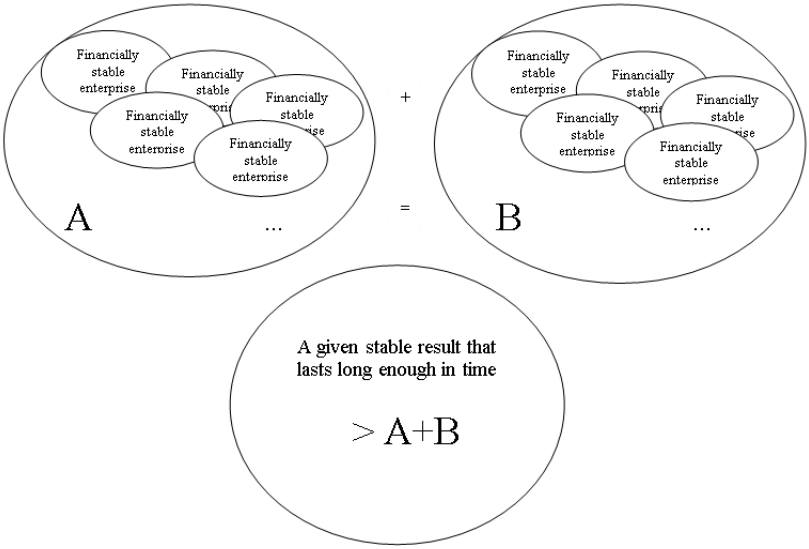

Fig. 2. Integration model based on the use of synergetic effect and identification of financial stability

The proposed model is universal: it can be used by enterprises, groups of companies, corporations, at the interstate level.

It allows:

1.Identify "anchor" enterprises - the basis of integration.

2.To increase the effect of the synergies of integration.

3.To improve the effectiveness of integration in general.

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国家安全是现代社会俄罗斯可持续发展的一个因素
NATIONAL SECURITY AS A FACTOR OF SUSTAINABLE DEVELOPMENT OF RUSSIA IN MODERN SOCIETY

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注解。文章论述了现代俄罗斯的国家安全问题，得出了法律行为与俄罗斯联邦发展的地理位置，生态状况和经济条件等具体关系的结论。可持续发展作为一种安全的发展类型，被视为解决社会不断增长的需求与无法满足这些需求之间的社会和自然矛盾的全球战略。安全是一种可持续的方式，在内部和外部的负面影响和变化的条件下保持其性质。值得注意的是，通过有效实施可持续发展战略，保障文明，确保俄罗斯的国家安全是可能的。建立一个理想的国家安全体系的问题具有相当大的意义，目前，有效的国家安全体系的发展可归因于国家发展及其立法的主要前景任务。

关键词：安全，国家安全，全球化，社会，安全发展，国际社会，发展前景。

Annotation. *The article discusses the problem of national security of modern Russia, the conclusion is made about the relationship of legal acts with the specifics of the geographical location, ecological status and economic conditions of the development of the Russian Federation. Sustainable development, as a safe type of development, is considered as a global strategy for resolving social and natural contradictions between the growing needs of society and the inability to meet these needs. Security is presented as a sustainable way of being an object, preserving its nature under the conditions of internal and external negative impacts and changes. It is noted that ensuring the national security of Russia is possible through the effective implementation of a sustainable development strategy leading to the preservation of civilization. The problem of creating an ideal system of national security has acquired a rather great relevance, and at the moment the development of an effective system of national security can be attributed to the main prospective tasks of the development of the state and its legislation.*

Keywords: *security, national security, globalization, society, safe development, world community, development prospects.*

The main principle of the National Security Strategy of the Russian Federation (Decree of the President of the Russian Federation No. 683 of December 31, 2015 "On the National Security Strategy of the Russian Federation") is the principle of ensuring security through the priorities of the sustainable development of society. In modern conditions, the issues of ensuring the national security of Russia are priorities in relation to other issues of political development, since for modern Russia the solution of national security problems is associated with the country's survival, preserving its identity, original culture and civilizational development model [2, p. 26-27]. In the modern world, misunderstanding and sanctions crowd out partnership and trusting relations between individual countries, manifested in economic, migration, social, environmental and other crises, most often manifested in military clashes affecting the national security of all countries of the world community, including Russia. The role of legislation in the field of national security is associated with the creation of conditions for the full functioning of the state and the necessary development of a new security paradigm of Russia, taking into account the modern understanding of its national interests and the system of strategic priorities.

National security is the basic, basic concept in the structure of the modern world community, a necessary and fundamental motive for the life of an individual, society and state. Security issues in relation to civilization have a global manifestation, therefore, understanding and interest in national security issues will gain momentum, despite a number of already existing conceptual approaches to this phenomenon of social life, providing social harmony in modern society.

In the usual sense of security means the physical survival and the formation of the state, the preservation and protection of its territorial integrity and sovereignty, the ability to adequately respond to potential and real external threats. At the same time, national security is understood as a special, complex, multidimensional and constantly changing integrated system. National security is a peculiar reference point of the state of society, its stable development, the ability to withstand the impact of all sorts of destructive factors, the ability to adapt to changing living conditions, protecting and maintaining a high standard of living of the population. The "national security" is based on the triunity of relations of its main social subjects: the state – society – person. The operation and subsequent modification of this system is determined by the influence of a significant number of specific circumstances, including: geographical, historical, religious, psychological, political, cultural, demographic, informational, economic and ethnic.

The unique geographical position of our country, the tradition of involvement in solving global problems indicate the unsuitability of geopolitical models of national security used by other states, which confirms the need to find their own path of development, determine the best directions for the realization of national

interests, serving as priorities for the future. The events of the last decades are connected with the worsening of the geopolitical position of Russia, however, they have a significant influence on the formation of approaches to ensuring national security. The national security system of a state is determined by its geographical and geopolitical position, the influence of a number of factors, the nature of geopolitical processes, the features of modern forms of political and economic confrontation, acting as sources of the formation of the geopolitical structure of the world, which undoubtedly affects the parameters of Russia's geopolitical space, determines its role and place in the modern world [6, p. 272-278]. The result of the complex influence of various factors on the elements of the national security system of Russia is the geopolitical position of the country, which is a complexly structured phenomenon [7].

The territorial-geographical component of the geopolitical position of modern Russia includes a description of the country's territory, its natural and climatic conditions, basic demographic and national ethnic indicators, administrative territorial structure, the outline of the state border and parameters of the border area.

Some scientists propose to distinguish between internal and external national security, which undoubtedly in the modern era of globalization would be inappropriate. In modern realities, internal and external threats are closely intertwined with causes and consequences, that the issues of information, economic, environmental or other security are almost impossible to relate to only one field of activity.

The appearance of new challenges, dangers and threats, the presence of problematic aspects of the theoretical and methodological nature and the legislative implementation of the national security policy force us to turn again and again to this area of research. Taking into account modern trends in the development of the state and society, let us single out the following types of national security: military security; space security; security of operations in the worldwide network; safety of scientific and technological progress; innovative safety; intellectual security; biological safety; psychological safety; moral security; demographic security; religious security; security of national economy objects; security of small nations; security of strategic natural resources; safety of science and education; development safety of municipal districts and settlements; border security; security from terrorist organizations; security of interstate economic formations and others.

Evaluating the geopolitical position of modern Russia, it is necessary to pay attention to geo-economic aspects, which suggests that it is the economy of modern Russia that is the most vulnerable link in its national security system [5].

Russia's geopolitical position influences the built-in national security system as follows:

1) Russia is a state with parameters of a great power, which has a vast territory with rich natural resources, a population with high intellectual potential, has a

huge military-strategic potential, geohistorical traditions of statehood and integrity [4, p. 211-218].

2) The position of Russia is influenced by the geopolitical processes of globalization, regionalization, fragmentation and separatism taking place in the world.

3) The geopolitical position of Russia periodically changes in the process of ensuring national security, the realization of national interests, and the progressive development of society and the state.

For a long period, the policy of ensuring the national security of Russia did not stand out in the independent sphere of state activity. The role of legislation in the field of national security is inextricably linked with the creation of the necessary conditions for the full functioning of the state in the modern world. The first document on national security problems in world practice was Law "On National Security" No. 257, adopted in the USA on July 26, 1947. The law introduced the concept of "national security" into the American legal system, and then into the legal and political discourse of other states, including Russian. Since 1936, the legislation of the Soviet Union used the term “state security”, which was officially included in the USSR Constitution (clause “and” article 14 of Chapter 2), reflecting the official point of view of the country's military-political leadership on the priority of state interests over the interests of society and the interests of the individual (“society for the state”). The first normative legal acts regulating public relations in the sphere of ensuring national security appear in Russia at the turn of the 90s of the XX century, in at the same time, the first theoretical studies of security problems by Russian scientists, public figures and politicians begin, which explains a number of reasons for historical social reality: the acute exacerbation of contradictions in the socio-economic development of a state after the collapse of the Soviet Union, the removal of the “veil of secrecy” from a scientific study of the phenomenon of security and a number of others. The analysis of the current legislation confirms the inadequate regulatory support of a number of the stated provisions of national security, of confronting Russia with the new challenges and threats of the modern world. In the Federal Law No. 390-FZ of December 28, 2010 “On Security”, which has lost its force, the concept of “security” was defined as “security status”, where by “security” we mean the complete absence of threats, respectively, if there are no threats, the security issue disappears by myself. By “security”, in our opinion, should be understood as a derivative of state activity: if a state is effective, it is able to protect its political and social institutions, as well as personal rights and freedoms of citizens. The likelihood of threats is high when the state cannot cope with its functions. In this regard, for Russia it is necessary to direct the policy of ensuring national security in such a way that the geopolitical position of the Russian Federation changes only for the better.

Russia's geopolitical position affects the country's national security system

through a system of geopolitical factors that characterize the relationship of the national security system with the external environment and set the parameters for the functioning of both individual elements and the system as a whole. The system of geopolitical factors of Russia regularly interacts with the systems of geopolitical factors of other countries, reflecting the spatial position of our country on the world stage and the nature of the relations of the national security system with the external environment, while having a direct impact on the elements of the national security system of Russia. The specificity of this interaction is that geopolitical factors have a significant impact on the formation of the objective vital needs of the population of our country, setting the basic qualitative parameters for Russia's national interests, refracting in the system of geopolitical factors a set of spatial-¬ power relations emerging between Russia and other countries that means the possibility of forming threats to the national security of our country [1, p. 50-54]. Taking into account such a complex influence of geopolitical factors in the practice of public policy contributes to the correct setting of national goals and the effective possibility of realizing national interests. The system of geopolitical factors has a controversial effect on Russia's national security, increasing its destructive component in recent years, and therefore using the positive and overcoming the negative influence of geopolitical factors is one of the main tasks of ensuring Russia's national security.

The national security system is determined by the parameters of the geopolitical space affecting the security system through groups of geopolitical factors, the interconnection of which is also of regional and global importance, which confirms the stability of the security systems of individual regions and largely depends on the effective functioning of the national security system of Russia.

Analysis of the existing practice of ensuring the national security of Russia suggests that the state successfully develops the state mechanism for developing and implementing security policies, the issues of which are developed in legal, conceptual, structural, organizational and substantive terms. In recent years, scientists and politicians have done a lot of work on conceptual understanding of the problem of ensuring the national security of the Russian Federation, important documents such as the National Security Strategy of the Russian Federation for the period up to 2020, Military Doctrine, Foreign Concept Policy, Information Security Doctrine. There was a conviction in society that state interests should be at the heart of state policy, and political decisions should be scientifically grounded and coordinated with the areas of ensuring national security.

However, there are certain contradictions in the activities of state and public structures to ensure the national security of Russia, meeting the needs of a sustainable geopolitical development of the country, preserving the status of a great state, legal regulation, the implementation of the historic mission. All this makes it nec-

essary to improve the mechanism of ensuring the national security of our country. Among the measures that can change the situation for the better:

The development of the concept of geopolitical development of Russia will make it possible to determine the long-term vital interests of the individual, society and the state, establish the sources of real and potential threats to the country's security, more intelligently apply the existing arsenal of forces and means to the realization of national interests.

The second component can be the improvement of the regulatory framework for ensuring national security of Russia, for the implementation of which it is necessary to ensure the adoption of the following bills: “On Amendments and Addenda to the Federal Laws“ On Defense ”,“ On Security ”,“ On Military Duty and Military Service "," On the Border Service of the Russian Federation "," On state support of the socio-economic development of the Russian Federation "," On the state of emergency "," On the military situation "," On military reform a reserve in the Russian Federation ”,“ On Immigration to the Russian Federation ”and the Law on the Armed Forces of the Russian Federation.

The third component is the very concept of national security as a set of views, judgments, provisions and principles that most accurately reflect the peculiarities of Russia's geopolitical position and elements of its national security system.

The fourth component is a set of political decisions taken by the leadership of the country, individual ministries and departments regarding their authority in the field of ensuring national security.

The main efforts to improve the mechanism of ensuring national security of Russia should be focused on the following areas:

- when making fundamental decisions in the field of national security, it is necessary to strive to achieve an optimal balance between national interests and opportunities for their implementation, concentration of available resources in priority areas of national interests;

- the main tasks in the political sphere should be the centralization of government, the strengthening of a single political and legal space, the achievement of unity on security issues between the branches of government, the formation of a two-, three-party political system, ensuring real equality between the subjects of the Russian Federation;

- in the economic sphere, it is necessary to create conditions for strengthening domestic producers, increasing the role of the state in managing the economy, especially its strategic sectors, abandon foreign borrowing and carry out reforms under the International Monetary Fund [5, p. 133-139];

- in the foreign policy sphere, the main attention should be paid to reintegration processes, speeding up the creation of the Union State of Belarus and Russia, conducting a multi-vector foreign policy, participation in regional structures and se-

curity regimes, promoting the strengthening of the UN role in international affairs;

- success in the military sphere in ensuring national security is associated with the successful reform of the military organization, the rejection of the endless reduction in the size of the Armed Forces, the preservation of strategic nuclear forces as the main deterrent potential, the dramatic improvement in the financing of the military organization, the preservation of the best traditions of domestic military education;

- in the information sphere, an important place should be occupied by the development of principles of state information policy, the strengthening of state mass media, the development of information technologies, the implementation of information and cultural expansion in relation to foreign countries;

- in the spiritual sphere, the main condition for ensuring national security should be the formation of a national idea, unity, uniting the peoples of Russia in their efforts to achieve a decent future for themselves and their descendants. The ideology that consolidates Russian society today may be a neo-Eurasian geopolitical project, which is built on the basis of the self-identification of the people of Russia in the territorial, cultural, civilizational and formational terms.

The implementation of the proposed measures could contribute to the sustainable and progressive development of the Russian Federation, improving the well-being of its citizens, peace and security in Eurasia and throughout the world.

The results of the analysis show that, despite the significant deterioration of the geopolitical position, Russia retains objective parameters that allow it to occupy a special place in the system of global spatial-power relations.

The status of a great power is determined both by Russia's special geopolitical behavior, the main ways of ensuring national security, and the inevitable involvement of the Russian state in regional security systems. In recent years, scientists and politicians have done a lot of work on conceptual understanding of the problem of ensuring the national security of the Russian Federation, which will undoubtedly lead to the achievement of social harmony in modern society [3, p. 5-6].

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科学与创新技术是俄罗斯国家安全的要素
SCIENCE AND INNOVATIVE TECHNOLOGIES AS AN ELEMENT OF NATIONAL SECURITY OF RUSSIA

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注解。提出了一种创新安全方法，作为国家安全的一个基本要素，反映了该国的创新潜力。提出创新安全，以了解国家确保创新体系发展水平的能力，这是国家稳定和动态的社会经济运作，福利增长，维护国防能力，经济和技术独立所必需的。和独立。确定了对创新安全的主要内部和外部威胁，为实现国家在创新领域的利益和任务创造了障碍：破坏俄罗斯的科技潜力，包括科学和科学的人员潜力学校，科学，技术和创新活动专家培训和再培训质量下降，科学与生产之间日益扩大的差距，最近政治事件的破坏和复杂化，俄罗斯与一些独联体的科学联系和联系国家和世界其他国家的社区。制定了确保俄罗斯联邦创新安全的主要任务。

关键词：创新安全，有前途的科学研究，创新创新风险，模型，创新技术，科学创新，人才培养，发展前景，创新安全威胁。

Annotation. *An approach to innovation security is proposed as an essential element of national security, reflecting the state of the innovation potential of the country. Innovation security is proposed to understand the ability of the state to ensure the level of development of the innovation system necessary for a stable and dynamic socio-economic functioning of the country, growth of its welfare, maintenance of its defense capability, economic and technological independence and independence. The main internal and external threats to innovation security are identified that create obstacles to the realization of the interests and tasks of the country in the field of innovations: the destruction of the scientific and technological potential of Russia, including the personnel potential of science and scientific schools, the decline in the quality of training and retraining of specialists for scientific, technical and innovative activities, the growing gap between science and production, the destruction and complication of the recent political events, scientific contacts and ties of Russia with a number of CIS countries and other*

countries of the world community. The main tasks for ensuring the innovative security of the Russian Federation are formulated.

Keywords: *innovative security, promising scientific research, innovative innovation risks, model, innovative technologies, scientific innovations, personnel training, development prospects, threats to innovative security.*

The promising future of any country is shaped in the struggle for youth, their intellect, worldview, values and priorities. This issue is global in nature, this is the successful development of the country for its future. The price of this issue is really high: it is health, including the psychophysical and moral-volitional component, and demographic indicators, and spiritual and intellectual potential, and economic and social indicators, etc. At the beginning of the 20th century, the Spanish philosopher José Ortega y Gasset warned mankind about the negative phenomenon of the "uprising of the masses", which, in his opinion, is based on the paths between the generational dynamics [6]. Scientists tend to argue that youth is the future of any state and of humanity. The philosophical fact is indisputable and can be traced both in the biological and in the social history of man [8, p. 469-480]. At the same time, there is an understanding of the whole conventionality of the real future, but the human mind and will force him to rise again and again into battle for a better future, leaving behind him the history of his being in the Universe or on Earth [7]. One of the most talked about in the past few years in the scientific, political and business issues is the issue of globalization. There are many supporters and opponents of this modern world process. Despite the controversial and contradictory nature of this phenomenon, the process of globalization is expanding, affecting all new countries, economies and markets. There is a growing integration, not only political, but also economic and social. The integration process has recently begun to pick up pace, which affects the social and economic development of countries. Not only opportunities for development appear, but also various threats arise, in particular, associated with a decrease in the competitiveness of domestic enterprises and an increase in dependence on goods and technologies from other countries. In this connection, the problem of ensuring national security is becoming one of the acute problems in the context of globalization.

One of the possibilities of ensuring national security in the economic sphere is the development and introduction of scientific innovation technologies. The solution of this task requires not only investment, including long-term, in promising scientific research, and improving the quality of the training of scientific personnel and highly qualified specialists for science and industry.

In 2008, the Government of the Russian Federation developed and adopted the "Concept of the long-term socio-economic development of the Russian Federation for the period up to 2020", which set the task of transition from the raw materials

export to the innovative model of economic growth [3].

Such an economic model can ensure the growth of competitiveness of goods and services of domestic producers in the domestic and world markets, and become the basis for ensuring the economic security of the country. The task of enhancing national competitiveness is complex, the solution of which is associated with such tasks as the development of human capital, economic institutions, strengthening Russia's existing competitive advantages, as well as the creation of new competitive advantages based on economic diversification and the introduction of scientific and innovative technological developments. Here the most difficult task is to create a national innovation system in Russia.

To do this, it is necessary to increase the demand for innovations from most economic sectors, increase the efficiency of research, overcome the fragmentation of the created innovation infrastructure (technology parks, business incubators, financial support systems, information systems, etc.).

Creating a national innovation system is a difficult task that cannot be solved without attracting large private businesses and foreign investment. Thus, at the state level it is necessary to identify those areas of research and those sectors that will become the engine of development of the innovation economy. Let us dwell on the question of investment in more detail.

According to statistics, the largest share of enterprises engaged in technological innovation, falls on the industry of coke and petroleum products (37.1% in 2016 and 23.0% in 2017), as well as the industry of electrical equipment, electronic and optical equipment (average 27%), the chemical industry (21%) and the industry of vehicles and equipment (20%).

The largest share of the cost of technological innovation in 2017 accounted for the industry: extraction of fuel and energy minerals (19.6%), production of coke and petroleum products (17.7%), metallurgical production and production of finished metal products (15.4%) , the production of vehicles and equipment (10.6%) [4].

In the cost structure of technological innovation in industrial production by types of innovation in 2015-2017. the largest share relates to the acquisition of machinery and equipment (on average 55%) and 20% to research and development. A much smaller remaining share is accounted for by pre-production (7.8%), production design (5.4%), the acquisition of new technologies and software (3.2%) [5].

It should be noted that the costs of technical and technological innovations in industrial production, although they have recently increased in monetary terms, but compared to the permanent prices of 2000, they remained at about the 2001 level. Over the past 15 years, the cost structure of technological innovations in industrial production has changed somewhat by sources of funding (Fig. 1) [4].

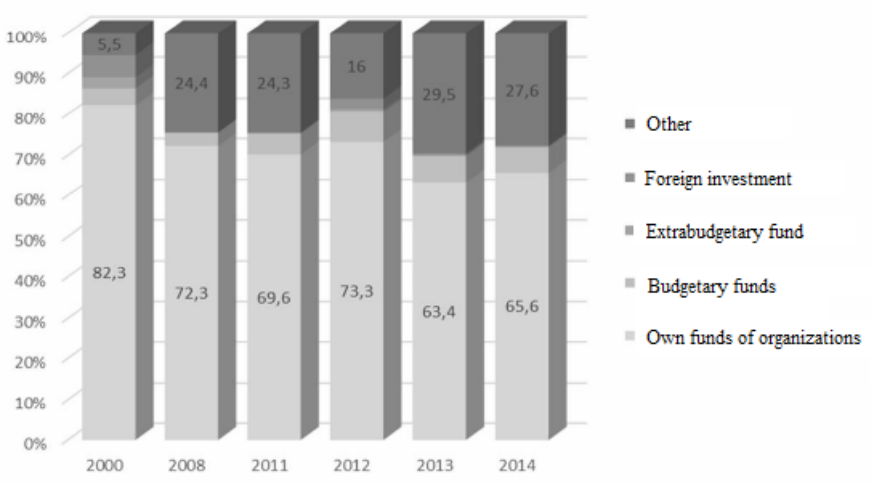

Fig. 1. The structure of the cost of technological innovation in industrial production by sources of funding (in percent).

If in the structure of financing innovations in 2000, financing from the own funds of enterprises and organizations prevailed (82.3%), then by 2014 the value of such sources of financing decreased to 65.6%, while the share of financing from other including grant funds from 5.5% in 2000 to 27.6% in 2014. The share of budget funding for the period 2000-2014. increased 1.5 times from 4.1% to 6.1% [5].

However, it is possible to identify a number of industries in which fundamental and applied scientific research is funded mainly by the budget, while the share of extra-budgetary funding is a small percentage. These are such industries as space, military, biotechnology, medicine, transport and others. According to experts, Russia occupies one of the leading places in the world in the development of the personnel potential of science, second only to China, the United States and Japan. The main problem hindering the achievement of world-class research and development is the imbalance of the research and development sector and the insufficient development of the mechanisms for its strategic development, which, in turn, raises a number of problems. The main ones include: the discrepancy between the business needs for new technologies and the proposals of the Russian research and development sector; insufficiently active participation of industrial companies in financing applied research aimed at creating products and technologies; lack of systematic planning of applied research and development carried out at the expense of budget funds.

The main directions of enhancing the scientific potential are the improvement

of the quality of training, the motivation of scientific personnel, the correct placement of accents. The state solves these tasks through the development and implementation of special state programs, as well as through the introduction of new state standards for training specialists in the system of higher education. Thus, the Government of the Russian Federation in 2008 adopted the Federal Target Program "Research and development in priority areas of the scientific and technological complex for 2008-2013," which was extended until 2020 (Decree of May 21, 2013 No. 426) [3]. The implementation of this state program involves a comprehensive solution to the problems associated with conducting scientific research. Financing of the program is divided into four blocks: Conducting applied research and development on the priorities of the development of the scientific and technological sphere; forming a system of scientific and technological priorities and forecasting the development of the scientific and technological sphere; the international cooperation; research and development infrastructure and material and technical base. Such a division allows not only to finance the research itself, but also to develop the material and technical basis for conducting research, to create an infrastructure and to establish an exchange of research results with leading foreign scientists. Under this program, the amount of funding starts from 15340.74 million rubles in 2014 and, increasing annually, reaches 23585 million rubles by 2020. At the same time, the share of extrabudgetary funds in the research funding program is about 20%. In 2014, the state program of the Russian Federation "Development of science and technologies" for 2013-2020 was developed and approved [3]. The amounts of funding for this program are presented in Fig. 2

Thus, state funding will increase annually and by 2020 will grow by 57%, i.e. up to 222576.4 million rubles.

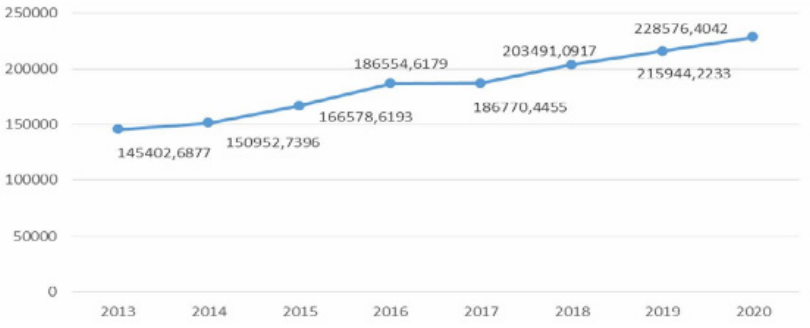

Fig. 2. State funding for the program "Development of science and technology" for 2013-2020.

The main results of the program should be highlighted:

- achievement of the world level of development of science and scientific research in priority areas;
- effective integration of scientific, educational and innovation activities;
- increase the practical application of research results.

In 2006, the Government of the Russian Federation decided to allocate funds in the form of grants of the President of the Russian Federation for state support of young Russian scientists and support of leading scientific schools of the Russian Federation. About 800 quotas are allocated under this program annually [1]. The priority areas of research under the grant support program highlighted: energy efficiency and energy conservation, including the development of new fuels; nuclear technology; space technologies related to telecommunications, including GLONASS, and the ground infrastructure development program; medical technologies, primarily diagnostic equipment, as well as medicines; strategic information technologies, including the creation of supercomputers and software development.

Of particular interest is a sociological survey of the population, conducted by the Federal State Statistics Service in conjunction with the National Research Institute "Higher School of Economics", about which industries should be developed at the present stage. 53% of respondents believe that it is necessary to develop agriculture and forestry, 38% - the improvement of technologies and equipment in industry, 31% - the development of medicine and health care; 21% - strengthening the defense capability, and hence strengthening the security of the country. The opinion of the population about the level of development of science, innovation and education in Russia is ambiguous, although most of the respondents believe that the introduction of new technologies, the development and spread of mobile communications and the Internet, the development of the education system in our country is either weaker or compared to the developed countries at the same level. At the same time, the population considers the use of natural wealth and the latest technologies to be the main condition for Russia's economic growth [5]. As for the training of specialists in the higher education system, the state should solve two problems - to develop university science and to train competitive personnel demanded by the state and business. The state has taken a number of decisions concerning education in general and higher education in particular. First, budget funding for education is increasing. Thus, under the item “Education” in 2000, funds were allocated from the state budget in the amount of 2.0% of GDP. Funding gradually increased and by 2015 amounted to 2.5% of GDP [4].

Secondly, federal universities have been created on the basis of regional educational structures, the purpose of which is to form and develop competitive human capital in federal districts based on the creation and implementation of innovative services and developments. Such universities will be able to provide large-scale

programs for the socio-economic development of territories and regions with qualified personnel, which will make it possible to bring the results of intellectual activity to practical application. A total of ten such universities were created: Siberian Federal University, Immanuel Kant Baltic Federal University, Far Eastern Federal University, Kazan (Volga Region) Federal University, Crimean Federal University, Northern (Arctic) Federal University named after M.V. Lomonosov, North-Eastern Federal University named after M.K. Ammosova, North Caucasus Federal University, Ural Federal University named after the First President of Russia B.N. Yeltsin and Southern Federal University. However, the creation of federal universities does not mean that there will be no regional universities in the higher education system whose task is to train specialists with a basic level of competence.

Thirdly, the state educational standards of the third generation are being introduced in the system of higher and secondary professional education, and in 2015 there are already standards of generation three plus. Training students in new educational programs brings the national education system closer to world standards [2]. The implementation of reforms in the education system of the Russian Federation has led to an increase in the number of bachelors, specialists, masters - graduates of higher vocational educational institutions and the graduation of skilled workers and employees with secondary vocational education. So, if in 2000 the number of university graduates per 10,000 people employed in the economy was 99 people, and the number of skilled workers and employees with secondary vocational education was 118, in 2014, 171 people and 63, respectively. Since 2000, the number of persons with higher education per 1000 population of the relevant age group has increased from 31 to 46 in 2013. And there is a clear upward trend in these indicators, which indicates to increase the level of education of the working population. However, the structure of graduation of specialists with secondary professional and higher professional education in the areas of training does not correspond to the priority scientific areas identified by the state. Therefore, one of the modern tasks in the field of vocational education is the task of strategic planning for the graduation of specialists with secondary and higher professional education in accordance with the state strategy for the development of science and technology. Innovation security is proposed to understand the ability of the state to ensure the level of development of the innovation system necessary for a stable and dynamic socio-economic functioning of the country, growth of its welfare, maintenance of its defense capability, economic and technological independence and independence.

Thus, ensuring national security in the economic sphere depends on the level of development of domestic science and technology and the developed modern education system.

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讨论学校问题的组织和方法方面
ORGANIZATIONAL AND METHODOLOGICAL ASPECTS OF THE DISCUSSION OF SCHOOL QUESTIONS

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注解。在学校课程中研究有争议的问题的问题在教育科学的各个方面都被考虑。在问题被解决以研究或不在学校研究讨论问题时，理论方面是研究人员关注的焦点。随着讨论问题的研究出现在课程中，并且在课堂上开始讨论，在课堂上讨论问题的研究的组织和方法学方面开始脱颖而出。这类工作的变体之一是提供给读者注意的文章。它考虑了作者在问题理论方面的发展和现代学校积累材料的实际实施方面的长期经验。作者在新西伯利亚高等教育培训和再培训学院的研究活动框架内研究活动中开发的历史课程中复制研究有争议问题的经验过程中遇到了真正的困难。本文将读者的注意力集中在组织讨论课堂讨论问题，消极后果和克服这些问题的方法时出现的主要问题上。作者提出了在俄罗斯联邦多个地区的教育组织中成功测试过的工作方案，这些方案已经证明了其有效性，标志着学生作品的共和国和国际竞赛的文凭在提名“科学讨论问题”中。这篇文章可能对教师，教育教育组织的学生以及对俄罗斯联邦现代普通教育状况感兴趣的广泛读者有用。

关键词：讨论，讨论问题，公民教育，社会价值观和兴趣，教与学。

Annotation. *The problem of studying debatable questions in school lessons is considered in pedagogical science in various aspects. At the time when the issue was resolved to study or not study discussion questions at school, theoretical aspects were in the center of attention of researchers. As the study of discussion questions appeared in the curriculum, and discussions began in the classroom, organizational and methodological aspects of the study of discussion questions in the classroom began to come to the fore. One of the variants of such work is the article offered to the attention of readers. It takes into account the long-term experience of the authors in the development of theoretical aspects of the problem and the practical implementation of the accumulated material in a modern school. The authors have come up against real difficulties encountered in the process of repli-*

cating the experience of studying debatable questions in history lessons developed in the course of research activities within the framework of the Novosibirsk Institute of Advanced Training and Retraining of Educators. The article focuses the reader's attention on the main problems that arise when organizing a discussion of a class discussion question, negative consequences and ways to overcome them. The authors propose work options that have been successfully tested in educational organizations in a number of regions of the Russian Federation, have shown their effectiveness, marked by diplomas of republican and international competitions of student works in the nomination "Discussion issues of science." The article may be useful for teachers, students of pedagogical educational organizations and a wide circle of readers interested in the state of modern general education in the Russian Federation.

Keywords*: discussion, discussion question, civic education, social values and interests, teaching and learning.*

Discussion questions of historical science include in the curriculum of an educational organization [1; 2; 8] if they want to help students achieve the learning outcomes provided for by the Federal State Educational Standard. Discussion of discussion questions helps students understand the complexity of the issue, in the simplicity of which they were previously convinced. Discussion questions are an integral part of teaching and studying ethical issues and the specifics of confessional relations.

The difficulty of working with discussion questions lies in the fact that the teacher, trying to foresee possible turns of the controversy, can hardly take everything into account [11]. It can be assumed that some issues may cause intercultural disagreements, for example, discussion of the role of women in the family. In other cases, the issue of, for example, wars in the Middle East and the flow of refugees to Europe can be interpreted differently from the positions of various confessional groups, refugees and the population of their host countries. Another difficulty lies in the fact that the teacher's own position can put supporters of one of the versions of the discussion question in a privileged position or even give students an assurance that there is no difference in opinion on this issue.

The choice made by the participants in the discussion between competing versions depends not only on the quality of the criteria, but also on the individual life experience and personality characteristics of the participants in the discussion. The effectiveness of the criteria does not depend on whether they are clearly defined enough to predetermine the choice of each participant in the discussion that recognizes them. If they were unequivocally outlined, the behavioral mechanism that determines the movement of science would cease to function [9]. "What is considered as eliminated imperfections of the rules of choice," writes T. Kuhn, "I interpret as some manifestation of the essential nature of science" [4, p. 63].

So far in education it is customary to single out indisputable material and controversial issues in the studied mass of information. Hence the discussion of the problem: "To study or not to study the controversial issues of science at school?" But you can look at this problem from the other side. Recall how many scientific theories were recognized indisputable, but, as science developed, they gave way to others. In this case, it is advisable to recognize the entire body of knowledge debatable, and the study of it - one of the tools of intellectual development of students. In this case, the controversy about which question to recognize as debatable will come to the background, and the search for effective tools for intellectual development of students will come to the fore.

The increasingly diverse social composition of modern society is also reflected in the composition of students in school, which inevitably affects their different perceptions of educational material and ambiguous answers to controversial questions. In the case of a well-planned and properly conducted discussion of discussion questions, students are given the opportunity to agree and acquire the skills necessary for this. Such a result can be considered positive. On the other hand, a carelessly planned and mismanaged discussion of a discussion question may lead some students to take root in their initial views, while others will feel ignored.

Students tend to come to school, believing that one point of view - the right one - will dominate, and that it would be unsafe to speak out against the mainstream point of view. At best, they consider the model of discussion of debatable questions as a means of searching for new information or recognizing another possible perspective.

Moot of discussion questions can also be hindered by the fact that only a small part of pupils believe that they have the right to speak, without being challenged, what they believe. Students and teachers can understand tolerance differently. The teacher, when mooting a discussion question, expects from all participants in the discussion an interested hearing and a reasoned speech in the process of moving towards a common position. At the same time, some students can share the conviction that tolerance means the equal right of all points of view to existence [10, pp. 32-44].

Pupils from participating in the discussion of debatable issues can keep the desire to maintain a comfortable atmosphere in the classroom. Intuitively, they fear that disputes during the discussion may affect interpersonal relationships in the class afterwards. Since now in an environment where education is recognized as a service industry, students feel that they are consumers, they believe that teachers should not inconvenience them. For example, students whose parents belong to the economic and political elite of society, most likely in the process of mooting discussion questions will not be inclined to question the existing power relations and privileges. Nevertheless, new ideas were always born in the process of col-

lision of opposing opinions, the dispute of knowledge with faith, which hardly implied "convenience".

Given all the above, we consider the practical aspects of managing the moot of discussion questions in the classroom.

First of all, a question is considered as debatable if there is more than one reasoned answer to it. This often happens in the context of cultural differences, but can also arise in the context of monocultural learning. Proceeding from this, when planning work with discussion questions, it is advisable, as far as possible, to take into account the cultural and intellectual level of students, which will allow them to track progress in their intellectual development as they study discussion questions. In addition, it is useful to predict in advance what material is most likely to cause controversy, and to foresee options for managing the discussion process, which will allow you to maintain a comfortable atmosphere throughout the discussion. It is important to include items in the checklist for discussion participants that will require students to track their own progress in developing skills:

- a critical analysis of the arguments of the opponent,
- building your own theses and the quality of their argumentation,
- conducting polemics,
- competent posing of questions and comprehensive answers to questions,
- self-control in any situations.

Encourage confidence and create a positive climate in the classroom allow you to:

- underlining in the process of discussing the discussion question of similar points in the answers of opponents, which can smooth out the barriers between students from different cultures, showing that each of them carries its own “cultural baggage”;

- preliminary organization of acquaintance of opponents with each other, which increases their motivation for positive communication;

- remind students of the importance of confidentiality. For example, in order for information developed in a small group to be made available to the class, it is necessary to obtain the consent of the group. In some cases, the teacher may need to keep secret some information entrusted to him by the student (fixation for subsequent reflection, facts of disrespectful behavior, attacks against the opponent, instead of criticizing his point of view, changing facts with opinions, etc.)

When discussing any discussion question, there may be a need to dwell on the problem of the relativity of knowledge. In this case, it is useful to demonstrate the relativity of knowledge in the discipline under study, explaining how they are acquired by people, what influences their change, what are the prospects for their change in the near future and in the distant future. This will allow students to better understand what they know and what they don’t know, and will encourage them to

learn what they don't know yet and set new learning goals.

To ensure the effectiveness of work at the beginning of the school year, set clear rules to follow when mooting discussion questions in the classroom. Use discussion options that encourage students to listen carefully to each other, such as, for example, that require the student to paraphrase the views of the previous speaker at the beginning of his presentation. Require students to reinforce their theses not to abuse general reasoning, but to refer to real evidence, be it excerpts from books or studies, from personal experience or the media.

Encourage students to interview orally or in writing from people with a different perspective on the subject under discussion and use it as an argument when presenting their views. Invite reputable guests who are able to defend opposing views on the discussion questions in the classroom. Be respectful use of the diversity of attitudes and experiences of carriers of different cultures in the classroom, when you want to understand the causes of cultural diversity.

In order to develop critical thinking, ask students in writing to substantiate in writing their own answer to a discussion question, and in another lesson to make a critical analysis of this option of justification. Then ask them to compare the first and second versions of the justifications and briefly argue their final position.

Use snippets of documentaries to help students discern facts and interpretations. Use the media to teach the critical analysis of materials from different sources, to distinguish between sources of information and misinformation. Have students analyze, criticize, and evaluate evidence in articles that present opposing positions on the issue. Encourage an independent assessment of the validity of evidence that students consider indisputable. Offer to study the critical articles that teach to recognize prejudice.

Avoid choosing to discuss questions that require one obviously correct answer. Use emerging arguments, inappropriate comments to encourage critical thinking. This can be done by inviting for reflection, asking for evidence of the statement, formulating leading questions to get to the original assumptions. Thus the idea will be discussed, not the person who expressed it. However, do not forget to anticipate and prevent the manifestation of strong emotions, such as anger, aggressiveness, when working with discussion questions. As the emotions subside, have the students analyze their differences. Control your own emotions in communication with students, with other teachers or specialists from institutions of advanced training and retraining.

Mooting the discussion questions, wait for the appearance of disagreements and plan to return to some questions several times. Offer options for gradually resolving differences in the discussion process. Be prepared to neutralize the sense of powerlessness among students who come to the discussion of the debatable issue and conclude that they cannot change anything. Provide an action plan for

this case.

Preliminary practical exercises, if they are carefully planned, supported and monitored, can reduce the division into “our own” and “alien” in the process of discussing a discussion question [5; 6; 7]. Role-playing games and simulations personalize learning activities, link them with concepts discussed in class, focus on key concepts and distract from the desire to absolutize examples [3].

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大学教育环境环境安全的主要方法论途径
THE MAIN METHODOLOGICAL APPROACHES TO THE ENVIRONMENTAL SAFETY OF THE EDUCATIONAL ENVIRONMENT OF THE UNIVERSITY

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***Annotation**. The article proposes a methodology for the productivity-risk, competence-risk, situational-risk approaches to the safety of the educational environment of the university. The authors conclude that the formation of environmental safety competence depends on the influence of environmental risks in the educational environment of a university on the quality of knowledge and skills, their application in practice.*

***Keywords**: competence, environmental safety, risks, educational environment*

To define the concept of the environmental safety of the educational environment of a marine university, it is necessary to analyze the theoretical and methodological approaches of modern scientific teachers to the educational environment. The identified theoretical and methodological approaches of scientists to educational environments; the requirements of the Federal State Educational Standards, International Conventions, professional standards allowed to determine the distinguishing signs of environmental safety.

The main criteria for comparison were: environmental education; laws and regularities of the educational environment; methodology of environmental and competence approaches; system analysis; structure, technology, assessment of educational environments. According to A. M. Novikov, V. I. Slobodchikov [4, 8] the interaction of different types of environments affect the three components of education: education, training, development. In our research, we proceed from the assumption that environmental education includes risk-based environmental education, environmental education involving conflicts; ecological development of personal experience. Ecology includes a system of human relations to the en-

vironment, to itself, to production. The content of education is aimed at mastering the systematic knowledge and skills necessary for the development of a student without taking into account the environmental ecology, environmental knowledge, that is, student-centered learning in the context of the environment (V. V. Serikov) [7], different orientation, for example: professional. The basis of the content of environmental education is knowledge, skills, abilities (competencies) that contribute to environmental education and development (I. A. Baeva, V. A. Yasvin) [1, 9]. The content of environmental education is aimed at developing the competence of environmental safety and includes three interrelated and interdependent components: human ecology (student), environmental ecology (educational), production ecology (professional). The content of human ecology, environment, production are ecological knowledge, skills, abilities, actions, that is, the competences of environmental safety, which are formed during the study of disciplines (Ecology, Life Safety, Risk Management and 12 professional disciplines, including universal, general professional, professional, conventional, special competences); interdisciplinary environmental projects. The content of environmental education affects the quality management systems for the environmental training of marine specialists, the management of environmental risks and university resources. In order to proceed to the definition of the essence of the environmental safety of the educational environment, we need to refer to the methodology of its organization.

Taking into account the opinion of A.M. Novikov's methodology for organizing the environmental safety of the educational environment includes the forms of organization of activities (educational, technological, managerial, etc.), the logical structure of activities (features, principles, forms, methods, means) and its temporary structure (phases, stages). [4, p. 46] The organization of the environmental safety of the educational environment will be the resources of the university (informational - simulators, simulation laboratories, software, etc .; material and technical - audiences, classrooms, gyms, clubs, etc .; financial, etc.). forms of joint cooperation and interaction "leadership - teacher - student - environment"; forms of independent actions of students. The structure of the organization of the environmental safety of the educational environment is logical, based on the peculiarities of environmental training at the marine university, the principles of risk management, quality, resources, situational, educational and health-saving technologies, each of which has goals, forms, methods, principles, means, and results. The structure may also be temporary, phased, aimed at the formation of the competence of environmental safety in the educational environment.

Based on the above, the research used the methodology of environmental and competence-based, personality-oriented and functional-activity approaches (I. A. Baeva, Yu. S. Manuylov, V. I. Slobodchikov, V. V. Nikolina, N. V. Samsonova, V. I. Panov, A. V. Tryapitsyn, V. A. Yasvin and others), who were considered from the

standpoint of managing the process of formation and development; the system of action with the environment and its impact on the learner. As is known, the educational environment becomes a means of education only in certain conditions with the use of technology [9] and as a condition for the entry (inclusion) of a person in a profession (the principle of environmental friendliness) [3]. The methodology of the competence approach from the standpoint of educational-technological, value-semantic, professional-activity, professional-personal, information-technological, environmental positions was used in the research by V. V. Nikolina, G. S. Kamerilova, V. A. Slastenina, A. V. Tryapitsyn, A. P. Tryapitsyn, F. T. Shageeva, A. V. Khutorsky and others. From the point of view of the functional-activity approach, competence is considered as a unity of theoretical and practical readiness for the implementation of professional functions, in the implementation of which the main parameters of professional competence are determined by the functional structure of pedagogical activity. The personal-activity approach was used in research (V. V. Serikov, M. L. Khutornaya and others) [7, 8] Activity is defined as the targeted interaction of a person with the environment, influencing him in order to satisfy his needs. Based on the analysis of approaches, taking into account the risks in the professional activities of marine specialists, we came to the conclusion that it is necessary to develop a risk-based methodology. The methodology of the ecological environment-risk approach is based on the management of processes: the formation of the competence of environmental safety of production (quality); environmental security development (risk management); environment action system (resource management). The methodology of the activity-risk approach consists in the search and recognition of risks based on cooperation and mutual understanding of the managers-teachers - students in solving risky, situational tasks. The safety of the educational environment becomes a means of environmental education, education and development of life experience of students, entering into the production of marine activities with the use of educational, health-saving technologies. The methodology of the competence-risk, situational-risk approaches is aimed at developing the competence of environmental safety of production, including environmental knowledge, skills, actions, theoretical and practical readiness of marine specialists to implement production functions, in which they are able to eliminate or limit the actions of environmental risks [6]. Situational risk approach allows to determine the needs of the student in recognizing educational, professional, production risks by simulating various environmental situations, to ensure personal safety, environmental security and production. Determining the impact of risks on the personal qualities of a student, a future marine specialist (stress resistance, adaptability, environmental friendliness) is important in the conditions of human ecology, environment, production.

The environmental safety of the educational environment is based on certain

laws that reflect the sources of the learner's life experience: personal knowledge, skills; personal socialization; sequence (taking into account the experience of the previous); self-determination - the choice of the line of conduct in problem and conflict situations (A. M. Novikov). [4, p.56] These laws include the laws: self-determination (personal, psychological - environmental knowledge, skills, abilities, ability development, resistance to stress, adaptability, environmental friendliness), socialization (communication, ability to work in a team, communication skills, choice of behavior in risky situations), consistency (continuity in content and organization, consideration of previous environmental knowledge, skills; in information and management).

The implementation of the principles in their unity is determined by the regularities of the ecological safety of the educational environment: psychological (personal), social, aimed at the ecology of man; informative, organizational, aimed at the ecology of the environment; information, management, aimed at the ecology of production (profession) adequate to the objectives of the research.

Ecological safety of the educational environment is a system; signs of system analysis are applied to it. System analysis is a set of rules and methods. The essence of system analysis is to separate the system from the environment and compile its adequate model. That is, the system is a part of the environment that exists independently and functions for a specific purpose. The main properties of the environmental safety of the educational environment of the marine university, as a system: structural (components: resource, eco-friendly, risk); principles (quality management, resource management, risk management, situationality); approaches (environmental risk, productivity-risk); functions (informational, organizational, content); laws (personal, social, aimed at the ecology of man; meaningful, organizational, aimed at the ecology of the environment; informational, managerial, aimed at the ecology of production); health-saving educational technologies (organizational-pedagogical, practice-teaching, diagnostic-effective) aimed at the gradual formation of the competence of environmental safety of production.

Thus, the environmental safety of the educational environment has a goal — the formation of environmental safety competence, management (resources, quality, risks), functions (management, organizational, content), evaluation criteria (risks, environmental friendliness, adaptability, stress tolerance, etc.), principles (quality management, risk management, university resource management, situationality). Environmental risk management is based on the principle of substitution (an acceptable environmental risk with fewer losses); awareness (of environmental risk); management (regulation) aimed at reducing environmental risk; eco-development (environmental friendliness: protection of health, preservation of the contingent, overcoming environmental illiteracy, the formation of competence, the conditions of the educational environment, which contribute to the prevention of environ-

mental situations). Since the environmental safety of the educational environment is a system object, we design its model.

Based on the analysis of the characteristics of educational environments, it can be concluded that the environmental safety of the educational environment of the marine university is a means and condition for the formation of the competence of the environmental safety of the marine specialist.

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终身教育模式作为学生个人和职业发展的战略资源
THE MODEL OF LIFELONG EDUCATION AS A STRATEGIC RESOURCE FOR PERSONAL AND PROFESSIONAL DEVELOPMENT OF STUDENTS

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Annotation. *The need for a person to develop the ability to adapt to the rapidly changing conditions in everyday life and in the professional sphere is a prerequisite for motivating him to self-development in the field of professional activity. One of the most important tasks is to ensure continuity of education. The article presents a model of continuous education in the information and educational environment. In the process of continuous education, taking into account the characteristics and interests of students, self-actualization of a person is formed and develops, as an integral quality, characterized not only by the property of the orientation of the person, but also by a set of systemic qualities that should be formed in the process of continuous education.*

Keywords*: continuing education, education model, personal and professional growth.*

The function of education in the 21st century is to ensure the vital activity of a person throughout his life. This corresponds to the need for people to develop the ability to adapt to rapidly changing conditions in everyday life and in the professional sphere, to maintain the desire for knowledge, regardless of age, i.e. education of the 21st century seems creative and innovative. Creative education focuses on the qualitative changes of subjects, fulfills their needs for self-realization and creativity, serves as a source of further development and self-improvement of society. Therefore, the reorientation of modern education to creativity will allow to take into account the demands of modern civilization and the requirements of the future [1].

Innovative education is an educational process that enables the development

of a student's creative abilities and creates the conditions for motivating him to self-development in the field of professional activity. At the same time, innovative education implies a qualitative change in the forms and methods of organizing the educational process.

Thus, innovative education is a purposeful process of upbringing and innovative training of a person, as a result of which he develops creative abilities, develops skills of self-learning, self-improvement, allowing him to acquire knowledge and experience for life in the knowledge society. By innovative learning is meant the process of self-organization of cognitive activity by the student through the development of his individuality [1].

In the conditions of a transitional state of the Russian economy, human capital becomes the determining factor of development. That is why the timely and high-quality training of specialists to meet the needs of science, the economy, society as a whole and its individual citizens will play a crucial role in ensuring the economic growth of our country. This means that one of the most important tasks is to ensure continuity of education.

The idea of lifelong education originated in the 20th century, but its origins can be found even in the times of the ancient philosophers. The universal and philosophical significance of this idea is great, because its meaning is to provide every person with the opportunity for continuous improvement, creative and professional development, renewal of knowledge, skills, and personal qualities throughout their lives, and thus contribute to the prosperity of the whole society [2].

The germs of the concept of lifelong education can be found in Plato, Confucius, Socrates, Aristotle, Seneca, and other eminent ancient thought giants. The ideas of continuing education are presented in the views of Voltaire, Goethe, Rousseau, who linked them to the achievement of the fullness of human development.

The first attempts to realize the idea of continuity of education were made in the 13th – 14th centuries. in European cities on the basis of the so-called "workshop schools", which were opened and maintained by craft workshops [2].

The founder of modern concepts of continuing education is Jan Amos Comenius, whose pedagogical heritage contains the core of thought, which is embodied today in the concept of continuing education.

The term "continuing education" was first used in 1968 in UNESCO materials, and after the publication of the report of the commission under the leadership of E. Faure (1972), a decision was taken by UNESCO that recognized continuing education as a basic principle, "guiding construction" for innovations or educational reforms in all countries of the world [3].

A new stage in the development of continuing professional education began with the introduction of the Federal Law "On Education in the Russian Federation".

The law introduced the concepts: “continuing education”, “network forms for the implementation of additional professional programs”, “e-learning”, “a modular principle for presenting the content of programs and building curricula”.

In modern Russian and foreign literature, the concept of “continuing education” is identified with such terms as “continuing education”, “further education”, “permanent education”, “lifelong learning”. The notion of “continuing education” is closely related to “renewable education”, meaning receiving education in parts throughout life, alternating education with other activities, mainly with work. The notion of “lifelong education” and related terms within the meaning of the term embed the idea of lifelong incompleteness of education for an adult, and, therefore, an objectively existing need for him to remain in the position of an apprenticeship. The most complete definition can be considered continuous education as a holistic process that ensures the progressive development of the creative potential of an individual and the comprehensive enrichment of its spiritual world. It consists of successively elevated steps of specially organized study, giving a person favorable changes in social status [3,4,5].

In the terminology of UNESCO (1997), continuing education is defined as “formal, non-formal, extra-institutional (informal)” and thus states that education is possible in any form and organizational form.

According to the International Standard Classification (2004) - formal education, carried out in the framework of official institutions (school - college - university). Formal education is a hierarchically structured system and is inherent in most states, including in Russia.

-formal education is a variety of educational systems that are flexible in terms of organization and form, are focused on the specific needs and interests of students, and possess signs of organization and complementarity of the knowledge gained in relation to the person’s existing education. Non-formal education is a qualitatively new phenomenon in social and educational practice, which has its own content, based on its own adequate principles, performs certain functions and solves many old tasks in a new way. In modern foreign literature devoted to issues of lifelong education, the concepts “life-long education” and “life-width education” have been adopted. Under the latter refers to non-formal and informal education, as part of the formal [5,6].

Continuing Education Model.

Purpose of continuing education: diversified personality development, professional growth.

Principles of learning:

- active participation in the training of students themselves;
- independent decision making on the choice of organization of training;
- high motivation and need for self-education activities, the absence of the

coercive nature of training;

- high personal sense of learning;
- development and self-development of students, manifested in changing the quality of learning outcomes, in achieving high qualification competencies;
- flexibility in organization and teaching methods. The methods and contexts of non-formal education are more used, the influence of direct life experience and the inclusion of corporate interaction (conducted within certain communities, regardless of whether they are allocated by location or by interest);
- internal responsibility of students for the result of educational activities;
- self-assessment of students' obtained results based on criteria that are significant for them.

The content of continuing education is focused on advancing the development of society, professional career, personal skills and qualities, and other areas of social practice. It assumes the continuity and multi-variant general and vocational education. In addition to the knowledge and skills themselves, the content itself includes the process itself, the experience of their acquisition and practical application, the ways and means of independently obtaining, searching and discovering, self-education - "personal experience" as a component of the content of education.

Forms of organization of continuing education:

- mastering educational programs in organizations carrying out educational activities ("formal education");
- training outside organizations that carry out educational activities, including at work (in the form of mentoring, internships, instruction, training, through the implementation of various training programs, exchange of experience, etc.), as well as education in the framework of public and other socially oriented organizations ("non-formal education");
- individual cognitive activity (self-education "or" informal (spontaneous education ").

The role of corporate education institutes, the activities of personnel services of enterprises and organizations, on-the-job training (with the help of mentors, tutors, instructors), experience exchange activities, professional conferences and seminars, and overall implementation of personnel training programs are being strengthened.

Active introduction of modern educational technologies, including open education, e-learning, distance and mobile technologies.

Training methods and technologies:

Interactive learning technologies, which is a special way of organizing cognitive activity, through active interactive interaction of all subjects of the educational process between themselves and the information and educational environment. The essence of interactive learning is pedagogical interaction, a special kind of

learning interaction. Based on the dialogue, the student becomes a full participant in the educational process, his experience serves as the main source of educational knowledge, and the teacher does not provide ready-made knowledge, but encourages participants to self-search and serves as an assistant in the work that ensures the personal growth of all participants in the educational process.

Changes occurring in the process of pedagogical interaction in connection with the realization of the capabilities of ICT tools allow to improve the technology of information interaction carried out between the student / learner, teaching and informatization and communication tools through the use of web-quest technology, case studies, technology of developing critical thinking, technology " learning together "and others.

Assessment, self-assessment and the result of continuing education: assessment of the knowledge and skills themselves; the process and experience of their acquisition; practical application of newly acquired knowledge; ways and forms of self-mining, search and discovery of knowledge; assessment and self-assessment of students' self-education.

Conclusion.

The backbone feature of lifelong education is the activity component, designed to ensure procedural readiness for solving problems, for creative transformation of reality. The activity component includes various types of educational activities: research activities, independent cognitive activities, communication activities, creative activities, etc.

The joint selection by the subjects of the educational process of goals, content, forms and methods of educational activities in the learning process affects the achievement of a high cognitive and creative activity level, taking into account the balance and harmony between the social requirements of personal and professional development and the needs of the learner's personality in self-determination, self-development .

In the process of continuous education, taking into account the characteristics and interests of students, self-actualization of a person is formed and develops, as an integral quality, characterized not only by the property of the orientation of the person, but also by a set of systemic qualities that should be formed in the process of continuous education [7].

In the new quality, there is reflection and self-reflection, as a form of theoretical activity, a way of thinking that reveals the goals, content, means, ways of one’s own activity (intellectual reflection); reflection of the human internal state (sensory reflection); be a means of self-knowledge.

The research of non-formal education shows that it is neither an alternative, nor a simple addition or continuation of traditional education, much less a spread

of traditional education for the entire duration of a person's life. It can be noted that formal education as it prepares and makes non-formal education possible, and non-formal education pushes the personal and professional development of a person forward.

Thus, in the model of continuous education, the integration of all forms of education, providing a new quality of vocational training, becomes the core-forming principle. Improving professional qualifications is due to the needs of society, the evolution of science and practice, the ever-increasing demands on a person, his ability to quickly and adequately respond to changing social processes and situations, his willingness to restructure his activities, to skillfully solve new, more complex tasks.

The system of views on the content, principles and main priorities of state policy aimed at providing opportunities for the realization of the right of the adult population of the Russian Federation to continuing education is reflected in the "Concept for the Development of Continuing Adult Education in the Russian Federation until 2025". The study of the model of continuing education requires a detailed study of all the components of the system, but the first priority is the problem of evaluating non-formal education. Development of criteria and indicators for personal and professional growth of students, which is currently an obstacle to the integration of non-formal education in the system of continuing professional education.

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儿童健身及其技术在学龄儿童体育中的战略作用
STRATEGIC ROLE OF CHILDREN'S FITNESS AND ITS TECHNOLOGIES IN PHYSICAL CULTURE OF SCHOOLCHILDREN

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注解。介绍了儿童健康的特点，揭示了儿童健康的具体特征。鉴于健身技术有效性的理论和实验原理。展示了他们引入体育课程的可能性，旨在提高学生的身体素质和对体育锻炼的兴趣。调查数据显示了体育专家对使用健身技术实现这一目标的积极态度。给出了1 – 11年级学龄儿童在不同方向的体育课程中引入健身技术的多年教学实验结果。由此得出结论，在不同方向的体育课程中使用健身技术促进了基本运动能力的发展，增加了对课程的兴趣，并有助于有效地解决其任务。

关键词：儿童健身，健身技术，体育锻炼，体育，学龄儿童，运动能力，效率。

Annotation*. The characteristic of children's fitness is presented and its specific features are revealed. Given the theoretical and experimental rationale for the effectiveness of fitness technologies. The possibilities of their introduction into the lesson of physical culture, with the aim of improving the physical fitness of students and interest in physical exercises are shown. The data of surveys that revealed a positive attitude of physical culture specialists to the use of fitness technologies to achieve this goal are given. The results of many years of pedagogical experiments with schoolchildren of 1-11 grades on the introduction of fitness technologies in the lessons of physical culture of different directions are given. This leads to the conclusion that the use of fitness technologies in the lessons of physical culture of different directions promotes the development of basic motor abilities, increases interest in the lesson and contributes to the effective solution of its tasks.*

Keywords*: children's fitness, fitness technology, physical training, physical education, schoolchildren, motor abilities, efficiency.*

The priorities of the development of Russia at the present stage are the issues of education and health of the younger generation. This is due to the demographic decline and deterioration in the health of the population, including children and

adolescents, which makes a real threat to the preservation and reproduction of the human resource as the most important factor in the national security of the state, its intellectual and economic potential.

Physical education and educational activities have significantly changed in connection with the modernization of education, quality improvement, development of the humanistic orientation of goals, content, conditions of education and upbringing of the individual. All this contributes to the transition to an innovative type of educational process and is designed to help resolve the accumulated problems and contradictions.

Of particular concern is the contradiction between the emergence of educational institutions of various types, programs and technologies, and, accordingly, the increase in mental stress on children from a very early age, their success in intellectual activity, on the one hand, and the deterioration of health, the decrease in the level of physical activity , loss of value orientations on a healthy lifestyle, on the other hand.

At the same time, for many years, there has been dissatisfaction with the traditional physical education classes of a significant part of children and adolescents, which affects the decrease in their physical fitness and loss of interest in the classes.

The above actualizes the search for effective ways to improve the health and harmonious development of children and adolescents, in particular, the transition from the existing schemes of maintenance and organization of physical education classes in educational institutions to innovative ones, which becomes an important scientific task.

The present vision of the problem allows us to consider fitness as an innovation in the field of physical culture, a significant sociocultural phenomenon, a focused systematic process of occupations with a health-improving focus, contributing to the physical development of those engaged, and improving their physical fitness. At the same time, it can be positioned as a factor in the formation in society of cultural values of the new millennium, freedom of choice, independence, enterprise, and tolerance, and substantiation of its scientific and methodological foundations as one of the promising ways to improve the efficiency and quality of physical education of preschool and school age in terms of modernization.

Covering various forms of physical activity, fitness meets the needs of various social groups in physical training and health activities due to the diversity of fitness programs, their accessibility and emotional training. Possessing significant adaptive and integrative capabilities, fitness has multifunctional significance for various spheres of public life. This contributes to its implementation in all types of physical culture and, in particular, in physical education education of school-age children.

The direction of children's fitness appeared relatively recently, but its popularity is growing rapidly and is of interest to specialists in physical culture. The widespread propaganda of fitness in the media serves as an additional and significant argument in favor of the choice of children to exercise them. Their interest is also due to the fact that fitness programs are widely available, highly effective and emotional.

The availability of children's fitness classes is determined primarily by the fact that their content is based on simple general developmental exercises and, in most cases, special expensive equipment is not required (exceptions are exercises on special equipment, simulators).

The effectiveness of classes lies in the diverse effects on the musculoskeletal system, the cardiovascular, respiratory and nervous systems of the child's body, the development of motor abilities and the prevention of various diseases.

The emotionality of the lessons is explained not only by musical accompaniment, which creates a positive psychological attitude, dance and play orientation of children's fitness, but also by the desire to coordinate their movements with the movements of partners in the group, the ability to demonstrate well-developed movements, to get satisfaction from the lessons, which also emotionally inspires the schoolchildren and improves interest in them.

Interest in fitness and the varieties of its directions is not accidental. The occupants are provided with great opportunities to engage in accordance with their needs and interests, to show their individuality and originality. This is also conditioned by the freedom to choose the areas of fitness and voluntary participation, accessibility for the widest range of schoolchildren (regardless of gender, age, health status) and a modern look at physical education..

Thus, *children's fitness can be viewed as an accessible, highly effective, emotional system of targeted recreational activities of various kinds on a voluntary basis, based on the interests of those involved, with the goal of achieving an optimal physical condition, improving physical conditions, preventing diseases, strengthening health and initiating a healthy way. the lives of children and adolescents.*

Children's fitness includes a wide variety of wellness and integrated programs. The priority of the health-preventive orientation of children's fitness programs is determined by the abundance of health problems in children and adolescents. Their basis is the use of physical activity for the purpose of recovery, physical development, improvement of physical fitness and the disclosure of the inner potential of the child as a person, as a supporter of a healthy lifestyle. Demonstration of the development of motor skills and abilities of students is implemented through demonstrations, contests, festivals and shows.

Programs in children's fitness and its technology in recent years have been used in general (preschool and school) institutions, additional education, fitness

centers and in special correctional institutions. Exercise complexes from different areas of children's fitness can be included in school as in extracurricular activities (clubs, sections, sports and recreational activities in the mode of training and extended day, in school-wide physical culture and sports activities), and in the main form of educational work - lesson.

Based on the analysis of scientific and methodological literature, pedagogical observations over 10 years and our own pedagogical experience in this field, we identified specific features of children's fitness classes that make it especially attractive and popular among children and teenagers. These include:

1. A wide variety of exercises (with objects, without them, on projectiles, simulators, etc.), their originality, different orientation and modernization due to the introduction of asymmetric and grotesque movements, which contributes to the emergence of new fitness programs;

2. Close connection of children's fitness trends with music, modern rhythms and dance directions;

3. Inclusion of various forms (plot, image, etc.) and methods (playing, competitive, etc.) of conducting classes, innovative technologies that provide for the expansion of the movement abilities of the schoolchildren, improving the culture of movements, the level of physical fitness, physical development, health, prevention of various diseases;

4. High emotional lift due to presentability and expression of the movements performed by a fitness specialist in the classroom;

5. The large variety of classes (including - without special equipment), the possibility of using different areas and technologies of children's fitness, as well as high adaptability and mobility of the selection of its funds, depending on the contingent involved;

6. Ensuring the possibility of emotional, creative expression, neuropsychic discharge, children and teenagers gaining pleasure from activities and satisfaction from performing various motor actions;

7. The inclusion in the classes of special knowledge on a healthy lifestyle, methods of doing fitness and control involved in their well-being, physical development and physical fitness.

Fitness classes for children of different ages can effectively contribute to their improvement, attraction to physical culture classes, and increasing interest in them. Using the full potential of fitness in the prevention of various diseases, physical inactivity, the society will receive the least costly and most effective way to heal children of school age.

The analysis of the scientific and methodological literature, pedagogical observations, a survey allowed to experimentally substantiate the effectiveness of the introduction of fitness technologies and programs in physical education of

schoolchildren. The development of new fitness technologies includes the most effective, both foreign and domestic achievements in the field of recreational physical culture, which allows them to be used for a specific purpose in various types and types of educational institutions, including specialized correctional, as well as in fitness centers . So, in. In St. Petersburg, 72% of physical education teachers introduce various fitness technologies into physical education classes or extracurricular activities. In terms of popularity among schoolchildren, they occupy the second place in sectional classes (after sports games), as 61% of respondents noted. A large variety of fitness technologies and their specificity makes it possible to use them in work with children belonging to the preparatory and special medical group, having various deviations in the state of health, children with disabilities.

Fitness technologies, regardless of their specific orientation and solvable main and particular problems, may be reflected in one direction or another of the lessons of physical culture: athletics (E. G. Saykina, Zh. E. Firileva, I. N. Venediktov, 1995), gymnastic, playing (E. G. Saykina, Zh. E. Firileva, M. L. Zhuravin, N. V. Kazakevich, 1996) and contribute to the diversity of choice of means in conducting the preparatory and final parts of the lesson [1].

For a number of years, we have conducted research on the use of various fitness technologies in physical education classes of different directions, the results of which were reported at scientific and practical conferences of different levels, reflected in numerous scientific articles and teaching aids [2,3,4,5 , 6 and others]. It has been determined that fitness technology can be used in almost all physical education classes at school. Their elements contribute to optimizing the lesson, give it a new emotional coloring, and most importantly, they do not oppose one type of exercise to another, but mutually complement them, thereby contributing to increasing interest in the lesson.

Based on the results, it was revealed that on the lesson of the gymnastics, athletics and game lessons it is advisable to include fitness technology in the preparatory part of classes. Their use should reflect the specifics of this type of physical culture and sports activities and contribute to the development of certain motor abilities of students necessary for gymnastics, athletics or sports games.

Fitness technology in the preparatory parts of the lesson with the athletics and game orientation should be applied to the lessons of improvement and repetition of the training material, when schoolchildren have a difficult monotonous work; in the main part of the lesson on the development of technical and tactical techniques in the game or work on endurance, as well as with the aim of expanding the choice of means, updating the methodical techniques while mastering the program exercises and increasing interest in physical education lessons.

To solve the problems of the main part of the lesson, you can apply specially designed sets of exercises of various fitness technologies aimed at developing en-

durance, strength, flexibility and other motor abilities necessary for the implementation of the tasks set in the lesson of physical culture of any orientation.

It is advisable to include fitness technology in the lessons of learning new material in their final part in order to increase the emotional state of schoolchildren, relieve tension and gain satisfaction from the lesson as a whole.

Creatively using various areas of children's fitness in physical education classes, the teacher activates the motor activity of students and thereby increases the interest in it.

A series of pedagogical experiments with the use of fitness technologies in the preparatory parts of the lessons with a track and field athletics, game orientation revealed that fitness technologies not only expand the choice of means and update the methodological approaches when conducting physical education classes, but also contribute to the development of basic motor abilities characteristic of data types of physical culture and sports activities. So, in the experiments conducted on the lessons of athletics, the results of indicators of general endurance ($t = 3.65$; $p < 0.01$) and speed ($t = 2.4$; $p < 0.05$) were statistically significant; speed ($t = 2.0$; $p < 0.05$); coordination of movements ($t = 2.94$; $p < 0.01$). In all experiments conducted in class with a game orientation, the indicators of motor coordination ($t = 2.78$; $p < 0.01$) turned out to be reliable.

Pedagogical experiments (conducted over 10 years), aimed at determining the effectiveness of fitness technologies developed on the basis of children's fitness programs for children of different school age, also confirmed the impact of their influence on the development of motor abilities, increasing physical fitness and interest in physical culture.

So, reliable results ($p < 0.05$) of the increase in motor abilities were obtained from the involved experimental groups according to the following programs:

- *dance and game gymnastics "Sa-Fi-Danse" (flexibility $t = 3.03$; coordination of movements $t = 4.75$; speed $t = 2.0$; speed-power abilities $t = 2.58$; imagination and figurative thinking $t = 4.16$). The obtained results confirm that the game method of conducting classes, figurative character, musical accompaniment, facilitate the process of memorizing and mastering the exercises, increase the emotional background of the lessons, contribute to the development of imagination and creative abilities;*
- *dance rhythmic gymnastics and children's aerobics (flexibility $t = 4.1$; coordination of movements $t = 2.94$; speed-strength exercises (test "long jump" $t = 3.06$ and test "lifting the body in 30 seconds" t = four);*
- *classical and dance aerobics "AeroDance" (arm muscle strength $t = 1.92$; speed-strength abilities $t = 2.61$; explosive strength $t = 3.27$; flexibility $t = 2.4$; coordination of movements $t = 3.6$; ability to express one's individuality (test "poses") $t = 6.98$ $p < 0.01$; physical performance $t = 2.84$; endurance $t = 2.78$). However, it*

has been established that aerobic exercises contribute to the development of dance, help to gain self-confidence, increase the culture of movement and replenish the motor reserve;

– *fitball aerobics "Dancing on balls" (speed-strength abilities (test "raising the body" t = 4.09; test "backing back" t = 3.03); balance t = 4.08; flexibility t = 2 , 75; coordination of movements t = 4.75). It was noted that classes on fitballs not only contribute to the development of motor abilities, but also contribute to the prevention of violations of posture, flat-footedness;*

– *treatment-and-prophylactic dance "Fitness Dance" (strength of the abdominal muscles t = 2.93; strength of the back muscles t = 3.06; strength of the muscles of the arms t = 2.12; flexibility t = 2.25; coordination of movements t = 2.21; speed t = 2.74). As a result of the experiments, there was an increased interest among all participants in the experimental groups (100%) in the classes.*

The organic inclusion of exercises of various fitness technologies (playing, correcting, dancing, etc.) will significantly expand the choice of means, update the methodological approaches in conducting physical education lessons. And, at the same time, one of the main requirements for the modern lesson of physical culture will be fulfilled - a combination of educational and recreational orientation with the achievement of motor density, dynamism and emotionality.

At the same time, professionals should not consider fitness as the ideal and only way to solve all problems associated with the recovery of the younger generation. With all its powerful health potential and attractiveness, it would not be advisable to detract from the value and effectiveness of other types of motor activity. Not in the replacement of traditional means, well-proven in the general education practice of many years of use, with new, modern fitness technologies, but in addition to and expanding the choice of means, a conceptual update of methodological approaches to physical exercises in physical education classes, seems to be the most productive way to improve its quality and attractiveness.

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教育会议是为医学生准备专业活动的机会之一
THE EDUCATIONAL CONFERENCES AS ONE THE OPPORTUNITIES TO PREPARE MEDICAL STUDENTS FOR PROFESSIONAL ACTIVITIES

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注解。本文讨论了教育会议的特点：从信息来源独立获取新知识;来自会议发言人的报告。教师作为学生报告组织者的作用与报告，指出所讨论问题的讨论的发起者;校正报告的实质内容;主持人总结会议结果，评估整个班级工作的专家和个别学生的工作。本文包含对使用信息源时学生技能形成阶段的分析：能够突出阅读文本中最重要的内容;用你自己的话复述内容的能力;教育会议的社会重要性是：教育会议的发展，学生的主动性，活动性和独立性，他们的集体主义意识，工作责任，这是与多种来源合作的技巧。完成了学生组。

关键词：教育会议，报告，阶段分析，教育价值，物理，系统化，概括，教育过程。

Annotation. *The article discusses the features of the educational conference: independently obtaining new knowledge from information sources; from the reports of speakers at the conference students. The role of the teacher as an organizer of student presentations with reports, the initiator of the discussion of the problems presented is indicated; corrector substantial content of the report; moderator in summarizing the results of the conference, an expert in evaluating the work of the class as a whole and the work of individual students. The article contains an analysis of the stages of formation of students' skills when working with information sources: the ability to highlight the most important things in the read text; the ability to retell content in your own words; the skill of working with several sources in order to systematize, structure and summarize the information presented, etc. The social importance of educational conferences is noted: the*

development of initiative, activity and independence of students, their sense of collectivism, responsibility for the work done to the student group.

***Keywords**: educational conference, report, analysis of stages, educational value, physics, systematization, generalization, educational process.*

The formation of students' competences in different areas of educational activity can be implemented through active forms of education. One of them is an educational conference [4]. The educational conference is a form of training, which is the performance of students with reports on a given topic, followed by questions from the audience.

The educational conference has educational value. In the process of preparing for it, each participant:

- acquires the skills and abilities of independent work with information sources;
- learns to analyze and summarize, to separate the most important from the minor;
- independently works with visual aids and devices, uses them during reports, demonstrates experiments;
- performs schemes, drawings and drawings;
- gains experience of public speaking, aimed at mastering the correct scientific speech.

All this contributes to the identification of professional aptitudes and intellectual abilities of students, the development of their interest in various scientific knowledge. At the same time, it has a positive meaning in the development of initiative, activity and independence, in raising their sense of responsibility towards the student team.

The first works on conducting educational conferences on physics are dated to the 60s of the last century. So in 1962 in the journal “Physics at School” an article by Margulis B.S. “Student's Conference on the topic “Physics of the Lathe”” was published. During the described conference, the acquaintance with the capabilities of the gearbox mechanism (rotational speed of the part) takes place, and the issues of lubrication (friction) of the gearbox mechanisms and other issues are considered. In 1964, Usova A.B. and Oleinikov S.F. presented the article “Educational Conferences on Physics in an Eight-Year School” in the journal “Public Education” on physics at the eight-year school.” During these years, there is an increase in vocational and polytechnic education in the country. Therefore, holding conferences on physics should acquaint students with the achievements of science and technology of that time.

As at the beginning of the implementation of conferences in the educational process, so today the difficulty of holding them in a comprehensive school is

that students are required to have universal learning activities for working with information sources. In the absence of this kind of skills and abilities, training conferences are ineffective: students spend a lot of time preparing reports and reports, not always achieving the necessary positive results. Therefore, each teacher must form among the students a “baggage” of competent handling of bibliographic sources (textbooks, dictionaries, reference books, encyclopedias, etc.), Internet resources (educational portals, simulators, virtual simulators, etc.).

Many of the listed learning activities are formed when teaching various subjects in a secondary school [6]. The students master the following skills and abilities: understanding the meaning of the text, highlighting the main text from the text, systematizing the essential features, classifying the similarities and differences of circumstances, analyzing the causal relationships presented in the information source. Also important are the ability of students to logically and consistently express the analyzed material in their own words; supplement educational material with information from other sources, use the structural elements of bibliographic and Internet sources (catalog, table of contents, subject index, navigation system, etc.). For example, the formation of students' ability to distinguish in the text "main thoughts" should be reduced to the development of the ability to determine its constituent structural elements and find their components.

Natural sciences have a certain specificity in the preparation and conduct of educational conferences. They are associated with the study of natural phenomena and technology, conducting demonstration experiments during a performance. Many aspects of scientific knowledge stem from the study of the life of scientists. Therefore, the designated "baggage" must be supported by the formation of the following skills:

- the ability to independently understand the findings of mathematical, physical, chemical and other formulas, analytically expressing the natural relationship of phenomena and quantities that characterize them;
- the ability to use diagrams, drawings, tables and graphs available in any scientific literature.

Training conferences can be viewed as a kind of transitional form of organization of studies from lessons to training seminars. To begin to introduce educational conferences into the educational process, preferably in the eighth grade of a secondary school. By the end of the seventh grade, only brief presentations of students on some issues in individual lessons are possible. It is also possible to write an essay (for example, prepare an essay on the topic “How was Archimedes' law discovered?”). However, even in the eighth grade and should not rush to the beginning of the training conferences. During the first half of the year, it is only possible to begin the formation of the initial skills of students in working with various sources, including the non-fiction literature. In this case, it is necessary

to clearly indicate the source in which the student can gather information for the assignment. This is most relevant in order to protect health and hygiene standards when working with students with Internet resources. It is recommended to use no more than one task. So it is possible to prepare messages and reports for traditional lessons with presentations on individual issues in front of students of their own or several classes (for example, “Development of aeronautics at the beginning of the 20th century.” In this case, students can use the encyclopedia “Technique” or information from Wikipedia). At the same time, it is obligatory to jointly draw up a plan for preparing a speech.

The most successful period of the training conferences is the fourth quarter of the school year. By this time, students will already acquire primary knowledge, skills and skills for independent work with various information sources..

In determining the topics of educational conferences, it is necessary to proceed from a pedagogical analysis of the features of the conference as a form of organization of studies and a psychological analysis of the characteristics and significance of the primary perception of educational material. Based on this, it can be concluded that it is inappropriate for an educational conference to make a primary study of any phenomena, properties of bodies, laws and theories. You should not make them also the material associated with the initial formation of concepts. More effective are the educational conferences on physics, which address more "broader" and deep questions (for example, the history of discoveries and inventions). They introduce the use of theoretical material in science and technology, with the principles of the design and operation of devices, machines and mechanisms, as well as with technological processes. These questions students can disassemble their own. Such training conferences help to clarify and concretize the concepts already learned in the classroom, systematize and synthesize students' knowledge.

According to the opinion of the methodologists-physicists (A.V. Usov, V.V. Zavyalov) the work of a schoolchild with educational material in preparation for an educational conference involves six main stages, each of which has its own content, purpose, and didactic tasks [7].

Analyzing the stages of development of skills for working with information sources, it can be stated that in the process of learning from stage to stage the quality of students' activity increases. This is manifested in the implementation of projects, presentations at problem seminars and scientific conferences [5].

The current state of teaching physics in domestic schools is associated with a decrease in the number of hours on this subject in general education classes. However, current education is characterized by an interdisciplinary direction. There is a mutual penetration of some sciences in the other. As a consequence of this process, the emergence of new sciences: biophysics, astrophysics, etc. Therefore, there is potential in time when organizing interdisciplinary educational conferences [6].

The Physics Learning Conference contributes to the sustainable motivation of students to the subject, the development of their interest in scientific and technical knowledge. In the process of preparing their messages, students acquire the skills of independent work with clarity and instruments, the ability to use training equipment during their report, create presentations on the specified topics, and demonstrate drawings and slides.

Preparing for an educational conference is a kind of problem that a student must solve. Therefore, holding conferences on physics is associated with problem-based learning. One of the main advantages of problem-based learning is its focus on learning the very process of acquiring knowledge. The basis of such training is a learning problem. Its essence lies in the dialectical contradiction between the knowledge, skills, skills and new facts known to the student, phenomena, phenomena for which the previous knowledge is not enough to understand and explain.

The activity of the teacher and students in problem-based learning has its own characteristics. On the part of the trainer - identification and classification of problems, problem statement. On the part of the trainee, tracing the logic of evidence, the movement of the trainer's thoughts (problem, hypothesis, proof of the validity or falsity of the assumptions made, etc.).

At the same time, problem-based learning is aimed at an independent search for new concepts and methods of action. It also implies a consistent and purposeful advancement of cognitive problems to students, resolving which they are actively assimilating new knowledge. It should be noted that it provides a special way of thinking, the strength of knowledge and their creative application in practice.

When preparing and holding a conference with the use of problem-based training, appropriate training is required from the teacher. Taking into account the peculiarities of the physics conferences, the teacher needs to develop a problem experiment and use problem-based training when solving problems [3].

Starting to apply a problem experiment, it is necessary that students become familiar with its features and become interested in its implementation. Initially, such tasks should be small in scope and relatively simple. Later, tasks are complicated to two or three tasks with tasks, the wording of which is not so specific (for example, “Write down what conditions, in your opinion, the buoyancy depends on. Test your assumptions empirically.”)

An important place in the educational process is the solution of physical problems. This is one of the most effective forms of consolidation and study of theoretical educational material. So it is possible to offer students to solve a non-standard problem and discuss the solution options for everyone. To do this, you can hold a conference - the solution of physical paradoxes.

The value of the conference is invaluable in the development of students' oral

speech, the ability to competently, logically consistently present the material selected for the report. The following report outline can be used as recommendations for preparing for a public speech at a training conference:

1. Appeal to the audience, consisting of greetings and wording of the topic;
2. In the 2-3 sentences, a description of the relevance of the topic is given;
3. Provides a brief overview of the literature on the topic;
4. Formulated the main provisions of the topic in a logical sequence.
5. For each provision presented, the arguments, conclusions or formulations describing the results are used. Here you can demonstrate illustrative material on the presentation slides. In a slide show, you should not read the text shown on them. It is only necessary to describe the image in one or two phrases. If graphs are shown, they should be named and state the trends viewed on the graphs. When displaying diagrams, pay attention to the designation of segments, columns, etc. Graphic material should be clear and understandable from the side. The text accompanying the charts and histograms should reflect only specific conclusions. The volume of this part of the report should not exceed 1.5-2 minutes of speech.
6. When demonstrating experiments, the attention of the audience should be paid to the specific features of the phenomenon being represented. At the same time, taking into account the willingness of the audience to perceive the effect of experience, it is necessary to follow the rules of the demonstration experiment (simplicity, clarity, ergonomics, etc.)
7. At the end of the speech, conclusions must be made.
8. Based on the conclusions, the rapporteur can make some assumptions about the continuation of the consideration of the submitted message.

Another advantage of holding educational conferences in modern education is the formation of the student's readiness to implement research activities. Its main advantage is the development of the process of obtaining knowledge, the actualization of cognitive independence, the development of logical, rational, critical and creative thinking [2].

Practical forms of preparation for training conferences are practice-oriented classes (experimental laboratory work, practical training, research, research design, etc.). During training, such classes are designed to form the ability to observe and study phenomena, to acquaint with various measuring instruments, devices and the principle of their action, to master the technique of measuring quantities, to prepare for detection and the need to check quantitative patterns, etc. The orientation of these classes on practical activities allows us to strengthen our understanding of the methods used in scientific research, to acquire the skills and abilities of experimental activities, to expand knowledge about society and industry.

In the formation of universal educational activities aimed at readiness for research in laboratory classes, the most rational will be not the traditional step-by-step instructions for implementing a clear algorithm, but tasks of a problematic nature. Such tasks

provide an independent ("inventive") solution that contributes to a more in-depth understanding of the processes under study. When searching for the resolution of a problem educational situation, it is appropriate to use the tools available for a given target audience. Among the specialized equipment of a particular subject area, modern information and communication technologies (both hardware and software) are universal. These tools allow you to visualize problem situations, simulate an ongoing process, implement a virtual experiment, conduct numerical testing of hypotheses, obtain necessary information using Internet search servers or use the capabilities of the information-subject environment [1]. Practical studies-research refers to the independent work of students. In the course of such lessons on the presented theoretical material and with minimal instruction, it is necessary to solve tasks of a problematic nature: conduct an experiment, identify and investigate the dependencies of the quantities characterizing the process, formulate conclusions on the work done, etc. When carrying out such a study, computers can also be productively used: conducting a numerical experiment, graphical representation of dependencies, estimation of measurement and calculation errors, etc. When forming conclusions, important aspects are: possession of the terminological apparatus of the subject area, stylistic methods of presenting information, highlighting semantic logical supports in judgments. The implementation of a research project, among other things, provides for a public presentation of the results achieved. This procedure can be implemented in the form of a training conference - contact discussion or video conference on the Internet (in real time). Such a performance, as a rule, is accompanied by illustrative materials (presentations, videos, flash animations, etc.). Dialogue with opponents contributes to the ability to use adequate and specialized language tools to express their thoughts and reasoned evidence. This is one of the important features of the formation of communication skills.

Formation of readiness to conduct training conferences is a multidimensional planned process. Success at each stage of development of a student's personal qualities is determined by the result of the previous stage. The path presented in the article can be incorporated into the modern educational process. At the same time, the development of readiness for the student's productive learning activities is entirely determined by the individual trajectory of the individual.

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专家的专业培训，考虑到新的要求
PROFESSIONAL TRAINING OF SPECIALISTS TAKING INTO ACCOUNT NEW REQUIREMENTS

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注释：在俄罗斯联邦经历了实质性的。这些建筑行业人员构成能力要求的变化。本文讨论了专家培训的改进，同时考虑到建筑领域专家要满足的第一要求的巨大变化。提供额外的专业要求，以满足那些将其纳入国家建筑领域专家登记册所需的技术要求，以便建造传统和严重危险，技术复杂和独特的基本建设项目。教室和实验室，通过现代技术控制，设备，装置和设备，与供水和卫生领域的国内外组织的领先专家一起配备课程。

主要学科的工作计划包括考虑到额外要求的补充和变更。提交给从事基本建设对象的建设，重建和大修的专家。

关键词：专家，经理，专业再培训。

Annotation*: In Russian Federation has undergone substantial. These changes in competence requirements for personnel composition in the construction industry. This article discusses the improvement of professional training of specialists taking into account the dramatic changes in the first requirements to be met by experts in the field of construction. Provides additional professional requirements to be met by those skilled needed for their inclusion in the National Register of experts in the field of construction for the construction of both conventional and severely hazardous, technically complex and unique capital construction projects. Classrooms and laboratories, where classes are equipped together with leading experts of domestic and foreign organizations in the field of water supply and sanitation with modern technical means of control, devices, installations and equipment.*

The work programs of the main disciplines include additions and changes that take into account additional requirements. presented to specialists engaged in the construction, reconstruction and overhaul of capital construction objects.

Keywords: *specialist, manager, professional retraining.*

In 2017, a fundamental reform took place in the system of self-regulation in the field of construction, which was based on increasing the responsibility of both the associations of self-regulating organizations (ASRO) and their specialists for their work at capital construction projects.

On July 1, 2017, Russia introduced the national register of specialists (LDCs) in the field of construction [8], which contain information about highly qualified staff members.

Each member of ASRO in the field of construction, reconstruction and overhaul of capital construction projects from July 01, 2017 should have at least two specialists in the state at the main place of work, information about which is included in LDCs.

A specialist-leader of a construction organization may be an individual [2] (general director, director, manager, manager) who is entitled to perform, under an employment contract with a legal entity or an individual entrepreneur, labor functions in organizing work on a construction site. The organizer of the construction industry can be [1] a specialist (chief engineer, chief engineer of the project, head of construction, project manager), information about which is included in the LDC of construction specialists - association All-Russian non-governmental non-profit organization - All-Russian Industrial Association of Employers based on the membership of construction workers - Nostroy ". They are notified about the introduction of a specialist-manager of a construction organization and a construction manager to LDCs, with assignment of a unique specialist number, for example C-16-147629, where 16 means the number of the region where he works.

The creation of LDC specialists has several objectives at once. First, there is a resource that brings together information about high-class industry experts, which will allow customers to evaluate the experience and competence of the individuals carrying out the work. Today, these data are available on the site Nostroy - www.nostroy.ru. Secondly, their personal responsibility will guarantee the quality and safety of their work.

Specialists should have [1,2,8] in the direction of training higher education (engineer, master, specialist) or non-core higher education plus additional professional education [7] in the direction of "construction" (professional retraining in the direction of "construction").

Specialists included in the LDCs in the field of construction, introduced the following additional professional duties:

- organization of input control of the received project;

- the implementation of operational planning, coordination, organization and implementation of operational quality control of the work performed, carried out during the construction, reconstruction, overhaul of capital construction facilities;

- acceptance of completed types and separate stages of work in the implementation of construction, reconstruction and overhaul of capital construction objects, elements, structures and parts of capital construction objects, engineering and technical support networks, their plots with the right to sign relevant documents;

- signing of the following documents:

a) acts of acceptance of the capital construction object;

b) confirming compliance of the constructed, reconstructed and repaired object with the requirements of technical regulations and sets of rules;

c) confirming the compliance of the parameters of the constructed, reconstructed and repaired object with the project, including the requirements of energy efficiency and the requirements of the facility equipment with metering devices for the energy resources used;

d) confirming compliance of the constructed, reconstructed and repaired object with the technical conditions of connection to the networks of engineering and technical support.

To take into account the requirements of the fundamental reform of the self-regulation system in the process of professional retraining of construction industry specialists [3], the staff of the Water Supply and Drainage Department of the Kazan State University of Architecture and Civil Engineering (KSAU), into the previously developed program PARIS. By the decision of the Prague Book Fair, it was included in the special catalog “PARIS BOOK FAIR 2018” and awarded the “Gold” Medal of the Salon), curriculum and work programs additions and changes were made to the main disciplines, taking into account the additional professional responsibilities of a construction industry specialist [4].

Professional retraining of managers of construction organizations is carried out according to the program “Professional retraining of a specialist - the head of a construction organization in the direction 08.03.01“ Construction ”, the profile“ Water supply and water disposal ”. The program of professional retraining of a specialist - the head of a construction organization in the direction 08.03.01 “Construction” was selected by the Presidium of the Russian Academy of Natural Sciences and presented to the International book exhibition Fore di Livre de Bruxelles “LIBER BARCELONA 2018”, by the decision of which it included the Catalogo in LIBER BARCELONA 2018 ”and awarded the“ Gold ”Medal. Vocational retraining for this program allowed to take into account the increasing requirements for their professional training [8], which impose on them the additional professional duties noted above, in accordance with the qualification standards of

the ASRO based on professional standards [2,3], approved by the state [8] .

According to the agreements of KSAU, both with legal entities, and directly with specialists with higher education in other specialties, but working in the construction industry and expressing a desire to undergo retraining on the water supply profile, water disposal has been trained according to the 802 hour program. Students of professional retraining completed the curriculum in full (settlement and graphic and coursework, passed tests and exams in the disciplines provided by the curriculum, developed and publicly defended final certification work at meetings of the State Attestation Commission). By decision of the State Certification Commission, they were issued a diploma of professional retraining in the water supply and sanitation profile, granting the right to introduce professional activity in the field of water supply and sanitation.

Classes at the professional retraining courses for specialists in the water supply profile are conducted in laboratories and cabinets, specially prepared by the team of the Department of Biological Equipment of the KSAHU together with leading experts of domestic and foreign organizations [9,10]. Conducted classes in the courses of professional retraining of specialists take into account advanced industrial experience in performing engineering surveys, performing architectural and construction design, introducing work in the implementation of construction, reconstruction and overhaul of water supply and wastewater facilities, both in our country and in the near and far abroad Beja [9,10].

In terms of water supply and sanitation, in the 2014-2015 academic year, 11 specialists underwent professional retraining, and in the 2016-2017 academic year, 9 specialists of the Volga Federal District (Republic of Bashkortostan, Mari-El and Tatarstan).

The full, additional professional knowledge and skills obtained in the process of mastering the professional retraining program on the water supply and sewerage profile, in full, made it possible to create a competent specialist in the construction organization and a construction industry organizer who has the knowledge to implement additional skills that are in demand in the modern labor market. professional duties specified in Federal Law No. 372 FZ. [8] Ultimately, they help to solve the problem of providing members of ASRO with specialists [5] in the direction of construction, the Water Supply and Sewerage profile that meets the requirements of Nostroya Russia regarding education and allows them to be included in LDCs in the field of construction.

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提高“供水和水的确定”概况的自律组织协会专家的资格
IMPROVING THE QUALIFICATION OF SPECIALISTS OF THE ASSOCIATION OF SELF-REGULATED ORGANIZATIONS OF THE PROFILE “WATER SUPPLY AND WATER DETERMINATION”

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注解。自2017年以来，建筑行业自律组织，其工程调查，建筑和建筑设计，建设，重建和基建工程大修的成员和专家的要求有所增加。对工程勘察，建筑和施工设计的组织以及基本建设对象的建造，重建和大修的自律组织和专家领导人的要求显着增加。在这方面，在先前制定的专业高级培训主要学科课程中，根据联邦法修订并通过了关于在建筑领域自我监管制度的根本改进。制定学科课程时考虑到从事工程测量，建筑和施工设计，工程系统建设和运行的领先组织的成就经验。

关键词：专家，高级培训，自我调节。

Annotation*. Since 2017, the requirements for self-regulatory organizations in the construction industry, their members and specialists in the organization of engineering surveys, architectural and construction design, construction, reconstruction and overhaul of capital construction projects have increased. Significantly increased requirements for the leaders of the self-regulatory organizations and specialists in the organization of engineering surveys, architectural and construction design, as well as construction, reconstruction and overhaul of capital construction objects. In this regard, in the previously developed curricula of the main disciplines of advanced training of specialists amended and adopted in accordance with the Federal Law on the fundamental improvement of the institution of self-regulation in the field of construction. The curricula of disciplines are developed taking into account the achieved experience of leading*

organizations engaged in engineering surveys, architectural and construction design, construction and operation of engineering systems.

***Keywords**: specialist, advanced training, self-regulation.*

The Department of Water Supply and Water Disposal of Kazan State University of Architecture and Civil Engineering provides advanced training for water supply and wastewater disposal specialists [3,4]. In the developed program of advanced training for managers and specialists in the profile of water supply and sanitation [5] and in the curricula of major disciplines include:

- adopted decisions of the I-IX International Specialized Exhibitions and Congresses “Clean Water. Kazan ";

-development and production experience of leading organizations in the field of water supply and sanitation: The Danish concerns “Grundfos” and AVK InternationalA / S [1], the Swiss “Geberit” [7], the Austrian “E. HawleArmatuenwerkeGmbH ”[2-4], German“ Viega ”and Russian“ Standartpark ”[8] and“ Soyuzpribor ”companies, as well as the Holding“ Polymeric pipeline systems ”[2,8];

- adopted decisions of the Republican contests "Fifty Best Innovative Ideas for the Republic of Tatarstan";

- fundamental changes envisaged by the main directions of improving the system of self-regulation in the construction sector, adopted by Federal Law No. 372-ФЗ dated July 03, 2016.

The official duties of specialists in the organization of engineering surveys, specialists in the organization of architectural and construction design include:

-preparation and approval of assignments for the performance of works on engineering surveys, preparation of project documentation of a capital construction object;

- determination of the criteria for the selection of participants for the performance of engineering surveys, the preparation of project documentation and the selection of the executors of these works, as well as the coordination of the activities of the contractors;

- submission, approval and acceptance of the results of work on the implementation of engineering surveys, preparation of project documentation;

- approval of the results of engineering surveys, project documentation.

The official duties of specialists in the organization of construction include:

-organization of input control of project documentation of capital construction objects;

- operational planning, coordination, organization and carrying out construction control in the process of construction, reconstruction, overhaul of capital construction objects;

- acceptance of finished types and individual stages of construction, reconstruction, overhaul of capital construction objects, elements, structures and parts of capital construction projects, engineering networks, their plots with the right to sign relevant documents;

- signing of documents:

a) the act of acceptance of the capital construction object;

b) confirming the compliance of the constructed, reconstructed capital construction object with the requirements of technical regulations and the compliance of the design documentation parameters, including the energy efficiency requirements and the equipment requirements of the construction site with meters for the energy resources used;

c) confirming compliance of the constructed, reconstructed capital construction object with the technical conditions of connection to the networks of engineering and technical support.

In this regard, in the early developed curricula of the main disciplines of advanced training of specialists in the water supply and sanitation profile [4], additions have been made to take into account new requirements for specialists in the organization of engineering surveys, architectural design, and in particular construction organizations, as well as technical customers, allow to meet the increasing demands of the level of professional training of specialists who will carry out their responsibilities Advanced Features listed above, in accordance with EU standards Association of qualifying self-regulatory organization (ACPO), based on professional standards, approved by the state.

As part of the implementation of the concluded agreements on creative cooperation of the department of water supply and sanitation with the Danish concerns "Grunfos" and AVK International A \ S by the Swiss company "Geberit", the Austrian company "E. HAWLEArmaturenwerkeGmbH ", the German company“ Viega ", and the Russian companies“ Standartpark ",“ Soyuzpribor ", and the holding“ Polymer pipeline systems "involved in conducting refresher courses in addition to the faculty of the KGASU, leading experts of the above-listed organizations that are world leaders in developing , production, design, construction and subsequent operation of the products supplied by them on the territory of the Russian Federation, CIS and foreign countries, respectively, pumping equipment, syst m sewage and surface drainage of rain water and snow, and water beskolodeznoy plenum valves of sanitary equipment and automation of individual plants and water supply and sewerage systems in general.

Classes in advanced training courses were held in laboratories and classrooms, specially prepared jointly by staff and specialists from the Danish concerns GRUNDFOS and AVK International A \ S, the Austrian Commande “E. HAWLEArmaturenwerkeGmbH ", Swiss company“ Geberit ", German company“

Viega ”and Russian companies“ Standartpark ”,“ Soyuzpribor ”and holding“ Polymeric pipeline systems ”. Conducted classes reflect the advanced experience of engineering surveys, architectural and construction design, construction, reconstruction and overhaul of capital construction and operation of external and internal water supply and drainage systems, both in our country and in the near and far abroad.

The staff of the World-famous (supplies its products to more than 60 countries of the world) "Austrian company E. HAWLEArmaturenwerkeGmbH" for the production of reliable operation (ensures perfect performance of its products for 10 years) pipeline valves, together with the teaching staff of the department of water supply and sanitation created a laboratory " Innovative technologies, equipment of water supply and drainage systems ”. It contains models, demonstration exhibits, in the form of fragments of a water supply network, on which all types of pipeline fittings are placed. Separate presented samples of fittings are made with cuts, demonstrating the internal devices and the principle of their work (valves, fire hydrants, valves, clamps of various designs and purposes, carpets, rods, fittings, fittings and others). It is equipped with technical means of training and control, and also has access to the sectoral information center for collective use "Water supply and drainage systems, engineering ecology and nanotechnology in the preparation of natural and waste waters." The latter was created by the teaching staff of the department of water supply and water disposal of the KSAU together with the State Unitary Enterprise "Tatarstan Center for Scientific and Technical Information."

The Swiss company "Geberit" has equipped the laboratory of the department of water supply and sanitation with elements of sewerage systems, drainage of storm and melt water from both ordinary and unique (buildings with a height of one hundred or more meters) facilities.

The German company "Viega" equipped the laboratory of the department with existing modern sanitary appliances.

The holding “Polymeric pipeline systems” provided the Department of Water Supply and Drainage with elements (polyethylene pipes of high ring stiffness made of polyethylene PE 80 and PE 100 with diameters of 400-2400 mm) of the sewage system Spiroline [5].

The company “Standartpark” presented to the department of water supply and wastewater samples of water intake devices of point and linear drainage of storm, thawed and sewage, storm water inlets - sand-catchers of various designs, made of various materials (concrete, fiber-reinforced concrete, polymer concrete, plastic, cast iron, galvanized and stainless steel) used in various conditions of their operation. Samples of water intake devices presented by Standartpark are installed in a specially equipped laboratory, where classes are held in the disciplines of

advanced training and specialists in the Water Supply and Water Disposal profile.

The knowledge and skills obtained in the process of improving the skills of managers and specialists in the direction of construction of the water supply and wastewater profile allows us to form a competent specialist in the field of water supply and drainage that is in demand in the modern labor market and who can independently solve tasks set by the Federal Target Program the program "Improving the provision of the population of the Republic of Tatarstan with water and heat supply services for a period of 20 14 - 2020 ", by the International Congresses" Clean Water. Kazan. Improving the training of managers and specialists will reduce the urgency of the problem of providing members of associations of self-regulating organizations with water supply and wastewater disposal specialists.

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恢复湖Lebyazhya喀山市
Restoration of lakes Lebyazhya Kazan city

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。 本文提出了Lebyazhye湖泊系统的环境恢复，为此目的，为此提供了文化活动和对抗Lebyazhye湖泊系统过滤的措施。
关键词：湖泊生态修复，湖泊有利功能研究。

Annotation. *This article proposes the environmental rehabilitation of the Lebyazhye lakes system, for this purpose cultural activities and measures to combat filtration of Lebyazhye lakes systems from the basins are provided for this.*

Key words: *Ecological rehabilitation of lakes, work on the favorable functioning of lakes.*

The system of Lebyazhye lakes, located in the western part of Kazan, the Republic of Tatar-Stan in a forest-park zone in the Kirovsky district, includes 4 lakes, which are located in the following sequence from north to south - Lesser Lebyazhye, Bolshoe Lebyazhye, SvetloyeLebyazhye and Sukhoy Lebyazhye. The total length of the lake system is 2.6 km, its width is 476 m. Up to the end of the 80s of the last century, these lakes functioned fully, (their maximum depth reached 3.9 m, and the average 1.5 m, the total water volume 586 thousand m3), had water communications among themselves. The lakes were fed by rain and melt water, especially during the flood period. However, intensive industrialization of the Kazan suburbs, which took place at that time in the area under consideration (mining of large amounts of quarry sand, construction of modern highways, intensive construction of the suburban area, large recreational pressure) led to the exchange of Lebyazhye system lakes.

The main reasons for the decrease in the volume of water in the lake system (60% or more) are:

- reduction of the catchment area of the reservoir as a result of dumping the dam canvases under the Kazan-Zelenodolsk road;

- industrial mining of sand in the Yudinsky open-cast mine, which is located 800 m from the lake. Dry Lebyazhye, which led to enhanced filtration, (at present, the newly formed lake at the open-pit mine is called the Emerald Lake, the level of the normally-backed level of NHL in it, which coincides with (NHL) in the Kuibyshev reservoir).

- termination of the discharge of conditionally clean waters of CHPP-2 into Sukhoye Lebyazhye Lake.

From 1995 to 2005, measures were taken to rescue the Lebyaze lakes system, which is a favorite resting place of Kazan citizens and guests, and Sabantui venue for residents of Kirovsky and Moskovsky districts of Kazan. Initially, the eco-rehabilitation of the Lebyaze lakes system was as follows:

1) pumping water from Lake Emerald to Lake Svetloye Lebyazhye in 1995-2002;

2) deepening of the bottom of the Malaya Lebyazhye Lake, the creation of a partial clay impervious lock (screen) with a thickness of 0.3 m in 1999-2000;

3) pumping water into the Malaya Lebyazhye Lake from two newly drilled artesian wells with a depth of up to 110m.

However, these activities were not enough, and the shallowing and degradation of lakes continue to this day.

At present, the Lebyaze lake system is degrading, the lakes dry out and are overgrown with weedy and low-value tree-shrub vegetation. It is possible to maintain the water level only in the lake Lesser Lebyazhye due to the installation of an earthen dam that cuts it off from the Greater Lebyazhye and periodically pumping water from the above-mentioned wells currently in operation. If the frequency of injection decreases, the water level inevitably falls. In addition, the coastal zone around the perimeter slipped due to the constant fluctuation of the water level for many years, which led to the shallowing of the lake bed.

According to the data of geological surveys, at the bottom of all dry lakes there is no silty horizon and natural water stop. By lithological composition after 0.10-0.20 m. Alluvial sediments of the 3rd and 4th terraces above the floodplain soil layer (up to 10 m) are fine-grained sands with rare local loam lenses. Groundwater at a depth of 10m. over the entire area of the lakes Sukhoi, Svetloe and Bolshoy were not found.

The water level in the Malaya Lebyazhye Lake is maintained due to the constant replenishment of water from an artesian well with an intake depth of 100-110 m. Water is pumped irregularly. The previously created clay screen was apparently

partially made, as there is a constant filtration of water. At present, the water level in the Maloye Lebyazhye Lake is at 68.420, which is 0.880m lower than the NPU design mark. As a result, 14.5% of the lake area in the NPL is overgrown with weeds and low-value tree-shrub vegetation.

Lake Bolshoe Lebyazhye today dry. 48.3% of the lake area was overgrown with weedy and low-value trees and shrubs. Among the trees and shrubs there is a single coniferous undergrowth up to 1.0 m.

Lake Swan Lebyazhye - dry. About 45.3% of the bed is overgrown with weeds and low-value trees and shrubs.

Dry Lake Lebyazhye is dry and overgrown with weeds and low-value trees and shrubs. In addition to weedy and low-value tree-shrub vegetation, there is good undergrowth of pine and birch up to 3.0 m.

In all lakes, the density of overgrowing by weedy and low-value woody shrub vegetation is different. In dry lakes, lake flora and fauna is degraded or almost disappeared.

In connection with the foregoing, it is planned to systematically and at the same time differentiate the solution to the conservation and restoration of the Lebyazhye lake ecosystem. After analyzing the available results of design and survey materials (engineering and survey) OAO TC "Tatmelioratsiya" offers the following solutions in lakes bowls:

1. Carrying out cultural and technical works;
2. The device impervious screen;
3. Filling with water to the level of 69,300;

Cultural works are reduced to clearing of shrub, weed vegetation and tree residues on an area of 132800 m2 (lake bowls MaloeLebyazhye, Bolshoe Lebyazhye and SvetloyeLebyazhye).

Based on hydrometeorological and hydrogeological engineering surveys of 2016, an expert opinion on raising the level of Lebyazhye lakes and their environmental rehabilitation from 05/25/2015, as well as archival hydrogeological reports and conclusions, it is proposed to dry Lake Lebyazhye with a dam from Lake Lebyazhye. In the Bowl of Sukhoye Lebyazhye Lake, preserve the ecosystem formed by time and nature, selectively removing at the same time weedy and low-value tree-shrub vegetation while preserving good undergrowth of pine and birch.

As part of maintaining the NPC water at the design level of the NPL 69,300, it is planned to deepen the existing bottom and install screening screens in the Great Lebyazhye, SvetloyeLebyazhye lakes and in the channel connecting these lakes. As an impervious material it is proposed to use the innovative shielding material Bentolock in a roll version, made on the basis of natural bentonite clay. The shielding material is laid, in our case, on a leveled natural base on the entire area of the bed and on the shores of the lakes. On the shore, 0.1m above the level of NPU, the

anchor lock of shielding material is performed. Then a protective layer of soil 0.5-0.7 m thick is laid over the screen in order to protect it from damage and create a foundation for the formation of a natural ecological environment.

Filling the lakes with water will occur at the expense of thawed and rainwater, and additionally due to the inflow of water from Lake Emerald (the former Yudinsky sand pit) through the reconstructed pressure water conduit. On the basis of archival data and long-term observations when pumping a system of lakes earlier from the same source, we understand that the water balance of Lake Emerald does not change. At present, the NPU of Lake Emerald and the mark of NPU of the Kuibyshev reservoir are almost identical.

Despite the previous work on the device of the clay castle of the bed, there is a rather active filtration of water on the lake Lesser Lebyazhye. It is proposed to use this fact by organizing a non-rushing live current (exchange) of water in the recreated lake system.

Also on the lakes Bolshoe and Svetloye, a device is proposed for groups of islands planted with vegetation characteristic of these places to create favorable conditions for development and livelihoods for the historically established set of animal and bird species living in a given area.

The lake Small Lebyazhye and Bolshoe Lebyazhye are now divided by an earthen dam in whose body it is planned to lay the culverts with valves. A cutting dam is also provided between the Lakes Lebyazhye and Sukhoye Lebyazhye lakes with a culvert with a valve. For the release of excess water during the spring and rain flood if necessary.

Table 1. Main design indicators of the Lebyazhye lakes system

Lake / Indicator	Maloe Lebyazhye	Bolshoe Lebyazhye	Svetloye Lebyazhye	Sukhoye Lebyazhye
Designed area of the mirror at NPU, m^2	8700	186600	93300	91000
Perimeter, m (projected)	2400	2670	2980	1260
Mark with NPU, m	69,3	69,3	69,3	69,3
Mark with FPU, m	69,7	69,7	69,7	69,7
Mark bottom, m	66,3	66,6	66,8	66,8
Maximum depth, m	3,0	2,7	2,5	2,5
Area for cultural events, m^2 /%	1270/14,5%	90230/48,3%	42300/45,3%	74600/82,0%
Water volume at the NPS, thousand m^3	183,00	377,80	181,48	282,60

塑造和评估小学，中学和高中学生的社会文化地位指标
SHAPING AND ASSESSING THE SOCIO-CULTURAL POSITION INDICATORS IN PRIMARY, SECONDARY AND HIGH SCHOOL STUDENTS

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注释：本文对小学，中学和高中以及高等学校的外语教学过程进行了观察。 特别关注社会文化地位作为跨文化交流的关键组成部分。 在整个外语教学过程中塑造社会文化地位的必要性是合理的，尽管事实证明，对于每个外语学生年龄组，一套特殊的技能作为社会文化立场的基础是具体的。 在这方面，有必要在教学过程中从一开始就实施社会文化立场的工作 – 即小学。

关键词：外语教学过程，社会文化立场，教学实验，工作阶段，结果，图式

Annotation*. The article views the foreign language teaching process in the primary, secondary and high school as well as the higher school. Special attention is paid to the socio-cultural position as the key component of cross-cultural communication. The necessity of the socio-cultural position being shaped during the whole of foreign language teaching process is justified, though it is proved that for each age group of foreign language students a special set of skills making the foundation of the socio-cultural position is specific. In this respect it is necessary to implement in the teaching process the work on socio-cultural position formation from the very beginning – that is from the primary school.*

Keywords: *teaching foreign languages process, socio-cultural position, pedagogical experiment, work stages, result, schemata*

The modern Russian educational policy is defined by the modern internationalization and globalization processes in the world economics. Due to this factor one of the key problems of foreign language teaching process – the problem of students being ready for cross-cultural communication – is becoming actual. This development tendency requires resetting the goals and the results of foreign language preparation of the young people. In the first place the preparedness and ability of the students to take part in cross-cultural communication is considered

as the main result. In this case not only the knowledge of the foreign language is needed but also the student's ability to use the second language in real communication and his being ready to enter this communication. Moreover, the orientation on the awareness of the sociocultural position of the students, their opinion and assessment is transferred in the educational aspects of the foreign language teaching.

It is also important that one of the key competences defined by the European community is sociocultural position. It is known that this competence does not appear as a result of self-education but it requires special activities to get formed. The non-formed sociocultural position makes the interaction of the students difficult not only in the process of foreign language learning but also in the process of communication with the representatives of different languages and cultures. This is also vital for the methodology of foreign language both in secondary school and high school because the socio-cultural position is a complex phenomenon. It is difficult to shape it even with high-school students who are adults and motivated on foreign language learning. In this regard we suppose the fundamental skills of socio-cultural position must be founded at the beginning of foreign language learning – that is in primary school.

The analysis of scientific and pedagogical literature made while writing the dissertation theses let us define the socio-cultural position as predetermined complex of views and beliefs which serve the basis of the person's behavior and actions in everyday and professional life. [7, p. 37]. In the framework of the socio-cultural position lie socio-important qualities and characteristics: politeness, delicacy, readiness to find a compromise, tolerance, diplomacy, active civic stand, which must be shaped in a foreign language teaching environment [7, p. 123-126].

According to the Russian Federal State Law the students start learning a foreign language from the second form [5] that means that from this time we can start founding the basis of socio-cultural position characteristic politeness. We conducted a pedagogical experiment the goal of which was to teach the students politeness in foreign language communication. Interesting tendencies were observed. In the preparation period of the experiment the level of the characteristic being shaped was measured. The children were offered a ball game where the leader (the teacher) greeted them and asked how they were in English. The data received showed that the indicator of politeness in foreign language communication needs to be shaped. For this reason the goal of the formation period of the experiment was to teach second year children to say hello and good bye in a foreign language at different times of the day and to answer the question "How are you?" with the use of different means. The children again were offered a ball game and Crosses and Noughts game on the lexical units of greetings and feelings and also the game of "Deaf phone". We introduced the lexical units of greetings Good morning, Good afternoon, Good evening, Hello, Hi; Good bye, Bye, Bye-bye, See you later.

With the objective of learning to answer the question "How are you?" during the first 10 lessons we were listening to and singing the song Hello, how are you song for IPG kids, where all the types of mood are mentioned [6]. We also began each lesson with the repeating and reading the words of mood written on the cards. Moreover, the kids got pluses for every suitable use of polite words "please" and "thank you".

As a result, by the end of formation period of the experiment in Moscow school "Kuzminki" where 265 second-, third- and fourth-year students are studying who began learning a foreign language in the second year, it was discovered that 96 per cent of the students asked can answer the question "How are you?" with the use of different means: "I am fine", "I am okay", "I am good", "I am super", "I am wonderful", "I am great", "I am tired", "I am bored", "I am bad", "I am happy", "I'm sad", "I am angry"; 93 per cent are able to thank for the question and can ask back "How are you?"; 91 per cent can greet the groupmates and the teacher depending on the time of the day "Good morning", "Good afternoon", "Good evening". 90 per cent of the children do not forget to say "Good bye" to the teacher by the end of the lesson and 98 per cent of the students use the polite words "thank you" and "please" appropriately.

We supposed that in the middle school (11-14 years) it is possible to shape the following characteristics of socio-cultural position: delicacy, readiness to find a compromise, tolerance. So we anticipate that from the age of 11 we can teach the children to get interested in other people's opinion and to admit that the interlocutor has the right to have his/her personal opinion which can be different from their opinion; not to interrupt the interlocutor, if they disagree with him – to state their position tactfully; if the opinions are different – to look for mutual decision; to make concessions; not to show negative emotions in respect to the interlocutor or the facts of the other culture, not to consider one culture better than another one [7, p. 123].

In the course of the preparation period of the experiment the students were offered to produce a dialogue on the topic of School is cool in small groups of four, where 2 people had a different opinion. The results received showed that the children were absolutely not ready to find a compromise and were interested only in their personal opinion, they interrupted each other. In the formation period of the experiment we asked the 11-14 year-olds to learn short dialogues by heart and to make their own dialogues on the sample provided. They worked in pairs or small groups. We also asked them to learn the phrases "What do you think about it?", "What is your opinion?", "I agree with you but…", "I am afraid I do not agree with you on it", "I agree with you but partially", "Let's look at it from a different point of view". Sometimes we organized disputes on the topic of the day, for example on the topic of the use of the internet / computer in studies or the necessity of pocket

money with teenagers or their visiting places on their own and the like. Along with this the students were divided into the groups with the opposite opinion not on their personal wish but by lot or teacher's appointment. After the fulfillment of one task they got another one, for example, to prove the opposing opinion. Finally the results were summarized and their feelings in their point of view defense were discussed.

The use of the technique "Speaking line" causes considerable interest: the students are built into two parallel lines and discuss a question during the set period of time with different partners. With the teacher's signal the students change their partners making one step to the side. The students can discuss one question with different partners or a new question with different partners.

In the final period of the experiment the students were offered to develop the route of world tour collectively. The teenagers suggested the countries and cities for the tour and agreed or disagreed with the opinion of the groupmates. Out of 85 8-year students of our school 77 per cent demonstrated their interest in the other people's opinion and admitted that the interlocutor has the right to have his/her personal opinion which can be different from their opinion and they do not interrupt their interlocutor but if they disagree with the opponent they tactfully state their position; in case they have different views with the interlocutor they look for mutual decision and make concessions; they do not show negative emotions in regard to the opponent or the facts of another culture, they do not consider one culture better than another one.

It is interesting to see further how the pedagogical experiment went on in 9, 10, 11-year (15-17 years of age). The main task of the preparation period of the experiment was to see in the high school students the two characteristics of the socio-cultural position – diplomacy and active civic stand. The essence of these is in the following: in the conversation the speakers try not to let a conflict situation or to resolve the conflict; they realize their belonging to the Russian culture and are proud of their national culture, they know the facts of their national culture as well as the facts of other cultures and show interest in other cultures; they participate in the collective discussion actively and suggest the solutions to the problems in our society, and they define the degree of their personal participation in these problems solutions, in the perfection of the society, they put forward the arguments which show the information about their attitude to their country and the perspectives of its development [7, p. 124-26]. In this period of the experiment the students were offered to take part in the collective discussion on the topic of Similarities and differences of the Russian and English cultures. This event showed that the teenagers conflict with each other when they state their opinion, they are not proud of their culture and do not know many facts not only from the foreign culture but also from their native culture. Taking into consideration the data received we decided to ac-

tively apply case method in the formation period of the experiment. The students had to study the situation, understand the essence of the problems and suggest the possible ways out and choose the best of them. [1, p. 117]. We used the collection of cases in Market Leader Pre-Intermediate, Intermediate, Upper-Intermediate Course books and the cases from the blog of the trainer Nadezhda Bondarenko [3].

So the students of the 11th Year were offered to discuss the case City Plaza Hotel where it was necessary to develop an effective strategy of taking the hotel out of the critical financial situation [4, p. 124-125]. The results of the work showed that out of 43 11-Year students of Moscow School "Kuzminki" 76 per cent try not to let the conflict situation happen or they try to resolve a conflict situation; 79 per cent of the students realize their belonging to the Russian culture and are proud of their national culture, they know the facts from both their native culture and a foreign culture and demonstrate the interest in another culture; 81 per cent of the students take an active part in the collective discussion, 70 per cent suggest the solutions to the problems in our society and define the degree of their personal participation in these problems solutions and the society perfection, they also put forward the arguments which show the information about their attitude to their country and the perspectives of its development. As we can see, after the special teaching the students demonstrate a quite high level of such characteristics of the socio-cultural position formation as diplomacy and active civic stand.

Relying on our dissertation research and the pedagogical experiment carried out with the higher students-managers on the basis of the module Strategy specially designed for the formation of the socio-cultural position, we can claim that further on we shape and improve the socio-cultural position which was founded in the school years of foreign language teaching. The socio-cultural position with adult students is shaped a little easier due to the fact that they possess the schemata not only in the language but also the world as well as the experience in communication with different types of people.

In conclusion we would like to highlight that the pedagogical experiment carried out in our secondary and high school and its results provide the basis for the confirmation of the statement that the skills which are the foundation of the socio-cultural position are necessary to be shaped gradually (in stages) starting with the very beginning of the foreign language teaching, that is with the primary school.

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打印页面批次出版物的布局特征
FEATURES OF THE LAYOUT OF THE PRINTED PAGE LOT PUBLICATIONS

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注解。 文章讨论了向大学生传授印刷出版物布局设计顺序的必要性。教育过程中出版物布局的清单和说明。

关键词：工作台，印刷版，网格结构，模块化网格，原始布局，光栅图形，矢量图形。

Annotation*. The article discusses the need to teach university students the sequence of layout design for printed publications. A list and description of the layout of publications in the educational process.*

Keywords*: workbench, print edition, grid structure, modular grid, original layout, raster graphics, vector graphics.*

Educational activities are the basis for the development of a creative person, in which the student becomes a real subject of the educational process [1; 2; five]. In the process of training graphic designers it is necessary to train competent and consistent layout of publications [3; four]. Layout printed multipage publications - is, above all, the creation of models of books, brochures, magazines and newspapers.

Layout is the process of assembling and assembling text and graphic materials in editions of a given format. The layout of a multipage edition must meet certain compositional, graphic and style requirements. The layout of books, magazines, brochures and newspapers is characterized by the exact and identical size of strips, the use of elements of the same type in style and uniform characteristics of text formatting.

In order to properly organize the structure of the future publication, it is extremely important to know the elements of which it is composed. For this purpose are necessary:

- definition of the purpose and tasks of the future print edition;
- collection of necessary materials;

- choice of a graphic computer program;
- determination of the structure of grids and their organization;
- choice of color and graphic design;
- the creation of images (illustrations);
- font selection;
- the creation of the cover;
- implementation of a test print (creating a layout);
- preparation of the edition for printing (prepress preparation of files).

Before developing a design, it is necessary to clarify the purpose and tasks assigned to a particular edition. The layout product can serve as a direct sales tool, briefing potential buyers about the products so that they can contact the firm for details, maintain contact with consumers, remind the company, demonstrate to competitive firms, etc. Identifying the target audience that will use the catalog gives an idea of its preferences, will help analyze the competitive environment and make a spectacular design.

The collection of necessary materials is needed to accurately reflect the subject matter and the necessary information in the publication. When working with a customer, it happens that the information is incomplete or only terms are given. Therefore, scientific literature and Internet sources come to the rescue, with which the designer should work himself.

Layout is a complex process. There are a number of special programs that are designed to create multi-band layouts. Adobe PageMaker, Adobe FrameMaker, CorelDraw, Microsoft Publisher, QuarkXPress, Adobe InDesign. The choice of the program depends on the tasks and requirements for the finished publication, as well as on the experience and even personal preferences of the designer. The most popular are QuarkXPress and Adobe InDesign.

The modular grid is a preliminary layout of the page for the layout. As a rule, the designer determines how much space is allocated to the fields, headers and pictures, layout of headers and footers. The principles of symmetry must be taken into account. The structure of the grids and their organization should provide the most advantageous compositional structure of the publication. That is, with the help of typesetting it is necessary to create the most user-friendly publication. The layout clearly demonstrates the structure and composition of the pages of the publication, determines which components of the text or illustrations are major and which are minor.

A sign of professional work in the design of the catalog is the creation of an original concept that corresponds to the objectives of the publication and which will be positively perceived by the targeted audience.

Graphic images used in layout can be divided into raster and vector. Raster conditional, photos) for publications you need to edit only in Adobe Photoshop.

Vector images created in programs such as CorelDraw and Adobe Illustrator are displayed in the correct format.

There should not be too many fonts in the layout, usually two or three, no more. One main, which is typed the entire text of the publication, and one or two additional, on the headings and subtitles. Also the size (size) of a font and line spacing (leading) are important. Any printed publication should be readable. Selecting a font by name simply because it is traditionally used, for example, in drafting documents, is not a good idea when you type a book or booklet. Before making the final choice, you need to look at the same piece of text (with the accompanying heading) in several different fonts and combinations. Readability is the most important result, but at the same time use fonts that reflect the type of activity and correspond to the information that it must transmit.

Particular attention when creating a print edition should be given to the cover. Before working on the design of the cover, you need to figure out how the catalog will be used and distributed. If it will be distributed free of charge, the maximum number of inks is needed to attract the target audience and at the same time the paper of this print edition will be simple (without varnishing, without lamination, without gloss and with a density not exceeding 140 g / m2 - soft cover). If the printed publication is scientific (encyclopedia, scientific works) and is included in a limited number of books in circulation, then the cover should be firm and possibly embossing, lacquering. Also, when designing a cover, the following factors should be taken into account: what the cover will be made from, what will be the brooch and how thick the printed edition will be. From here there can be a need in addition to impose a back.

After the final approval of the appearance of the layout, proofreading and processing of illustrations, a so-called prepress takes place. This is the preparation of the entire layout file for printing. This takes into account the requirements of the printing house at which this edition will be printed. At this stage, it is important to take into account the features of the finished edition (gluing, thickness, type of printing), track the unity of all fonts, take into account the features of the layout on the MAC or PC platforms.

The final stage of the layout becomes a trial print edition (layout). The layout is needed for demonstration of the print edition to the customer and discussion during the educational process. With it, you can clearly show and tell about the results achieved.

So, thanks to a detailed review of the structure of the elements that make up the multipage printed edition, students will learn how to conduct a phased work on the layout. All this is necessary in the further independent professional work of the designer.

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利用设计促进政治思想在教育中的应用
USE OF DESIGN FOR PROMOSHING OF POLITICAL IDEOLOGIES THROUGH EDUCATION

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注解。 文章将教育领域视为政治意识形态的平台，采用设计方法提供信息。 给出了实现方法的分析，并定义了它们中的设计活动角色。
关键词：设计，社会政治项目，教育。
Annotation. *Article consider the educational sphere as platform for political ideologies, using design methods in providing information. Analysis of the realized methods is given and the design activity role in them is defined.*
Keywords*: design, socio-political projects, education.*

Large socio-political projects often have long-term character, some of them can last not one decade. In many respects it is connected with features of development of human mentality as scientists have understood for a long time that it is more effective to form necessary thinking at the person gradually, beginning with early age, than to try to do it in short terms. As an example is the revolution in Ukraine of 2014, then her historical roots go not only in Post-Soviet, but also to the Soviet era [3, 9]. For this reason in the political projects pay special attention to school students and rather often use the educational sphere as the platform for their realization.

D. V. Bereznyakova and S.V. Kozlov described the effective socio-political communication in which there are three factors: the political and intellectual elite forming the message; the social groups consuming information; the intermediaries transforming initial information for recipients, to show the place of designers in this communicative chain [1, 35–37]. They are a link between creators of information and its recipients.

Use of education as platforms for distribution of the political ideas demands a lot of experience and professionalism from the designer. The situation is com-

plicated by the fact that formal education most often has no attractive cover for pupils.

As practice shows, in educational institutions often apply various options of interpretation of history and geography. For example, in Ukraine to unite several social groups which will be enough for the organization of color revolutions it was necessary to create an image collective "We" and to distribute versions of the historical past [1, 38].

For this purpose actively began to be rewritten the textbooks of history and geography for different classes where the gained independence Ukrainian nation, and a question of Russia became the main heroes of the Ukrainian history. Widely were attracted for justification of the idea of national liberation fight the successor of Kievan Rus' who has illegally proclaimed herself, the ethnogenetic theories proving distinction of origin of Russians and Ukrainians, idea of the special rights of the people for "historical lands" and cultural heritage [2, 58–59] . The bright example is presented in the figure 1 where on the page of one of modern Ukrainian textbooks on stories the Great Russian revolution is called as "The Ukrainian revolution of 1917-1918".

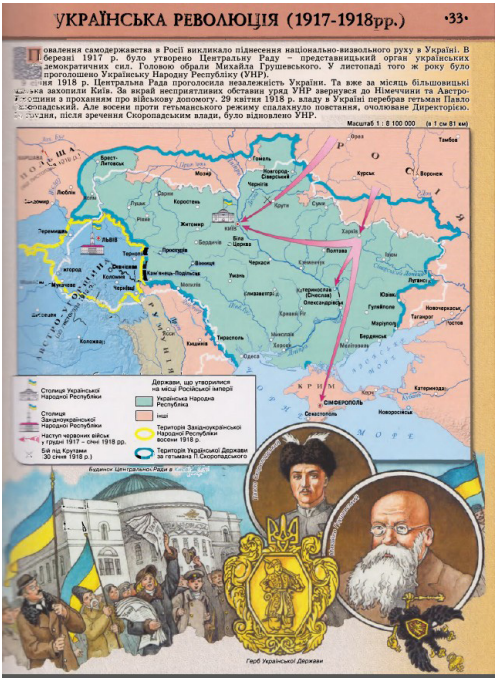

Figure 1 – The page from the Ukrainian school textbook of history

It is worth paying at once attention to an illustrative part where process of a meeting at the office building on which with flags of Ukraine the representative of the intellectuals and the Cossack are in the same way represented is shown, than the illustrator shows the height of the propagandized ideas and the Ukrainian protester of society in general. Very important detail is also presence of two young people at one of whom the satchel is represented behind the back. The reader there has passed the involuntary and full association with itself. And, of course, the concept of nationalization and creation of the state identity of Ukraine is supported by the coat of arms of "the Ukrainian Power".

Certainly, use of the channels provided by formal education can bring a big contribution to the general socio-political project, but the channels developed taking into account preferences of target audience and with use of modern technologies can bring even more benefit. A good example are the exposition complexes "Russia — My History" where history of Russia is presented to visitors, since a dynasty of Ryurik dynasty and finishing present [4]. An important detail is that in the museum there is no exhibit, and history is presented to visitors on interactive boards, screens, in various pavilions, is frequent in playful way. Premises of the museum are presented in the figure 2.

Figure 2 – Premises of the museum "Russia — My History"

Of course, activity of the present Government of the Russian Federation in this project is represented from the positive point of view and, unambiguously, such approach positively meets target audience, and information will be acquired better, than at a history lesson as her studying is presented in the form of fascinating

interaction with interactive screens on which actions are presented in the form of the colourful and dynamic presentations. In this project it is difficult to overestimate a contribution of designers. There are involved specialists in development of interfaces, illustrations, three-dimensional modeling, animation and the organization of real space.

These two examples besides that prove active use of the educational sphere as platforms for distribution of the political ideas, also indicate that the role of design activity is rather important in such projects. Her tools create a cover for information which not only is capable to broadcast the message in subconsciousness of the pupil, but also to create conditions to which the target audience itself will stretch.

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高等教育系统中教职人员编制要求的创新模式
INNOVATIVE MODELS TO THE REQUIREMENTS OF THE PREPARATION OF TEACHING STAFF IN THE SYSTEM OF HIGHER EDUCATION

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注解。 这篇文章涉及几乎所有人类活动领域的创新问题。 它们已成为我们时代的特色之一。

在这方面，特别是教育活动的新的现代内容已被证明是一个完整的，完整的生产（创新）活动循环。

甚至还有一个新的知识分支 – “高等教育教师管理培训”，它基于系统分析 – 研究方法系统或复杂系统的设计，搜索，规划和实施变革，旨在消除问题。

因此，随着教育领域教师教育领域创新领域研究的扩展，实现了整合知识及其综合的必要性。

关键词：教育效率的流动性，意志坚定的品质，价值取向，对情境的反应能力。

Annotation. *The article deals with the problems of innovation, which is introduced today everywhere, in almost all areas of human activity. They have become one of the characteristic features of our era.*

In this connection, in particular, the new, modern content of pedagogical activity has turned out to be viewed as a full, complete cycle of productive (innovative) activity.

There was even a new branch of knowledge - "management training of teachers in higher education", which is based on system analysis - the study of the system of research methods or the design of complex systems, search, planning and implementation of changes aimed at eliminating problems.

Thus, with the expansion of research in the field of innovations in the field of teacher education in the field of education, the need to integrate knowledge and their synthesis was actualized.

Keywords: *mobility of pedagogical efficiency, strong-willed qualities, value orientations, competent of responses to situations.*

In the XXI century in the new millennium, the problems of education become a priority throughout the world, because they determine the future of each country separately and the planet as a whole. Pedagogical universities are also facing the strategic task of educating an educated and responsible person, able to ensure not only their own viability, but also reasonably relate to the existence of others [1,2].

High demands on the personality and professional competence as a high communication style and pedagogical staff of teachers indicate a serious program of modernization of the higher education system. Currently, the education system as a whole is undergoing multidimensional reforms to update the content: the introduction of new programs and innovations, an active process of retraining of teaching staff.

Innovative models in the system of higher education impose new requirements in the training of teachers, as the goals and methods of the pedagogical style of communication and attitudes change as part of an innovative approach to learning. Modernization of software and methodological equipment of the educational process also requires a change in the methods and forms of assessing the achievement of the expected results of students. Evaluation should comply with the following principles: validity, systematicity, consistency, objectivity, transparency, recommendation, reliability.

Evaluation of educational achievements in the model of higher education based on results implies ways of evaluating the results of the boundary and final control.

Student learning outcomes will now require a comprehensive and objective assessment of the success in achieving the expected learning outcomes of each student, his attitude towards learning, and the dynamics of personal development in general.

But updating the content of education, translating the best experience of introducing new approaches to learning and teaching methods, should take into account the positive experience.

Therefore, it is necessary to conduct advanced training of teaching staff in view of the new competence-oriented content of education and retraining of teachers at a new level. Thus, the methodological support of raising the level of professional competence and competence of the teaching staff will contribute to changing the outlook on understanding the quality of education system. The introduction of innovative methods, methodological tools in the higher education system will allow them to integrate their activities in a new format.

The program of educational courses focuses on the main changes in education, which consider: international trends and internal experience in the field of

education; theory of educational programs; theoretical and practical principles of teaching methods [1,2,3].

The courses for improving the teaching staff carry out systematic work on the following aspects (Table 1).

Table 1 Aspects of systematic work on the courses of increasing the teaching staff

№	Work Plan Structure	Content
1.	Information about the training program	Goals, objectives and learning outcomes
2.	Analysis of the essence of learning objectives	Determination of the activity and personal position of students in solving educational problems
3.	Resource representation	Assisting faculty in planning and conducting classes
4.	The possibility of approbation	Programs of courses during training and reflection in relation to the educational program
5.	Participation in development	The effectiveness of teaching methods and strategies
6.	Methods of creating pedagogical conditions	Adaptation of students and the organization of a favorable social climate in the team
7.	Development of short-term study plans	Accounting for differentiation in learning and the use of active forms of learning in the process of teaching
8.	Designing learning outcomes	Detailing the activities and assessment of students.

Updating educational programs is taking into account innovative experience. A structure with multidimensional techs, technologies of updated programs that stimulate mental activity, both teachers and students, developing reflexive thinking is presented.

The main purpose of educational activities is presented to students as a form of individual self-realization, meaningful learning activities with systems for structuring knowledge about the surrounding reality, understanding the degree of interest formation and the desire to learn from them in subsequent courses.

The organization of educational and cognitive activities contribute to the acquisition of the necessary skills and skills and the teacher. They need a number of integrative methods in the classroom, combining both learning skills and socio-psychological.

The reform of Kazakhstan's education is carried out with the understanding that “a qualitative reform of education in the context of dynamic socio-economic changes in society can only be carried out if there is a detailed strategy that takes

into account both the real situation in the field of education, the growing trends and existing relations, and possible ways of the future development of society and the state. Such a strategy was to become the basis for developing a flexible tactical action program that is constantly adapted to rapidly changing real conditions. ”

Using interactive methods at lectures and practical classes, the teacher and students become full participants in the process of communication, their experience is the main source of educational knowledge of students. The problem of pedagogical innovation is the need to develop the teaching staff of individual educational trajectories of students as a holistic didactic technology for training future specialists. President of the Republic of Kazakhstan N.A. Nazarbayev sets the task of modernizing the higher education system in the Message to the People “GROWTH OF WELFARE OF KAZAKHSTAN: INCREASING REVENUES AND QUALITY OF LIFE” and testing innovative ideas and teaching methodologies educational activities.

The IET will allow teachers to calculate the student’s “Personal Effectiveness”, to calculate the opportunity to carry out productive actions, which is based on such basic concepts as awareness of their intentions and goals; personal resource management.

Thus, “Personal Effectiveness” is the quality of interaction with oneself and the world around. In other words, this is how well a student is trained to negotiate and cooperate with himself and others, achieve his goals and at the same time feel comfortable and confident. "Personal effectiveness" is the composition of resource qualities: personal effectiveness in communication; individual typological features of interaction.

Innovative approaches to learning (creative tasks, didactic interactive techniques, psychological attitudes, methods of health savings) put the teaching staff of universities in terms of scientific research, encourages the desire to be collected, to clearly perform professional functions and improve the level of qualification training.

Many important features of the teacher’s psychological world, his moral character are already laid at the beginning of the pedagogical stage, and it is at this professional stage that he gains the basics of systematic knowledge, and features of his character, will and moral character are formed and developed here.

In general, the level of higher education should be consistent with the development objectives of the state and ensure that the faculty is competitive in the modern world. First of all, new programs related to changes in the education system put forward new attitudes of teachers to the educational process (Table 2).

Table 2. Curriculum Feature

№	Curriculum feature	Content
1.	General information about the subject	Organizational requirements for the teaching process; Pedagogical approaches used in teaching the subject; Building respect for the diversity of cultures and opinions; Competence in the use of information and communication technologies.
2.	The content of disciplines and content practices	The updated programs are aimed at mastering students of a wide range of skills: critical thinking and problem-solving skills; flexibility and ability to adapt to new conditions; initiative and entrepreneurial skills; the ability to search and find information.

One of the components of the effectiveness of educational programs for training teachers is to teach the teacher to orient in a wide range of innovative ideas, technologies and directions. Innovative learning technologies are primarily a factor in the professional growth of teachers, their psychological potential, understanding of responsibility at the time of entry into the world educational space [4,5,6]. These technologies contribute to the fact that each subject of technological actions will take an active part in the development of new styles of communication and the formation of pedagogical installations.

In the modern system of higher education, many reforms are planned, the introduction of innovations, the testing of new methods.

The following areas were considered:

- new behaviors and communication styles, professional growth and career of teaching staff;
- forms of language interaction, as the most important condition for improving the quality of higher education.

Among them are the main issues and to systematize a certain concept (Table 3).

Table - 3 Systematization of higher education quality improvement

№	Quality system	Content
1.	Improving the configuration of the multistage career model	holistic continuous education systems from the university to the completion of a career based on practice-oriented training of specialists.
2.	Development of new mechanisms for networking and social partnership and responsibility	training not only faculty, but also managers, with wide public involvement

The basis of the pedagogical training system with an innovative approach to the topic of styles of pedagogical communication and communications will be

built on constructivist approaches. For this PPS, it is important to have a developed constructive thinking as a style of new communication.

In this case, the organization, motivation and control are accomplished according to the mechanisms of the modules. The modular mechanisms of the program are represented as a set of communication styles and communicative attitudes, each of which is an aspect of a certain stage of communication [3,4,5].

We also note that the principle of assisting the student's personal growth has been introduced into the program of teaching the teaching staff - the constructivist:

- assist in the improvement of teaching practice as a new style of behavior and communication,
- the study of sources of information
- to become for themselves a "guide".

The result of the updated program does not always allow the subject of the educational process to become independent, self-motivated, enthusiastic, confident, responsible.

Individual educational trajectory (IET) is an innovative educational model that determines the sequence of elements of educational activities aimed at realizing the personal potential of each individual student in accordance with their capabilities, abilities, and interests.

Counseling, coordinating the activities of teachers in cooperation with students in the process of IET leads to the growth of capable mobile and responsive students to new demands of the time, creating innovative products and quickly introducing them into production.

To improve personnel policy in practice, it is necessary for teaching staff to know the concepts of "coaching and mentoring", to study the topics "Establishing effective questions in case of pre-school education", "Smart goals", "Methods of critical thinking", "Reflection on practical exercises", "Criterion assessment", "New approaches in learning" as effective ways to provide self-help in professional development and improvement [7,8,9].

The best option to improve the quality of the pedagogical process, its qualifications is to install the teacher and his style of work on the formation of mechanisms of pedagogical interaction as a social partnership.

Such a combination of communicative and psychosocial functions ensures the transfer of not only the personal, individual experience of the teacher, but also the general social [10,11,12,13,14].

In this case, a university teacher, interacting in the conditions of the educational process, conveys his individuality to the style of pedagogical communication, realizing the need and ability to be a person and, in turn, forming the corresponding need and ability of students as future specialists. However, practice shows that only teachers who have a high level of development of a motivational value

attitude to pedagogical activity work with such an installation.

The personal side of pedagogical communication and communication interaction affects the motivational-semantic sphere of the subjects of the educational process as a level of efficiency. Scientific knowledge, the content of education in this case act as a means of transforming this sphere. I must admit that the university - the exact place where the future professional society matures, the model and practice of social relations is laid, and hence the development of the political and economic system of any state.

This is where the state sees the main task in preparing the faculty for a new level of relations.

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现代科学方法论中的物理和数学教育
THE PHYSICAL AND MATHEMATICAL EDUCATION IN THE CONTEXT OF MODERN METHODOLOGY OF SCIENCE

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注解。 考虑了现代物理学和数学教育的方法论方面。 在现代信息社会生活中发生的变革，科技进步的快速变化，创造了科学和生产各个领域的专业需求，在盒子外思考，能够 做出决定并对他们负责。 现代体育和数学教育体系作为社会制度的基本可持续形式之一，在发展的背景下确保社会经验的连续性的完整性和稳定性，在这一专家的准备中发挥了重要作用。 科学方法论。

关键词：物理和数学教育，数学，物理，科学方法论。

Annotation*. The methodological aspects of modern physics and mathematics education are considered. The transformations occurring in the life of the modern information society, the rapid change of technology as a result of the achievements of scientific and technological progress, create the needs of various fields of science and production in a professional, thinking outside the box, able to make decisions and take responsibility for them. An important role in the preparation of such a specialist is played by the modern system of physical and mathematical education as one of the fundamental sustainable forms of a social institution that ensures the integrity and stability of the continuity of social experience in the context of the development of the methodology of science.*

Keywords*: physical and mathematical education, mathematics, physics, methodology of science.*

The exceptional efficiency of physical and mathematical education, manifested, in particular, in the fact that graduates from the physics departments of leading universities around the world successfully work in various areas, sometimes very

far from physics, led to the emergence and widespread aphorism – «this is not a profession, but a style of thinking». The study of the characteristics of physical thinking involves the analysis of a fairly wide range of issues. Apparently, it is simply impossible to list all the characteristic features of the mode of reasoning adopted in modern physics and mathematics, which together determine its extraordinary effectiveness in analyzing unknown and incomprehensible phenomena of very different nature.

Apparently, today the competences formed in the study of physical and mathematical disciplines can be considered as an invariant of the professiogram of any specialist, regardless of his professional interests. In other words, one can speak of fundamental education on the basis of methodical systems of fundamental training in the field of mathematics and physics. It is not by chance that R. Feynman noted that physics is the most fundamental of all sciences, the most comprehensive [2].

Modern physics is a part of universal culture, characterizing the intellectual level of development of society and its ability to confront various challenges that threaten the very existence of human civilization. Among other natural sciences, physics still retains the role of the leader of natural science, determining the style and level of scientific thinking. It is physics that most fully demonstrates the ability of the human mind to analyze an unfamiliar, incomprehensible situation, identify its fundamental qualitative and quantitative aspects and bring the level of understanding to the possibility of theoretical prediction of the nature and results of its development.

The construction of modern physics courses in higher education on the basis of its general methodological principles makes it possible to achieve a specified degree of physical understanding — the ability to predict the nature of the flow of various processes and to predict new physical phenomena. This allows us to consistently consider the process of teaching physics as an educational model of science. The essence of scientific education, reflecting the dynamics of the progress of science, consists in combining the necessary minimum of fundamental knowledge with a new intensive research technology. It assumes the development of a perfect style of scientific thinking, corresponding to the modern methodology of science.

Regarding the construction of a physical theory, A. Poincaré wrote: “All laws are derived from experience. But to express them you need a special language. Everyday language is too poor; moreover, it is too vague to express such rich and precise contents of subtle ratios. This is the first reason why a physicist cannot do without mathematics; she gives him the only language in which he is able to speak." Further, the law is derived from experience, but it does not follow directly from it. Experience is always carried out in fairly difficult conditions,

but the wording of the law excludes them. To derive the law from experience, it is necessary to generalize. What criteria should guide these generalizations? As A. Poincaré notes, "the leader can only be an analogy ... But who taught us the knowledge of true, deep analogies, such that the eye does not see, but which the mind guesses? This has been taught to us by the mathematical mind, which neglects content to deal only with pure form. He taught us to call with the same name all entities that differ only in their content" [5].

The physical picture of the phenomenon and its mathematical description are additional: the creation of a clear physical picture of the phenomenon requires the neglect of details and leads away from mathematical accuracy. On the contrary, an attempt at an exact mathematical description requires taking into account all the details, which makes the overall picture more cumbersome and difficult to understand clearly. This position, characteristic of physics as a science, is of paramount importance for the proper organization of the learning process, designed to develop scientific thinking and creative abilities.

Analyzing these very subtle, and sometimes contradictory moments in the relationship between physics and mathematics, Dyson ends his argument on the following note: "With all the deviations and turns in the development of physics, one factor remains unchanged - the exceptional role of mathematical imagination. In each century, preference was given to some of his own direction in science and developed his own style in mathematics. However, whenever they achieved major successes in physics, it was increasingly comprehended through the synthesis of empirical observation and purely mathematical intuition. Mathematics for physics is not only a tool with which he can quantitatively describe any phenomenon, but also the main source of ideas and principles on which new theories are born" [3].

The problem of establishing the correspondence between physical and mathematical concepts, and in a more general form, the problem of translating verbal physical representations into mathematical language, is very acute, its solution is not always at a satisfactory level even in the most advanced textbooks on physics. One of the most striking examples here is the situation with the zero law of thermodynamics, establishing the fact of temperature as a function of the state of a system based on the experimentally established transitivity property of thermodynamic equilibrium.

Understanding the differences in the physical and mathematical interpretation of many specific situations led the outstanding physicist R. Feynman to the following conclusion: "When studying physics, mathematicians or people with a mathematical mindset often lose sight of physics when studying physics. They say: "Physical law is an equation; physicists themselves admit that there is nothing that is not contained in this equation. If I understand it mathematically, I will understand physics". But nothing comes of it. They are failing because the real

physical situations of the real world are so confused that one must have a much broader understanding of the equations." And the famous physicist, Nobel laureate F. Anderson, emphasizes the other side of this issue in his Nobel speech: "Exact calculation only copies nature, but does not explain it" [4].

Finally, the great scientist P. Dirac, whose achievements in physics and mathematics are so great that it is difficult to give preference to any of them, thus, characterizes the highest degree of understanding of mathematical relationships in physics: "I think I understood the meaning of the equation, if able to imagine the general appearance of his decision, without solving it directly. So, if we have a way to find out what happens in these conditions, without solving the equations directly, we "understand" the equation as applied to these conditions... Physical understanding is something inaccurate, indefinite and absolutely not mathematical, but for physics it is absolutely necessary". Perhaps it is these words that most fully characterize the peculiarity of physical thinking, at least when applied to the use of the mathematical apparatus [6].

Today, in the conditions of the development of information technologies and computational experiment, the question of studying the methodology of thinking that is capable of ensuring the productive development of this new direction of physical knowledge is put on the agenda. Meanwhile, the computer simulation itself should receive and is really becoming more and more widespread, since the objects of study of modern physics lead to the discovery of new completely unexpected processes and structures.

Speaking about the prospects for the development of computational experiment and computer simulation, as a universal methodology of scientific research of real processes and systems, we note that the model nature of all our knowledge leads to the convergence of physical and mathematical models. A characteristic feature of scientific activity is the exceptional difficulty, and sometimes the impossibility of separating the physical and mathematical models when considering fairly complex real phenomena.

Considering the methodological aspects of modern physics and mathematics education, let us recall the point of view of the outstanding mathematician V.I. Arnold: "Mathematics, like physics, is experimental science, differing from physics only in that experiments are very cheap in mathematics... Mathematics is an experimental science - part of theoretical physics and a member of the family of natural sciences. The basic principles of the construction and teaching of all these sciences are applicable to mathematics... The ability to compose adequate mathematical models of real situations should be an integral part of mathematical education ... For all the enormous social significance of computing (and computer science), the power of mathematics is not in them, and the teaching of mathematics should not be reduced to computational recipes." [1].

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信息技术在学生独立工作中应用于某高职院校高等数学课程开发的经验
EXPERIENCE OF APPLICATION OF INFORMATION TECHNOLOGIES IN INDEPENDENT WORK OF STUDENTS ON THE DEVELOPMENT OF THE COURSE OF HIGHER MATHEMATICS IN A TECHNICAL UNIVERSITY

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注解。 本文介绍了在技术学院掌握高等数学课程的学生独立工作中使用信息技术的经验。 它们的使用是由于需要形成认知动机，对学生的独立认知活动进行控制。 给出了在伏尔加格勒州立技术大学高等数学系修改的MENTOR控制和训练系统的使用实例。

关键词：学习个性化，学生独立工作，控制和培训系统，测试生成，认知动机，测试结果有效性，教学方法的适应性。

Annotation. *The article describes the experience of using information technology in the independent work of students in mastering a course in higher mathematics at a technical college. Their use is due to the need to form cognitive motivation, to exercise control over the independent cognitive activity of students. Examples of the use of the MENTOR control and training system adapted at the Higher Mathematics Department of the Volgograd State Technical University are given.*

Keywords*: individualization of learning, independent work of a student, control and training system, test generation, cognitive motivation, validity of test results, adaptation of teaching methods.*

In the conditions of the information society, the ability of a specialist to acquire knowledge independently becomes especially important, and teaching this is an important task of modern education [1].

An important component of the educational process, along with the communication of information, is the organization of independent work and the control of acquired knowledge and skills of students, the formation of cognitive motivation on their basis. At the same time, independent work means various types of individ-

ual and collective student activities organized and directed by a teacher.

Sociological surveys and work experience show that a large part of undergraduate students do not have a psychological readiness for independent work and there are no learned ways to organize it. At the same time, the adjustment of curricula in many areas of bachelor's training has a tendency to increase the proportion of hours allocated for independent work of students, while maintaining or reducing the total number of hours devoted to the study of general scientific disciplines in the physics and mathematics cycle.

All noted indicates the need for a special organization of teachers of independent work of junior students. Proper organization of independent work and control of student knowledge should convince the student that the implementation of the planned volume of independent work provides the necessary level of training (the formation of certain skills). The specificity of mathematical disciplines, in particular, lies in the fact that a significant place in the educational process, including in the independent work of students, is occupied by mastering the methods of solving problems. Therefore, the most important condition for the successful study of mathematical disciplines is the existence of an appropriate database of tasks. From our point of view, the tasks for individual sections of disciplines should meet the following requirements:

- coverage of the main typical tasks of the relevant section of the discipline at various levels of complexity;
- the presence of a sufficient number of similar tasks;
- the ability to quickly update (modify) the database;
- structuredness (for example, by topics, methods of solution, level of complexity);
- variability and the possibility of individualization - both for the teacher and for the student [2].

We will supplement this series of technological requirements with pedagogical requirements:

- it is necessary to differentiate learning by expanding the system of tasks (for strong students, additional tasks are offered within the system, and for the weak, for some tasks, the system is accompanied by simpler or leading questions);
- it is necessary to adequately reflect the relationship between the main provisions of the theory and information auxiliary, developing nature;
- each introduced notion of a system of tasks should be brought to a minimum level, that is, ensuring in the student’s mind all the fixed in the definition of the properties of the concept and vice versa recognition of the new concept by its properties;
- it is necessary to design a system of tasks, preliminarily defining the backbone connections proposed in the textbook or at the lecture.

Work on the creation of structured sets of parameterized tasks of varying degrees of complexity and methods of their use in the educational process for organizing independent work of students and various forms of current, intermediate and final control has been carried out at the department of Higher Mathematics using the MENTOR program for the past fifteen years.

Using the MENTOR program, a teacher can:

- select topics and tasks included in the control, verification, independent, semester and other types of work;
- determine the number and sequence of tasks in the task;
- assign a range of values for the parameters of each task;
- to appoint a way of presenting tasks to students (on a computer screen or in the form of variants printed on paper).

The MENTOR program allows you to create tasks in the form of tests for use on the Internet, both for work in a computer classroom and on any PC with access to the network. This feature becomes especially relevant when conducting self-certification or during the licensing of the university [3].

The MENTOR program, by assigning specific admissible values to the parameters of the selected task, ensures the receipt of the required number of tasks of the chosen type and presents them to the students in a form that does not contain parameters. If a task consists of several types of tasks, then, receiving the task in an un-parameterized form, the student is forced to independently determine the types of tasks and choose methods for solving them. The verification of non-test jobs is facilitated by using the response verification module built into the MENTOR system and offering answers to each task of the current work variant. To use the verification module, it is enough to enter the key (a natural three-digit number) with which the task was created and the number of the desired option. For some tasks, intermediate results are also displayed. You can print answers to the desired options for the task or to all variants of this task. The module for checking answers is not available to students.

When working on the network, on http: \\ mentor.vstu.ru, tasks created offline and then properly prepared are offered as tests with a choice of one correct answer from the 4-5 proposed. At the same time, after entering the selected answer, the program gives the decisive an estimate for this task (right-wrong), and at the end of the current session it gives an estimate - the percentage of correctly completed tasks in this task. These assessments are accumulated during the semester and at any time the arithmetic average for all tasks that must be completed by this time is available to the teacher who assigned this task (and to others with access).

Effective use of the MENTOR program in the educational process involves a great deal of preliminary methodological work, consisting primarily in forming a database of tasks for various sections of mathematical disciplines, distributing

them by type and level of complexity, and also including these tasks in the MENTOR program taking into account the capabilities of the software shell. Initially, structured sets of tasks in the sections “Elements of linear algebra”, “Vector algebra”, and “Elements of analytical geometry” were developed and included in the MENTOR program. The experience of organizing independent work of students using the MENTOR program in these sections has shown the feasibility of preparing similar developments in other sections of mathematical disciplines and improving the methods of their application. Recently, task bases have been created for the sections “Introduction to Analysis” and “Differentiation and Integration of Functions of One Variable”. When selecting tasks, additional requirements to them were taken into account - the parametrization and the dependence of the response on the parameters - associated with the most efficient use of the MENTOR program. The developed task bases contain both very simple tasks and tasks of medium and high difficulty and thus make it possible to take into account the level of training of most students and to individualize work with them. Tasks for the indicated sections of mathematical analysis were successfully included in the MENTOR system with preservation of all system functions (generation of tasks, compilation of job options, checking answers, printing options and answers to them on paper, generating test tasks).

Various types of work (training, control, semester work, test assignments, etc.) created by teachers using the MENTOR program were used in various combinations and proportions in groups of first-year students of FE & FT. Experience has shown that assignments prepared in this way meet the requirements set for them, understandable to students, they meet with interest and allow for an individual approach to students. For each task, the MENTOR program generates options in a predetermined quantity sufficient to provide students with individual tasks. To make it easier for the teacher to complete the assignment process (for example, tests), detailed tables have been drawn up with the conditions of the tasks in a parameterized form and the necessary restrictions on the parameters for each of the listed sections.

It should be noted that such a technological approach to the organization of students' independent work makes it possible to free the teacher from routine work, while at the same time ensuring the timely updating of tasks and their individualization. The quick receipt of the results of the monitoring allows us to make timely adjustments to the method of conducting classes, clarify the scope and level of complexity of the proposed tasks of various forms of control and maintain a steady interest of students.

The use of various methods within the framework of the proposed technology for organizing students' independent work and control allows combining traditional forms of control, which imply the complete formulation of the tasks to

be solved, and computer testing in different proportions, using advantages and reducing the disadvantages of each of these forms. This technology is quite flexible, allowing you to change the proportions of the types of tasks used, as well as their content depending on the level of preparedness of students of the stream or group, the varying number of hours devoted to classroom and independent work of students, the provision of equipped classes and methodological preferences of teachers within the approved programs and rating control techniques.

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俄罗斯大学在国际教育服务市场中的吸引力（以阿姆斯特丹大学为例）
ATTRACTIVENESS OF RUSSIAN UNIVERSITIES IN THE INTERNATIONAL MARKET OF EDUCATIONAL SERVICES (ON THE EXAMPLE OF THE AMUR STATE UNIVERSITY)

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注解。 本文讨论了经济发展中最重要的当前趋势之一 – 国际化 – 与高等教育相关的主要形式和特征，如外国学生的流动性，项目的国际化以及教育服务的出口。

关键词：高等教育系统，人口趋势，教育传播，远东，地区大学。

Annotation. *The article discusses one of the most important current trends in economic development - internationalization - in relation to higher education, its main forms and characteristics, such as the mobility of foreign students, the internationalization of programs, and the export of educational services.*

Keywords: *higher education system, demographic trends, educational communication, the Far East, regional universities.*

The development of the Far East is a strategic priority for Russia in the 21st century; human potential is becoming the main resource for this development. In this regard, the demo-graphic policy of the Far East should ensure the stabilization and increase in the number of the population in the constituent entities of the Russian Federation that are part of the Far Eastern Federal District.

The Government of the Russian Federation approved the Concept of the demographic policy of the Far East for the period up to 2025. In accordance with the Concept, it is assumed by 2025 in the Far Eastern Federal District to ensure population growth of up to 6.5 million people due to natural and migratory growth, attracting residents of other regions, compatriots living in regions of the Far East for permanent residence abroad, qualified foreign specialists and young people.

The implementation of the demographic policy of the Far East for the period until 2025 implies, among other things, conducting sociological research on the migration potential of young people and the mechanisms for securing young specialists in the Far East.

Demographic trends have had a profound impact on Russia, including the Far Eastern region, and not least on the higher education system.

The number of secondary school graduates fell by almost 50 percent between 2000/01 and 2014/15, from 1.46 million graduates to 701,400.

Along with noticeable trends in the reduction of students in institutions of higher education in 2015, Russia increased the international student quota in Russian universities by 33 percent. It also significantly increased scholarship funds for foreign students. In the same year, a number of leading Russian universities that are part of the newly created global association of universities attract at least 15,000 foreign students annually. Russia is consistently among the top ten most popular destination countries for international students in the world.

Today, China is one of the largest partners of the Russian Federation in the market of educational services both as a source of demand for them and as a source of their supply. With the beginning of the development of the Russian-Chinese strategic partnership, humanitarian exchanges, political mutual trust and trade and economic cooperation became an important pillar of Russian-Chinese relations. Since 2000, both countries have supported the creation of an inter-service cooperation platform and are constantly increasing the scale of student exchanges. On this basis, both countries agreed to bring the total number of students studying abroad to 100,000 by 2020.

At the initiative of President Xi Jinping of China, a project «Economic Belt of the Silk Road» was created. Later this project was merged with the project "Sea Silk Road of the 21st Century" within the framework of the unified strategy "One Belt, One Road". This belt extends from China to Europe and passes through Central Asia along the route of the ancient Silk Road. The "One Belt, One Road" strategy has played a major role in the higher education sector in Central Asia. The PRC regards Russia as an important partner among the countries participating in the national strategy.

The analysis of the influence of the "One Belt, One Road" strategy on relations between China and Central Asia in the field of higher education suggests that the changes in the educational sector can be traced by the discourse of Chinese cultural diplomacy, which attaches special importance to establishing relations between people through education. The Educational exchanges can serve as a bridge to closer ties between people, while cultivating talent can support these countries 'efforts to coordinate policies, infrastructure connectivity, unhindered trade, and financial integration along routes. The countries participating in the project have

close interdependence, and the educational exchange between these countries has a long history; therefore, the prospects for educational cooperation are not bad. Combining efforts in the development of education to create a belt and a path together is a great work that will bring benefit to all nations.

China has consistently maintained its open education policy and is deeply integrated with global trends in education reform and development. Facilitating the general prosperity of education in countries along the route will not only strengthen mutually beneficial cooperation between countries, but also provide a good incentive for internal reforms and development of education.

The attractiveness of a country for the purpose of obtaining higher education is due to a number of factors for foreigners: the prevalence of the language of instruction; the economic and cultural attractiveness of the country; the country's authority in the international arena; the level of the national education system; geopolitical, trade, economic, cultural and historical ties between the exporting country and the importing country; the promotion of national educational institutions in the global space.

In total, more than 800 foreign students study at universities in the Amur Region. According to the Amur Department of the Federal Migration Service, 105 foreigners are citizens of the CIS, 750 are from countries with a visa regime, the majority are citizens of China. In the Amur region there are five state universities - the Far Eastern Higher Military Command School. K.K. Rokossovsky, Amur State Medical Academy, Far Eastern State Agrarian University, Blagoveshchensk State Pedagogical University and Amur State University. Some of them develop the traditions of professional and academic exchanges with foreign universities in specialized fields. For example, Blagove-Schensky State Pedagogical University is actively working in the field of teaching Russian to foreign citizens, supports scientific research, educational projects and other practical developments on topical issues of transboundary cooperation, aided by the Confucius Institute.

In accordance with the Order of the Government of the Russian Federation of June 20, 2017 N 1298-p, the Amur State University (AmSU) has developed a program for the development of international activities for 2017-2020. in order to increase competitiveness in the research and education space of the Asia-Pacific region in priority areas of university development and the gradual integration of the university as an equal partner in the international educational space.

The strategic objectives of the Amur State University in international activities are the internationalization of research and educational programs; an increase in the export of educational services and the share of revenues from foreign economic activity in the overall structure of the university budget. Achieving these priorities involves the implementation of a set of measures, including:

- improving the quality of training of foreign citizens enrolled in educational

programs of undergraduate and graduate programs;

- implementation of network educational programs in cooperation with foreign partner universities;

- formation and promotion of a positive image of AmSU on the international market of educational services;

- sustainable provision of the educational process with highly qualified personnel with international experience in the organization of educational work;

- development and implementation of a long-term university policy in the field of student language training;

- improving the conditions of their stay during training at the Amur State University, as well as increasing the recognition and status of higher education, which contributes to a significant increase in revenues from the export of educational services;

- attracting a high-quality contingent of foreign citizens to study under educational programs of undergraduate and graduate programs.

Thus, in the Amur State University, a preparatory department was created, within the framework of which Russian language courses were organized to prepare foreign citizens for admission and training in educational programs for undergraduate, magistracy, and postgraduate studies. Here, foreign students study the grammar and vocabulary of the Russian language, written and spoken language, listening, phonetics, as well as Russian culture and traditions (linguistic and cultural studies). They are learning Russian (general literary and pro-professional language of the future specialty), correcting gaps in general educational disciplines and sciences necessary for successful learning in the main faculties of AmSU.

The educational program of pre-university training has the following profiles: humanitarian; technical; economic. The distribution of foreign students by profiles allows you to implement the educational process based on their professional preferences. Foreign citizens are also studying the fundamentals of mathematics, knowledge society, and other disciplines that are supposed to pass at the entrance exams to the university.

Education under the pre-university educational program involves not only mastering the Russian language to the extent that it is possible to carry out educational activities in Russian and is necessary for communication in the educational, professional and socio-cultural fields, but also mastering the system of subject knowledge necessary for continuing education in the Russian university, as well as psychological preparedness ready for learning activities in the new social and cultural environment.

Every year, in winter and summer, Russian language schools are organized at Amur State University. The school is an open public education project that brings together students who want to learn more about the Russian language, the history

of Russia, its culture and customs. The Winter School and the Summer School for those entering the State University are a communication platform for young professionals who want to achieve new results in learning Russian.

The university has developed a roadmap for the development of international activities, in which a set of measures is planned to improve the quality of educational programs and to increase the export of educational services. Building a system of assistance in adapting to foreign students in their own university, the university relies on the experience of foreign universities, where the work on adaptation has been carried out for a long time and systematically, more professionally builds its own system of assistance to foreign students on theoretical and practical scientific research on the adaptation process which have long been held by Russian and foreign researchers. An approach to the adaptation of foreign students is being implemented at AMU, which relies on the results of scientific research and borrows the basic components of adaptation work from the experience of foreign universities. The goal of this approach is to assist in the social and cultural adaptation of foreign students.

For foreign students who have just entered, AmSU conducts a primary adaptation program. The goal of this program is to prepare students for life and study in Russia as much as possible. During acquaintance with AmSU and its territory, foreign students are shown the location of vital facilities. At the talks, instructing give the most important information about life and study in Russia. For beginners, on the basis of theoretical and methodological apparatus, developed disciplines "intercultural communication" and "cultural studies", aimed at the transfer of such knowledge of Russian culture, which help foreigners to better adapt and contribute to the solution of the strategic problem - the formation of a positive attitude towards Russia and Russian culture.

Attracting foreign students to universities of the Russian Federation is one of the tasks, the solution of which will allow to take a higher place in educational institutions in international rankings. Academic mobility for a long time is an important factor in competition between institutions of higher education, both at the national and global levels. International university rankings form models and set the standards of a modern university, which many universities around the world are trying to follow.

The need to compete in the global market of educational services is actualizing the task of shaping the international image of the university, which is viewed as a competitive advantage over competing universities. Modern universities have joined the competition in the global scientific and educational market, which gives a new meaning to the international activities of the university, making it one of the main factors in the development of the university. Due to the fact that in the field of higher education there is an erasure of geographical boundaries and an increase

in academic flows between countries, the international image is of particular importance for the university. The formation of an international image is represented as the most complex process, due to the level of integration of the university into the international educational and scientific space, the quality of the proposed education, the availability of high-level scientific developments, the level of infrastructure development, etc.

The existing image of the university develops depending on relations with various groups of the target audience: with society as a whole, with students who act as clients (consumers of educational services), with business (industry), expecting commercially relevant knowledge from the university , and the state, which requires from the university more economic self-worth.

The main directions of forming a positive image of the university in the international educational environment are:

- establishment of long-term mutually beneficial direct contacts with foreign educational institutions, as well as international organizations, foundations, non-profit organizations;
- development of the system of academic mobility of the faculty, students and managerial staff of the university;
- intensification of work on the preparation of applications for international projects and grants;
- expansion and intensification of international research and innovation activities of the university;
- maintaining cooperation with universities in other countries, associated with the creation of international joint research and educational structures at the university;
- the development of joint educational programs at the university, involving the issuance of a double diploma as the most important means of improving the competitiveness of the university in the educational services market;
- development of a postgraduate education system for foreign students, the development of short-term programs, summer schools; providing the opportunity to undergo undergraduate practice;
- improving the quality of life and safety of foreign students;
- development and submission of proposals for the opening in partner universities of organizational structures that popularize knowledge about the university, culture and history of the peoples of the country and thereby enhance the positive image of the university abroad.

The dynamics of international student mobility is obvious, it is associated with economic growth, the shortage of highly qualified personnel in China and the availability of higher education in Russia. There are several reasons why Chinese citizens choose to study in Russia. Firstly, Russian universities can provide good

theoretical knowledge and practical skills in various fields, because our education traditionally has great scientific and educational potential, as well as a high level of some technologies that China would like to learn. Students have the opportunity to participate in research projects and internships in large Russian and foreign companies. Secondly, it is a financial component - studying in Russia today is cheaper than in the West and is the most optimal choice for ordinary families. Thirdly, it's just an interest in Russia itself, a country with a rich culture, whose history is intertwined with the history of China, because the Chinese traditionally seek to learn more about the culture of Russia. Fourth, the two countries are implementing many joint projects in various fields, from science to construction and trade. This creates a demand for specialists with specialized education and fluent in Russian.

For the development of international relations, providing specific activities in the eastern direction, Russian universities need to create and develop joint educational programs and scientific research with leading Chinese universities, which will allow modern Russian universities to become more attractive for foreign students. This will facilitate integration into the international educational system.

Thus, currently attracting foreign students is viewed largely as a political resource that allows the Russian Federation to realize its long-term interests in strategically important regions through "soft power politics" - through the training of qualified personnel, as well as future representatives of national political elites, the formation of their attitude to cooperation and loyalty in the process of educational communication.

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电子学习环境在学生管理培训研究中的应用
APPLICATION OF E-LEARNING ENVIRONMENT FOR MANAGEMENT OF STUDENTS TRAINING RESEARCH

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注解。 本文介绍了一个使用电子学习环境管理学生项目活动的模型，用于解决教育和研究问题。 强调了学生项目活动组织管理周期功能的内容。

关键词：电子学习，项目活动，管理周期，项目，教育研究。

Annotation. *The article presents a model for managing students' project activities using an e-learning environment for solving educational and research problems. The content of the functions of the management cycle for the organization of project activities of students is highlighted.*

Keywords: *e-learning, project activities, management cycle, project, educational study.*

Introduction. There are two interesting trends in the higher education system. One is the use of electronic learning resources (ELR) in the educational process for a student to master the content of disciplines [1]. Another is the inclusion of students in various types of project activities. The concept of the project is associated with the cycle of productive activity, which includes three phases: the design phase, technological and reflexive phase [7]. The use of the project method as a "way to achieve a didactic goal through the detailed development of technology, which should be completed with a very real, tangible practical result, executed in one way or another" [8] evokes cognitive interest among students. The use of an ELR teacher to manage the activities of students during project implementation significantly increases the efficiency of their interaction. Project activities create favorable conditions for the development of students of various general cultural, professional and professional competencies.

Materials and methods. The successful involvement of students in project activities is largely determined by the ability of the teacher to form a pedagogically expedient ELR. Constructing the content of its components and interconnections allows you to efficiently coordinate and adjust the trajectory of the students. Man-

agement of students' project activity is modeled according to the structure of the project type. [3].

Research results and discussion. The management process has a cyclical nature, so the management cycle is a closed sequence of such basic management activities as analysis, management decision making, goal setting, work planning, results forecasting, organization of performance and control [1]. Modeling by the teacher of the content of management functions of the project activities of students should take into account the features of the project being implemented.

Successful construction of the teacher's management cycle model is based on a clear separation of management levels [6]. The first level is the image of the project activity, the second is the draft curriculum; the third is the project of a specific training event, the fourth is the organization of the real process of project activities. It is advisable to take into account the peculiarities of the management of the individual and the team. It should be noted that attracting students to academic research does not always cause everyone's interest. A possible version of the model of management of project activities of students using ELR for conducting educational research is presented in table 1.

Table 1. Model of management of project activities of students using ELR

Control functions	Content
Analysis	Identifying the structural and functional capabilities of the ELR. The selection of educational and research tasks in the discipline. Diagnosis of the level of knowledge, skills and competencies necessary for students to complete educational and research tasks
Making management decision	Selection of components of the ELR to solve didactic and methodological problems. Drawing up a system of educational research tasks. Differential distribution of tasks at various levels of complexity among students based on their training
Goal setting	Definition of general cultural, general professional, professional competencies in the process of educational research. Setting students the task of their educational activities. Motivation to achieve the expected result of learning and development
Work planning	Compilation of technology solutions for educational and research problems. Filling the contents of the components of the ELR. Distribution of learning tasks. Creating a didactic map as an indicative basis for the passage of students of all stages of teaching and research activities to solve problems of varying complexity
Forecasting results	Building a system of criteria for evaluating the effectiveness of teaching and research activities. Encouraging students to conduct self-analysis of the adequacy of the results obtained in the process of solving educational and research problems

Fulfillment organization	Construction of the navigation movement of students in the ELR space at specified time intervals. Observation of the interaction of students in solving their educational and research problems. Providing advice to eliminate gaps in the system of knowledge, skills and competencies of the studied discipline
Control	Measurement of individual educational achievements of students by means of ELR in automatic mode. Discussion on the forum emerging methodological difficulties. Evaluation of the results of solving educational and research problems of other participants of the training group according to specified criteria

Conclusion. Management of students' project activity in the ELR is a complex intellectual process that requires the teacher to have knowledge of modern information and computer technologies, psychological and didactic patterns. The modeling of the managerial cycle allows the teacher to productively solve methodological tasks for students to master the technology of solving educational and research problems for developing a culture of thinking [4] and creative abilities [5].

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社会发展现阶段学生青年的社会化
SOCIALIZATION OF STUDENT YOUTH AT THE PRESENT STAGE OF SOCIETY DEVELOPMENT

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注解。 目前，在现代社会全球化的条件下，教育机构需要从心理社会适应学生作为一个人的新的社会化条件的角度来确定学生的心理和教育支持形式。 在实施高中成功的内部和外部动机的背景下，学生的行为因素值得特别关注。 获得的结果可以改善学生在健康生活方式和预防非传染性疾病中实施社会文化和心理态度的组织和方法。

关键词：学生，动机，适应，学习成功，健康的生活方式。

Annotation. *At present, in the conditions of globalization of modern society, educational institutions are required to determine the forms of psychological and pedagogical support of students from the standpoint of psychosocial adaptation to the new conditions of socialization of the student as a person. The behavioral factors of students in the context of the implementation of internal and external motivations for achieving success in high school deserve special attention. The obtained results allow to improve the organizational and methodological approaches in the implementation of sociocultural and psychological attitudes among students in a healthy lifestyle and the prevention of non-communicable diseases.*

Keywords: *students, motivation, adaptation, learning success, healthy lifestyle.*

Currently, the dynamics of changes in social life brings the problem of higher education to a new level. The upbringing of students who are able to study in qualitatively new social and economic conditions is becoming relevant, since it is the younger generation that represents the intellectual and productive potential of

society. We have to admit that it is the personality-oriented value of education that determines the individually-motivated attitude of students to their own education, and the damage and quality of the knowledge they receive.

The specifics of the psychological adaptation of students at the university is determined by the restructuring of the psycho-physiological function of the organism in the conditions of the development of modern society. At the same time, the socialization of an individual is caused, first of all, by both social and psychological adaptation in the student environment, the development of his own style of behavior, and the skills of autonomy, as an individual in the public life of the university. Success in solving these problems allows students to improve the quality of their lives and achieve high professional qualifications after graduation.

The dynamics of changes in social life and its requirements, a large workload, and social contacts generally affect the psychological health of students, which include mental, emotional, social, intellectual, and spiritual health. [2] At the forefront of psychophysical stress come the factors that are realized by the formation of psycho-emotional stress, self-doubt, their cognitive abilities. Reducing self-esteem and motivation to the learning process affects the adaptive capacity of the young body, followed by the formation of emotional instability, hostility, isolation, anxiety and depression, which ultimately affects the success of training. At this stage, in terms of self-determination, self-actualization and self-realization, there are often risks of developing both psychosomatic disorders and dependence on bad habits (drinking alcohol-containing beverages, smoking, etc.). So, in the activities of educational units on the basis of the analysis of the socio-cultural and psychological attitudes of students on learning success (internal and external motivation), it is necessary to optimize measures aimed at adapting students to the new society in modern society (Figure 1).

Novikov A.M. asserts that "self-determination is an individual's choice of his life path, his place in society, lifestyle and activities, as well as his behavior in problem and conflict situations, based on free will. Self-actualization is the desire of a person to identify and develop his personal abilities as fully as possible" [1].

Current priorities for the formation of a healthy lifestyle include the presence or absence of bad habits.

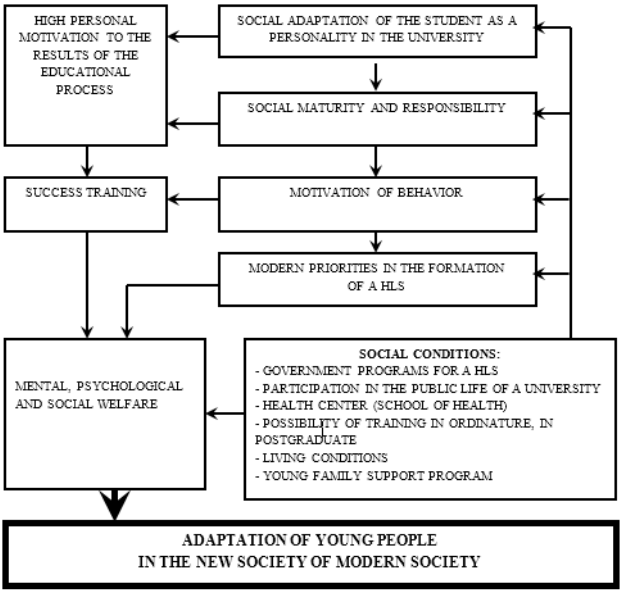

Figure 1. Stages and conditions for the formation of a student as a person in modern society.

A comparative assessment of the presence of risk factors for non-communicable diseases in the studied groups was carried out between students of the second and sixth courses with the division into subgroups of young people and girls. The survey was conducted anonymously in order to achieve the most reliable results. From the stated follows the following:

- assessment of weight using Brock's formula: weight gain from 3-5 kg (II and VI courses - 7.2% - 16.9%), weight gain above 5 kg (II and VI courses - 6.5% -11.3 %), weight loss less than 3 kg (II and VI courses - 3.4% - 9.25);

- slight physical exertion (ascent to the 5th floor) causes: heartbeat (second and sixth courses - 4.5% -17.8%), heartbeat and shortness of breath (second and sixth courses - 4.9% -10.3%) ;

- smoking: 1-2 cigarettes within 2-4 days (II and VI courses, men - 8.8% -16.6%, girls - 3.2% -7.4%), 1-2 cigarettes for days (II and VI courses, men - 3.2% -7.4%, girls - 0.2% -0.8%);

- alcohol consumption: low alcohol beverages (II and VI courses, men - 8.2% -34.3%, girls - 3.4% -9.8%), strong drinks (II and VI courses, men - 2 , 8% -6.6%, girls - 0.1% -0.5%);

- students living in a dormitory or in an apartment - 34%.

The results of our work have shown that the formation of the status of a successful student affects both junior and senior courses:

- academic performance as an initial intellectual factor;
- the presence of internal motivation as the need for the development of the profession at a high level, focused on obtaining solid professional knowledge and practical skills;
- the absence of bad habits and a healthy lifestyle;
- social adaptation, including active participation in the activities of the university, classes in student circles, speeches at scientific conferences.

Consequently, the risk factors for non-communicable diseases should be considered as adaptations of internal and external motivations for achieving successful university studies to the external conditions of student socialization of the individual. It is the behavioral factors of students from the position of physical, psychological and social well-being that attract attention.

Yakunin V.A. in his studies [3] revealed the relationship between internal and external motivation, affecting the success of the student in learning activities. Strong students are motivated to obtain high professional skills even at the stage of study at the university, due to the initial goals set for admission - internal motivation. External motivation is more often expressed in weak students - obtaining scholarships, avoiding punishment for poor studies, and expulsion from the university.

Thus, our studies have shown that the student's personal self-esteem is inextricably linked to its motivational sphere, which ultimately affects psychosocial health, where personality maturity in the self-esteem "I" in a rapidly developing modern society is dominant. Moreover, it is precisely motivation that is an important factor contributing to the successful learning activities of students and determining the ways of their professional development in a healthy lifestyle.

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在运动旅行中通过运输标准化运输物理准备旅游者的会计
ACCOUNTING OF PHYSICAL PREPARATION OF TOURISTS WITH NORMALIZATION OF SHIPPING BY RUCKS IN A SPORTS TRIP

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注解。本文致力于考虑到游客运动员在旅游旅行中分配背包重量的体能的教学问题。如果不考虑参与者的身体状况和负荷水平，设备的重量分配不当 – 可能导致沿途旅游运动员长期过度拉伸或受伤。

选择以下测试并用于评估游客在竞争前期间的功能准备情况：Rufier的测试 – 确定心脏活动指标，哈佛步骤测试，以及确定一般身体健康水平的测试。为了在整个时间内控制负荷强度，在加息期间采集心率指标，并且基于它们，确定每个参与者的背包的最佳重量。在完成路线后，再次进行了对性能水平的研究。

关键词：体育旅游，体育活动，力量耐力，身体能量消耗，生理状态。

Annotation. *The article is devoted to the pedagogical problem of taking into account the physical fitness of tourists-athletes in the distribution of the weight of backpacks in a tourist trip. Improper weight distribution of equipment without taking into account the physical fitness of participants and load levels - can lead to chronic overstretching or injury to tourist athletes along the route.*

The following tests were selected and used to assess the functional readiness of tourists in the pre-competitive period: Rufier's test - to determine cardiac activity indicators, Harvard step test, as well as tests that determined the level of general

physical fitness. In order to control the load intensity during the whole time, the heart rate indicators were taken during the hike and, based on them, the optimal weight of the backpack for each participant was determined. Upon completion of the route, a study of the level of performance was again conducted.

Keywords: *sports tourism, physical activity, strength endurance, energy expenditure of the body, physiological state.*

Tourist route is one of the available means of physical culture. Its success depends on the physical fitness of the participants. In the march, the traveler must overcome various obstacles. He often finds himself in conditions that require prolonged physical exertion from him. A participant in a hike with poor physical fitness may cause an accident for his colleagues. Research data show that about 25% of all injuries in travels occurred against the background of fatigue, attention and coordination disorders, the cause of which was the low level of physical fitness of participants. Improper weight distribution of equipment without taking into account the physical fitness of participants and the level of load can cause injuries [7].

Often in a tourist trip overwork occurs due to excessive weight of equipment. This is aggravated by the long transitions between parking at night and lay down. In this regard, the load, which participants are exposed to the campaign, for some, is prohibitive and can lead to injuries, and well-trained can not feel it [6].

At the moment, the problem of the physical fitness of tourists on the load, namely, the weight distribution of a backpack, is not sufficiently covered. Some researchers are guided by the percentage ratio of the weight of the cargo to the weight of the tourist (35-40% for men and 20-30% for women). As a rule, the weight of a backpack for women should be 30% less than for men. There are also misunderstandings about how to determine the optimal speed of the route and the length of the rest intervals. All of the above indicates the need to study this issue and is the actual topic of scientific research.

The intensity of the load in tourism is distinguished into the following levels in terms of heart rate: low - 90-130 beats / min; average - 130-170 beats / min; high - 170-190 beats / min.

At rest, the change in the degree of general endurance can be controlled independently by pulse. A well-trained heart is rarely reduced at rest, and the pulse usually varies from 60 to 50 beats / min, and sometimes to 35-40 beats / min. With loads of heart rate increases, and the trained heart provides the necessary enhancement of blood circulation. The highest cardiac performance is achieved with a heart rate of 180 beats / min, a further increase in heart rate is ineffective, since it leads to a decrease in both the stroke and minute volumes of the heart, which characterize its power. The stroke volume is determined by the amount of blood

entering the aorta in one heart beat. The minute volume is equal to the product of the stroke volume per HR. Studies show that the stroke volume of the heart increases while running from a heart rate to 130 beats / min. With this level of load, the power of the heart grows, both due to the stroke volume and due to the heart rate. When the pulse rate is higher than 130 beats / min, the stroke volume of the heart does not increase, therefore, the power increases only due to the heart rate. When the pulse is more than 180 beats / min, the heart power does not increase, but decreases due to a decrease in the stroke and minute volumes. From this it follows that the average level of stress (pulse 130-170 beats / min) is the main factor in training tourists, since it is these loads that help improve the blood supply to the body and strengthen the heart muscle [6].

Breathing with such loads only through the nose is almost impossible, therefore experts now recommend breathing through the mouth and nose simultaneously [6].

With an increase in heart rate, there is an increase in oxygen consumption, which, however, can not be more than the IPC. The size of the IPC for each person is determined by its individual characteristics and is expressed by the amount of oxygen (in milliliters) consumed per 1 minute in terms of 1 kg of human weight. Approximate data for the IPC of highly qualified tourist athletes up to 90 ml for those who regularly go in for sports tourism are about 50 ml, for those who are not involved in sports - less than 40 ml [6].

The present study consisted of 3 consecutive stages. The experiment and its preparation was carried out on the basis of the Krasnoyarsk-ska Solnechny-S sports and fitness camp. The experiment involved children aged 12-13 years.

1st stage - preparatory. This stage consisted of studying and summarizing the experience of preparing for tourist trips. We scientifically substantiated, selected and used tests to determine the physical fitness of tourists shortly before the hikes: the Rufier's test - to determine the indicators of cardiac activity, the Harvard step test, as well as the tests that determined the level of general physical fitness.

The 2nd stage was characterized by carrying out three LDPE (weekend trips). All three trips had similarities along the route, terrain, speed, and airspace intervals.

The first trip was organized in the vicinity of the Nikolaevskaya Sopka, with a total duration of 4.5-5 hours, with rest intervals between transitions of 5-7 minutes. In total, there were 10 transitions of 15 minutes each. Schoolchildren 12-13 years old with a backpack weight, which is recommended in modern literature, namely, boys 12-14 kg, girls 8-10 kg. Using the pulsometry method, we also determined the intensity level of the load performed by the participants in the hike by calculating the heart rate over 10 seconds. throughout the campaign on the stopovers (Table 1).

In the following hikes, based on the first hike heart rate indicators, as well as taking into account the test results carried out before the hike and the time of restoring the heart rate to normal, we changed the weight of the backpacks between participants so that the heart rate at the transitions was 130-160 beats / min, which corresponded to the average load level. The results of the trips were processed and presented by the scale of distribution of the weight of equipment for trips for children 12-13 years old (Table 3).

The third stage, the final stage, included the organization and conduct of an experimental campaign to confirm the effectiveness of the scale developed by us. Immediately before the hike, control tests (TES-test) were repeated, the results of which we divided into two groups of 12 people - the control and experimental groups. In the EG we distributed the weight of equipment in accordance with the scale developed by us, in the CG the weight of the backpack was distributed in accordance with the recommendations, which were reflected in the educational and methodical literature.

In order to control the intensity of the load, the heart rate indices were determined during the entire time during the hike (Table 6). Upon completion of the route, we again conducted a study of the level of efficiency.

Table 1 presents the values for each of the selected tests of schoolchildren before the trip and the optimum equipment weight corresponding to this level of physical fitness.

Table 1- Test values before the hike and the optimal weight of equipment

List of the participants	Tests					
	GPT	Ruff	IGST	backpack weight (optimal.)	Body weight	Ratio in (%)
1.	satisf	satisf	satisf	11	46	23
2.	exc	good	good	14	52	27
3.	exc	good	good	13	48	27
4.	good	exc	good	16	57	28
5.	good	good	av.	11	43	26
6.	satisf	satisf	b/av.	10	54	18
7.	satisf	satisf	satisfy	12	55	21
8.	satisf	good	b/av.	10	47	21
9.	good	exc	good	11	40	27,5
10.	exc	good	good	10	43	24
11.	good	exc	exc	9	32	24
12.	good	exc	exc	10	48	26

In order to control the intensity of the load, the heart rate indicators were determined throughout the campaign. Measurement indicators are shown in table 2.

Table 2 - Indicators of heart rate in 1 campaign

List of the participants	I	II	III	IV	V	VI	VII	VIII	IX	X
1.	146	122	130	130	122	118	108	114	108	106
2.	130	130	134	136	118	108	96	100	104	96
3.	154	160	142	142	114	114	112	108	112	108
4.	136	142	136	126	116	110	102	104	104	104
5.	130	130	136	124	118	114	108	104	102	108
6.	136	148	142	136	120	120	116	114	114	112
7.	132	142	140	130	128	120	114	118	108	104
8.	166	172	178	154	132	126	120	124	120	114
9.	122	130	122	118	114	114	108	106	112	106
10.	136	130	136	124	118	108	112	108	112	108
11.	136	148	142	130	124	112	108	108	102	102
12.	123	146	130	124	130	118	102	112	112	100

The purpose of the second and third trips was to individually determine the weight of backpacks, taking into account their level of physical fitness and performance.

On the route, during halts, we tracked the heart rate of all participants in the trip and distributed the weight of the backpacks. For the schoolboy, who was hard to overcome the load, we lightened the weight of the backpack and added it to those for whom the load was insufficient. Acting on the scheme worked out by us, by the end of two hikes we determined the optimal weight of the backpacks for each of our participants.

After processing the results of our experiment, we developed a scale that included the weight distribution of the participant based on the physical fitness indices. The distribution scale is presented in table 3.

Table 3. Scale weight distribution backpack.

Indicators of physical fitness				The ratio of the weight of the backpack on body weight in%	
Pulling up \ push up	Bounce b / g	60 м. b/g	Ruff	B	G
3\5	130/119	8.8/12.1	Satisf (10.1-15)	18-21	14-17
5\7	145/137	8.5/12.0	Good (10.1-15)	20-22	16-18
8\9	166/145	8.6/11.8	Good (5.1-10)	22-26	19-21
10\9	172/140	8.4/11.7	Good (5.1-10)	25-27	22-24
13\11	186/163	8.1/11.6	Good (5.1-10)	26-28	23-25
10\10	176/158	8.5/11.8	Exc (1-5)	27-28	25-26
12\12	190/173	8.2/11.4	Exc (1-5)	28-29	26-27

Immediately before the hike, the control tests (tests) were repeated, the results of which we divided into two groups of 12 people each - the control and experimental groups.

Table 4. Test values for the experimental campaign in the experimental group.

No. of participant	Tests				
	Pull up \ push up		Bounce (cm)	Running 60 m (sec)	Ruff's test
1	B	5	145	8.5	Satisf (13,9)
2	G	7	137	12.0	Satisf (12,2)
3	B	10	172	8.4	Good (7,2)
4	G	9	140	11.7	Good (8,4)
5	B	10	176	8.5	Exc (4,8)
6	G	10	158	11.8	Exc (4,4)
7	B	9	155	8.4	Good (8,3)
8	G	8	143	11.5	Good (9,1)
9	B	12	188	8.2	Exc (4,7)
10	G	13	173	11.5	Exc (3,9)
11	B	7	156	8.5	Satisf (11,3)
12	G	8	149	11.8	Satisf (10,9)

Table 5 - The values of the tests before the experimental campaign in the control group.

No. of participant	Tests				
	Pull up \ push up		Bounce (cm)	Running 60 m (sec)	Ruff s test
1	B	6	148	8.5	Satisf (14.1)
2	G	9	140	12.1	Satisf (12.1)
3	B	9	172	8.2	Good (7.5)
4	G	8	152	12.0	Good (8.5)
5	B	10	174	8.6	Exc (4.8)
6	G	12	164	11.9	Exc (4.3)
7	B	10	161	8.9	Good (8.1)
8	G	8	149	12.5	Good (10.5)
9	B	15	188	8.4	Exc (4.8)
10	G	12	179	11.6	Exc (3.7)
11	B	6	149	8.6	Satisf (11.6)
12	G	7	140	12.1	Satisf (11.3)

During the experimental hike, we also determined the level of intensity of the load performed by the participants in the hike by calculating the heart rate over 10 seconds using the pulsometry method. Throughout the hike, as shown in Table 6, the experimental group had lower rates after each of the transitions as compared to the control group.

Table 6 - Average group indicators of heart rate in the CG and the EG during the experimental campaign

Group	Transitions									
	1	2	3	4	5	6	7	8	9	10
Experimental	126	138	136	128	118	110	108	116	106	102
Control	138	152	156	142	132	136	142	138	120	112

Table 7 presents the average group values of the Ruffer test before and after the experimental hike. As we can see, after the hike, the experimental group has better recovery rates compared to the control group, as evidenced by the indicators of the average for the group. The differences in results between the control and experimental groups after the hike are significant.

Table 7 - Average group values of the Ruffer test

Group	Before hike	After hike	P
	X ± m	X ± m	
Experimental	8.8 ± 0,67	9.1 ± 0,61	> 0,05
Control	8.6 ± 0,76	10.8 ± 0,7	< 0,05
P	> 0,05	> 0,05	

For greater clarity, the average of both groups are presented in Fig. 1. It shows an increase in indicators in the control group, which indicates a slow recovery of all group members. In the experimental group, on the contrary, the indicators of the sample increased slightly, which means our hypothesis was confirmed.

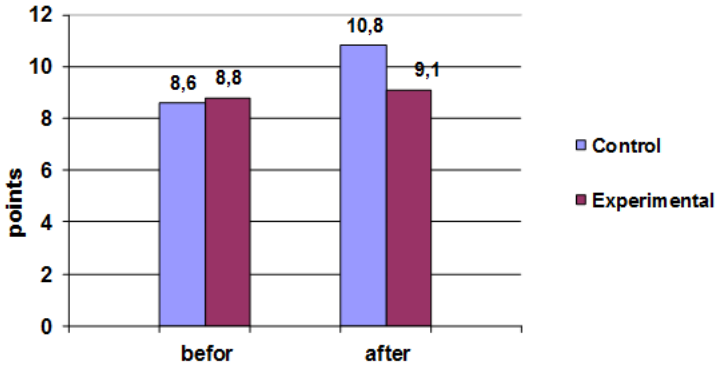

Figure 1. Values of the Rufier test in the control and experimental group before and after the experimental campaign.

In the course of the work, we proved that by distributing the weight of the backpack and using the scale we developed, we can effectively carry out hiking with optimal dosing of the load.

Conclusion.

1. The purpose of the tourist's special physical training, in addition to GPT, is to develop endurance and improve the rational technique of the tourist step, taking into account the individual characteristics of the person and the weight of the backpack. In tourism, there are three levels of stress in terms of heart rate: low - 90-130 beats / min, medium - 130-170 beats / min, and high - 170-190 beats / min.

2. In the course of the experiment, having processed the data of tourist trips of schoolchildren of 12–13 years old, we developed a scale of weight distribution for a backpack taking into account the physical fitness of participants in the hike.

3. The results of the study showed that after the hike, the experimental group has the best recovery rates compared to the control group, as evidenced by the average group indicators. The differences in the results between the control and experimental groups after the hike are significant. This suggests that the weight distribution of the backpack allows you to dose the load in such a way as to avoid rapid fatigue, increasing the effectiveness of the hike in general, which confirmed the hypothesis of our study.

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OYKONIM“HARBUK”和KHARBUK DARGIAN TALK的微词录
OYKONIM "HARBUK" AND MICROTOPONYM OF KHARBUK DARGIAN TALK

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注解。 在文章中考虑了oykonim Harbuk的词源，并对Dargwa语言的harbuksky方言的两个主要的微型名称进行了分类。 其中一个是Dargins的古老定居点 - 位于达吉斯坦共和国Dakhadayevsky区的Harbuk村。 及时研究哈布克斯基方言的微型名称不仅有助于更深入地了解达尔戈人民的历史，而且有助于全面了解达尔金斯地名的现存和起源，并提供一个线索 他们是他们。 我们在对村民进行民意调查期间收集了Harbuksky微型地名，并与档案馆和当地历史文献合作。

关键词：地名学，微型信息学，达尔瓜语词典，达尔加方言学，哈尔布克语，哈布克斯基方言。

Annotation. *In article the etymology of an oykonim Harbuk is considered and two primary groups of microtoponyms of a harbuksky dialect of the Dargwa language are classified. One their ancient settlements of Dargins – the village of Harbuk it is located in Dakhadayevsky district of the Republic of Dagestan. The timely research of microtoponyms of a harbuksky dialect will help not only to glance more deeply in the historical past of the Dargwa people, but also to help drawing up an overall picture of existing and origin of toponyms of Dargins and also to furnish a clue of some them them. Harbuksky microtoponyms were collected by us during the poll of residents of the village and also work with archives and local history literature.*

Keywords**:** *toponymics, microtoponymics, lexicon of the Dargwa language, Dargwa dialectology, Harbuk, harbuksky dialect.*

In recent years, the Dargin microtopony has received wide coverage in the scientific literature. At present, many works are devoted to its study, ranging from scientific articles on specific aspects to monographic studies (for example, the Dargin micro-toponymic system was generally considered in the monograph by M. R. Bagomedov [2]). Such attention is due, firstly, to the fact that the leveling of dialects, urbanization, the associated demographic changes, the massive disap-

pearance of mountain villages and many other factors lead to the degradation and complete disappearance of topo-nimic vocabulary. This mainly concerns microtoponymy, since “microtoponyms form the most mobile part of toponymy” [6, p. 48]. Secondly, the Darginsky language is one of the most multidialect languages of Dagestan (it has about 70 dialect units [7]). Dialectic fragmentation of a language requires great efforts to cover the material of all dialectal units. Consequently, the toponymic vocabulary of many dialectal units of the Darginian language is still outside the field of vision of researchers. Consequently, the current situation requires urgent measures and, above all, the accelerated collection and description of microtoponies.

Correctly note the researcher of the Avar toponymic system, Z.M. Otsomieva-Tagirova, “Toponymy contains great opportunities as a source of study of the vocabulary of the language, especially of the early period, which is poorly reflected in the monuments of writing. It allows you to detect words or links of a lexical chain that once existed in a language, but disappeared over the centuries or changed form and meaning, to obtain new characteristics of words existing in a language” [4, p. 81].

Microtopyony of the village Harbuk of Dakhadaevsky district of the Republic of Dagestan has not yet been systematically studied. For several years we have been working on the collection and research of microtoponymy of the Harbuk dialect of the Dargin language. Some of the material was published by us in a study on the history of v. Harbuk [8].

The etymology of the oikonym "Harbuk". There are several versions of the folk etymology of this oikonyma.

1) The village of Harbuk (or Karbuk) was located slightly higher than the neighboring villages of Mugi and Memugi (now Akushinsky district of the Republic of Dagestan). Therefore, the neighbors called karbuktsy: “kharbukante”: khar “top” and bukante “living, literally. "Eating". So, "Karbuk" means "living at the top."

2) The village of Karbuk was located near the trade route and the caravanserai, where they were engaged in their craft and the sale of iron products. Therefore, the Carbukians were called “caravanbukante”; which means "living near the caravan" or "living by the caravan way." From the word "caravanbuk" came the abbreviation "karbuk". Residents of the ancient settlement of Karbuk had to leave their homes during the invasion of Timur's troops. They settled on the territory of modern v. Harbuk (now Dakhadaevsky District of the Republic of Dagestan).

3) According to the legend, recorded by Magomedov R.M. in 1935 during a visit v. Harbuk, together with the ethnographer Shilling EM, the inhabitants of the ancient Karbuk and Memugi were engaged in robbery. Their robbery bothered the Darghins, and they decided to teach the robbers a lesson, attacking them. Karbuk

residents and Memugin found out about this conspiracy and at night fled from their old place. Based on this, there is a perception that the Karbukians are called "Hyambucante": "Hyam" - "robbery", "Bukante" - "living", i.e. "living by robbery" [8, p. 36].

Researcher M.R. Bagomedov, considering these folk etymologies of the oiko-nyma "Harbuk", notes: "In our opinion, the first version is the most plausible, but the etymology is distorted by an inaccurate translation of the second component of the beech (bukant "living"). The beech (bukI), most likely, came from the Dargin bekI "head" ... Apparently, the inhabitants of this village were originally called Khar bekIlichibti "They are at the top, on the crown". The transformation process of this oikonyma is as follows: HarbekI → HarbikI → HarbukI → Harbuk → Hyarbuk. This change was facilitated by the dialectal environment in which this name turned out, after the resettlement of villagers

The same component is also found in other names of Darginsky villages: GIyar-bukI Arbuk (Kubachi), DeybukI Deybuk, ZhirbukI (ZhirbachIi) Dzhirbachi, SursbukI (SursalabachI) Sur-Surbachi... All this testifies in favor of our version of the etymology of the component beech in the oikony-me Hyarbuk: bekI → bikI → bukI → buk" [1, p.18-19].

It is difficult to disagree with the conclusions of M.R. Bagomedov. Indeed, the second component of the oikonyma bekI "head, peak" could transform into a beech. In our opinion, an indirect confirmation of this is given by the tradition recorded by us in Harbuk. According to him, at a certain period of history, the ancient aul Karbuk was the main one among Dargin villages. Consequently, Karbuk (Kharbek I - Karbek) during this period could mean "supreme, chief". After all, it was on the plain of Karbachidirka (Karbuk plain) for a few hundred years that the rural communities of Dargins were met and all the most important issues were resolved.

Such conclusions are also confirmed by the etymology of Oikonyma Deybuk I Deybuk (the village is located 8 km from the village of Harbuk). The first component of oikonyma dei, apparently, is derived from the word deg "word". In the Dargin language, only the plural of the given word dugbi "words" has been preserved (the word deg has become the word "dev"). The process of transforming this oikonyma is as follows: DegbekI → DegbikI → DegbukI → Degbuk → Deybuk. Tradition says that in the village Deybuk solved the controversial issues of the surrounding villages and therefore Deybuk means "the main, decisive word."

Harbuk microtoonyms. Basically, all the dialect lexemes that are part of the micropoponyms we identified are typical names for geographic objects for Harbouk dialect. Harbuktsev microtopony is extremely rich. The material collected by us as a whole does not reveal sharp differences from the general Dargone toponymic names. Differences are observed only in the dialect phonetic appearance.

And so, in this work, besides oikonyma “Harbuk”, we consider two groups of microtoponyms: the names of settlements and the names of intra-settlement objects.

I. Names of settlements (shi “village”, shibark “pride”, GUI “ancestral settlement”, makhi “otsylok”, makhya “hu-tor”, kush-makhi (seasonal - summer - farm):

1) *shi “village*”: Kharbuk “Karbuk”, Hula shi “Big village”, Kharbuk “Harbuk”;

2*) Shibarka “mound*”: Shinttan “Shandan”;

3) “*Ancestral Settlement”:* HIintIinshin “Red Water”, Dirmaki “Dirmaki”, Uneu “Uneu”, KkimkhIe “Kimkha”, Halikula, “Settlement of Khalik”, Dyan-giya “Settlement of Diana”, IshtIa “Ilya” Ishtala ”, Aydula,“ Settlement of Aidu ”; GIahImadila GIyaya “Settlement of Ahmadi”;

4) *Makhi “separation”:* Kyaidakha Makhya “Kaydaevyh settlement”, Chach Makhya “Chach separation”;

5) *Makhi “Khutor”:* Khujayydarkh Makhya “Khuzhaydarov Khutor”, Muslimkha Makhya “Khutor Muslimovykh”, Hula KyurbakhIyazhikha Makhyi “Khutor Elder Kurbangadzhievykh”, XI-Hall XIyaskhanha “Khakhyor Elder Kurbangadzhiyev” Balzinayla makhi "Balzin Khutor", Sirkuha makhi "Sirkuyev Khutor", Miyalihya makhi "Aliyev's Farm", MyahIlahIyassa makhi "Makhla Hasan's Farm", Xiyaliha Makhya "Khaliyev Galiyevs", Zaidkha Makhya "Khid Zaydovykh", Mustapakha Makhi "Khut Mustapayevs", AmirkhanhIazhikhya makhi "farm Amirhangadzhiyev", Chach Mustapaha makhi "farm Chach Mustapayev", HIyanagh mahyi “Khanaev's farm”, Tsitsitsikha makhi “Tsitsiyev farm”, GIyabduryakhImankha makhi "farm of Abdurakhmanovs", HIyakimla GIyabdulzhalilla makhi "hu-tor of Khakimla Abdulzhalil"

6) *kush-makhi "seasonal farm": Myak'ihya makhi "Makiev farm", GIyahimadkha makhi "farm Akhmedov", MyahIiha makhya "farm of the Mahiyevs",* Tukhumkha makhi “Khukh Tukhumovykh”, ZhyagIparkha makhi “Khutor Dzhaparovykh”, GIantaykha makhi “Khutor Antaevykh”, Kkuzhakkha makhi “Khutor Kuzhakovykh”, Daniyalla Gielikha makhi “the farm of Daniyal Aliyevs”, IsmyagIe GIyahImadkhankha makhi “the farmer of Ismail Akhmedkhanovs” MyahIyadkhya Mahya "farm of the Mahadovs" HIatsainil Gielikha makhi "" hamlet of Gatsaini Aliyevs ", MyahIshinkha makhya" hamlet of Makh-sinovi ", Tukku Amirkhanha makhi "farm Tukku Amirkhanovs", Kuynukh makhi "farm Kuynu-oi", ShyagIbanh Iyazhikha makhya "farm of Shahbangadzhiyev", HIaysa Kyurba Makhya "Aisa Kurban Farm", PirmyahIammala Zhambulatkha Makhya "Pirmagomed Dzhambulatov Farm", Hula-HIusbanha Makhya "Farm of the Older Osmanovs", Batir BakhImudha Makhi "Farm of Ba-Tyr-Bakhmudovs", Khiyamzatha makhi "Gamzatovs' farm", Qalip-Kurbanha makhi "Kalip-Kurbanovs' farm", NukhIkha makhi "Nukhovs farm", Ibihah makhya "farm of the Ibievs". As you can see, as a

toponymic name is a complex formation composed of two or more personal names [5, p. 287].

II. Names of intra-settlement facilities (KvatI “quarter”, Kkumagya “Godekan”, KkalgIya “Tower”, Mizgit “Mosque”, gIinits “Rod-nick”:

1) QuatI Quarter: Hyarsha Nizhneye Selo, Dagly Prigorok, GIayini Dvor, Bukhyen QuatvI Long Quarter, QuatvI QuatI Kvartal on the Ledge, Kharsha Upper Selo DumkvatI Koryniy Quarter Quarter Quarter KvatI "Quarter of Twenty Persons";

2) kkumagi "godekan": hula kkumagi "main godekan" kebil kkumagi "top-ny godekan" harshela kkumagi "godekan lower quarter" harshela kkumagi "godekan upper quarter" shaddikela kkumagi "godekan begging" tsIulla byahI "The slope of the tower", GIyalil Haigiel I "behind the house of Ali";

3) kkalgIya "tower": Gurgur kkalgIya "Round tower", dagla klyakypik "tower on a hillock", hula kkyalgIa "Big tower", tsiulla bahil kkyalgIya "Tower on the slope of the bash-ni", Tashlukhla kkyalgII kkyalgIya "Tower on the slope of the tower-ni" “Tower for Kake”, BishtIa KkimkhIakela kkalgII “Tower at Malaya Kimha”, KkalgIya-khali “House-tower”; KkyalgInaula Guni “Underground passage between two towers”;

4) “mosque” puppet: Hula puppet “Juma mosque”, Kharshelah puppet “Mosque of the upper quarter”, Kharshela puppet “Mosque of the lower quarter”, Dumquat of puppet “Mosque of the farthest quarter”;

5) gIinits "spring": Darshullah hIhmIel hIinits “Spring of the donkey” DugIyar ne shi iinits “Spring of Cold Water”, GIayarla rugerla hIinits “Spring of Hunting Halt”, Shab-lukhla hIinits “Spring of Shabluka” Lagwallah of the “Pigeon Water Spring”, Uncekna katte HInits “The Spring of the Gorge of the Gorge”, TSIuba ne gIinits “The Spring of White Water”, Vana She HIinits “The Spring of Warm Water”, HIrbella shesHiInits “The Spring with Water for the Eyes” “The Spring of Tin Water”.

When considering the microtoponyms of the first group, we see that there are two types of settlement names: 1) a small number of ancient names (mostly with a darkened etymology) - the HIintinshins "Red Water", Dirmaki "Dirma-ki", Uneu "Uneu", KkimkhIe "Kimkha ", Chach Mahy" Chach outbreaks "; 2) all the rest are mainly formed from the generic (family) names of the owners of the settlements.

In the formation of the names of intra-settlement objects, a big role is played by the definition, which indicates the location of the object (lower, upper, middle, extreme, etc.) or the name of the place where the object is located (slope, hill, etc.). The most interesting, in our opinion, are the names of the springs. Some names indicate water quality (“Spring of Cold Water”, “Spring of White Water”, “Spring of Warm Water”), others on accessory (“Spring of Jafar”, “Spring of Mami”, “Spring of Quarter Water”). Such figurative names as “Spring of the donkey”, “Spring of

the water of the dove", "Spring of writing water", etc. hard to explain.

In the related languages of Dagestan, there are quite a few fully or partially coinciding names of geographical objects. The descent of the names, apparently, was due to the fact that "often the same names were obtained by similar objects having an analogous location on the ground" [6, p. 136]. So, when comparing the groups of microtoponyms we are considering with Avar microtoponyms, we find, for example, the following similar names: TIasa aval "Upper quarter", Barazulitsts "Spring for the eyes" [3, p.31].

Thus, Harbuk microtoponyms, functioning in a limited area (the territory of the modern village of Harbuk, Dakhadaevsky district), arose on the basis of the dialectal form of the language. Harbuk language refers to the Mughin adverb of the Dargin language. All material collected by us belongs to the Harbuk dialect. The collection, systematization and analysis of the microtoponym of a dialect is also important in linguistic terms, since they are of interest for the interpretation of certain diachronic phenomena in the language. Microtoponyms are an important part of onomastics of any language. Therefore, their collection, processing and study are important.

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跨文化非语言交际的细节
THE SPECIFICS OF CROSS-CULTURAL NONVERBAL COMMUNICATION

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注解。语言被定义为人类交流的一种手段，但在这个工具的帮助下，不可能完全传达丰富的语言信息的细微差别。科学家已经证明，大约35％的信息是通过语言传播的，其余信息是非语言传播的 – 通过手势，面部表情，姿势，衣服，发型等。这是非语言交流，补充了口头信息的内容，指出了信息的特别重要的时刻，提供了关于他自己的个人品质的详尽描述。因此，通过各种非语言交流方式，信息在通信过程中相互阅读。一言不发，传播者明白他们什么时候需要伸出沟通，当他们不应该这样做时，只需点头，引导他们的眼睛，稍微倾斜他们的头，当他们可以微笑，支持他们的对话者，以及何时表现得更加克制和正式..

关键词：跨文化交际，非言语交际，手势，面部表情，沟通

Annotation. *Language is defined as a means of human communication, but with the help of this tool it is impossible to fully convey the nuances of rich verbal information. Scientists have proved that about 35% of information is transmitted using language, and the rest of the information is transmitted nonverbally - by gestures, facial expressions, posture, clothing, hairstyles, and the like. It is non-verbal communication that complements the content of verbal information, pointing out particularly important moments of the message, provide an exhaustive description of the person himself, about his personal qualities. Thus, it is through various means of nonverbal - communication that information is read from each other in the process of communication. Without saying a word, communicators understand when they need to reach out for communication, and when they should not do this, but just nod their heads, lead their eyes, tilt their heads slightly, when they can smile, support their interlocutor, and when behave more restrained and formally..*

Keywords: *intercultural communication, non-verbal communication, gestures, facial expressions, communicator*

Recently, in connection with the active expansion of the interaction of intercultural contacts, the issue of studying various means of non-verbal communication has become particularly relevant, which has been significantly intensified thanks to the researching of socio- and psycholinguistics, semiotics, and the theory of intercultural communication.

In the works of foreign and domestic linguists [1; 2; 3; 4; 5; 6; 7; 8; 9; 10 and others]. The main idea is that the gesture can be read the characteristics of the addressee from the territorial, national, and social characteristics, and age, gender, household and family relations, religious affiliation.

There is no doubt that the etiquette of different nations differs significantly. Ritualized gestures are different (greetings and farewells), smiles, hugs and kisses are different in the process of personal and intercultural communication, gestures are different in official communication, in communication with younger relatives, the boss and subordinate and subordinate and boss, etc.

Non-verbal communication has great advantages: it is based on the action of all the senses: sight, hearing, touch, taste, smell, each of which forms its own channel of communication. "On the basis of the hearing, an acoustic channel of non-verbal communication arises, through which paraverbal information flows. Based on the view, an optical channel is formed, through which information about facial expressions and body movements (kinesic) of a person enters. It allows you to assess the posture and spatial orientation of communication (proxemics). On the basis of touch, the tactile channel works, on the basis of smell, the olfactory channel. The understanding and use of time is also referred to as nonverbalic - chronicle." [2, p. 144].

With non-verbal communication, the same meaning can be conveyed across cultures. For example, waving a raised palm sends verbal information "Goodbye!" "Arms crossed on the chest means: *I give up, I can not resist, I submit to your will.* The requirement to raise your arms up means giving in and giving up. Just pray for pardon and protection. Such gestures are equally interpreted by representatives of various ethnic groups, thereby achieving an understanding that does not depend on language and social barriers." [11, p. 149].

Gestures used by representatives of different cultures, which coincide in the form of execution and value, can be interpreted as universal. These include mimes that convey surprise, indignation or resentment, gestures of greeting and farewell, etc., which are understandable to representatives of various nationalities. For example, kinema *to threaten with a fist* is perceived as *a threat, a warning* in Russian-speaking, Kazakh-speaking and English-speaking communication, and kinema, indicated by *a raised thumb*, is understood by representatives of the culture of the analyzed ethnic groups as "*everything is good"; 'everything is fine'; 'I managed everything as I wanted!*' "The movement of *the right hand above the*

head from left to right is a sign of farewell. *Waving a handkerchief, hat* or *cap* is both a sign of goodbye and a wish sign of a good journey. Such gestures are called *universal forms* of nonverbal behavior." [10, c. 154].

Due to the fact that gestures are different movements of the body, hands, etc., they can be natural, that is, involuntary, spontaneous, physiological and arbitrary, culturally determined. The first type of gestures is called gestures-adapters: rubbing hands, twisting a pencil in one's hands, biting the tip of a pencil/pen or handles of glasses. But most of the gestures are culturally determined, they are symbols and are contractual in nature. They can be classified as follows.

However, most gestures are culturally conditioned, therefore, the same gesture is also interpreted differently by representatives of different ethnic groups, and therefore creates certain difficulties in intercultural communication. For example, "it's customary for us to wave from side to side when greeting at a distance. But in North America, such a gesture means farewell; in Central America or Africa, such a movement stops the car or calls someone to itself." [2, p. 145].

Scientists have proved that "gestures have a social origin, and therefore intercultural differences appear in them particularly clearly. For example, expressing their approval in public places, the Germans do not clap their hands, as is customary in other cultures, but knock their knuckles on the table top, whistle or shout. With the score, they do not bend, as is customary in Russian and Kazakh cultures, but, on the contrary, unbend the fingers of a clenched fist." [11, p. 149].

In different cultures it is customary to attract a waiter. In the USA, this is done with a raised index finger, a slight movement of the hand, with the words 'waiter' or 'sorry'. In Europe, for this, lightly tap on a glass with a spoon or ring. Clapping your hands in the Middle East. In Japan, raise your hand palm down, slightly moving fingers, and in Spain and Latin America - palm up, quickly unclenched and squeezing fingers [11, p. 149].

In the process of intercultural communication, it is not enough to know only the language of the country to which the official visit will be made, it is much more important to know the culture of this people. As a rule, 80% knowledge of foreign culture predetermines the outcome of negotiations, official visit, etc.

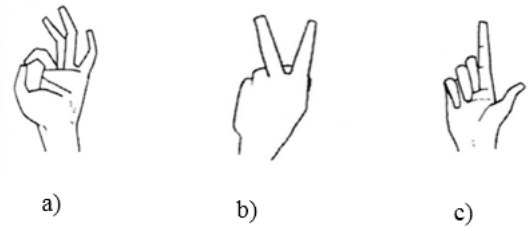
Misuse of gestures can lead to very serious misunderstandings. Grushevitskaya T. G describes the case "when one American politician was on a visit to Latin America. In his speeches, he constantly stressed that the United States wants to help this country, showed its friendliness and disposition to others. But his trip was not successful. His biggest mistake was that, going off the plane, he showed everyone the well-known American gesture - OK, not knowing that in Latin America it is a very indecent gesture." [2, p. 146].

We add that this gesture (see Figure 1-a) has several other meanings that mark Alan and Barabara Pease: "... in the Mediterranean, Russia, Brazil and Turkey - a

sign of a hole, a sexual insult; France, Belgium - zero, worthlessness; Japan - money, coins." [3, p. 146].

A gesture depicting raised up forefinger and middle finger (see Figure 1-b), in Britain, Australia, New Zealand, they convey a request to leave alone, Get out!', Get off!'; in the USA, two; in Germany - a victory, and in France - the world. Raised up thumb and forefinger (see Figure 1-c) in Britain, Australia, New Zealand mean two, in America - non-verbal appeal to the waiter, attracting his attention, and in Japan - an insult.

Japan, for example, was for a long time a country where merchants did not seek because of the humiliating procedure of greeting. "A merchant who came to Japan to establish trade relations was necessarily introduced to the emperor. The presentation procedure for the European was so humiliating that not every foreign guest could do it. The foreigner had to crawl on his knees to the place assigned to him from the door on the floor of the reception hall, and after taking it in the same way, backing away, leave his seat and hide behind the door." [9, p. 255].



a) - gesture 'OK'; b) - gesture raised up forefinger and middle finger; c) gesture raised up thumb and forefinger.

Figure 1 - The semantics of finger gestures

Each ethnic group has its own set of national codes and non-verbal communication models. We often had to observe situations that occurred in the process of communication with volunteers from America. Among the Kazakhs, especially in the south of the Republic, where national traditions and customs have been preserved to a greater degree, where the cultural code has strictly defined boundaries, it is not customary to talk standing according to the rules of good taste. It is not permissible to sit, lounging in a chair or on a chair, while talking, throw one leg over the other, gesticulate briskly, use gestures prohibited by custom, in particular, point the finger at a person, etc. For American volunteers, it is considered an ordinary gesture when one leg is thrown on the other or when the legs are thrown on another chair, standing next to or opposite. Such behavior often causes negative attitudes towards themselves on the part of the Russian or Kazakh intelligency.

In addition to the national-cultural code, gestures can also indicate a social origin, where intercultural differences appear most clearly. Russian culture often uses a slightly stylistically reduced gesture the turn of the forefinger at the temple, which means "not in one's mind" and "in Holland this gesture indicates that someone said a witty phrase. Speaking of himself, a European will show his hand on his chest, and the Japanese - on his nose "[12]. In Russian, eyebrows raised upward express surprise, bewilderment, and "in Germany - admiration, in England - an expression of skepticism. The Italian expresses disbelief, tapping his forefinger on the nose. The same gesture in Holland means that the speaker or the one about whom they are talking is intoxicated." [12].

Consequently, non-verbal means of communication, along with verbal, have a certain independent value and carry a significant part of the message's semantic load. "It is the independent value of a non-verbal element that represents a difficulty in perception and can lead to a disruption in communication, since the verbal element most clearly illustrates the often unconscious differences in the process of communication, which constitute the national specifics of the linguocultural community" [10, p. 152]. An example of this is the so-called beckoning gesture, adopted in Russian-speaking communication, when the communicator makes movements with his palm toward himself, while clenching and unclenching his fingers. Gesture means 'Come here!', 'Come to me!', Come closer! 'And the Italian will start saying goodbye in such a situation.

"The Italian gesture' Everything is in order 'will be understood by the Russian as an image of zero, and the gesture' It is time to eat up 'as a complete disagreement" [12].

Comparing the non-verbal communication systems of different cultural communities, one can easily find that many gestures are expressed in absolute lacunae. Lacuna ("from the Latin. Lakuna -' deepening, hollow, cavity ') - space, omission, missing space in the text. The absence of words for meanings that are lexically expressed in other languages "[13, p. 118]. For example, when a bearer is American, passing the meaning of "*I love you*", raises a clenched fist to the level of the head and then extends the thumb, index finger and little finger, then the representative of another culture of the region we are describing (Russian, Kazakh) does not guess about the meaning of the described kinetic behavior, which causes him to be perplexed, since non-verbally such a value is transmitted, as a rule, by an air kiss, by compressing the lips, meaning a light kiss from a distance.

"A nod of the head in Russian means' yes', and for the Bulgarians,'no'; A European and an American, reporting a grief or misfortune that has befallen them, accept a sad expression and expect that the other person will do the same, and the Chinese, Japanese or Vietnamese will smile in a similar situation because he does not want to impose his grief on the other person and relieves his from the feigned

expression of emotions; It is very difficult for Arabs to communicate without direct constant contact with views that are more intense than that of Europeans or Americans, and the Japanese are educated since childhood to look to the interlocutor not in the eyes, but in the neck, etc. [14, p. 425].

Observations of this kind clearly indicate the national-cultural context of various forms of non-verbal communication and behavior. The choice of this or that gesture from the circle generally accepted in a particular culture is determined by the personal characteristic of the communicator (individual thesaurus), the relations between communication partners (intimate, official, casual, etc.), the communication situation. Gestures can tell a lot: about nationality, character, temperament, gender, attitude towards a partner, about the emotional state of a person. "Each specific culture imposes a definite imprint on non-verbal means of communication, therefore there are no universal norms for all of humanity: the non-verbal language of another country must be learned in the same way as its verbal language. Knowing the culture of another people will not only help avoid misunderstanding of partners in the process of communication, but also intensify the exchange of information and interaction with each other." [10, p. 153].

Alan and Barabara Pease, being at a scientific conference in Venice devoted to the problems of intercultural communication, noted that representatives of each nationality traveled and walked along a certain side of the road: an Englishman, an Australian, a South African or a New Zealand resident - on the left, and the Italians - on the right. "Naturally, the Italians will constantly bump into you, because, making way, they take a step to the right, whereas in the same situation you take a step to the left." [3, p. 116].

In order to succeed in communication, to understand the contactee in communication and to be understood by oneself, it is important to know the national culture of the ethnic group in which communication should take place. Incorrect use of the rules of etiquette can turn into big trouble. For example, in Korea, tactile gestures towards people of the opposite sex are impossible, in Muslim countries they are especially scrupulous about public expressions of courtesy to women, and any wrong gesture can be perceived as an insult. A man should not greet a woman first, do not use any tactile signs. Even in Europe, welcome rituals are quite diverse. "Somewhere you must kiss (France), but somewhere not in the custom and a simple handshake (England). The Tajiks shake the outstretched hand with both hands - to respond only one is disrespect. In Japan, Korea, the belt bows are still taken, and in North Africa, having bowed, the communicator puts his right hand to his forehead, to his lips, and then to his chest" [14, p. 504]. Researchers of non-verbal communication have marked various gestures used in greeting in different countries: "... in Tibet, during a greeting, they put their hands behind their ears and stick out their tongues, in Polynesia they rub noses and pat each other on

the back, Eskimo men lightly strike each other with their fists on the head and on the shoulders. All these rituals are a demonstration of peace and good intentions [15, p. 14].

Of particular interest in intercultural communication is such a section of kinesics as oculentum, in particular, eye contact, eye behavior. “If a white teacher makes a remark to a black student in the USA and he lowers his eyes in response, instead of looking directly at the teacher, he may become angry. The fact is that black Americans view the lowered look as a sign of respect, and white Americans regard a direct look as a sign of respect and attention. Cambodians believe that meeting the gaze of another person is an insult, as it means invading their inner world. Looking away here is considered a sign of good tone.” [2, p. 508].

Winking in Russian culture means solidarity, while in North Americans this gesture means that they are incredibly tired of something, the Nigerians give such a signal to children to leave the room, and Thai people and Indians will regard an wink as an insult.

Thus, non-verbal communication, duplicating, supplementing, enhancing or replacing verbal communication, is a reflection of the national culture, is transmitted by certain national-cultural codes, serves as the basis for the development of a certain communicative style of behavior. A communicative style can be defined “as a set of stable and familiar behaviors inherent in a given person, which are used by him in establishing relationships and interactions with other people” [16, p. 139].

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政治宣传文本中的上诉和情境类别比例（以当代英语为基础）
THE RATIO OF AN APPEAL AND SITUATIONAL CATEGORY IN POLITICAL PROPAGANDA TEXTS (ON THE BASIS OF A CONTEMPORARY ENGLISH)

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说明：本文致力于在政治宣传文本中考虑申诉和情境类别的比例。 本文提出了整个政治宣传的每个单独文本的故意特征问题，充满了明确和隐含意义的表达。 例如，在许多情况下，“英国必须保留其在欧盟的成员资格/退出欧盟”的情况中，广泛使用英语宣传的绰号和隐喻，鼓励宣传接受者重新思考他们惯常的刻板印象，果断地改变他们对政治的态度 事件，以了解宣传在许多其他文本中描述的解决方案的好处，文本以某种方式与之相关。

关键词：上诉；情境类别；政治宣传文本；政治话语；有意的显性和隐含意义；务实而有意义的文本完整性

Annotation. *The article is devoted to the consideration of the ratio of appeal and situational categories in the texts of political propaganda. This article raises the question of the intentional characteristics of each individual text of political propaganda as a whole, replete with the expression of both explicit and implicit meanings. Intensively used in English propaganda epithets and metaphors associated, for example, with the situation “Britain must retain its membership in the European Union / withdraw from it” in many cases encourages the propaganda recipient to rethink their usual stereotypes, decisively change their attitude to political events, to understand propaganda the benefits of the solution described in many other texts with which the text is somehow related.*

Keywords: *appeal; category of situational; texts of political propaganda; political discourse; intentional explicit and implicit meaning; pragmatic and meaningful text integrity*

The most important condition for the integrity of each individual text of political propaganda is situationalism, which is related to the functional-semantic category (FSC) of appeal and addressing [1, 2, 3, 4, etc.]. By themselves, as separate

lexical and grammatical means of expressing appeal, they are far from always determined by situationality, but acquire it within the framework of a text that has a certain intentional explicit and implicit meaning [5, 6, 7, 8, 9, etc.]. It is important to note that due to the situational nature, the pragmatic and substantive integrity of the text of political propaganda turns out to be motivated by a specific situation that causes concern or interest among a speaker seeking to stimulate many other participants in political discourse to show their solidarity with the propagandist in one way or another. in general, or improve it [10, 11, 12, 13, etc.].

Paying attention, for example, to the situation "The UK must remain in the European Union or get out of it", presented in political propaganda, which appeared on the eve of the referendum, we can learn in detail the relationship between the categories of appeal and the situation.

At one time, the Conservative Party of Great Britain promised voters to hold a referendum in 2017 to find out whether they should remain in the European Union or leave it. After winning the election and forming a government, the conservatives were forced to fulfill their promise.

At the referendum, the British had to answer "yes" or "no" to the question about the need to secede from the European Union. The specificity of this situation was motivated by the fact that the answer, which will receive more than half of the votes of the referendum participants, will indicate whether the other European countries for Britain are now their own or others.

Prime Minister David Cameron, speaking in 2013 the initiator of this referendum, seeks either to achieve the necessary economic reforms for Britain in the European Union, or to change the conditions for UK membership in the EU, since he himself does not oppose Britain's membership.

Having promised to put this question to a referendum only after negotiations with other European countries on these reforms, D. Cameron did not expect, however, that among the people he considered his own, ready to defend British membership in the European Union, there would be "alien", a kind of traitorous, people those who are ready not to use the referendum only to raise the rating of Britain in the European Union, and those who are ready to support the withdrawal from the European Union, refusing to be in D. Cameron's camp (supporter of membership), becoming a champion of the new line, in many respects justifying the understanding of the British as a special nation, the most advanced economically and intellectually.

Such a traitor, a "stranger," for D. Cameron, quite unexpectedly for him, was the Mayor of London, Boris Johnson, who supported the withdrawal of Britain from the EU.

Boris Johnson has said President Barack Obama should not back the campaign for Britain to remain in the European Union [14].

In our view, this unexpected and unpredictable step for D. Cameron, the man whom he hoped to support, created a precedent for the British, a kind of example to be followed, showing the rest of Europe that Britain is still a superpower different from the whole of other Europe the level of development of democracy, economic and political power.

So bold for both British Prime Minister D. Cameron and the mayor of London, B. Johnson, the actions are largely due to their desire to attract other participants in the political discourse to their own person, to encourage them to express their "yes! or "no" in the upcoming referendum.

Referring to the text of the political propaganda *"The UK Should Leave the European Union"* related to the situation, whether the UK should retain its EU member status or abandon it, we can find an extensive list of criteria for the connection of the categories of appeal and situationality that require let's focus our attention.

Situationality, due to the British awareness that terrorism must be fought together, and therefore their power should retain its membership in the European Union, in many respects obliges them to make terrorism less frequent in their referendum than recently.

The UK Should Leave the European Union

Yes because...

*We **need to co-operate** against **global crime** and **terror***

*The main **advantage** of Europol is that it enables **criminals** that cross borders to be **tracked and arrested easily by a multinational force**. However, if is considered that Britain is an island, the **likelihood of criminals crossing our borders is quite low**, thus rendering the major advantage of Europol somewhat **irrelevant**.*

*If the aims of the UK are to **fight global terror** then **surely** it would be of **greater benefit** to **strengthen relations with the United States** where there is a **far stronger focus on tackling this issue** [15].*

Appealability in this case is undoubtedly related to the use of FSC of assessments, expressiveness and emotiveness, first of all, *need to co-operate, track and arrest easily, fight global terror, strengthen relations with the United States, global crime, terror, advantage, criminal, irrelevant, surely, great benefit* (in the text highlighted by the authors, R.G.), etc..

However, even pointing out the likelihood of an affirmative answer to the question *"Should the UK Leave the European Union?"* airport and metro Brussels, a kind of capital of the European Union. As a result, as we see, there is a close connection between situational and appellativeness within the framework of this text, which promotes the exit of the UK from the European Union.

The UK Should Leave the European Union

No because...

*We **need to co-operate** to **fight the increasingly global threat of crime and violence**. Europol is an **effective** multinational police and security force and **leaving Europe would deprive us of its benefits** [15].*

Accordingly, an understanding of the precedent in many ways stimulates the British to answer this question with a "yes", since these advantages, given the having precedents, are questionable.

Being adherents of *case law*, not *common law* (in the text highlighted by the authors, R.G.), as, for example, the French, the British, in our opinion, are unlikely to believe in the myth of the possibility of a better fight against terrorism together, in the framework of such a many-sided and contradictory union, as the European Union.

Adding reasoned arguments about the advantages of the UK maintaining its membership in the European Union (*fight the increasingly global threat of crime and violence, effective multinational police and security force, leaving Europe would deprive us of its benefits*) is largely determined by the situational nature of the choice, the desire of this propaganda text to dwell on the alternatives of choice that are perceived by each individual recipient as relevant and irrelevant

The representatives that we elect should not be able to give the UK away

The UK Should Leave the European Union

Yes because...

*Britain must remain its own country. Being a part of the EU threatens national identity and the UK economy amongst other things. Britain does not **need to rely on its European neighbours in order to succeed**.*

No because...

*[…] The main reason for Britain joining the EU was for the **economic benefits**, so obviously it shows that in the age of globalisation and increased competitiveness, Britain cannot act alone [15].*

An indication that Britain need to rely on its European neighbours in order to succeed (in the text highlighted by the authors, R.G.), which are not reliable enough and do not deserve trust, in many respects stimulates them to take a critical look at the *economic benefits* of maintaining their membership, which, given the threat of emigration and the fall in this regard of living standards, become doubtful for many of them.

Appealability in this propaganda text is due in each individual case to the expression of a communicative strategy of opposing agreement «*Yes because...*» or disagreement «*No because...*», one way or another motivated by each individual reader with his subsequent participation in the referendum.

Other text «*The economic consequences of leaving the EU*», published in 2014, results in a considerable number of factors that, in the author's opinion, should stimulate the British in a referendum in favor of maintaining the EU's

membership in the European Union.

These factors in many cases rely on economic terms of one kind or another (in the text highlighted by the authors, R.G.).

*The UK would have no **input** into EU **trade policy** but would have to comply with it [16].*

*Not only would British-based **manufacturers** have to comply with EU product standards, but the UK would have to abide by large sections of the EU's **acquis communautaire** [16].*

As we can see, French terms are also used in this text (*acquis communautaire* (in the text highlighted by the authors)), that are difficult for many British to understand.

All this in many respects indicates that situationality (the connection of a text with propaganda with one issue or another to be resolved) is more connected with the addressing, which in this case motivates the author of the text of propaganda to use words and expressions that are unlikely to be remembered by an ordinary reader.

In general, the abundance of economic terms and the lack of an open dialogue with the reader largely determine that this kind of persuasive propaganda texts have little effect on how the majority of Britons voted on the upcoming referendum in 2016.

British awareness that the European Union is something parasitic for the UK economy (EU is a **Drain** on British Economy), is draining its economy, sucking up and pumping out valuable material resources, tangible and intangible assets from it, as a whole will hardly allow the British to question «*Should The UK Leave the European Union?*» give a negative answer, since they are unlikely to be willing to sacrifice the economic well-being of Great Britain in the name of a common European good, advantages for less economically developed countries of Europe.

The UK Should Leave the European Union

Yes because...

*The EU is arguably a drain on the British economy. A huge amount of money given to the EU is allocated to bureaucracy and wasteful spending such as the **Common Agricultural Policy (CAP)**. In 2006, a whopping 45% EU spending went towards the **CAP**. To put this in perspective, that's almost half EU spending allocated towards an industry that employs only 5% EU citizens and generates 1.6% **GDP**.*

*This is truly unnecessary and is unequally distributed, France reportedly benefiting immensely, while countries with very little agricultural sectors seeing **few benefits**, and yet expected to foot the bill for this **wasteful** policy [15].*

Active use in this case of terms such as CAP (Common Agricultural Policy), GDP (gross domestic product, the total cost of goods and services produced domestically for a specific period (usually a year); one of the fundamental macroeconomic indicators), designation of only a *few benefits* of economic advantag-

es, characteristic of agricultural policy as uneconomical and *wasteful* (in the text highlighted by the authors) as a whole emphasizes that a Briton who is not indifferent to his economic status will be inclined towards self-sacrifice.

The UK Should Leave the European Union

No because...

More than 80% of the EU ***budget*** *is spent by the member states.*

[...] We don't have a problem with rich ***London bankers*** *paying a bit more to help* ***the Welsh Valleys*** *so why is helping poorer areas within EU member states any different?[15].*

Situationality due to the communicative tactics of reliance on real facts encourages the author of the text of this propaganda to be as objective as possible, as means of expressing appeal to use geographical and economic realities and terms (*budget, London bankers, the Welsh Valleys* (in the text highlighted by the authors, R.G.)).

The characteristics of this propaganda text of the European Union as a undemocratic, strange political entity (undemocratic and unaccountable) are largely connected with the communicative tactics of discrediting the European Union and advertising a bright future, waiting for the British in the event that the UK finds complete economic and political independence.

The UK Should Leave the European Union

Yes because...

The EU is undemocratic and unaccountable

The European Union is run by ***unelected****, unaccountable elites whose power is* ***vast*** *[15].*

Emphasis of this propaganda text on the fact that Great Britain is ruled by strangers, people for whom they did not personally vote (*unelected*), who receive wide, almost unlimited (***vast***) (in the text highlighted by the authors) powers of authority in many ways testifies to a greater connection of appeal not with a specific situation, but with opportunities to find in this situation, the moments favorable for this text of propaganda.

Doubt of the author of this text in the possibility of coordinating politics within such a huge political conglomerate like the European Union, taking into account the will and opinion of the British (*coordinating opinion, and ultimately policy and resources, into a common pool*), to a large extent confirms the great connection of appeal not with situationality per se, but with the ability and opportunity of the propagandist to choose certain communication strategies within a specific political situation that help him make the communicative impact on the recipient of political propaganda as effective as possible and those situations that help This propaganda is the most intelligible.

Appeals motivated by the choice of “other EU countries - own / alien” within

the framework of a referendum on the need for the UK to secede from the European Union, is due to the interpretation of other EU countries as “alien”, namely, countries that are not reliable enough, decrease in the standard of living and GDP, awareness of the danger of the influx of a huge number of migrants, the inability to defend their point of view on one or another political and economic issue at.

Appeal motivated by the desire of each participant in the political discourse "to maintain their membership in the European Union / withdraw from it" in this regard is due to the concepts «Britain», «British», «England», «English», and «Europe /European Union», «European».

Thus, the ratio of appeal and situational categories of political propaganda texts is determined by the degree of interest of the addressee in the problem that requires solving and participating in the discussion of a narrow category of people (professionals) or the widest possible audience (both professionals and nonprofessionals).

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“House”（使用Avar地名材料）概念的词汇语义语言化
LEXICAL-SEMANTIC VERBALIZATION OF THE CONCEPT «HOUSE» (USING THE AVAR TOPONYMIC MATERIAL)

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Annotation. *The author of the article examines the concept «House» and analyzes the ways of verbalization of this concept on toponymic material. This research is focused on the toponyms of the Dagestan districts, which represent all the dialects of the Northern group of dialects of the Avar language. Based on the analysis of the theoretical data, we conclude that the world-view allows us to get acquainted with the idea of the world belonging to the Avars. The toponyms found in the Gergebil, Gumbet, Kazbek and Khunzakh district of Dagestan contain both concrete semantic and expressive meanings of the people. In toponyms we find not only the concrete description of object but also the attitude of the people-nominator to the area, their beliefs, customs and traditions.*

Keywords: *concept, concept «House», lexical-semantic group, lexical-semantic field, toponymic world view, Avar toponymy*

The area of microtoponymics, in which a person appears in several guises - as an individual (person), as a member of a family and the whole rural society, as a representative of an ethnic group - begins outside the house-yard complex, which is a reference point when the surrounding space is inhabited.

As components of the Avar national topography, the toponymic microsystems have common features, the explanation of which is found in the general features of the studied settlements: the isolation of the population of one village within a relatively small space, its self-isolation from the isally adjacent settlements. The peculiarity of a separately taken toponymic microsystem was due to the individual features of the dialect of each locality, district, ethnic composition [3, p. 20-24].

Dagestan is a territory that has long been inhabited by various nations. This is evidenced by both various historical documents and numerous geographical names, including those associated with ethnonyms - direct witnesses of the eth-

nicity of the population. In general, ethnotoponyms are quite diverse. Most among them are toponyms that indicate the native population of the region [4, p. 247–255].

Mastering the territory outside his house and yard, a person goes into the space of the street, the village. The names of places in the village or immediately behind the village are connected with the house-dwelling, the yard, the outbuildings and are motivated by the corresponding nominal words (appeals) as a whole or by the formations with their roots. When this occurs, the reorientation of the value from the structure to the place where it is located, or near it, occurs.

The notion of "house" in the Avar language means a permanent rather than temporary dwelling, but it also materializes the idea of kinship, which for some time becomes as important in mutual relations between people as the genus used to be. In the SRYA, the word house is fixed in the following meanings: 1) "a building, a structure intended for housing, to house various institutions and enterprises"; 2) "living space, apartment, housing"; 3) "family, people living together as one household..." [5, p. 425].

In the process of human cognitive activity, conceptual ideas about the formative elements of a settlement were formed, respectively, the process of naming these objects was going on, and a certain base was formed consisting of individual concepts (cognitive base of native speakers) [7, p. 42]. Conceptual ideas, going from century to century, form the specific structural and semantic space of the village. In Avar toponymy, it can be assumed that one of the first to emerge is the concept of settlement as a certain conventional unit of territory inhabited by people, the name of which was probably given from the outside. Gradually, within the territory, its name was divided into smaller parts: part of the village, center, and suburb.

The names of man-made objects (squares, fields, etc.) appeared within these territories. Often, large objects had point dominants - these are the most significant reference objects:

Part of the village:

- tower: *Хъаладухъ бакI* «У башни» (укрепл., с. Хубар, Казб. р.), *Зинабер Рагъул заманалда лампочка бакулеб бакI I0 метраялъ борхалъи столб бугеб* (укрепл., с. Гертма, Казб. р.), *РучнáкIкIалахъ си (Оцáл цIунизечи толев вукIарав)* «Укрепление в ущелье с загоном» (с. Амуши, Хунз. р.), *ГьинтIа* «У дворца» (башня, укрепление, с. Хунзах, Хунз. р.), *ГIадани хъала* «Крепость у темени», *ГIакарохъала* «Укрепление на горе Акаро» (башня, укрепление, с. Хунзах, Хунз. р.).

- streets *Къваридаб къватI* [кваридаб кват] «Узкая улица», *Клубалда цебе къватI* [клубалда цебе кват] «Улица перед клубом», *Хабзалазда аскIоб*

*къват*I [хабзалазда аскоб кват] «Улица рядом с кладбищем», *ГьоцIцIи къватI* [гоци кват] «Улица на гумне» (с. Чалда, Герг.р.), *Цебе къватI* «Передняя улица», *Нахъа къватI* «Задняя улица», *Гьоркьо къватI* «Срединная улица» (ул., с. Гуни, Казб. р.),

- Quarters: *Авал Бадайихъ* [авал бадайих] «Квартал Бадайих», *ТIаса авал* [таса авал] «Верхний квартал», *КьуртIа авал* [тлуртаавал] «Квартал на скале», *Гъоркьа авал* [гортла авал] «Нижний к вартал», *ГьоцIиб авал* [гоциб авал] «Квартал на гумне» (с. Чалда, Герг.р.), *Гъоркьа росо* (ГъаланцIуни) «Нижнее село», *Тала* «Поляна», *Шавдан* (кварт., с. Алмахъ, Казб.р.), *Жаниб тала* «Внутренняя поляна», *Жаниб авал* «Внутренний квартал» (кварт., с. Алмахъ, Казб.р.), *Гъоркьавал* «Нижний квартал», *ТIасаавал* «Верхний квартал», *Хошет авал* «Квартал Хошет», *ГохIда авал* «Квартал на холме», *Бакъда авал* «Квартал на солнечной стороне», Далил авал, Орихъ авал (кварт., с. Буртунай, Казб. р.), *Хъерен авал* (от *хъерен// тамахьо* «табак») «Табачный квартал», *Ансазул авал* «Квартал ансалтинцев», *ГIабдалил тала* «Поляна Абдала», *ХьуцIил авал* [хуцил авал] «Заболоченный квартал» (кварт., с. Буртунай, Казб. р.), *Ахáдароххéн* «Нижний, внизу», *НáхъгьоцIи* «В заднем гумне», *ТIарáдароххéн* «Верхний, наверху квартал», *ГIéдероххéн* «Квартал вдоль», *ГьоцIóрагIал* «Край с гумном», *КIкIалáлроххéн* «Квартал в ущелье», *ХайнзилрагIáл* «Край Хамиз», *МащкIидахъ* «У мечети», *ГIанкигъода, Балáнух* «Крутая дорога», *КIудяхьуйлъ* «В большом кусте» (с. Амуши, Хунз. р.).

Centre:

- Mosque *МащкIидахъ* «У мечети», *Мащк1ид бугебакIалда* «В местности, где есть мечеть» (с. Амуши, Хунз.р.),

- swimming pools: *КъулгIадухъ* «У бассейна», *Эхелъ къулгIа* «Бассейн внизу», *ХIарищуйла къулгIа* «Бассейн в местности Харищуйла// место с селевыми наносами», *ГIачигъолеб бакIалда къулгIа* «Бассейны в местности куда загоняют коров», *НахърогIаниб къулгIа* «Бассейн в местности Нахроаниб», БатIайил къавуда къулгIа «Бассейн у вороб Батая// Батала», *Гунащил къулгIа* «Бассейн Гунаша», *Сагъикьода къулгIа* «Бассейн на мосту в местности Сагри» (с. Игали, Гумб.р.), *Ахурил лъаратIа кьо* [ахурил тларата тло] «Мост на речке Ахурил», *БагIараб кьо* [бааараб тло] «Красный мост», *ЛъаратIа кьо* [Тларата тло] «Мост на речке», *Залмо кьо* [залмо тло] «Мост Залмо» (с. Чалда, Герг.р.), *Бекмирзал ицц* «Бассейн Бекмирзы», *Камалицц* «Бассейн Камала», *Росдал ицц* «Бассейн села», *Ургьисалабазда ругел ганчIал ринарулеб ицц* «Бассейн с водой, который очищает почки от камней», *Щобда ицц серная вода* «Вода на холме», Квас жаниб бугеб лъим (ЦIоросарикIкIил лъим) (с. Алмахъ, Казб.р.), *Гъóркьа росдал къулгIа* «Бассейн в Нижнем селе», *КъулгIáдухъ* «У бассейна» (с. Амуши, Хунз. р.).

Outskirts:

– Cemeteries: *Гъоркьияб хабал* «Нижнее кладбище», *Сахил хабал* «Кладбище Сахи», *Росда тIадехун хабал* «Кладбище на верхней стороне села», *МичIчIил гохIда хабзал* «Кладбище на холмах с крапивой», *Жагъинкоялда хабзал, ЧIвадахъ Насирил ищцухъ хабзал, БагIарилазул хабал* «Кладбище рода Баарилал», *ЖарбагIилил хабал* «Кладбище Жарбаила», *Вабаьалъул унтиялъ хваразул хабал агьло* «Кладбище, где похоронены умершие от холеры», *Данухъ бугеб буртабазул хабал агьло* «Кладбище буртунайцев, которые живут в селе Данух» (с. Буртунай, Казб. р.),

– mills: *Парил гьобо* «Мельница Пари», *Шайхил гьобо* «Мельница Шайха», *ГIабдулагьил МухIамадил гьобо* «Мельница Мухамада, сына Абдулаха», *Хасамирзал гьобо* «Мельница Хасмирзы», *Пирасул гьобо* «Мельница Пирава», *УхIумагъазил гьобо* «Мельница Ухумагази», *Султамурадил гьобо* «Мельница Султанмурада», *Тухал ХIажил гьобо* «Мельница Хаджи, сына Тухал», *Сагъиса Исуйил гьобо* «Мельница Ису из Сагри», *ГIадукаримил гьобо* «Мельница Абдулкарима», *Х1авлагьил// ХIайбулагьил гьобо* «Мельница Хайбулы», КIачIи гьобо «Мельница Качи», *ГIалиасхIабил гьобо* «Мельница Алиасхаба», *СагIдулагьил гьобо* «Мельница Сагдулаха», *ГIалил гьобо* «Мельница Али», *ХIасанхIусенил гьобо* «Мельница Хасанхусена», *Лъалгъади гьобо* «Мельница в местности Талгади», *Гечебегил гьобо* «Мельница Гечебега», *ГIумарасхIабил гьобо* «Мельница Умарасхаба» , *Бажал гьобо* «Мельница Бажи», *ХIамзатил МухIамадил гьобо* «Мельница Мухамада, сына Хамзата» (с. Игали, Гумб.р.), *Хасбулатил гьобо* «Мельница Хасбулата», Утарбийил гьабал (ханжу, урба) «Мельницы Утарбия», *НухIил гьобо* «Мельница Утарбия», *ГIамириласул гьобо* «Мельница Амирилава», *Хадижал гьобо* «Мельница Хадижи», ХIажиясул Мусал гьобо «Мельница Мусы,сына Хажи», *Гъуйлубил гьобо* «Мельница Гьуйлуби», *ХIакинил гьобо* «Мельница Хакина», *Мочокъил ГIалил гьобо* «Мельница Мочок Али», *Тавлуханил гьобо* «Мельница Тавлухана», *Нанул гьобо* «Мельница Нану», *Гъулул МухIамадил гьобо* «Мельница Гулул Мухумада» (с. Буртунай, Казб. р.). So there are point names that define a certain structure of the onymic territory. In this case, the naming reference point was located inside the territory.

Turning to the toponymy of the Avars, it can be noted that, probably, simultaneously with the nomination of objects within the territory, there was a process of naming objects outside the settlement:

– Farms: *Жаниб рохьоб ферма* [жаниб рохоб ферма] «Ферма во внутреннем лесу» (с. Чалда, Герг.р.), *Олений перма* «Оленья ферма», Кроликоперма «Кроликоферма», *Норкоперма* «Норкоферма», *ГIачиязул перма* «Коровья ферма», *ГIиял перма* «Овечья ферма» (ферма, с. Алмахъ, Казб.р.), *МиккигохIалда перма* «Ферма на Голубином (Или дубовом?) холме» (ферма, с. Буртунай, Казб. р.), *Колхозалъул ферма* «Колхозная ферма», ГIачиязул

ферма «Коровья ферма», *ГIиял перма* «Овечья ферма», *Алмахъалда бугеб перма* «Ферма в Алмаке» (ферма, с. Ленинаул, Казб. р.),

– farm: *МуртазгIалил МухIамадил кули* [муртазаалил мухамадил кули] «Хутор Мухамада, сына Муртазаали», ГIалибегил кули [алибегил кули] «Хутор Алибега», *Мирза МухIамадил мархьу* [Мирза мухамадил марху] «Хутор Мухамада, сына Мирзы», *Устарил мархьу* [устарил марху] «Хутор Устара», *ХIасахIусенил бакI* [хасахусенил бак] «Место Хасахусена» (с. Чалда, Герг.р.), *Цебеотар* «Передний хутор», *ХIавдишки* (хутор, с. Алмахъ, Казб.р.), *ГIавхъ* (хутор, с. Алмахъ, Казб.р.), *Къадил ХIажил бакI* «Место Хажи, сына Кади» (хутор, с. Буртунай, Казб. р.), АлимухIамал бакI «Место Алимухама» (хутор, с. Буртунай, Казб. р.), *Абулвайсил тала* «Поляна Абулвайса» (хутор, с. Буртунай, Казб. р.), *Магьдиханил бакI* «Место Магьдихана» (хутор, с. Буртунай, Казб. р.), *ГIалавдинил бакI* «Место Алавдина» (хутор, с. Буртунай, Казб. р.), *ГIабул бакI* «Место Абу» (хутор, с. Буртунай, Казб. р.), *БалахIажил бакI* «Место Балахажи» (хутор, с. Буртунай, Казб. р.), *Халитил тала* «Поляна Халита» (хутор, с. Буртунай, Казб. р.), *Айдимирил тала* «Поляна Айдимира» (хутор, с. Буртунай, Казб. р.), *Нуцалханил тала* «Поляна Нуцалхана» (хутор, с. Буртунай, Казб. р.), *Халипал тала* «Поляна Халипа» (хутор, с. Буртунай, Казб. р.), БурхIимякьмахьи «Бургимакмахи», Кьякьмахьи «Какмахи», Узнимахьи «Узнимахи», ЧIянкIаламахьи «Чанкаламахи» (хутора, Акушинский район) [8, с. 1116 – 1117].

– ramparts: *БорхьигохI* «Змеиный холм» (укрепл., с. Алмахъ, Казб.р.), *ГIурусазул хъала букIараб бакI* «Место, где было укрепление русских» (укрепл., с. Буртунай, Казб. р.), *ЧихIи бакълъи окопал* «Окопы на больших солнцепеках» (укрепл., с. Хубар, Казб. р.), *КIкIалхур окопы ВОВ* (укрепл., с. Хубар, Казб. р.), СихIил гохI «Холм Сихи» (укрепл., с. Дылым, Казб. р.), *Игищулалъи* «Укрепление в местности Иги» (башня, укрепление, с. Хунзах, Хунз. р.), *СихIил гохI* «Холм Сихи» (укрепл., с. Дылым, Казб. р.).

– pens: *Лагъу* «Загон в местности Лагу», *ГIачикъоро* «Местность, где закрывают стадо», *ГIанкIиручнахъ* «У заячьего загона», *Ручнахъ* «У загона», *ЦIцIаналъ* «В местности Цанатль», *Зазиручнахъ* «У загона с колючками», *Къада* «Загон в местности Када», *Инхва* «Загон в местности Инхва», ГанчIикь «Под камнем» (загон, с. Игали, Гумб.р.), *Мирзахъала* «Укрепление Мирзы», *ЧIегIер рохь* «Черный лес», *Олений перма* «Оленья ферма» (с. Алмахъ, Казб.р.), *Завод* (с. Гостала, Казб. р.), *ГIабул тогъай* «Поляна Абу», *Мусал тогъай* «Поляна Мусы», *Салманил къадиро* (с. Гостала, Казб. р.), *Зезел тогъай* «Поляна Зезе», *КIудя къадиро* «Большой загон» (загон,с. Гостала, Казб. р.), *Чали* «Изгородь (загон)», ЦIаназул чали «Загон для коз» (с. Инчха, Казб. р.).

– bridges: *Гъваниб кьо* «Мост в местности Гваниб», *Ахтач кьо* «Мост

через Ахтач», *ЦIиркъиналъул кьо* (мост, с. Алмахъ, Казб.р.), *ГIачикIкIалахъе кьо* «Мост к ущелью коров», *ХъахIнухалъул кIкIалахъ кьо* «Мост в ущелье Белой дороги» (мост, с. Буртунай, Казб. р.), *Висячий мост // Аб авалалдаса доб авалалде кьо* «С этого квартала в тот квартал мост»// *Гьашимил кьо* «Мост Гашима» (мост, с. Гертма, Казб. р.), *ТIасия кьо* «Верхний мост», *Гъоркьиякьо* «Нижний мост» (мост, с. Гостала, Казб. р.), *Ленинаулалде кьо* «Мост на Ленинаул», *Абули отаралде кьо* «Мост на хутор Абули», *Гьабил гIурдаде кьо* «Мост на Мельничную поляну» (мост, с. Калининаул, Казб. р.), *Бакъдé кьо* «Мост на Солнечную сторону села» (с. Амуши, Хунз. р.).

As we see from the above examples, the reference point was located inside the territory. This is how the opposition “our own” - “alien” arises. Such a meaning of the word “home” can serve as the basis for the emergence of “construction” metaphors. As V. Kolesov emphasizes, it is not the concept of a building that is the basis of the popular idea of a house, but the concept of something created. Constant, common to all "their", who are united by the shelter of such a house” [1, p. I96]. This understanding of the concept of "house" is also characteristic of the Avar language picture of the world.

Since sometimes, as a result of the extralinguistic reasons of the producing topo-nyma, due to a change in the content or loss of the object itself, this paradigm disintegrates. There is a new binary opposition of the opposition of toponyms according to temporal basis according to the type “old” - “new”: *Басрияб росо* «Старое село» – *ЦIияб росо* «Новое село» и другие постройки, где противопоставлены первые части сложного топонима: *ЦIия росо* «Новое село» (кварт., с. Гостала, Казб. р.), *Басрияб кьо* «Старый мост» (мост, с. Калининаул, Казб. р.) – *ЦIияб кьо* «Новый мост» (мост, с. Калининаул, Казб. р.), *Басрияб росоялъул кьо* «Мост старого села» (мост, с. Инчха, Казб. р.), *Басрияб росо* «Старое село» (кварт., с. Инчха, Казб. р.), *ЦIия планал Мусал тала авал «*Новые планы или Квартал на поляне Мусы» (кварт., с. Гуни, Казб. р.), *ЦIйя Гьамущи* «Новое Амуши – *Басря Гьамущи* «Старое Амуши» (с. Амуши, Хунз.р.).

The concept рукъ “house”, as we see, is connected with the opposition “own - alien” both in territorial, spatial, and socially. Microtoponymy represents the observed, developed in the direction from the house, its own space up to the vicinities of the neighboring villages, with which another space begins, centrifugally expanding to the nearest village, the regional center, etc. This kind of mental space is transmitted by macro-names, proper toponyms, oikonyms, hydronyms - names of cities, rivers, lakes as reference signals in this space. With the development of the linguistic personality of this microsystem, the “surroundings of the speaker” [9, p. 48 - 62], there is an expansion of such a space and the volume of the “own, our own” in the most direct sense of the word, relations of expansion in space:

more and more distant spaces are mastered, and then, when physical development beyond the range of space becomes impossible, development continues mentally, by transferring already known parameters to more remote distances ”[6, p. eleven; 2, s. 26].

Thus, the concept of “house” is reflected in both fragments of the regional linguistic picture of the world — the appellative and proprial — through an extensive, voluminous system of means of its verbalization. Toponymic units, fixing the historical fact, become a cultural text that translates information. The mentality of that-understanding is closely connected with the consciousness of the subject-nominee, connecting its physical space with the cultural space, revealing the mental image of рукъ “home”, which strengthened the culture of the nomination people.

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对早产儿母亲的心理支持
PSYCHOLOGICAL SUPPORT FOR MOTHERS OF PREMATURE BABIES

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Annotation. *In the article, the authors reveal the peculiarities of the psychological state of mothers of premature babies, describe the activities of a psychologist to accompany them. Presents the results of a research on the implementation of the program of psychological support for mothers of premature babies.*

Keywords: *psychological support, mothers of premature babies, psychological support program.*

In the conditions of the current unfavorable demographic situation and a significant deterioration in the health status of women of childbearing age, the preservation of the life and health of each born child is of particular relevance. Despite the maintenance of pregnancy from the moment a woman registers to birth, the number of preterm birth increases every year.

Today, preserving the health of a premature child is the most important social, medical and psychological problem. In the Russian Federation, this figure is 10%. Over the past decade in the Republic of Adygea, the frequency of birth of children weighing less than 2000 grams is 6.5% of the total birth rate. Children born prematurely feel the need for comprehensive support from the first days of life.

One of the urgent psychological researches is the problem of psychological support for mothers of premature babies. Foreign psychologists (M. Walker, L. Corvaglia, S. Martini) studied the personal characteristics of women who gave birth prematurely. The domestic authors described the emotional reactions of mothers who gave birth prematurely (T.A. Gancheva, M.Ya. Studenikin). The peculiarities of the psychological state of mothers of premature babies include: a sense of inferiority, fear for the life of a newborn, a desire to distance themselves from a newborn, a feeling of guilt, a feeling of helplessness, a breakdown of ex-

pectations about the role of motherhood. Thus, today the actual question is, what are the directions and methods of work of a psychologist in support of mothers of premature babies. The problem we identified and its relevance determined the goal of our research: to determine the content of the activities of a psychologist in accompanying mothers of premature babies.

The hypothesis of the research is the assumption that the work of a psychologist to accompany mothers of premature babies will be effective, provided that a targeted program is implemented that helps reduce anxiety, depressive symptoms and optimize personal differentiation.

After analyzing the theoretical foundations of psychological support for mothers of premature babies (N.N. Vaganov, A.V. Zaporozhets, E.P. Il'in, O.A. Karabanova, N.V. Mazurova, S.L. Rubinstein, E.O. Smirnova, E.G. Shchukin and others), we came to the following conclusions:

1. From the point of view of S. L. Rubinstein, psychological assistance is a type of professional assistance that is provided to an individual, a social group or any other subject of activity in solving their psychological, individual and personal problems [3, p. 43-45].

Psychological support is considered by us as a kind of activity of psychological services and centers for the patronage of the individual, family, etc .; a set of technologies of psychological work on the restoration of personal potential, the actualization of resources. The main goal of psychological support is the fulfillment by man of his duties and functions that are inherent in society.

2. Mothers of premature babies, in contrast to those who gave birth on time, experience the following emotional manifestations: a sense of inferiority, fear for the life of the newborn, a desire to distance itself from the newborn, a feeling of guilt, a feeling of helplessness, a breakdown of expectations about the role of motherhood.

3. The main activities of the psychologist in support of mothers of premature babies are: diagnosis of individual personality traits and characteristics of mothers; correctional and developmental activities; individual counseling for mothers; education in medical terminology on the functional status of premature babies.

We divided the experimental work on the psychological support of mothers of premature babies into three stages: ascertaining, formative, and controlling. The respondents were women in the ward of newborn and premature babies of the State budgetary institution of public health "Adygea Republican Clinical Hospital", Maikop. The total number is 48 people aged from 19 to 38 years. Of these, 20 people constituted the experimental group (EG), 28 - the control group (CG).

The ascertaining stage was associated with the determination of the level of the emotional state of the mothers of premature babies (the level of anxiety, depression, and personality differentiation). Empirical research methods were:

• "Questionnaire for the mother" (I.A. Arincina, L.P. Gvozdeva);

• Methodology "Determination of the level of anxiety" (C.D. Spielberger, Yu.L. Khanin);

• "Scale (test questionnaire) of depression" (A.T. Beck);

• Method "Personal Differential" (E.F. Bazhin, A.M. Etkind).

The emotional state in our research was chosen as an integral criterion. The results of the ascertaining experiment make it possible to assert with a sufficient degree of confidence that premature babies have a high level of anxiety and depression, and unfavorable personal differentiation. Consequently, the results indicate the relevance and need for the introduction of a program of psychological support for mothers of premature babies.

The formative stage was aimed at correcting the level of anxiety, reducing the symptoms of depression, and optimizing personal differentiation. To this end, we have developed a psychological support program "I am – the mother of a BABY", which was tested on mothers who gave birth ahead of time, separation of newborns and premature babies of the State budgetary institution of public health "Adygea Republican Clinical Hospital" of Maikop. This program was the resource component of the change in the emotional and functional state of women who gave birth prematurely..

The basis of the program of psychological support for mothers of premature babies was laid by the organizational and methodological principles of N.N. Avdeeva.

Organizational principles:

- goodwill and willingness to help the one who approached you;
- scientific and reliable information;
- individual approach;
- targeting;
- individual approach
- modernity and relevance of materials;
- cooperation with other specialists [1, p. 3-9].

Methodical principles:

• the principle of awareness of the existing problem;

• the principle of accepting help from specialists;

• the principle of compliance of the chosen methods and techniques of psychological support for mothers of premature babies, taking into account their individual and personal characteristics;

• the principle of the activity of mothers of premature babies during the process of their psychological support;

• the principle of development reflects the idea of creating such a program of psychological support for mothers of premature babies, which would give women

the opportunity to fully realize the maternal function, satisfy their needs, and actively participate in society [1, p. 9-13].

We have designed a program of psychological support for mothers of premature babies, which includes the techniques and methods described in the works of domestic and foreign psychologists: D.S. Ainsworth, O.R. Voroshina, A.G. Koschavtseva, R.Zh. Muhamedrikhova, O.B Polovinkina, E.V. Ponevazh, K.V. Soloed: game, exercises, educational conversations, methods of individual and group psychodiagnostics, moral and emotional support for mothers of premature babies, assistance in choosing the trajectory of rehabilitation for mother and premature baby. The thematic plan of the program contains 10 classes, among them introductory and three blocks of three classes. The introductory lesson is devoted to the topic “My child was born ahead of time”. The first block is called: "Reducing the level of anxiety of mothers of premature babies." It includes classes on the manifestations and consequences of psychological trauma of mothers of premature babies; skills to manage your emotional state; projective techniques of working with external and internal resources of mothers of premature babies. The second block includes activities aimed at reducing the depressive symptoms of mothers of premature babies. Among them are techniques for overcoming the state of depression by mothers who gave birth prematurely, as well as methods and techniques for the prevention of depressive states: contact with the “inner child”. The third block is called “Optimization of the personal differentiation of mothers of premature babies” and involves the study of their life values and the level of responsibility for the circumstances and events of life. The final lesson is dedicated to the personal potential of mothers of premature babies.

The control phase was devoted to re-assessing the emotional state of mothers of premature babies in the experimental and control groups. According to the results of the research, positive changes in the level of anxiety and depression were revealed, optimization of personal differentiation in the experimental group, while in the control group of subjects no significant changes were observed.

To study the social status of the mother, the main parameters of the child at birth, the characteristics of the real situation in which the mother is after the birth of a premature baby, we used the “Questionnaire for the mother” (I.A. Arinkina, LP. Gvozdeva).

After conducting an ascertaining experiment, it was found that the average age of mothers of premature babies is 28 years in the experimental and 26 years in the control groups. The average age of the father is 34 years in the EG and 32 years in the CG. Higher education prevails in women (40%; 50%); secondary vocational education was diagnosed in 30% of subjects tested by the EG and 29% of the CG; secondary education - 30% EG and 21% CG. When asked about their marital status, the subjects responded as follows: Married - 60%, 50%; in a civil marriage

- 20%, 25%; live alone - 20%; 25%. Male sex among premature babies dominates (60%; 64%), as opposed to female (40%; 36%). The subjects dominated the average family income (50%; 39%); 40% and 36% of respondents noted low. Only 10% of women from the EG and 25% of the CG called the family high income. The condition of the child at birth was mostly moderate (50%; 50%) and severe (30%; 39%). The average gestational age was 26 weeks in both groups. In the questionnaire, mothers indicated that the pregnancy was planned (40%; 43%) or accidental, but desired (50%; 50%). Random unwanted it was designated respectively by 10% and 7% of respondents. The absence of toxicosis was attributed to the peculiarities of the course of pregnancy (20%; 14%); toxicosis of the first half of pregnancy (40%; 25%); toxicosis of the second half of pregnancy (20%; 25%), toxicosis of the first and second half of pregnancy (20%; 36%). After giving birth, mothers of premature babies experience a number of health problems: physical weakness (40%; 25%); difficulties of the new regime (30%; 39%); exacerbation of somatic diseases (20%; 25%). The birth of a premature baby for 70% of women from the EG and 64% of the CG created great difficulties in life. 50% of mothers of the EG and 39% of the CG noted deterioration of the relationship with the father of the child.

In the process of introducing the psychological support program "I am – the mother of a BABY" in women, the perception of the situation of the birth of premature babies changed: the view that premature birth created great difficulties in life decreased from 70% to 30%; the answer "did not change my life" became more popular (40%). Consequently, most mothers of premature babies accepted the situation of premature birth and the birth of a premature baby, which creates a solid foundation for further personal growth and development. 40% of women reported an improvement in their relationship with their spouse. No significant changes were recorded in the control group.

To identify the level of anxiety in mothers in the situation of birth of premature babies, we used the method of "determining the level of anxiety" (Ch. D. Spielberger, Yu.L. Khanin) [2].

After the introduction of the program of psychological support for mothers of premature babies, a decrease in the level of anxiety in subjects of the experimental group was noted. Thus, the high level decreased from 60% to 20%, the average strengthened from 20% to 40%, due to which the low level increased from 20% to 40%. The mothers of the control group showed a worsening condition: a low level of anxiety decreased from 25% to 11%, in turn, the average increased from 25% to 39%.

To study the level of depression in the subjects, we applied the method of "Scale (test questionnaire) of depression" (A.T. Bek) [5].

After carrying out the program of psychological support "I am – the mother

of a BABY" in the mothers of the experimental group, it was possible to reduce the symptoms of depression. Pronounced depression decreased from 30% to 10%; moderate fixed at a value of 30%; mild depression increased from 30% to 40%, the absence of depressive symptoms was recorded in 20% of mothers. The subjects of the control group showed a worsening of the level of depression among mothers: the moderate level decreased from 39% to 25%, which caused the growth of a pronounced level - from 11% to 25%.

In order to study the subjective aspects of the respondent's relationship to himself and the people around him, the level of personal differentiation (LD), we applied the method of "Personal Differential" (E.F. Bazhin, A.M. Etkind) [4].

As a result of the psychological support program "I am – the mother of a BABY", the positive dynamics of the level of development of the personal differentiation of the respondents was revealed: low decreased from 50% to 20%, high - from 30% to 20%; the average increased from 20% to 60%, which indicates the optimization of this indicator. No significant changes were recorded in the control group.

Thus, the implementation of the program of psychological support for mothers of premature babies contributed to the reduction of anxiety, depressive symptoms and optimization of personal differentiation.

Psychological support for mothers of premature babies seems to us an extremely promising activity of the psychologist from the point of view of understanding the goals and objectives of psychological practice in a medical institution, developing a specific model that can be implemented and successfully implemented not as a single author's performance, but as a mass technology.

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俄罗斯小学生意识中的成人生活价值观
VALUES OF ADULT LIFE IN CONSCIOUSNESS OF THE RUSSIAN YOUNGER SCHOOLCHILD

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注解。 个人的价值取向决定了对世界的态度。 价值观是个人结构的支柱。 小学年龄段对个人价值领域的形成很敏感。 该研究提供了关于现代俄罗斯小学适龄儿童价值取向特征的数据。 通过分析儿童对成人生活时期的态度，对1250人的样本进行了价值取向研究。 分配了儿童认为重要的成人生活特征，确定了儿童不想长大的原因。 研究结果将有助于教师建立一个考虑到孩子地位的教育体系。

关键词。 价值，人格的宝贵取向，内心的平静，个人关系，初中生。

Annotation. *Value orientations of the individual determine the attitude to the world. Values are the backbone of the structure of the individual. The period of primary school age is sensitive to the formation of the value sphere of the individual. The study presents data on the features of value orientations of the modern Russian child of primary school age. Value orientations were studied in a sample of 1250 people by analyzing the child's attitude to the period of adult life. The characteristics of adult life, which children consider important, are allocated, the reasons for which children do not want to grow up are defined. The results of the study will help teachers to build an educational system taking into account the position of the child.*

Keyword. *Value, valuable orientations of the personality, inner peace, personal relationship, Junior high school student.*

The development of modern psychological thought is characterized by the release of the personal principle in the human psyche, which is the basis for the development of other mental properties. The central system-forming bases of the personality is its value. It is this that creates the basis for the unity of various relationships in which a person really functions and determines the direction of a given personality [2]. Value, as proves D. A. Leontyev, on the one hand, synthesizes activity, personal relationships, consciousness and cognition (generalized

forms of external content), on the other hand, highlights the awareness of his “I” [4]. Personality values are a component of its structure, they should be studied together with the needs, motives and mechanisms of activity regulation (K. A. Abulkhanova-Slavskaya, I. S. Kon, A. N. Leontyev, S. L. Rubinstein, etc.). On the basis of empirical research, N. I. Nepomnyashchaya proposed the following typology of value: the value of real-familiar functioning, the value of activity, the value of personal relationships, the value of communication, the value of the plan of cognition and awareness of reality [5].

The most intensive formation of value representations is carried out in primary school age. It was at this time that the spiritual and moral foundations of the personality, knowledge, skills were laid down, the norms of behavior were learned, the relationship between the child and the world around was realized, and motives of behavior were formed [1, 3]. Despite a fairly large number of research papers on the problem of value orientations, the question of a child’s ideas about adult life and the role of an adult remains problematic.

In order to identify value ideas in children of primary school age about their lives and the lives of adults, determine the prospects for their own future based on observations of the lives of adults and real conditions, together with M.Yu. Mamontova and N.A. Pogorelova conducted an empirical research. In this research, 1250 third-grade schoolchildren from Yekaterinburg and the Sverdlovsk Region took part. Students were asked to write an essay under the heading: "I am an adult." The subjects could choose one of three themes: “When I grow up,” “I don’t want to be an adult,” “What do I need to do in order to become an adult.”

Processing of essays was carried out using the method of content analysis. As a basis for analyzing the essays, various value-semantic areas were chosen: the sphere of personal relationships (to the child from others and the child to peers and adults), the sphere of knowledge and awareness, which correspond to the above typology of N.I. Nepomnyashchaya.

263 works were written on the topic: “I do not want to be an adult,” which revealed the reasons for refusing adult status. In 79% of children in this group, the reluctance to grow up is due to the fear of losing the usual course of life. Thus, in the field of activity they are frightened by the difficulty of learning at an older age, the need to hold exams and other tests.

In the sphere of relations: despite the positive attitude towards them from adults (mostly their parents and grandparents) at the moment, the dominant view is that this attitude is solely due to their age - they are small, therefore they are loved, fondled, forgive pranks and bad deeds. When they grow up, there will be no such attitude towards them (23%).

Sphere of communication: 12% of children like to communicate with their peers - to walk, play, that is, the types of communication formed in the pre-

school age prevail. 9% highlight the importance of working together with adults (mostly domestic work, helping parents), but this is related to the scope of norms and requirements, since they need help.

Scope of knowledge: 3% of children positively note that a child can learn something new, and when they grow up - in their opinion, this will not happen.

9% of children noted with regret that it is impossible to remain a child forever. Among this group there are children who are convinced that if they do not grow, their parents will not grow old and die.

Describing the image of an adult, children who have chosen this topic, describe it negatively. Habitual daily activities (going to work, taking care of the house) are clearly negative in 100% of the children in this group.

8% of children have identified a negative side in the field of personal relationships in the adult world - adults are cuss, fighting.

Describing the sphere of communication of adults, children (3%) note that adults do not have the opportunity to simply walk, communicate with their friends because of constant employment. 5% of students believe that children are a burden for adults and do not want such a problem for themselves in the future.

Describing the sphere of adult knowledge, children note that being an adult is boring, as they all know.

Thus, in the group of children identified above, who do not want to become adults, the dominant value is the real-usual functioning, characterized by a reluctance to change the existing stereotypes of activity, communication, cognition, which is a powerful factor inhibiting their personal development.

In 720 essays on the topic “When I grow up”, children have a clear image of themselves in the future, modeled on parents, teachers, older children in the family (“When I grow up, I will work as an older brother at an electrical plant” or ”I want to be like Svetlana Petrovna"). 78% associate with their favorite profession. This group of children is focused on the value of activities where the process of activity is important. 52% of children are attracted by the material independence of adults (“ Buy myself a house ”,“ Buy car "). These children are aimed at, i.e. they can be assigned to a group with a value of activity, with an orientation toward obtaining a result, but a result for themselves.

From the point of view of the value of personal relationships, 8% of children are dominated by the motive of recognizing their social status (I will be a famous musician, scientist, etc.).

The sphere of knowledge of 11% of students represent through the disclosure of additional opportunities (“I will read forbidden books”, “I will go to restaurants and clubs”, “travel independently”, “watch videos for adults”).

Attention is drawn to the fact that in children who have chosen this topic the value of personal relationships remains at the level of egocentrism, the value of

communication has not been revealed.

When analyzing the essays on the topic "What should be done to grow?" The following data was obtained (218 subjects).

Children quite adequately imagine the image of an adult person, his qualities and know what they need to do in order to grow up. Scope of activities: 62% of children believe that it is necessary to study well in school, get a professional education and find a job (value-oriented activities aimed at the result).

It should be noted that among children who have chosen the last topic, a significant proportion is focused on the values of communication: 34% talk about the possibility of providing feasible assistance to the weak, sick, parents, 2% of children think that adults should have many good and faithful friends.

Analyzing the sphere of relations, it can be noted that 7% of children want to serve in the army ("an important duty of an adult man"), 21% as a positive point out the duty to care for children, the sick and old, to provide for the family, i.e. the value of personal relationships at empathy, assistance, which creates favorable conditions for the maximum realization of personal opportunities.

Thus, the conducted research allows to state the presence of significant differences in the structure of their values. It is important for teachers and educators to create conditions for overcoming the dominant value of real-familiar functioning and a favorable combination of activity values, personal relationships and knowledge to stimulate the development of the personal potential of each child.

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THE OPTIMAL METHOD OF FORMATION OF CONCRETE MATERIALS IN THE COATING OF IRRIGATION CANALS FOR CONSTRUCTION AND MAINTENANCE WORK ON THE RECLAMATION NETWORK

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注释。 说到灌溉渠。 国内外材料的比较特征。 描述的覆盖物
关键词：土地复垦，灌溉渠，围垦网，建设改造，集约化，混凝土板。

Annotation*. The article discusses the current problems of the reclamation network with the formation of concrete materials when covering irrigation canals. The comparative characteristics of domestic and foreign materials. An optimal method for the formation of concrete materials when covering irrigation canals was proposed and described.*

Keywords*: land reclamation, irrigation canal, reclamation network, construction and reconstruction, intensification, concrete sheet.*

Introduction.

At present, as in ancient times, technical progress is an integral part of the development of any industry. Conducting effective agriculture is impossible without land reclamation, and, accordingly, irrigation networks cannot function without effective land reclamation.

The formation of concrete materials when covering irrigation canals is an important task for land reclamation production. Technical progress in the field of materials for coating irrigation canals provides the best options for replacing concrete slabs with concrete. It is at this stage that the path of development of land reclamation production in the canal construction industry is laid. An irrigation canal covered with concrete slabs will have high construction costs and a constant loss of resources for maintenance, infiltration, annual repairs, etc. The implementation of the production program with the least expenditure of resources and quality work carried out is of paramount importance. Accordingly, it is necessary to form irrigation canals with highly efficient materials, such as a concrete canvas [3].

The aim of the study is to propose an optimal method for the formation of concrete materials when covering irrigation canals for construction and maintenance work on the reclamation network.

The problem of re-equipment of irrigation canals is relevant, since a large number of irrigation canals in Russia need re-equipment and reconstruction. The irrigation canal performs an irreplaceable function - transporting water to the right place, at the right time and in the right quantities. Morally or physically worn-out channel, respectively, over time, ceases to perform its functions, in the future it can completely fail [2,4,5].

Research methods.

In conducting the study, the method of empirical knowledge was used, which served as a synthesis for the theoretical analysis of the literature by the deductive method. The theoretical method included the summarization, note-taking and quoting of general and special scientific works of scientists in this high-tech area. In this work, mathematical and statistical methods were used to obtain and establish quantitative dependencies between the studied phenomena. The mathematical method included data logging. The statistical method included the determination of average values of the obtained indicators, respectively comparing and obtaining a quantitative or qualitative dependence of the process under study.

Research results.

The research is based on identifying the best materials to cover irrigation canals and, accordingly, their formation. The selection of concrete material should be preceded by an in-depth study of domestic and foreign experience. Theoretical and practical analysis showed that domestic production in the construction and reconstruction of canals used concrete or monolithic slabs to cover the surface of the canal. Foreign experience since 2013 allows us to switch to the path of intensification and production reduction, since it offers the consumer an innovative material - a concrete canvas [2, 3].

Concrete canvas has several advantages over domestic material. In our previous articles, all characteristics, indicators and a living example of the production process for which production is reduced were described in detail [1].

Analyzing the work of the famous scientist A.G. Sichkarev, it can be noted that this intensification with the use of concrete canvases fit into the category when the costs of living and materialized labor are reduced, which is typical when replacing the old material with a new one.

Table 1 presents the comparative characteristics of concrete materials, which clearly shows the advantage of a concrete canvas over concrete facing plates. [1].

Table 1. *Comparative indicators of concrete canvas and concrete lining*

Indicator	Concrete canvas	Concrete lining
Cost, rubles	1м^2 = 3000	1м^2 = 4000
Weight, kg	1м^2 = 10	1м^2 = 200
The need for technology, (minimum, maximum)	Minimum	Maximum
The need for specialized workers, (minimum, maximum)	Minimum	Maximum
Necessity of equipment mode, (minimum, maximum)	Minimum	Maximum
Laying speed, m^2/day	800	80
Acquisition of the necessary strength, hours	24	72
The seriousness of the preparation for the work, (minimum, maximum)	Minimum	Maximum
Logistics level for delivery (low, medium, high)	Low	Tall
Crack resistance (low, medium, high)	High	Average
Environmentally friendly, (Needs recycling, does not need)	Does not need	Needs
Water resistant, (low, medium, high)	Low	Average
Frost resistance, (low, medium, high)	High	Average
Compressive strength, (low, medium, high)	High	High
Flexural strength (low, medium, high)	Average	High

In this table, the analysis was carried out using a concrete sheet of the SS8 brand and a brand of concrete slabs PK-30-25 with a dimension of 3000x2500x80.

The proposed method for the formation of concrete material to cover irrigation canals involves determining the optimal dimensions and characteristics through technical and economic calculations that will allow you to correctly form sets of concrete materials for each type of canals.

The initial data are: concrete materials, irrigation canals of the irrigation network, the planned amount of work at each facility, the planned hourly operational productivity of workers and machines at each facility and the cost of concrete web, workers and machines at each facility.

The duration of the work of machines at each facility (X_{ij}, machine-hours) is determined by the formula:

$$X_{Mij} = V_j / \Pi_{эij}; \quad (1)$$

where V_j – scope of work at the *j*-th object; $\Pi_{эij}$ – hourly operational performance of the *i*-th type machine at the *j*-th object.

The duration of the work of workers at each facility (X_{ij}, man-hours) is determined by the formula:

$$X_{чij} = V_j / P_{эij}; \quad (2)$$

where V_j – scope of work at the *j*-th object; $P_{эij}$ – hourly operational productivity of a worker at the *j*-th object.

The calculation of the working hours of workers and machines is made taking into account the full implementation of the scope of work. It is also necessary to introduce a restriction that takes into account the timely execution of work in accordance with the working time fund:

$$X_{чij} \leq \Phi_i; \quad (3)$$

$$X_{мij} \leq \Phi_i; \quad (4)$$

where Φ_i – the working time fund of the *i*-th destination machine and the working time fund of the *i*-th working time.

If the condition (3 and 4) is not met, then the corresponding position is excluded from consideration. Since the concrete canvas reduces the construction process several times and eliminates the construction equipment during excavation work, it is obvious that using the concrete canvas will be completed on time.

To assess the effectiveness of the use of concrete canvases on objects, the calculation of the reduced costs is made according to the formula:

$$З_{пij} = C_{м.ч.ij} * C_{р.ч.ij} * C_{мат.общ} * (X_{чij} * X_{мij}) \quad (5)$$

where $З_{...}$ - reduced costs when using concrete material i-th size on the j-th object; $C_{м.ч.ij}$ - cost of 1 machine. work *i*-th destination on the j-th object; $C_{р.ч.ij}$ - cost of work *i*-th destination on the *j*-th object; $C_{мат.общ}$ - cost of concrete material *i*-th size.

For the purpose of convenience of calculation and clarity, the calculation is performed in the form of the table below.

Table 2. *Determination of the optimal size of the concrete canvas for irrigation canals*

Irrigation canals	Concrete material							Priority number Z_{np}
	V1	V2	V3	…	Vj	…	Vn	
1	$З_{n11}$ $С_{м.о.11}$	$З_{n12}$ $С_{м.о.12}$	$З_{n13}$ $С_{м.о.13}$	…	$З_{n1j}$ $С_{м.о.1j}$	…	$З_{n1n}$ $С_{м.о.1n}$	Z_{np1}
2	$З_{n21}$ $С_{м.о.21}$	$З_{n22}$ $С_{м.о.22}$	$З_{n23}$ $С_{м.о.23}$	…	$З_{n2j}$ $С_{м.о.2j}$	…	$З_{n2n}$ $С_{м.о.2n}$	Z_{np2}
3	$З_{n31}$ $С_{м.о.31}$	$З_{n32}$ $С_{м.о.32}$	$З_{n33}$ $С_{м.о.33}$	…	$З_{n3j}$ $С_{м.о.3j}$	…	$З_{n3n}$ $С_{м.о.3n}$	Z_{np3}
…	…	…	…	…	…	…	…	…
i	$З_{ni1}$ $С_{м.о.i1}$	$З_{ni2}$ $С_{м.о.i2}$	$З_{ni3}$ $С_{м.о.i3}$	…	$З_{nij}$ $С_{м.о.ij}$	…	$З_{nin}$ $С_{м.о.in}$	Z_{npi}
…	…	…	…	…	…			
m	$З_{nm1}$ $С_{м.о.m1}$	$З_{nm2}$ $С_{м.о.m2}$	$З_{nm3}$ $С_{м.о.m3}$	…	$З_{nmj}$ $С_{м.о.mj}$	…	$З_{nmn}$ $С_{м.о.mn}$	Z_{npm}

The calculations in the table are as follows. First, known values and estimated indicators are recorded, respectively. Vertically recorded names of irrigation canals and horizontally variants of concrete canvases. Then, the reduced costs for each cell are calculated by the formula (5) and the resulting values are entered in a table. Then among the values of each column (respectively, each concrete material) is the minimum value of the reduced cost $З_{пij}$, and one is written into the cell corresponding to $З_{пij}$ = min, and the remaining zero. Then, respectively, each irrigation canal will be set the threshold of maximum costs for a concrete web and there will be a comparison of the material cost and the max of possible costs, if these costs meet the stated requirements, a unit is written, the remaining zero. The last stage of the calculation is the determination of the priority number $\mathbf{Z}_{пр}$, which is found by summing over the rows of zeros and ones written in the cells of the calculation table.

The working time fund should be taken into account when comparing materials of different nature of origin, such as a concrete web and concrete slabs. In this case, the accounting of the fund of working time is necessary, and it is added to each cell.

The hourly productivity of machines $П_{эij}$ should be taken into account if there is at least one option where the equipment is necessary. In this case, accounting is required.

As a result, the most optimal variant will be that variant of the concrete web, which has a higher priority number value. Moreover, the greater the number of irrigation canals, the higher the reliability of the conclusion about the effectiveness of a particular variant of the concrete canvas.

Thus, for the formation of optimal sets of concrete canvases in ameliorative production it is necessary:

- to determine the physical characteristics of each version of the concrete web through analysis.
- to identify with technical and economic calculations the optimal variant of the concrete web.

Conclusion.

Thus, we have proposed an optimal method for the formation of concrete materials when covering irrigation canals for construction and maintenance work on ameliorative network, which allows us to consider absolutely any material and compare it with available resources, time boundaries and one or another irrigation channel. From this it follows that this method takes place, be comprehensively reviewed and supplemented.

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技术系统的逻辑和数学建模
LOGICAL AND MATHEMATICAL MODELING OF TECHNICAL SYSTEMS

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注解。 本文致力于描述使用功能语法设备构建任何动态系统（包括技术系统）的逻辑 - 数学模型的原理。 在这种情况下，lambda演算被用作逻辑系统，它是功能语法和函数编程语言的理论基础。

关键词：技术系统数学建模，任务建模，知识库，功能语法，lambda演算。

Annotation. *The article is devoted to the description of the principles of constructing logical-mathematical models of any dynamic systems, including technical ones, using the apparatus of functional grammars. In this case, lambda calculus is used as a logical system, which is the theoretical basis of functional grammars and functional programming languages.*

Keywords: *Mathematical modeling of technical systems, task modeling, knowledge base, functional grammar, lambda calculus.*

Introduction

The purpose of the article is to describe a method for constructing logical-mathematical models of dynamic technical systems using functional grammars.

The method includes:

1) a description of the theory of the subject area of a dynamic technical system in the form of an incomplete functional grammar;

2) a description of the problem of modeling within the framework of the theory in the form of a complete functional grammar;

3) the construction of a logical-mathematical model in the form of a superposi-

tion of functions based on the construction of a conclusion within the framework of a complete functional grammar.

1. Description of the task of logical-mathematical modeling of dynamic systems

In general, the logical-mathematical modeling of any dynamic systems, including economic ones, can be given by the equation

$$W = \{\boldsymbol{K},\ \boldsymbol{D},\ \boldsymbol{Q}\},$$

containing three sets:

1) the set of concepts and relations of the subject area that make up the knowledge base:

$$\boldsymbol{K} = \{k_l\},\quad l = 1,\ 2,\ \ldots,\ p;$$

2) a set of input variables of the problem, characterizing the initial knowledge of the model:

$$\boldsymbol{D} = \{d_i\},\quad i = 1,\ 2,\ \ldots,\ r;$$

3) a set of output variables of the problem, describing the purpose of modeling:

$$\boldsymbol{Q} = \{q_j\},\quad j = 1,\ 2,\ \ldots,\ s.$$

If the modeling problem is solvable, then it can be represented as:

$$\left(\boldsymbol{K};\ d_1,\ d_2,\ \ldots,\ d_r \mapsto\ q_1,\ q_2,\ \ldots,\ q_s\ \right).$$

Thus, logical-mathematical modeling consists in mapping the vector of input variables $\boldsymbol{D}$ to the vector of output parameters $\boldsymbol{Q}$ using ratios from the knowledge base $\boldsymbol{K}$:

$$\boldsymbol{Q} = \boldsymbol{B}\boldsymbol{D},$$

where $\boldsymbol{B}$ is the operator of logical inference, which in the case of serial-parallel decomposition can be represented as:

$$\boldsymbol{B} = \begin{pmatrix} B_{t1} & B_{(t-1)1} & \ldots & B_{21} & B_{11} \\ B_{t2} & B_{(t-1)2} & \ldots & B_{22} & B_{12} \\ \ldots & \ldots & \ldots & \ldots & \ldots \\ B_{t(s-1)} & \ldots & \ldots & \ldots & \ldots \\ B_{ts} & B_{(t-1)(g-1)} & \ldots & B_{2(g-1)} & B_{1(g-1)} \\ & B_{(t-1)g} & \ldots & B_{2g} & B_{1g} \end{pmatrix},$$

where $B_{t1},\ B_{(t-1)1},\ \ldots,\ B_{2g},\ B_{1g},\ g = r \cdot s.$ – operators of elementary operations.

2. The method of constructing logical-mathematical models based on the apparatus of functional grammars

The general ideas of the representation of knowledge by the apparatus of functional grammars and the derivation of models in the form of a superposition of functions are presented in [1] and [2]. Let us formulate the main theoretical as-

pects of the derivation of logical-mathematical models based on the use of the apparatus of functional grammars.

Definition 1. Incomplete context-free grammar is a collection:

$$G1' = \{\boldsymbol{V1},\ \boldsymbol{P1}\},$$

consisting of a set of (alphabet) characters:

$$\boldsymbol{V1} = \{c_i\},\quad i = 1,\ 2,\ \ldots,\ n$$

and sets of rules:

$$\boldsymbol{P1} = \{P1_j\},\quad j = 1,\ 2,\ \ldots,\ m$$

kind of:

$$c_j \rightarrow \psi_j,$$

where ψ_j – an arbitrary sequence of characters in the alphabet, i.e. $\psi_j \in \boldsymbol{V1}^+$, $\boldsymbol{V1}^+$ – set of nonzero sequences of alphabet characters $\boldsymbol{V1}$.

Axiom 1. For the mathematical description of the theory of any dynamic systems, there is an incomplete context-free grammar. $G1' = \{\boldsymbol{V1},\ \boldsymbol{P1}\}$. At the same time grammar symbols c_i denote the concepts of the theory, and the rules of grammar $P1_j$ – relationship between concepts in the form of formulas.

Definition 2. Incomplete functional context-free grammar is a combination:

$$G' = \{\boldsymbol{V_{T0}},\ \boldsymbol{V},\ \boldsymbol{F_0},\ \boldsymbol{F},\ \boldsymbol{P}\},$$

consisting of a terminal basis set (alphabet) of characters:

$$\boldsymbol{V_{T0}} = \{b_i\},\quad i = 1,\ 2,\ \ldots,\ n_0;$$

sets of a combined set (alphabet) of characters:

$$\boldsymbol{V} = \{a_i\},\quad i = 1,\ 2,\ \ldots,\ n_1;$$

sets of basic unary and binary functions:

$$\boldsymbol{F_0} = \{f0_i\},\quad i = 1,\ 2,\ \ldots,\ k_0$$

kind of:

$f0_i = f(x_1,\ x_2) = x_1 b_j x_2$, $f0_i = f(x_1) = b_j x_1$ или $f0_i = f(x_1) = x_1 b_j$;

sets of common functions:

$$\boldsymbol{F} = \{f_i\},\quad i = 1,\ 2,\ \ldots,\ k$$

kind of:

$$f_i = f(x_1,\ x_2,\ \ldots,\ x_p) = \sigma(x_1,\ x_2,\ \ldots,\ x_p,\ f0_1,\ f0_2,\ldots,\ f0_q);$$

rule sets:

$$\boldsymbol{P} = \{P_j\},\quad j = 1,\ 2,\ \ldots,\ m$$

kind of:

$$a_j \rightarrow \varphi_j\ \{f_i\},$$

where $\varphi_j \in \boldsymbol{V}^+$, – arbitrary sequence of characters of the combined alphabet, which is a collection of the actual parameters of the arguments $x_1,\ x_2,\ \ldots,\ x_p$ of function f_i.

Axiom 2. Mathematical description of the theory of any dynamic systems in the form of an incomplete context-free grammar $G1' = \{\boldsymbol{V1},\ \boldsymbol{P1}\}$ can be convert-

ed to incomplete functional context-free grammar $G = \{\boldsymbol{V_{T0}}, \boldsymbol{V}, \boldsymbol{F_0}, \boldsymbol{F}, \boldsymbol{P}\}$ due to the selection from the set $\boldsymbol{V1}$ subset V_{T0}, $\boldsymbol{V_{T0}} \cup \boldsymbol{V} \equiv \boldsymbol{V1}$, elements of which correspond basic functions $f0_k$, through which functions are expressed f_i, describing the subject logic of the rules P_j.

Definition 3. A (complete) functional context-free grammar is a collection:

$$G = \{\boldsymbol{V_{T0}}, \boldsymbol{V_T}, \boldsymbol{V_N}, \boldsymbol{F_0}, \boldsymbol{F}, \boldsymbol{P}, S\},$$

consisting of a set (alphabet) of basic terminal symbols:

$$\boldsymbol{V_{T0}} = \{V_{T0i}\}, \quad i = 1, 2, \ldots, n_0;$$

sets of (alphabet) terminal symbols:

$$\boldsymbol{V_T} = \{V_{Ti}\}, \quad i = 1, 2, \ldots, n_{11};$$

sets of (alphabet) non-terminal symbols:

$$\boldsymbol{V_N} = \{V_{Ni}\}, \quad i = 1, 2, \ldots, n_{12};$$

initial non-terminal symbol (axiom):

$$S \in \boldsymbol{V_N};$$

sets of basic unary and binary functions:

$$\boldsymbol{F_0} = \{f0_i\}, \quad i = 1, 2, \ldots, k_0$$

kind of:

$f0_i = f(x_1) = b_j x_1$, $f0_i = f(x_1) = b_j x_1$ или $f0_i = f(x_1) = x_1 b_j$;

sets of common functions:

$$\boldsymbol{F} = \{f_i\}, \quad i = 1, 2, \ldots, k$$

kind of:

$$f_i = f(x_1, x_2, \ldots, x_p) = \sigma(x_1, x_2, \ldots, x_p, f0_1, f0_2, \ldots, f0_q);$$

rule sets:

$$\boldsymbol{P} = \{P_j\}, \quad j = 1, 2, \ldots, m$$

kind of:

$$a_j \rightarrow \varphi_j \{f_i\},$$

where $\varphi_j \in \boldsymbol{V}^+$, – arbitrary sequence of characters of the combined alphabet, which is a collection of actual parameters $x_1, x_2, \ldots, x_p$ of function f_i.

Axiom 3. The task of mathematical modeling of any dynamic system $W = \{\boldsymbol{K}, \boldsymbol{D}, \boldsymbol{Q}\}$ can be represented as a complete functional context-free grammar $G = \{\boldsymbol{V_{T0}}, \boldsymbol{V_T}, \boldsymbol{V_N}, \boldsymbol{F_0}, \boldsymbol{F}, \boldsymbol{P}, S\}$ due to isolation from the generalized alphabet V incomplete functional context-free grammar $G' = \{\boldsymbol{V_{T0}}, \boldsymbol{V}, \boldsymbol{F_0}, \boldsymbol{F}, \boldsymbol{P}\}$ terminal characters $\boldsymbol{V_T}$, that denoting the concept of input variables $\boldsymbol{D}$, and select from the remaining set of non-terminal characters $\boldsymbol{V_N}$ ($W = \{\boldsymbol{K}, \boldsymbol{D}, \boldsymbol{Q}\}$) axiom S, that denoting the notion of the output variable q_i.

Theorem. If the task of mathematical modeling of a dynamic system $W = \{\boldsymbol{K}, \boldsymbol{D}, \boldsymbol{Q}\}$ presented in the form of a complete functional context-free grammar $G = \{\boldsymbol{V_{T0}}, \boldsymbol{V_T}, \boldsymbol{V_N}, \boldsymbol{F_0}, \boldsymbol{F}, \boldsymbol{P}, S\}$ and for this problem there is a solution, then the logical-mathematical model can be constructed as a super-

position of functions $\sigma = \sigma(x_1,\ x_2,\ \ldots,\ x_p,\ f_{i(1)},\ f_{i(2)},\ \ldots,\ f_{i(q)})$, где $x_1,\ x_2,\ \ldots,\ x_p \in \boldsymbol{V_T}$; $f_{(1)},\ f_{(2)},\ \ldots, f_{(q)} \in \boldsymbol{F}$.

In this case, the functions $f_{(1)},\ f_{(2)},\ \ldots, f_{(q)}$ act as elementary operators of the sequential-parallel decomposition B_{ij}, and the superposition of functions σ has the meaning of the operator of the derivation of the solution $\boldsymbol{B}$.

Evidence. The problem of mathematical modeling $W = \{\boldsymbol{K},\ \boldsymbol{D},\ \boldsymbol{Q}\}$ has a solution only if the purpose of modeling in the form of output variables q_j can be expressed through input variables $\boldsymbol{D}$ in the form of the operator $\boldsymbol{B}$. That is, according to **Axiom 3**, the problem of mathematical modeling has a solution, if by using the rules P_j a complete conclusion can be constructed:

$$S \to \varphi_{V1} \to \varphi_{V2} \to \ldots \to \varphi_{V(n-1)} \to \varphi_{Vn} \to \varphi_T,$$

where $\varphi_{V1},\ \varphi_{V2},\ \ldots,\ \varphi_{V(n-1)},\ \varphi_{Vn} \in \left(\boldsymbol{V_T} \cup \boldsymbol{V_N}\right)^+$ – sequences containing both terminal and non-terminal characters;

$\varphi_T \in \boldsymbol{V_T}^+$ – terminal character sequence.

Every application of the rule

$$a_j \to \varphi_{Vj}\ \{f_i\},\ j = 1,\ 2,\ \ldots,\ n$$

matches function:

$$f_i(x_1,\ x_2,\ \ldots,\ x_{pi}),$$

where i – number of arbitrary grammar function, $1 \le i \le k$;

p_i – number of function arguments f_i.

The first immediate conclusion $S \to \varphi_{V1}$ suit the function:

$$f_{i(1)}(x_1,\ x_2,\ \ldots,\ x_{pi(1)}).$$

The second immediate conclusion $\varphi_{V1} \to \varphi_{V2}$ suit the function:

$$f_{i(2)}(x_{pi(1)+1},\ x_{pi(1)+2},\ \ldots,\ x_{pi(1)+pi(2)}).$$

Then the conclusion $S \to \varphi_{V2}$ is described by superposition:

$$f_{i(2)}(x_{pi(1)+1},\ x_{pi(1)+2},\ \ldots, x_{pi(1)+pi(2)-1},\ f_{i(1)}(x_1,\ x_2,\ \ldots,\ x_{pi(1)})) =$$

$$= f_{i(2)}(x_1,\ x_2,\ \ldots,\ x_{pi(1)+pi(2)-1},\ f_{i(1)}).$$

In general, the conclusion $S \to \varphi_{Vj}$ suit the superposition of functions:

$$f_{i(j)}(x_1,\ x_2,\ \ldots,\ x_{pi(1)+pi(2)+\ldots+pi(j)-j+1},\ f_{i(1)},\ f_{i(2)},\ \ldots,\ f_{i(j-1)}).$$

Then the full conclusion is described by the superposition of functions.:

$$f_{i(n+1)}(x_1,\ x_2,\ \ldots,\ x_{pi(1)+pi(2)+\ldots+pi(n+1)-n},\ f_{i(1)},\ f_{i(2)},\ \ldots,\ f_{i(n)}) =$$

$$= \sigma(x_1,\ x_2,\ \ldots,\ x_{pi(1)+pi(2)+\ldots+pi(n+1)-n},\ f_{i(1)},\ f_{i(2)},\ \ldots,\ f_{i(n+1)}) =$$

$$= \sigma(x_1,\ x_2,\ \ldots,\ x_p,\ f_{i(1)},\ f_{i(2)},\ \ldots,\ f_{i(q)}).$$

where $p = p_{i(1)} + p_{i(2)} + \ldots + p_{i(n+1)} - n$ – number of superposition arguments,

$q = n + 1$ – number of functions in superposition.

Thus, if a mathematical modeling problem has a solution, then a full conclusion can be constructed in the functional context-free grammar representing it:

$$S \to \varphi_{V1} \to \varphi_{V2} \to ... \to \varphi_{V(n-1)} \to \varphi_{Vn} \to \varphi_T,$$

which corresponds to a mathematical model in the form of a superposition of functions:

$$\sigma(x_1,\ x_2,\ ...\ ,\ x_p,\ f_{i(1)},\ f_{i(2)},\ ...\ ,\ f_{i(q)})$$

The theorem is proved.

3. Lambda description of the construction of logical-mathematical models based on functional grammars

Since the theoretical basis of functional grammars is lambda calculus, the conclusion of the logical-mathematical model is formally represented as a set of lambda functions.

For example, we present the lambda functions for constructing a complete functional grammar. $G = \{\boldsymbol{V_{T0}}, \boldsymbol{V_T}, \boldsymbol{V_N}, \boldsymbol{F_0}, \boldsymbol{F}, \boldsymbol{P}, S\}$ based on the problem of modeling dynamic systems $W = \{\boldsymbol{K}, \boldsymbol{D}, \boldsymbol{Q}\}$. We use the principles of pure lambda calculus, which are given, for example, in [3] and [4].

$Tr = \lambda x.\lambda y.x$ – boolean true;

$Fl = \lambda x.\lambda y.y$ – boolean false;

$If = \lambda p.\lambda x.\lambda y.p\ x\ y$ – conditional operator function;

$Nu = \lambda t.t\left(\lambda x.\lambda y.Fl\right)$ – empty list check function;

$Nl = \lambda x.Tr$ – empty list;

$Cs = \lambda x.\lambda y.\lambda s.s\ x\ y$ – list constructor function;

$Cr = \lambda t.t\ Tr$ – selector function of the first element of the list;

$Cd = \lambda t.t\ Fl$ – list tail selector function.

Functions of building a knowledge base in the form of incomplete functional grammar:

$$G' = \left[\lambda x.\lambda y.\lambda z.\lambda p.\lambda q.Cs\ x(Cs\ y(Cs\ z(Cs\ p\ (Cs\ q\ Nl))))\right]\ V_{T0}\ V\ F_0\ F\ \ P;$$

$$K = \left[\lambda x.x\right]G'.$$

The function of building the simulation task list:

$$W = \left[\lambda x.\lambda y.\lambda z.Cs\ x(Cs\ y\ (Cs\ z\ Nl))\right]K\ D\ Q.$$

Output functions of a complete functional grammar based on a modeling problem:

$$Vn = Y[\lambda f.\lambda p.\lambda q.If\ (Nu\ p)\ Nl\ (If\ (Vn1\ q\ (Cr\ p))\ (f\ (Cd\ p\ q))\ (Cn\ (Cr\ p)\ (f\ (Cd\ p)\ q)))];$$

$$Vn1 = Y[\lambda f.\lambda p.\lambda q.If\ (Nu\ r)\ Fl\ (If\ (=(Cr\ r)\ t)\ Tr\ (f\ (Cd\ r)\ t))];$$

$$G1 = \lambda x.Cn\ \left(Cr\ (Cr\ x)\right)\ (Cn\ \left(Cr\ (Cd\ (Cr\ x))\right)\ (Cn\ (Vn\ \left(Cr\ (Cd\ (Cr\ x))\right)$$
$$\left(Cr\ (Cd\ x)\right))\ (Cn\ \left(Cr\ (Cd\ (Cd\ (Cd\ (Cr\ x))))\right)$$
$$(Cn\ \left(Cr\ (Cd\ (Cd\ (Cd\ (Cd\ (Cr\ x)))))\right)$$
$$(Cn\ \left(Cr\ (Cd\ (Cd\ (Cd\ (Cd\ (Cd\ (Cr\ x))))))\right)\ Nl))))));$$
$$G2 = Y[\lambda f.\lambda x.\lambda y.If\ (Nu\ y)\ Nl\ (Cn\ (Cr\ x)\ (Cn\ (Cr\ (Cd\ x))$$
$$(Cn\ (Cr\ (Cd\ (Cd\ x)))\ (Cn\ (Cr\ (Cd\ (Cd\ (Cd\ x))))$$
$$(Cn\ (Cr\ (Cd\ (Cd\ (Cd\ (Cd\ x)))))(Cn\ (Cr\ (Cd\ (Cd\ (Cd\ (Cd\ (Cd\ x))))))$$
$$(Cn\ (Cr\ y)\ \left(f\ x\ (Cd\ y)\right))))))))];$$
$$G = \left[\lambda x.G2\ \left(G1\ x\right)\ \left(Cr\ (Cd(Cd\ x))\right)\right]\ W.$$

Conclusion.

The use of functional grammars in logical-mathematical modeling of dynamic systems, including technical systems, is formally described in the functions of lambda calculus. Since the lambda calculus is the theoretical basis of all modern functional programming languages, logical-mathematical modeling can be effectively implemented in a functional programming language. In addition, the logical-mathematical model itself in this case takes the form of a subject-logical model, which is a functional program of computer simulation of a dynamic system, in particular a technical system.

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系统工程的一般要点
GENERAL POINTS OF SYSTEMS ENGINEERING

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注释。 本文讨论了系统（主要是技术）系统的一般复杂性。 展示了发展过程的背景。 指出了先前系统的缺点。 该系统是它所必需的 本文确定了主要流程。 该系统专为 简要总结了一下。

关键词：系统工程，生产组织，流程，系统工程师。

Annotation*. The article discusses the general issues of system engineering - an advanced approach to the creation, development and maintenance of new complex (mostly technical) systems. The historical background of the emergence of a new direction in the organization of the engineering process is shown. The disadvantages of the previous systems are indicated. A general idea of what System Engineering is, starting with what a System is, where its boundaries are, who participates in it, etc. The article identifies the main focuses of this direction of the organization of engineering efforts and describes its main processes. Further definitions are given to a modern system engineer - who he is, what his tasks and functions are. The reasons for the failure of new engineering projects, which could have been avoided if we use the principles of modern system engineering, are briefly summarized.*

Keywords*: system engineering, organization of production, processes, system engineer*.

The concept of system engineering emerged relatively recently (40s-60s years of the 20th century), as a response to attempts to select a reasonable and universal approach to solving complex, primarily engineering problems.

For the first time, engineer F. U. Taylor undertook to systematize work processes. The main provisions of his theory are set out in the works «Factory Management» (1903) and «Principles of Scientific Management» (1911).

There were also attempts to bring order to the system of organization of production. Recall the Ford factory.

In the 40s of the 20th century, System Engineering approaches began to be applied in Bell laboratories, in the 60s, the term System Engineering was used in

the aerospace and defense industries of the USA to develop complex large-scale projects.

In 1969, the PMI (Project Management Institute) was created [1] - The Institute of Project Management, which studies and promotes this body of discipline. Many project management concepts have been incorporated into System Engineering.

Later, a private production quality improvement system, Lean Six Sigma [2,3], was developed. The Japanese managed to find a way to solve the problem of «flexible production settings when demand changes.» This method was first implemented at the automobile company Toyota and was called "just-in-time" or the Kanban system. [four]

The project management system was widely distributed in the Soviet Union. And many modern managers grew up in their careers precisely from project engineers, chief project engineers.

What was missing from these approaches? What makes you look for more versatile and working methods?

In each of these methods during their "invention" and implementation was something useful - project management allows you to follow the deadlines and significant milestones at the stages of project execution, Lean SixSigma allows you to achieve high quality production and its continuous improvement. Kanban, the "invention" of the Japanese, turns conveyor production into a single, well-functioning organism, where there is nothing superfluous and all resources are used with the highest possible efficiency, and the output is the highest quality product in the shortest possible time.

Without pretending to thorough knowledge of each of the above methods, I still note that, I think, they are:

- not universal;
- do not fully cover the entire life cycle of the project, tasks, systems, etc .;
- do not allow to evaluate all risks at all stages of the life cycle of a project or system;
- they are not always transparent and understandable for those who implement them, which in turn gives rise to a whole niche of the economy - a huge number of courses, programs and certifications of specialists, which then have the "official" right to introduce such techniques. Many people know certified Project Managers (PMP) in the PMI [5] certification system or color belt holders in the Six Sigma system. [6].

This is not to say that it is bad or «dishonest.» Any education or professional development of employees has a beneficial effect both on the income of the company where they work and on the well-being of the people themselves.

Progress does not stand still, and against the background of all these techniques, a whole direction has grown - system engineering. At first glance, this is

"the use of common sense in any undertaking," as John Holt [7], the author of the Unified Modeling Language, wrote in a popular children's book. It sounds simple, but at the moment this direction is already quite developed, INCOSE exists [8] - the International Council on System Engineering, many books have been written, standards and methods have been developed for using this progressive methodology, there are recognized certification programs for specialists. The site https://www.incose.org/systems-engineering-certification contains a file containing the names of certified professionals worldwide. There is also information on how and where to get certified. Unfortunately, at the time of this writing (June 2018) there is not a single family name in the list from the CIS countries.

So what is system engineering? INCOSE defines Systems Engineering as an interdisciplinary approach and means to implement successful systems. It focuses on identifying customer needs and functionality at the beginning of the development cycle, documenting requirements, and then developing system design and testing when considering a complete problem: Operation, Cost and Schedule, Performance, Training and Support, Testing, Disposal and Production. Systems engineering unites all disciplines and specialized groups in team efforts, forming a structured development process that moves from concept to production and operation. Systems Engineering addresses both the economic and technical needs of all customers in order to provide a quality product that meets the needs of the user. [9]

Or is there still such a definition of System Engineering as the design, development, production and support of a functional, reliable system, while respecting the budget and time frame. [10]

The question arises - what is a system? Webster's Dictionary provides such a definition — any two or more objects that act are interrelated to achieve a single goal or purpose. Dahl's dictionary interprets it this way - the plan, the order of the parts of the whole, the intended device, the course of something, in a coherent, coherent order. IEEE (Institute of Electrical and Electronics Engineers) defines a system as a set of components organized to perform a specific function or set of functions. That is, it can be understood in such a way that in any system a set of components must somehow interact, to achieve a certain goal or to perform a single function, and not just coexist separately from each other. And we can draw the following conclusion - any system can be part of a larger system and have some external borders and elements. And, therefore, the boundaries of the system will depend on the perspective or point of view. A System of Systems may also exist - an interacting group of systems united by a single architecture. Then Components are the operating parts of the System, Relationships are the connections between components, such as communications and / or flows between components, Interfaces are places or points at which systems meet and interact or communicate with each other.

Each system has its own stakeholders or participants. These can be individuals, groups of people or organizations having their own interests in the system being developed and having resources (money, people, political influence, etc.) to influence the outcome or the result of the system. An example of such participants could be: consumers, developers, users, or licensing organizations. The influence of such participants may be immediate or even apparent. The needs of interested parties can be categorized as current or for the future, in the form of "must exist", "it would be nice to have" or even a "crane in the sky".

To form your vision of the System, you can rely on the following questions:

1. What is our system? Maybe it's some kind of product, people, solutions, etc.

2. What are the internal processes of the system? For example, what do we or the people who work with us do during the day?

3. What are the products? What do we produce that becomes part of the system?

4. Who is the consumer of the system? Who controls the money to develop the system or who wants our product?

5. Who is a member of the system? Who else affects or can influence the system?

6. What is the environment in which our system is developed or used? This environment can affect the system, but you cannot influence the environment.

7. How is your system incorporated into other systems or system systems? What larger system exists where your system is part of?

Answers to these questions form a common vision or point of view on the system, defining its boundaries and elements.

There are many ways to describe system engineering. It may be structural, functional, or as intended. This may be a definition of system management levels. The description of System Engineering is known as an approach that considers the life cycle processes (product, system, population). You can consider the methods and tools. Can be decomposed into workflows or product lines. We may use specific products or services. In the end, we can talk about multi-level and transdisciplinarity.

The main focuses of the systems engineering processes are focused on the following - defining the basic needs of users and the required functionality **at the early stages** of the development cycle, developing and managing the requirements definition processes and interfaces, synthesizing the design and validation of the system, solving all current problems including: purchasing management, taking into account external factors (including environmental factors), the correct determination of the participants of the process, the definition of requirements, the definition of operational qualities, determination of cost and time parameters, technology, manufacturing, testing, training and support, operation and mainte-

nance, recycling. One of the main focuses of System Engineering is to take into account both the business or business parameters of the system, and the technical or functional requirements of all participants in order to provide a quality product that meets the needs of the user.

System engineering achieves its goals by means of certain processes - logical, systematic, comprehensive, repetitive actions aimed at solving problems specifically designed and used to solve problems of system engineering. Such processes may be scheduling; quality compliance processes; measurement and analysis processes; information management processes; risk management; decision analysis; cost estimation; system architecture; requirements management process; configuration management; the process of integration, verification, validation and transitions; integrated system security process.

All this looks quite complicated and comprehensive, but starting to understand the principles of system engineering and using them in life, in real projects, you realize that thanks to this universality you can always find something useful for a specific situation, for a current project. And you understand that what you have gained with experience can and should be formalized as an approach, as a set of processes by which you can solve complex tasks. Moreover, this can be taught, thereby transferring the experience of generations of engineers, minimizing errors, eliminating the known "rakes", reducing, in the end, the cost of a solution, project, task.

The question arises - who is a System Engineer? If we follow the definitions, then this is the person who determines, develops and implements solutions and projects using systems engineering processes. His role, in brief, should be as follows:

1. He has been involved in system development from day one;

2. The level of involvement of the system engineer depends on our role in interacting with consumers -

A. If we act as a contractor, then we use all possible and necessary systems engineering techniques;

B. If we act as a supporting or supervisory organization, we provide general supervision from the point of view of system engineering and management.

3. In each of the roles, we make decisions by quantitative and qualitative formulation, analysis and interpretation of alternative approaches.

Systems engineering is not just a role for a specialist or a group of specialists, but it is part of the work for each employee involved in the development of a system. A system engineer in his daily activities should also rely on his own engineering skills; he should be an expert in his work. But in addition, he should be able to manage the technical process - to transform operational requirements into system design, to help in project management. It should contribute to the integration of

technical parameters into the design of the system - be sure of the compatibility of operational, functional and physical design, involve narrow specialists (reliability, safety, etc.), optimize the overall design of the system. In the end, the system engineer must be some kind of link that holds the multidisciplinary team together.

In practice, this means that a system engineer must maintain professional communication in a team, ensure coherence, coordinate and maintain a balance between the disciplines involved, formulate a conceptual design and system architecture, define and manage system requirements, create and manage a budget of technical resources, coordinate the implementation of subsystems , and integrate, verify and validate the entire system. As a result, we conclude that the system engineer is not only an engineer, but also a manager. He stands on multidisciplinary knowledge and must take into account not only engineering, but also economic, political factors and many other factors affecting the system.

In modern society, the need for system engineers is growing constantly. So, as soon as they can define the boundaries of the developed systems, take into account the size of new complex solutions that are sometimes inaccessible by one person and should be broken down into manageable blocks. Modern systems are multidisciplinary and require the involvement of many experts in their fields, which must be properly coordinated (in any system, engineers must interact with managers, accountants, financiers, etc.).

Fred Brooks, who was involved in managing the OS / 360 development team at IBM in the 1960s, wrote: "*People think that time and human resources are interchangeable resources in a project, but when faced with this approach, we only lengthen development time, involving New people at a late stage of the project.*

In computer systems, the problem of decomposition and system management always turns with its ugly head to optimistic programmers who say: "This time it will be launched", or "I just found the last mistake".

Nothing works the first time as planned." [11]

INCOSE presented statistics on why 80% of projects fail:

1. Incomplete requirements - 13.1%;
2. Insufficient involvement of users - 12.4%;
3. Lack of resources - 10.6%;
4. Unrealistic expectations - 9.9%;
5. Insufficient support from senior managers - 9.3%;
6. Changes in requirements and specifications in the process - 8.7%;
7. Lack of planning - 8.1%;
8. The system is no longer required - 7.5%.

The ultimate goal of a system engineer is to protect the system from such problems! Everything should be earned the first time and exactly as planned.

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具有延迟反馈的混沌振荡的受控发生器
THE CONTROLLED GENERATOR OF CHAOTIC OSCILLATIONS WITH DELAYED FEEDBACK

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注释。它是混沌振荡的受控发生器。它是一个动态混沌发生器，具有相对宽的频带。这是一阶滤波器滤波器。它基于带有瞬时电压传感器的正交谐振子。已经发现它已被发现。在软件环境PSIM-9中得到的模拟结果。建议您使用控制信号。可以遵循控制参数。

关键词：结构图，传递函数，动态混沌，相位图。

Annotation*. The most important part of any information transfer system based on dynamic chaos is a controlled generator of chaotic oscillations. Of particular interest are dynamic chaos generators with delayed feedback, which allow the formation of chaotic oscillations with a relatively wide frequency band. The article deals with the construction of a controlled generator of chaotic oscillations, in the feedback circuit of which a first order phase filter is included. It is based on a quadrature harmonic oscillator with an instantaneous voltage sensor. An analytical expression has been found for calculating the time constant of the phase filter, which allows to obtain the best approximation of the phase response of the phase filter to the ideal response of the delayed link. The simulation results obtained in the software environment PSIM-9. You can control the chaotic oscillations in the proposed generator using the control and / or reference signals, changing the time constant of the phase filter, as well as using the input coefficient of the oscillating system. The developed model will allow further research on various types of chaotic oscillations as the control parameters change.*

Keywords: *structural diagram, transfer function, dynamic chaos, phase portrait.*

Introduction

Chaotic signals with a large information capacity and allowing the use of various methods of inputting the information signal into a chaotic signal can be used [1–4] for the practical implementation of communication systems.

There are quite a large number of different options for building communication systems using chaotic signals, but the most important part of any information transfer system based on dynamic chaos is the generator of chaotic oscillations [5, 6], therefore the creation of controlled generator of chaotic oscillations (CGCO) with given spectral characteristics is relevant the challenge.

Among the wide variety of CGCOs, generators with delayed feedback [7–9] are of interest as sources of chaotic oscillations with a relatively wide frequency band.

Due to the high sensitivity to the initial conditions and unpredictability of phase trajectories for systems with nonlinear dynamic chaos, it is difficult, and in most cases impossible, to obtain a solution in a closed analytical form. Therefore, the creation of mathematical models for theoretical studies will allow to analyze the main features of the CGCO dynamics, to determine their spectral and bifurcation characteristics.

The task is to develop a computer model for the study of the main characteristics of a controlled generator of chaotic oscillations with delayed feedback.

Main part

The proposed solution is based on the generator [10], which is described in detail in [11, 12].

The block diagram of the controlled generator of chaotic oscillations is shown in Fig. 1:

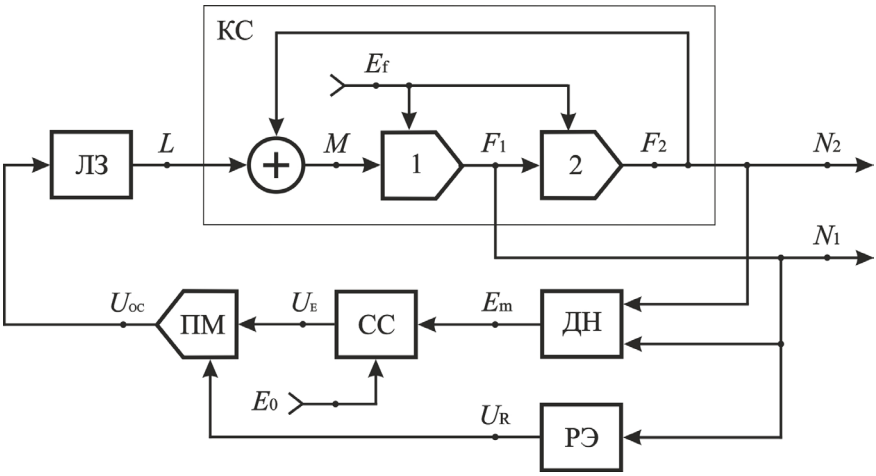

Fig. 1. *Structural diagram of the generator*

The block diagram of the controlled generator of chaotic oscillations (Fig. 1) contains an oscillating system (КС), a voltage sensor (ДН), a multiplier (ДН), a relay element (РЭ), a comparison circuit (СС) and a delay line (ЛЗ). The oscillatory system is made of two controlled integrators (1, 2) and an adder.

In the absence of *ЛЗ*, that is, when a signal U_{OC} is sent from the output of the ПМ directly to the input of the КС, the device works as a controlled harmonic oscillator.

The high-speed (non-spinning) voltage sensor, as well as the presence of the relay element РЭ and the multiplier ПМ provide a high speed generator in transients, both in the starting mode and when the frequency changes (up / down) within wide limits [10-12]. The presence of two astatic links (integrators) in the automatic control system, that is, in the mode of stabilization of the amplitude of the output signals of the harmonic oscillator, reduces the control error to almost zero $U_E \approx 0$.

The magnitude of the control voltage E_f sets [10] the frequency f_0 of the generated signals $N_1(t)$ and $N_2(t)$.

$$f_0 = E_f /(2\pi \cdot \tau) \ ,$$

where τ – the time constant of the integrating amplifiers included in КС.

When turning on ЛЗ generator can be transferred to the mode of excitation of chaotic oscillations.

ЛЗ delay line can be considered as an ideal quadrupole with transfer function

$$H_{ЛЗ}(s) = \frac{U_{OC}(s)}{L(s)} = e^{-\tau_{ЛЗ}} \ ,$$

where $\tau_{ЛЗ}$ – delay time.

Introduction to the ЛЗ scheme does not change the transmission coefficient of an open-loop system, but significantly affects the resulting phase-frequency response.

$$\varphi_{ЛЗ}(\omega) = -2\pi \cdot f \cdot \tau_{ЛЗ} \quad .$$

The introduction of a delay into the feedback loop gives the system ***a multi-frequency character***, since the phase balance will be performed for several frequencies, including the main frequency.

Circuit implementation of the pure lag link encounters considerable difficulties, therefore, in practice, various methods of approximating the exponential function are used [13, 14], among which the Pade series [14] are widely used.

In this case, the exponent is replaced by a fractional function with polynomials of the same degree in the numerator and denominator. The degree of approximation to the ideal link of pure retardation depends on the number of terms of the *n* series.

When *n=1* we get an approximate replacement of the delayed link link with the transfer function

$$H_1(s) = \frac{(2 - \tau_{ЛЗ} \cdot s)}{(2 + \tau_{ЛЗ} \cdot s)} \quad . \tag{1}$$

We give (1) to the following form

$$H_1(s) = \frac{(1 - T_Э \cdot s)}{(1 + T_Э \cdot s)} , \tag{2}$$

where $T_Э = \tau_{лз}/2$ – the equivalent time constant of the delayed link.

The module of the complex frequency response (CFR) does not depend on the frequency and is equal to one, and the phase shift

$$\varphi_1(\omega) = -2arctg(\pi \cdot f \cdot T_Э) .$$

Circuit implementation of the simplest phase filter (PF) using *RC*-circuits is given in [15, p. 56], the transfer function of which

$$H_{RC}(s) = \frac{(1 - \tau_{ФФ} \cdot s)}{(1 + \tau_{ФФ} \cdot s)} . \tag{3}$$

Therefore, the ПФ of the phase filter (3) will correspond to the transfer function (2), provided that the value of the time constant $\tau_{ФФ} = T_Э = R \cdot C$.

The chaotic oscillations in the proposed generator can be controlled by changing the time constant $\tau_{ФФ}$, the control E_f and reference E_0 signals, as well as by changing the transmission coefficient of the КС on the information input.

To best approximate the transient response of the phase link to the transient response of the ideal retarded link, we use Fig. 2, which depicts:

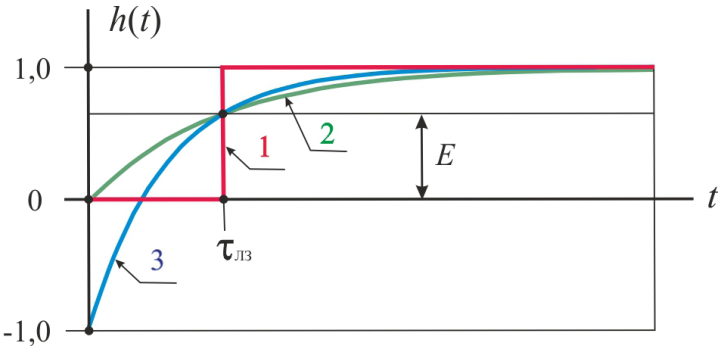

Fig. 2. *Transitional characteristics*

1 – transient response of an ideal retarded link $h_1(t) = 1(t - \tau_{ЛЗ})$;

2 – normalized transient response (exponent) $h_2(t) = 1 - \exp[-t / \tau_{ЛЗ}]$;

3 – phase response $h_3(t)$ transient response.

When approximating the exponent with the help of the Pade series, the amplitude of the transition function 3 (Fig. 2) at the initial moment of time takes negative values, which is connected [14, Fig. 4] with the equality of the orders of the polynomials of the numerator and denominator.

To find the transient response $h_3(t)$, we bring (3) to

$$H_{RC}(s) = \frac{(1 - \tau_{ФФ} \cdot s)}{(1 + \tau_{ФФ} \cdot s)} = 2 \cdot \left[\frac{1}{(1 + \tau_{ФФ} \cdot s)} \right] - 1. \qquad (4)$$

Using the inverse Laplace transform with reference to (4), we obtain the transition characteristic of the phase link in the following form

$$h_3(t) = 1 - 2 \cdot \exp[-t / \tau_{ФФ}] . \qquad (5)$$

We introduce the following notation.

$$\alpha = t / \tau_{ЛЗ} ; \ \beta = t / \tau_{ФФ} . \qquad (6)$$

In view of (6), we write the expressions for the transient characteristics $h_2(t)$ and $h_3(t)$ in the form

$$h_2(t) = 1 - \exp[-\alpha] ; \ h_3(t) = 1 - 2 \cdot \exp[-\beta]. \qquad (7)$$

When $t = \tau_{ЛЗ}$ exhibitor 2 (fig. 2) reaches the level $E = 0{,}632$

In this case $h_2(t_{ЛЗ}) = h_3(t_{ЛЗ}) = E$ and then, as a result of solving the system of equations (7), we obtain

$$\exp[-\alpha] = 2 \cdot \exp[-\beta] . \qquad (8)$$

Using (8), we find the relations between the coefficients α and β

$$\beta - \alpha = \ln 2 . \qquad (9)$$

The relationship between the time constant of the phase filter $\tau_{ФФ}$ and the delay time $\tau_{ЛЗ}$ will be found with a joint solution (6) and (9), given that $t = \tau_{ЛЗ}$

$$\tau_{ФФ} = \frac{\tau_{ЛЗ}}{(1+\ln 2)} \approx 0{,}59 \cdot \tau_{ЛЗ} , \qquad (10)$$

meaning attitude $\gamma_0 = \tau_{ФФ} / \tau_{ЛЗ} = 0{,}59$.

Modeling was carried out in a software environment PSIM-9**.**

As an example, the corresponding figures show temporal (Fig. 3), spectral (Fig. 4) characteristics of the generated signal N_1, as well as phase portraits of chaotic oscillations (Fig. 5) for two cases:

- pure lag link, the time constant of which $\tau_{ЛЗ} = 30{,}4$ ms;
- phase filter with time constant $\tau_{ФФ} = 16{,}0$ ms.

In this case $\gamma_1 = \tau_{ФФ} / \tau_{ЛЗ} = 16{,}0 / 30{,}4 = 0{,}53$, which indicates a fairly good approximation to the value of the coefficient γ_0 calculated by the formula (10).

At the same time, in the CGCO model, the following parameter values were set: $E_f = 7\text{B}$; $E_m = 1\text{B}$; time constants of integrating amplifiers $\tau = 1{,}59$ ms. In this case, the frequency of the generated harmonic oscillations $f_0 = 0{,}7$ kHz.

In Fig. 4 values of frequencies in a logarithmic scale, and in Fig.4.a the spectrum extends from 1 kHz to 10 kHz, and in Fig. 4.b - from 0.5 kHz to 20 kHz.

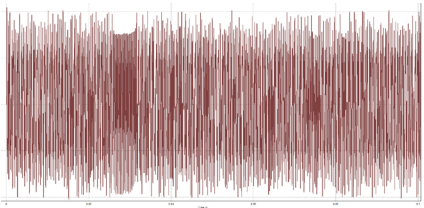

Fig. 3.a - *time characteristics (link pure lag)*

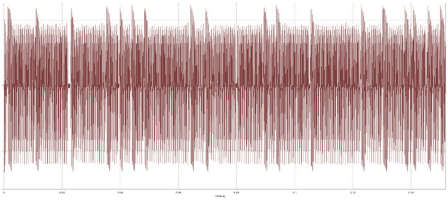

Fig. 3.b - *time characteristics (phase filter)*

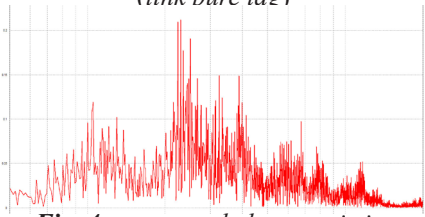

Fig. 4.a - *spectral characteristics* (*link pure lag*)

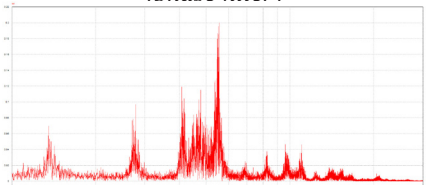

Fig. 4.b - *spectral characteristics* (*phase filter*)

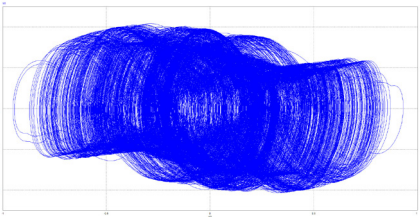

Fig. 5.a - *phase portrait* (*link pure lag*)

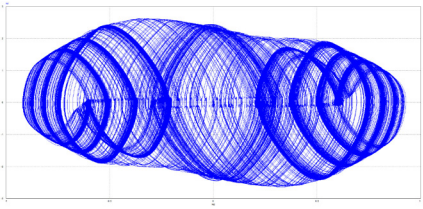

Fig. 5.b - *phase portrait* (*phase filter*)

Conclusion:

1. Developed a computer model of a controlled generator for the study of chaotic oscillation modes.

2. It has been proven that a first-order phase filter can be used to excite chaotic oscillations in the lagging feedback circuit of a controlled generator.

3. The results of mathematical modeling in the program PSIM-9 fully confirmed the calculated ratios obtained.

4. The proposed generator is a very convenient device for studying the general laws of nonlinear dynamics in systems with delayed feedback.

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在线管束中增强传热的脉冲方法的效率

EFFICIENCY OF THE PULSATIVE METHOD OF ENHANCEMENT OF HEAT TRANSFER IN THE IN-LINE TUBE BUNDLE

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注释。注意到在线管束中的传热方法。已确定数字应计算为Pr / 243数字。
关键词：热损失和水力损失。

Annotation. *The paper considers the effectiveness of the use of the pulsation method of heat transfer enhancement in a in-line tube bundle. Efficiency estimation was performed using the thermal performance factor, for Reynolds numbers Re from 100 to 1000 and Prandtl numbers Pr = 243. It was established that an increase in Re numbers leads to an increase in the efficiency of the pulsation stimulation method.*

Keywords: t*hermal and hydraulic efficiency, pulsating flow, heat transfer, corridor tube bundle, coefficient of hydraulic loss.*

Introduction

To improve the efficiency of various heat transfer equipment, various methods of heat transfer enhancement are widely used. Today in the scientific literature there is a huge number of works devoted to this topic [1]. It is well known that an increase in the intensity of heat transfer is accompanied by an increase in the hydraulic resistance of the heat transfer equipment, which leads to an increase in the power required for heat carrier pumping.

To assess the effectiveness of methods of enhancement of heat transfer, they use the coefficient of overall enhancement ratio of Kirpichev [2] $E = q/N$, where q – heat flux, W/m^2; N – power required for heat carrier pumping, W/m^2.

Both passive and active methods are used to enhancement of heat transfer. The use of various swirls of flow (twisted tape, wire coils inserts), discretely rough surfaces, the use of tubes with discrete double-inclined, helical, inclined ribs etc. can be considered as passive. [3,4]. Active methods include ultrasound waves [5], surface vibration [6], multiple jet impingement [7], etc.

One of the active methods of enhancement of heat transfer is pulsation of the flow created artificially as well [8,9]. Despite the fact that in the literature there

are a large number of works in which the thermal performance factor of passive methods [2, 10] is estimated, number of experimental data results of pulsation method use is extremely small.

Therefore, in this work, it is planned to evaluate the thermal performance factor of the pulsation method of heat transfer intensification. Evaluation will be made for previously obtained data on heat transfer and hydraulic losses in the in-line tube bundles [11]. In a previous paper [12], a thermal performance factor was made in the staggered tube bundle at constant Reynolds numbers Re = 100, and the influence of Re numbers will be analyzed here. Re range will correspond to $100 \le Re \le 1000$, Prandtl number Pr = 293, pulsating frequency $0,2 \le f \le 0,5$ Hz, dimensionless relative amplitude of pulsating flow $0,2 \le A/D \le 0,5$, duty cycle $0,25 \le f \le 0,5$ Hz, dimensionless relative amplitude of pulsating flow $0,2 \le A/D \le 0,5$, duty cycle $0,25 \le \psi \le 0,5$.

Assessment of thermal performance factor

To estimate the thermal performance factor, the technique proposed in [13] was used.

$$\eta = E_p/E_{st} = (Nu_p/Nu_{st})/(\xi_p/\xi_{st}), \quad (1)$$

where Re_{st}, E_{st}, Nu_{st}, ξ_{st} are Reynolds numbers, Kirpichev coefficient, Nusselt number and hydraulic losses in a tube bundle with a stationary flow Re_p, E_p, ξ_p – is the average Reynolds number for pulsating flow, Kirpichev coefficient, Nusselt number and equivalent hydraulic resistance in a tube bundle with a pulsating flow. The parameter η in equation (1) is also called the Reynolds analogy factor (RAF) [2] under condition $Re_p = Re_{st}$.

Results and discussion

Thermal performance factor η calculated by equation (1) is 3 shown in fig. 1, the increase in hydraulic losses ξ_p/ξ_{st} and the Nusselt numbers Nu_p/Nu_{st} in a pulsating flow, compared with a stationary one. According to fig. 1 the increase in the Reynolds numbers Re leads to an increase in the indicator η. The growth of η continues to $Re \approx 600$, further increase of Re, the indicator η does not change significantly. When Re = 100, an increase in the frequency *f* of the pulsations (Fig. 2) leads to an increase in the hydraulic losses ξ_p/ξ_{st} and Nu_p/Nu_{st}, but the growth ξ_p/ξ_{st} is ahead of the increase Nu_p/Nu_{st}, and therefore the thermal performance factor decreases. At Re = 600 and 1000, with increasing f, the growth of the ratio ξ_p/ξ_{st} slows down, which leads to an increase in the indicator η. The influence of the amplitude of the pulsations *A/D* (Fig. 3) on the ratios ξ_p/ξ_{st} and Nup/Nust, is similar to the influence of the frequency f.

If we consider the influence of the duty cycle ψ on the factor η, then according to fig. 1–3 it can be seen that with a decrease in the duty cycle an increase in η occurs. Thus, asymmetric pulsations $\psi = 0,25$, more effective than symmetric $\psi = 0,5$.

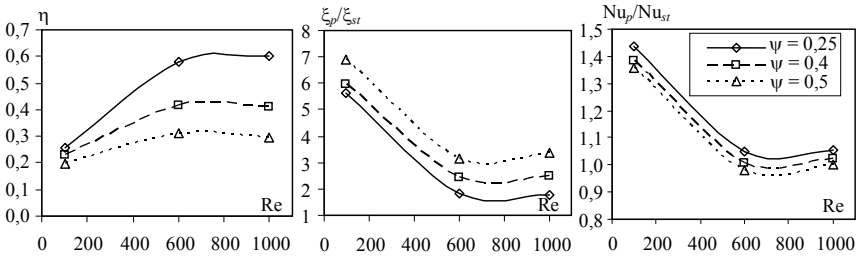

Fig. 1. The dependence of Nu_p/Nu_{st}, ξ_p/ξ_{st} and η on Re at Pr = 293; *A/D* = 25; f = 0,2 Hz

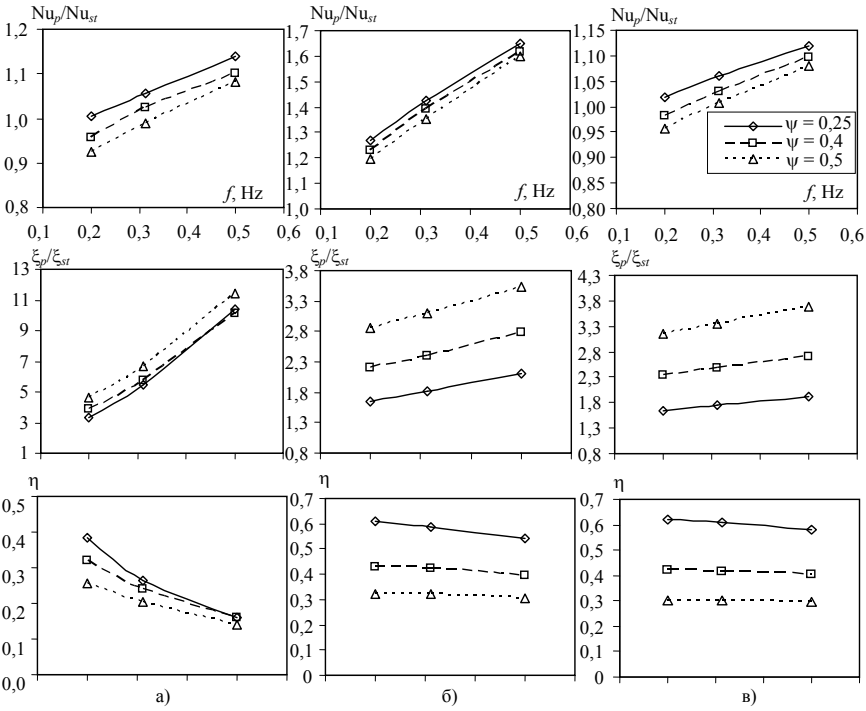

Fig. 2. The dependence of Nu_p/Nu_{st}, ξ_p/ξ_{st} and η on *f* at Pr = 293, *A/D* = 15: а) Re = 100; б) Re = 600; в) Re = 1000

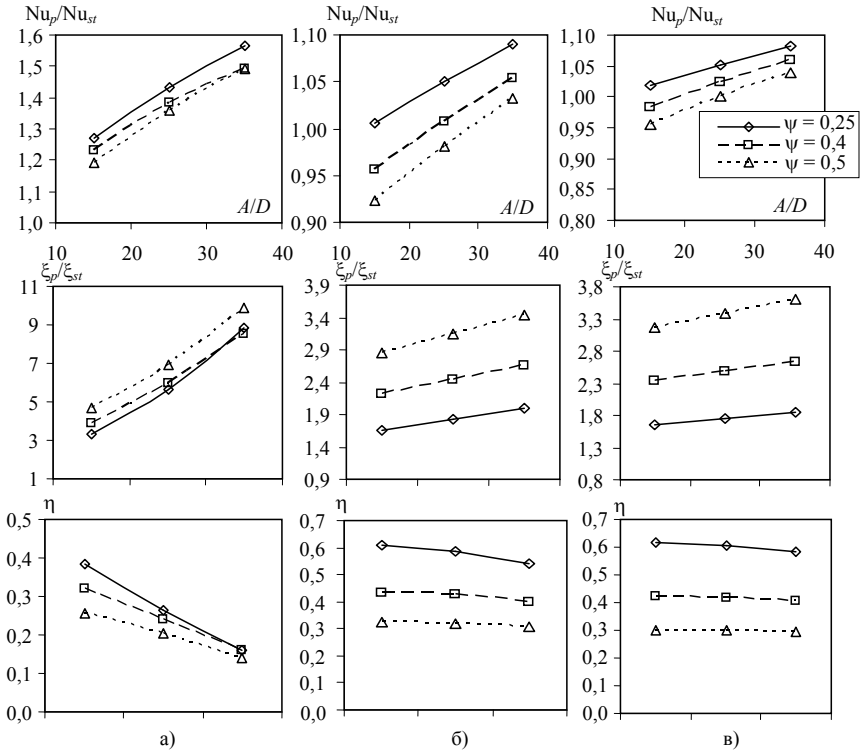

Fig. 3. The dependence of Nu_p/Nu_{st}, ξ_p/ξ_{st} and η on *A/D* at Pr = 293, Re = 100, *f* = 0,2 Hz:
а) Re = 100; б) Re = 600; в) Re = 1000

Conclusion

An increase in Reynolds numbers Re leads to an increase in thermal performance factor η. With an increase in the frequency *f* and the amplitude of the pulsations *A/D*, there is a decrease in η. Asymmetric pulsations are more effective than symmetrical ones. The maximum value η = 0,62 corresponds to the mode Re = 1000, *f* = 0.2 Hz, *A/D* = 15, ψ = 0,25.

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传热系数

DETERMINATION OF HEAT TRANSFER COEFFICIENTS IN CHANNELS WITH INTENSIFIERS

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注释。这是一个考虑事实的例子。考虑到它和S. Kutateladze建立的传热。存在湍流线中的瞬时热损失的过程。这是动态速度的路径。摩擦系数的数量。传热系数的结果由经验表达式确定。

关键词：边界层，传热，过程强化，湍流模型。

Annotation. *The application of the equations obtained earlier by the authors on the basis of the three-layer model of the Owen P. turbulent boundary layer, as well as the Dysler and Van Drist models for calculating heat transfer coefficients in channels with intensifiers is considered. Taking into account the conservatism of the laws of friction and heat transfer established by S. Kutateladze. and AI Leontiev, to various disturbances in the turbulent boundary layer, shows the definition of the parameters of equations for average heat transfer coefficients in channels with process intensifiers (roughness, transverse annular projections and annular knurling in pipes). The main characteristics for the calculation are the ratio of the friction coefficient of a smooth surface to the coefficient of friction of a surface with intensifiers, as well as the dynamic velocity. An expression is obtained in the form of a dimensionless complex, as a function of the Nusselt number of the Reynolds number and friction coefficients. The results of calculations of average heat transfer coefficients are given, which are in satisfactory agreement with the experimental data and with the calculation by empirical expressions.*

Keywords: *boundary layer, heat transfer, process intensification, turbulence models.*

The work was performed as part of the basic part of the state assignment in the field of scientific activity (№13.6384.2017/БЧ).

Introduction

The purpose of this work is to show the application of equations obtained from models of a turbulent boundary layer without disturbances, to calculate heat transfer coefficients in channels with intensifiers.

It is known that a turbulent boundary layer, like any stable statistical system, has some conservative properties. An important feature of near-wall turbulence is the very weak dependence of some characteristics of the averaged flow with respect to external disturbances — a special attention was paid by S.S. Kutateladze, together with A.I. Leontiev. Based on the limiting relative laws of heat transfer and friction, computational methods were created [1, 2].

There are various modifications of the Reynolds analogy for separated flows behind small obstacles on the channel walls. The violation of analogy in separated flows is taken into account by a certain coefficient K, showing the degree of difference in the intensity of momentum and heat transfer in the separated flow (works by P. Tetervin, V.K. Migaya, G.A. Dreitzer, B.A. Dementieva, B.A. Kadera, A.M. Yagloma and others). The ratio of coefficients R_τ / R_q is also used, taking into account the difference in the velocity and temperature profiles [3]. The theoretical basis of the above approaches is to use the well-known properties of the conservatism of the laws of friction to the longitudinal pressure gradient in the boundary layer, i.e. The structure of the mathematical description of elementary acts of transfer is invariant to various perturbations and the scale of the apparatus. The influence of these factors does not change the structure of the mathematical description of the boundary layer, but is taken into account parametrically.

In [4, 5], the following expressions for the heat transfer coefficients were obtained within the framework of the models of a turbulent boundary layer.

Using the three-layer model of Owen P.

$$\alpha = \frac{\rho c_p u_*}{\left[2{,}386\, R_1 + \frac{1}{\chi}\ln\left(\chi R_\delta / R_1\right)\right]\mathrm{Pr}^m}, \qquad (1)$$

where α – heat transfer coefficient, W /(м^2 K); u_* – dynamic speed, m/s; ρ – medium density, kg/m^3; c_p – specific heat of the medium, J / (kg K); Pr – Prandtl number; $\chi = 0{,}4$ – turbulence constant; $R_1 = u_*\delta_1 / \nu = 5$ – dimensionless viscosity of underlayer; $R_\delta = u_*\delta / \nu$ – dimensionless boundary layer thickness; δ_1, δ – the thickness of the viscous sublayer and the boundary layer, respectively, m; ν – coefficient of kinematic viscosity, m^2/s; m – the exponent at the Prandtl number depends on the hydrodynamic conditions of the flow; it is known that for plate and pipe m = 0,57 in a chaotic nozzle m = 0,67, etc.

Using the Daisler and Van Drist turbulent viscosity function, obtained

$$\alpha = \frac{\rho c_p u_*}{\left[R_1' + \frac{1}{\chi}\ln R_\delta\right]\mathrm{Pr}^m}. \quad (2)$$

In the expression (2) parameter $R_1' = 5{,}2$.

The given formulas are verified in calculations of the average heat transfer coefficients when a turbulent flow flows around various channels and bodies. Satisfactory agreement with experimental data has been established.

Heat transfer from the surface with intensifiers

For the intensification of heat transfer can be used both active and passive methods. The latter include surface roughness, dimples, ring knurls, spin flow, porous inserts, small nozzles, etc.

Below is an example of using equations (1) and (2) obtained for a flat boundary layer, and taking into account disturbances caused by the intensification of transport phenomena is taken into account parametrically, which allows us to approximate the average heat transfer coefficients using hydraulic resistance coefficients.

It is known that if $ku_*/v < 5$ (k is the height of the protrusions, m), then all the elements of roughness are located inside the viscous sublayer, their flow occurs without vortex formations, and the roughness does not affect the characteristics of turbulent flow. If $5 < ku_*/v \le 70$, then the elements of roughness protrude from the viscous sublayer, causing additional resistance and intensification of heat transfer. If $ku_*/v > 70$ - the mode with the full manifestation of roughness and the resistance coefficient $\xi_ш$ does not depend on the Reynolds number, but is determined only by the value of the relative roughness. To determine the coefficients $\xi_ш$ of rough surfaces, semi-empirical dependencies or graphs are used [2].

The values of the dimensionless parameters R_1 and R_δ in expressions (1) and (2) and for rough surfaces will differ from those for smooth surfaces. Calculation of R_1 and R_δ for surfaces with elements of intensification can be performed according to dependencies [4-6] with $\xi_ш$ (for round channels):

$$R_{1ш} = 5\sqrt{\frac{\xi}{\xi_ш}},\ \mathrm{R}'_{1ш} = 5{,}22\sqrt{\frac{\xi}{\xi_ш}}. \quad (3)$$

$$R_\delta = 0{,}25\,\mathrm{Re_d}\sqrt{\xi_ш/8,} \quad (4)$$

where ξ, $\xi_ш$ – smooth and rough pipe drag coefficients; $\mathrm{Re}_d = u_{cp}d/v$ – Reynolds number; d – pipe diameter, m.

The challenge is to determine the average dynamic velocity on the wall with elements of intensification. If $ku_*/v < 70$, then with a small error it is possible to use known expressions for a plate and a pipe:

$$u_{*ш} = u_\infty \sqrt{C_{f\,ш}/2}\,,\; u_{*ш} = u_{ср}\sqrt{\xi_ш/8} \tag{5}$$

Using the formula (1), the Nusselt number for a rough surface with parameters (3) - (5) is written in the form

$$Nu_ш = \frac{\mathrm{Re}_d \sqrt{\xi_ш/8}\,\mathrm{Pr}^{0,43}}{11,93\sqrt{\xi/\xi_ш} + \frac{1}{\chi}\ln\left[\frac{0,05\chi\,\mathrm{Re}_d\sqrt{\xi_ш/8}}{\sqrt{\xi/\xi_ш}}\right]} \tag{6}$$

The expression for calculating the Nusselt number of a rough surface of (2), (3) - (5) will get the form

$$Nu_ш = \frac{\mathrm{Re}_d \sqrt{\xi_ш/8}\,\mathrm{Pr}^{0,43}}{5,22\sqrt{\xi/\xi_ш} + 2,5\ln\left(0,25\,\mathrm{Re}_d\sqrt{\xi_ш/8}\right)} \tag{7}$$

where $\xi = 0{,}0032 + 0{,}22\mathrm{Re}_d^{-0,237}$; the value ξш is experimentally.

Obviously, for ξш = ξ, expressions (6), (7) give results for a smooth surface, which are in good agreement with the calculation using the expressions Mikheev MA, Petukhova B.S. and etc.

Calculation results

To compare the results of calculations of Nusselt numbers for rough surfaces, both well-known semi-empirical expressions and experimental data from various authors were used.

We write the expression (7) in a more convenient form for calculations. Using theratio (3)-(5) c ξ=0,316 $\mathrm{Red}^{-0,25}$, (4•103<Red<105) we get:

$$\mathrm{Nu}_{d\,ш} = \frac{\mathrm{Re}_d \sqrt{\xi_ш/8}\,\mathrm{Pr}^{0,43}}{6,52\left(\mathrm{Re}_d^{0,125}\,\xi_ш^{0,5}\right)^{-1} + 2,5\ln(0,0135\,\mathrm{Re}_d^{1,125}\,\xi_ш)} \tag{8}$$

In fig. 1 plotted area - 2, occupied by experimental data [7, 8] for channels with transverse annular protrusions in relation to gases: the relative step of transverse annular projections *t/d* = 0.25...1.0; the ratio of the internal diameter of the pipe in the region of the protrusions to the internal diameter of the smooth pipe is 0.9...0.95, as well as the anomalously effective method of intensification (area –1) [8]. As can be seen, the known dependence $\mathrm{Nu}_ш/\mathrm{Nu} = \xi_ш/\xi$ for ordinary methods

is valid only for $\xi_ш / \xi < 2$, and for anomalously effective before $\xi_ш / \xi < 2{,}5$. The calculation by the formula (8) provides good agreement with the experimental data for the usual methods of intensification for the entire investigated interval of relations $Nu_ш / Nu$ and $\xi_ш / \xi$ (Fig. 1)

The calculation of Nusselt numbers by formulas (6) and (7) gives average values of heat transfer coefficients and does not allow for local disturbances (flow separation, negative pressure gradient, etc.), but for industrial devices this is quite enough when designing or modernizing them.

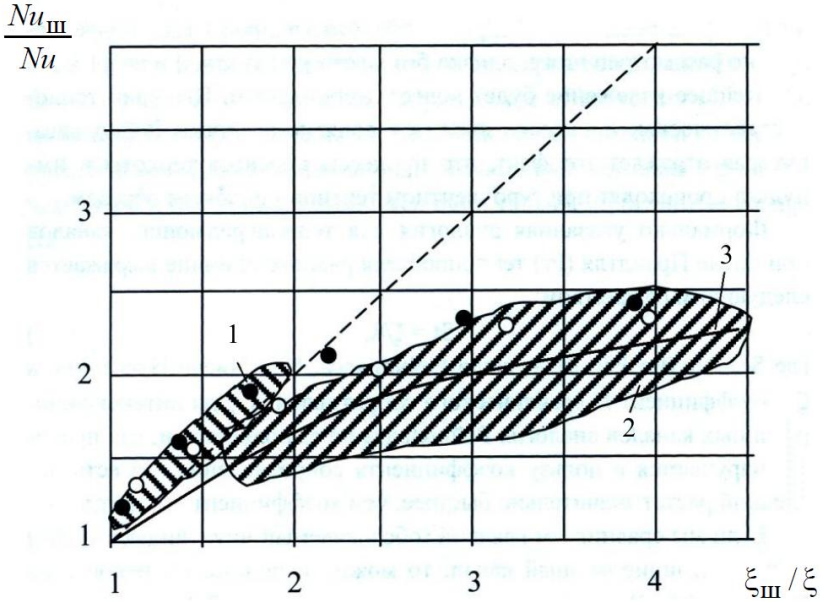

Fig. 1. *Relative efficiency of heat exchange intensification with transverse annular protrusions in a circular channel [7, 8]: dashed lines - areas occupied by experimental points; 1 - anomalously effective method of relative intensification; 2 - conventional methods of intensification; curve 3 - calculation using formula (8)*

Conclusion

The article gives examples of calculations of average heat transfer coefficients using equations derived from the use of three-layer models of the Owen P. turbulent boundary layer, Daysler and Van Drist. Satisfactory agreement with known results, both for smooth surfaces, and with various intensifiers is shown.

It should be noted that expressions (1), (2) can also be used for approximate

calculations of heat transfer in channels with a constant spin flow. In this case, the dynamic speed is written from the equation of the balance of forces in the form, $u_* = u_{cp}\sqrt{\xi_з / (8\cos\theta)}$, $\xi_з$ - the coefficient of resistance of the channel with a twist; θ - the twist angle of the thread. As a result, we obtain expressions similar to (6), (7), which provide satisfactory agreement with experimental data on average heat transfer coefficients. The use of equations (1) and (2) also provides good agreement with experiments in the calculation of the coefficients of heat and mass transfer in the gas phase of film apparatus [9]

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公寓和个人住房安全活动自动化的协同与整合
SYNERGETICS AND INTEGRATION IN AUTOMATIONS OF SAFE ACTIVITY IN APARTMENTS AND PERSONAL HOUSES

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注释。紧急部和自愿火灾队。已经证明这不是问题。 -execution。这是一个已经实施的系统。在能量泄漏的情况下，必须将其考虑在内。俄罗斯联邦发明和实用新型的证明。

关键词：能源风险，防爆，能源和能源危害

Annotation*. The article presents an analysis of the activities of the state fire service of Russian Emergency Situations Ministry and voluntary fire formations. The statistics of fires and the consequences of them in the Krasnodar Territory shows the unsystematic nature of the existing methods and means of fire protection of the village, as well as the imperfection of legislative and regulatory legal acts in this area, which leads to their non-execution. Based on the results of the system analysis, a systemic synthesis of a synergistic system for detecting and suppressing fire and energy harm and dangerous factors of fire and explosion in the use of energy resources in the residential sector has been carried out. With the help of a synergistic approach to the accounting of energy consumed, the integration of innovative solutions to protect the residential sector of rural settlements from fires and explosions in case of leakage of household gas has been implemented. The scientific novelty of the proposed solutions is confirmed by patents of the Russian Federation for inventions and utility models..*

Keywords*: safety, explosion protection, energy resources, fire and energy harm, fire hazards, residential sector, reinvestment mechanism, reactive power compensator, thermomagnetic air separator*

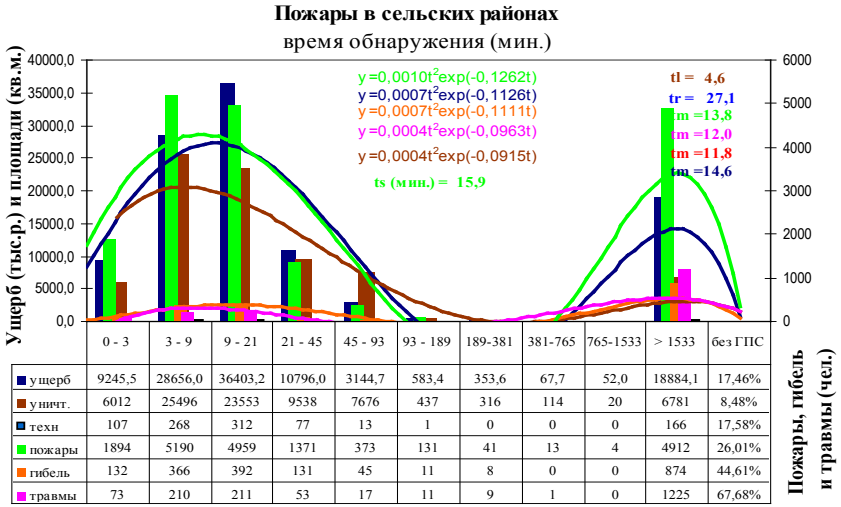
The main reason for the high level of social and economic losses from fires, and at the same time a consequence of the “sectoral attitude” to the problem, is the lack of a systematic approach both to the processes of ensuring fire safety of vital activity and to safe living activity in general, i.e. to management as a forced organization, without taking into account the processes of self-organization of the activities of all members of society in this area [1,2].

First of all, this concerns the tasks of preventing and extinguishing fires in the residential sector of rural areas, which, after the collapse of the USSR, turned out to be practically without protection. And statistics show that more than 70% of fires in Russia occur in residential buildings. At the same time, more than 70% of those killed in fires are attributed to combustion products poisoning. Therefore, based on the latest methods and means of fire protection (detectors, self-rescuers, primary fire extinguishing equipment, etc.) and fire prevention (inspection of objects), it is necessary to integrate them so as to prevent the occurrence and spread of fires, as well as death and injury from them than to reduce the socio-economic losses from fires [2,3].

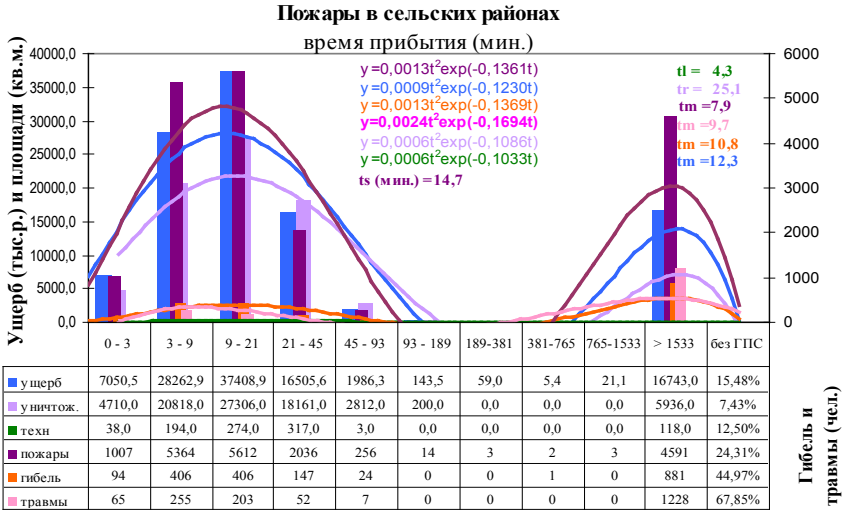
Currently, in order to increase the level of protection of the population against fires, Federal Law No. 100 “On Voluntary Fire Protection” has proposed to revive voluntary fire formations (VFF) to reduce the number of fires and losses from them in the most vulnerable areas of activity, namely in rural areas . At the same time, one of the main tasks of voluntary fire protection in the field of fire safety, along with extinguishing fires, is fire prevention. [4]**.**

Article 25 of the 69-FZ "On Fire Safety" states: "... targeted public awareness of the problems and ways to ensure fire safety, is carried out through the media .... This work is required to carry out government bodies, local governments, fire protection and organizations. ” However, to date, training in fire safety measures for the population (in the private and departmental residential sector), as required by the 69-FZ "On Fire Safety" is practically not carried out.

The statistics of fires over the past decade in rural areas of the Krasnodar Territory shows that the time of detection of fires is, on average, 15.9 minutes (Fig. 1). In this case, the average time of arrival at the fire site after its detection is 14.7 minutes (Fig. 2). The first is due to the fact that the fire alarm is absent on the overwhelming number of objects, and the second is the remoteness and low average speed of movement (Fig. 3) of a fire truck [3,5].



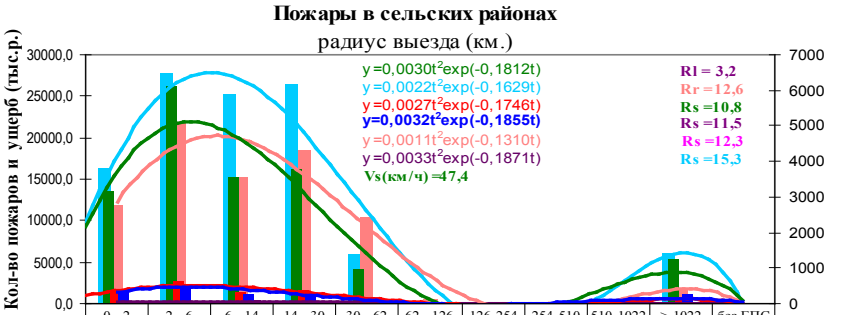
	0 - 3	3 - 9	9 - 21	21 - 45	45 - 93	93 - 189	189-381	381-765	765-1533	> 1533	без ГПС
ущерб	9245,5	28656,0	36403,2	10796,0	3144,7	583,4	353,6	67,7	52,0	18884,1	17,46%
уничт.	6012	25496	23553	9538	7676	437	316	114	20	6781	8,48%
техн	107	268	312	77	13	1	0	0	0	166	17,58%
пожары	1894	5190	4959	1371	373	131	41	13	4	4912	26,01%
гибель	132	366	392	131	45	11	8	0	0	874	44,61%
травмы	73	210	211	53	17	11	9	1	0	1225	67,68%



	0 - 3	3 - 9	9 - 21	21 - 45	45 - 93	93 - 189	189-381	381-765	765-1533	> 1533	без ГПС
ущерб	7050,5	28262,9	37408,9	16505,6	1986,3	143,5	59,0	5,4	21,1	16743,0	15,48%
уничтож.	4710,0	20818,0	27306,0	18161,0	2812,0	200,0	0,0	0,0	0,0	5936,0	7,43%
техн	38,0	194,0	274,0	317,0	3,0	0,0	0,0	0,0	0,0	118,0	12,50%
пожары	1007	5364	5612	2036	256	14	3	2	3	4591	24,31%
гибель	94	406	406	147	24	0	0	1	0	881	44,97%
травмы	65	255	203	52	7	0	0	0	0	1228	67,85%

Fig. 1 - *Time of detectig fires in rural areas*
Fig. 2 - *Arrival time for a fire in rural areas*

Figures 1-3 clearly show that the greatest number of fires and damage from them in rural areas are concentrated outside the operational and tactical capabilities of the garrisons, since The State Fire Service does not leave for every 4th fire, where every 2nd is killed and 2 out of 3 of those affected by fires are injured, and every 6th unit of agricultural equipment is de-



	0 - 2	2 - 6	6 - 14	14 - 30	30 - 62	62 - 126	126-254	254-510	510-1022	> 1022	без ГПС
ущерб	16368,1	27858,3	25216,8	26424,5	5919,2	198,7	0,1	0,0	0,0	6200,3	5,73%
площ.	11764,0	21659,0	15292,0	18541,0	10542,0	548,0	0,0	0,0	0,0	1597,0	2,00%
техн	119,0	172,0	442,0	162,0	22,0	0,0	0,0	0,0	0,0	27,0	2,86%
пожары	3175	6119	3551	3792	947	45	1	0	0	1258	6,66%
гибель	311	632	337	386	115	5	0	0	0	173	8,83%
травмы	303	534	276	330	81	3	0	0	0	283	15,64%

stroyed, every 12th quarter. square meter and brought the 6th part of direct material losses [3,5]

Fig. 2 - Гистограммы радиусов выезда ПЧ

In-depth statistical analysis of fires showed that 73.51% of all fires in rural areas develop as a result of [5]:

- late detection (> 10 min.) - 40.67% of fires, in which 49.57% die and 13.09% of the affected population is injured, and the damage is 46.69%;

- late arrival (distance> 5 km.) - 25.29% of fires, in which 16.03% die and 9.45% of the affected population is injured, and the damage is 38.22%;

Thus, it can be considered proven that the main causes of increasing losses from fires are their late detection and late arrival to the fire site, as well as the lack of necessary means and skills of fire protection from the facility personnel and the population, which does not depend on equipment and combat training of GPS, However, it fundamentally depends on the structure of the system of fire protection equipment for cities and settlements, which, therefore, is built on requirements that are inadequate to the fire danger of modern infra Structures of administrative-territorial units [1,3,5]!

The synergetic approach requires, in addition to “reviving” the DFT and teaching their members methods of fire protection, fire prevention and propaganda, delegate some functions of state fire supervision (GPN) to the DFT, with the combination of maintenance of object fire fighting equipment and fire prevention [1,5] while increasing their frequency, for example, instead of annual - once a quarter, because there is a seasonal dependence of the causes, places of occurrence and consequences of fires - Fig. 4 and 5).

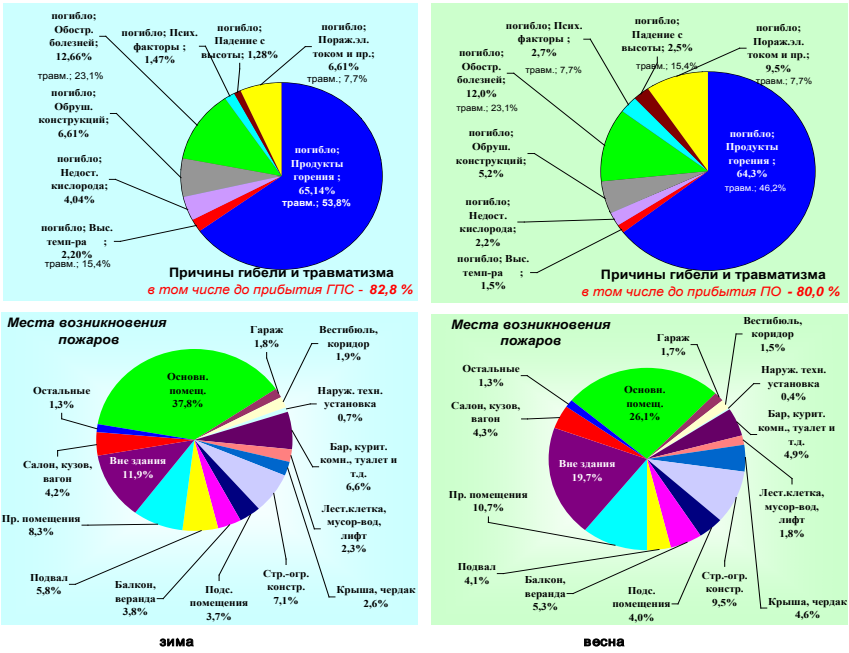
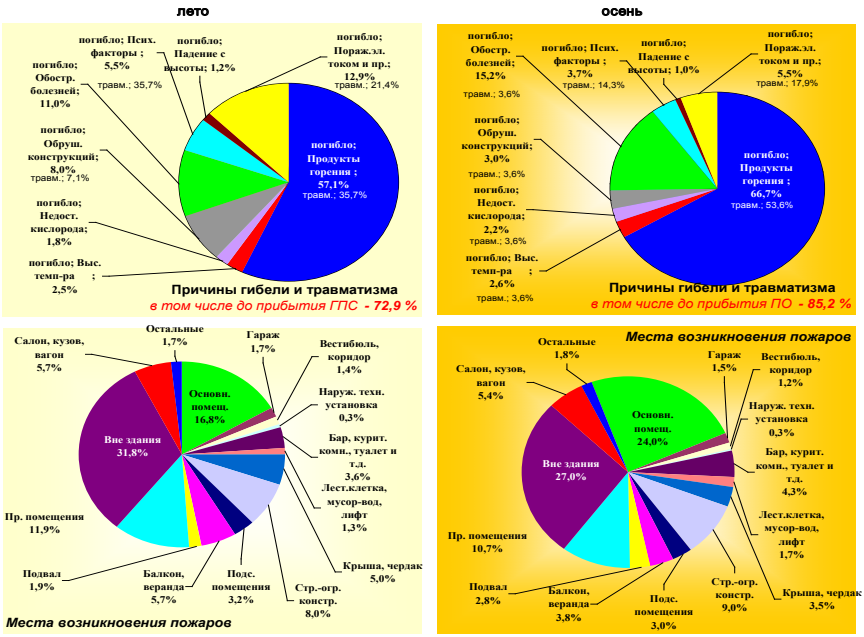


Fig. 4 - *Seasonal changes of causes and places of occurrence of fires*



(1-half year)

Fig. 5 - *Seasonal changes of causes and places of occurrence of fires (2-half year)*

This approach will allow, firstly, to relieve the inspectors of the state fire supervision, leaving behind them only scheduled inspections (1 time in 3 years) and raising their quality, due to the participation of voluntary fire formations in them, and secondly, to implement supervision residential sector, where more than 70% of fires occur [3,5].

Taking into account that due to the quantity and quality of consumed electricity, gas and coal in the residential sector of rural areas of southern Russia, more than 70% of fires occur and over 80% of damage (figure 6 - appliances and household items), a synergistic approach to ensuring fire safety of housing requires the use of electro-gas meters, detectors, which allow to measure fire and energy damage, preventing fires and explosions due to it [5-7].

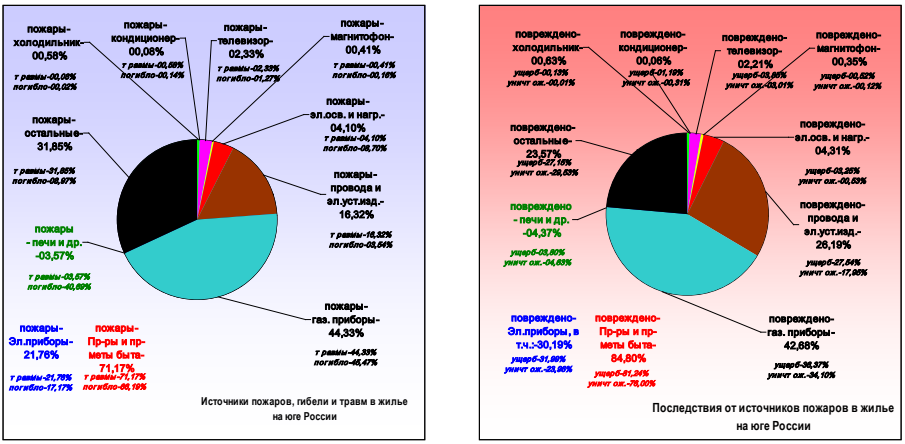


Fig. 6 - *Sources of fires and consequences from fires in the residential sector*

Domestic research has established [7] that low quality of electric power consumed by electric devices (for example, low or high voltage, phase shift of current and voltage, etc.) reduces the technical life of electrical devices and creates conditions for the occurrence of fire hazard in them, i.e. . increases the likelihood of fires for electrical reasons, higher than those required by GOST 12.1.004 [8].

However, for the normal functioning of electrical appliances and ensuring their fire safety, it is not enough just to control the quality of consumed electricity - it is necessary to "smooth out the quality of delivery" of electricity to the consumer, which is successfully performed by reactive power regulators, with which the electric-gas-meter-detector was supplemented [9,10].

Since recent years, the cases of leaks and explosions of domestic gas with fires from this have become frequent, the idea has arisen to develop a pair of an electric meter-detector with a gas meter having an electromagnetic valve and a gas leak sensor (for example, GRAND), which has a GSM module (and connector connection) for the removal of gas consumption data and to control the overlapping of the gas inlet by a solenoid valve [11,12].

In this case, as studies [3, 5–7] have shown, the formula for fire and energy harm from the transformation of electricity and gas in household appliances can be represented as the sum of the products of consumed energy resources on the likelihood of fires from them:

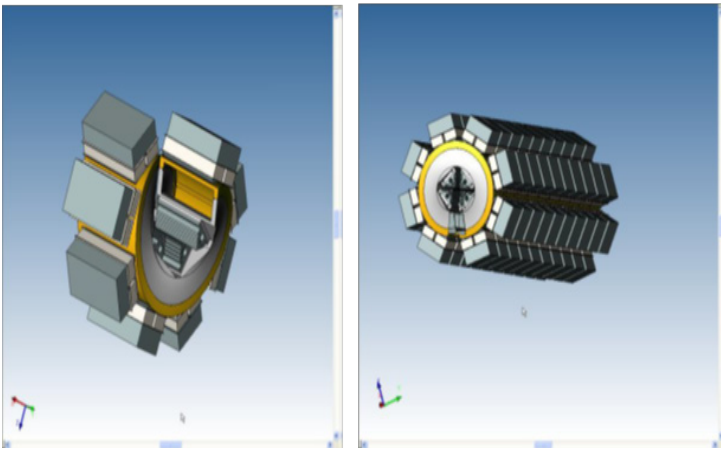
$$ПЭВ = k_{Дж} \cdot (P_{Д} \cdot Wд + P_{НД} \cdot Wнд) + q_{г} \cdot P_{Г} \cdot Wг, \quad (1)$$

where ПЭВ – fire and energy harm during time t, $k_{Дж}$ – conversion factor kilowatt / hour to Joules (3.6 mJ), $P_{Д}$ – probability of fire for electrical reasons with permissible deviations of the parameters of electricity, Wд - the amount of electricity consumed with permissible deviations of its parameters, $P_{НД}$ – probability of fire for electri-

cal reasons with unacceptable deviations of electric power parameters, Wнд – the amount of electricity consumed with no allowable deviations of its parameters, qg is the calorific value of the gas (35 mJ / m^3), Wg is the total amount of gas consumed by the consumer during time t, $P_Г$ – probability of fire from gas appliances.

The use of a gas meter with an electromagnetic valve and a gas leakage sensor will reduce the likelihood of explosions and / or fires from consumer gas appliances. However, they will not be able to protect against leakage of domestic gas from the outside (external gas pipeline, neighboring apartment, etc.). Only the use of gas fire extinguishing installations [13], which lower the oxygen concentration and introduce nitrogen in the protected premises, for example, membrane air separators [14] or thermomagnetic air separators (TMS) [15], can fully suppress the detected PEV and the detected FEPM, by removal of oxygen and the introduction of nitrogen through the aspiration system ESSI [6].

The thermomagnetic air separator (TMAS) is a pipe coiled into a spiral (Fig. 7), on the outside of which there are permanent magnets, and on the inside - Azarov's vortex coolers [15,16].



а) б)

Fig. 7 - *TMAS: a) - single turn; b) - separator assembly*

In the middle of the TMAS channel, to reduce the reduction of diffusion, a nanopartition made of porous aluminum was installed (Fig. 8), dividing it into a “paramagnetic” - oxygen subchannel and a “diamagnetic” - subchannel with inert gases cooled by vortex Azarov modules. TMAS is based on the equation of gas motion (Euler equation) in a magnetic field, through ν is the gas velocity vector field, p is the gas pressure, α is the magnetic polarizability of a single molecule, and H is the magnetic field strength

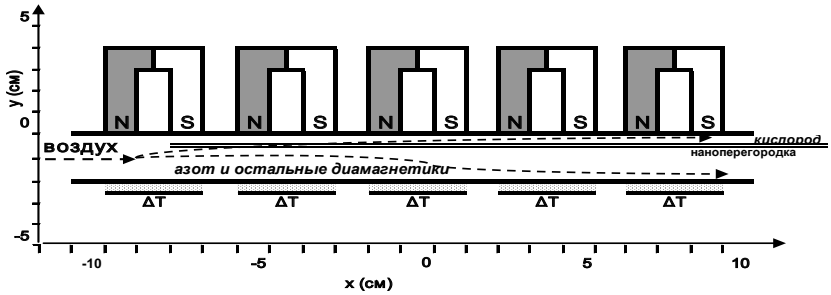


Fig. 8 - *Arrangement of magnets, coolers and nano-partition*

$$\rho \cdot \left(\frac{\partial \nu}{\partial t} + (\upsilon \cdot \nabla) \cdot \nu \right) = -grad\ (p) - \rho \cdot grad\left(-\frac{\alpha H^2}{2m} \right); \qquad (2)$$

Substituting into equation (2) the equation of state of an ideal gas $pV = NkT$, and expressing the density of the gas through its pressure $p = nkT = \rho kT/m$, we obtain the expression for the density of gas molecules in the form of the Boltzmann distribution

$$\rho = \rho_0 \exp\left(\frac{\alpha H^2}{2kT} \right) = \rho_0 \exp\left(-\frac{U}{kT} \right), \qquad (3)$$

where $U = -\alpha H^2/2$ – potential energy of a single gas molecule with paramagnetic or diamagnetic properties located in an external inhomogeneous magnetic field.

For oxygen with paramagnetic properties, the magnetic polarizability of an individual α molecule is positive ($+3396 \cdot 10^{-6}$), and for other atmospheric gases, including Nitrogen ($N_2 = -12 \cdot 10^{-6}$) with diamagnetic properties, the magnetic polarizability of a separate α molecule is negative. Therefore, the oxygen density increases (up to 100%) in accordance with equation (4) in the region of a strong magnetic field (in the "paramagnetic subchannel"), and the density of the nitrogen component decreases to zero in it, increasing (up to 98%) in the "diamagnetic subchannel".

Thus, the new method [17] of diagnostics and suppression of fire and energy harm (FEH) and dangerous factors of fire and explosion (DFFE) from household gas leaks in residential buildings using an electric-gas-meter-detector, integrated with the reactive power compensation unit and with a thermomagnetic air separator, turn them into an electric-gas-counter-detector-suppressor FEH and DFFE, that is, into an element of self-organization of fire and explosion safety in the residential sector, and especially in residential houses in rural settlements.

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分析无损检测方法
ANALYSIS OF NON-DESTRUCTIVE TESTING METHODS

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注解。 本文回顾并确定了最有前景的声学（超声波）和辐射（射线照相）无损检测方法。

关键词：无损检测，缺陷检查，声学方法，X射线方法，能力。

Annotation*. The paper reviewed and identified the most promising acoustic (ultrasonic) and radiation (radiographic) methods of non-destructive testing.*

Keywords*: non-destructive testing, defectoscopy, acoustic method, x-ray method, capabilities.*

The main purpose of non-destructive testing is the indisputable detection of defects by analyzing the interaction of the test object with fields of different nature and substances.

The main methods of non-destructive testing:

- magnetic;
- eddy current;
- radio wave;
- optical;
- acoustic (ultrasonic);
- radiation (radiographic);
- heat;
- electric;
- penetrating substances.

It should be noted that with all the variety of methods of non-destructive testing, acoustic (ultrasonic) and radiation (radiographic) methods are often used.

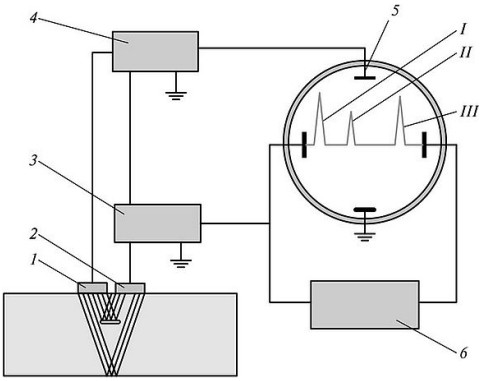
The acoustic method of non-destructive testing is based on the possibility of high-frequency vibrations to penetrate into the object and be reflected from the surface of cracks, voids, to detect increased fatigue. We can observe this with the help of elastic oscillations, which are periodic changes in the state of the medium.

Ultrasonic control allows us to control various objects: vessels, pipelines, sheet metal, welded joints, etc.

Possibilities of the radiation method:

1. high sensitivity to dangerous violations (for example: undercuts, cracks, etc.);
2. impeccable reliability and speed of research;
3. the ability to control without stopping the process;
4. eliminates the possibility of eliminating parts (of the entire object) from operation;
5. the part is not deformed or damaged.

Currently, the pulsed ultrasound method is the most common. Thanks to him, the evaluation of turbine rotor blades, cylinders of internal combustion engines, wheel drums, etc. is carried out. This method is also used to determine the thickness of the walls of an object and the structure of the material.



Pulsed ultrasonic flaw detector circuit

1. piezoplate of the transmitting searching head; 2. piezoplate receiving ascending head; 3. generator of radio pulses; 4. amplifier; 5. cathode ray tube (CRT); 6. horizontal scan generator .	I. initial impulse; II. bottom signal; III. defect signal .

Ultrasonic oscillations in an acoustically transparent medium are transmitted in the form of ultrasonic waves over long distances and without strong attenuation. The intensity of ultrasonic vibrations I_x at a distance x from the emitter lies in the acoustic properties of the medium, characterized by the linear attenuation coefficient α, and their initial intensity:

$$I_x = I_0 e^{-2ax}$$

The attenuation of ultrasonic vibrations in a medium is subject to the nature of elastic bonds and the structure of matter, the frequency of vibrations, etc. For example, when the grain size is close to half the length of the ultrasonic wave, the medium becomes acoustically “opaque”.

The main quality of the medium is its acoustic resistance Z, which designates the conditions for the penetration and reflection of the ultrasonic wave from the interface between two media. It is calculated by the product of the density of the medium p and the speed of distribution of the sound C in it:

$$Z = pC$$

Acoustic resistances of materials differ significantly, because they differ in density and speed of sound distribution.

The velocity of the distribution of ultrasonic vibrations is calculated by the elastic modulus of the material E and its density ρ. The speed of distribution of ultrasonic oscillations in the form of longitudinal waves $C_{прод}$ is calculated from the expression:

$$C_{прод} \approx \sqrt{\frac{E}{\rho}}$$

Other types of ultrasonic waves are in a solid medium, for example, surface, ultrasonic, etc., which differ in the direction of vibrations and the speed of their distribution. Thus, the velocity of the distribution of transverse waves is almost equal to half the velocity of the longitudinal, i.e. $C_{попер} \sim 0{,}5C_{прод}$, and the speed of surface waves $C_{пов}$ is almost equal to half the speed of transverse waves, therefore, $C_{пов} \sim 0{,}9C_{попер}$.

Acoustic resistances of gases, liquids, and metals are compared with each other, respectively, as 1: 3000: 10,000; as a result, positive conditions are created for reflecting ultrasonic vibrations from the interface between two media and introducing them into the part.

Ultrasonic waves are distributed from the emitter in the form of a diverging cone. The angle of divergence of the waves φ in the medium is determined by the ratio of the wavelength λ and the diameter of the radiator d, i.e. $\varphi = 2arcsin1.2\,\lambda / d$, and the wavelength λ is the ratio of the velocity of the distribution of the wave in medium C and the oscillation frequency f, i.e. $\lambda = C/f$. In this case, the minimum size of the detected defect x_{min} is more than $\lambda/2$.

The radiation method is based on X-ray absorption and analysis of radiation after its interaction with the test object. In the presence of such defects as cracks, holes or the content of foreign material, leads to the fact that the rays passing through the material are attenuated in various stages.

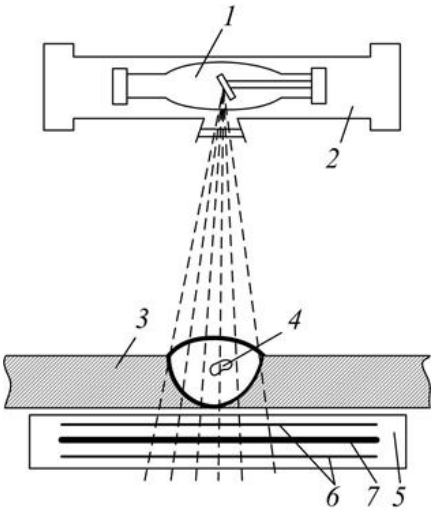
Possibilities of the radiation method:

1. the ability to identify defects that cannot be detected using another method (for example: incomplete welds, undercuts, burn-throughs, etc.);

2. the ability to accurately fix the identified defects, which significantly increases the potential for instant repair;

3. the ability to analyze and evaluate the convexity and concavity.

X-ray inspection - a method of obtaining on an X-ray film (screen) an image of an object (part), illuminated by X-ray or gamma radiation. This method allows X-rays and gamma radiation to pass through the products, affect the X-ray film and some chemical elements, thanks to which they glow.



X-ray transmission scheme излучением

1. x-ray tube;
2. case with lead screen;
3. translucent product;
4. defect;
5. cassette;
6. screen;
7. radiofilm.

The radiation generator is an X-ray tube (one or more). It incorporates a glass flask with evacuated air, into which 2 electrodes, a cathode, were soldered, and a copper anode with a target of tungsten. A low voltage (5–15 V) is supplied to the cathode, and a high voltage (≈ 10 kV) to the electrodes. The heating of the cathode creates thermionic emission, and electrons fly from it, which, under the influence of high potential, reach the anode at high speed.

In the ratio of the anode voltage U and the sequence number of the target material Z, it is possible to determine the fraction of the kinetic energy R (%), which went to the formation of x-rays:

$$R = 1.4 \times 10 - 7 \times Z \times U$$

Having made the calculation, it can be fixed that for a tungsten target Z = 74 the value is R≈0.01% at U <100 kV, R = 1% at U = 100 kV, R = 20% if the voltage reaches 2 MV. Judging by these data, we can conclude that the main part of the energy is not used for receiving X-rays, but is converted into heat.

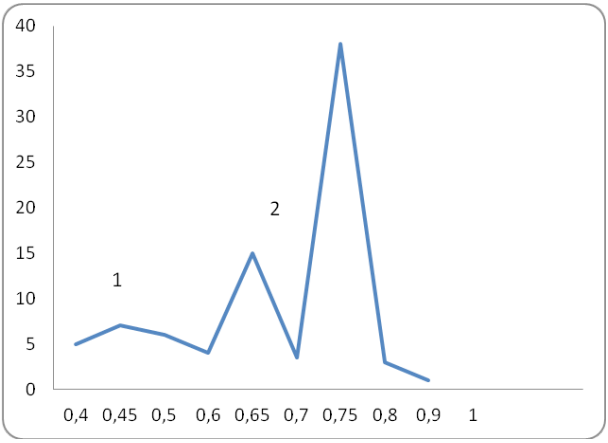
When converting the voltage and anode current of the tube, the radiation intensity is corrected. A change in current only leads to a change in intensity, and a voltage also causes radiation energy. The minimum magnitude of the X-ray wave coincides with the maximum quantum energy, which increases with increasing electron velocity due to the voltage applied to the RT, and can be calculated:

$$e \times U = h \times \nu = \mathrm{h} \times \mathrm{c} \times \lambda_0$$

where e is the electron charge equal to $1.6 \cdot 10^{-19}$ C, U is the voltage on the tube in volts, c is the speed of light, λ_0 is the minimum wavelength of radiation in the X-ray spectrum of the tube, ν is the frequency of radiation, h is Planck's constant .

Conclusion: Based on the above formulas, it can be concluded that the energy spectrum of bremsstrahlung is more dependent on the voltage of the tube. The higher it becomes, the greater will be the speed of the electrons and the radiation energy, thus, the penetrating power of the X-ray radiation and the depth of the layer being tested increase.

As for the overall detection of defects, the probabilities for both methods are close in value. Their significant difference lies in the cost of instruments for detecting cracks, slags, pores, etc., and the X-ray control method used in various branches of engineering production will be more effective and promising.



X-ray spectra for molybdenum targets at U = 35 kV: 1 - solid; 2 - line

基于声音攻击的乐器分化

METHOD OF SOUNDS DIFFERENTIATION OF MUSICAL INSTRUMENTS BASED ON THE SOUND ATTACKS DETECTING

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注释。 每种乐器的声音都专用于每种乐器的声音。 变量是提出的方法。获得分析信号。

关键词：声音攻击，包络，比较器，可变阈值水平，乐器。

Annotation*. The article is devoted to the registration of the sounds of musical instruments by detecting the attack of each sound. A method for detecting sounds based on a comparison of the envelope of a sound with a variable threshold is proposed. Analytical expressions for the parameters of the recording device and signal are obtained.*

Keywords*: sound attack, envelope, comparator, variable threshold level, musical instrument.*

Development and creation of devices that expand the creative possibilities of modern sound engineering, contributes to improving the quality of sound transmission in general. This necessitates the continuous improvement of sound equipment and the search for new methods of sound processing.

The emergence of the next sound, as a rule, is accompanied by a change in the level of its envelope. At the first moment its level increases, and then begins to subside. This recession either continues to zero, or is terminated by the occurrence of the next sound. It should be noted that the decay character of the envelope of many sounds is not monotonous. If we consider the envelope during signal attenuation as a certain function, then in this area it can change the sign of its derivative [1, 2].

One of the simplest ways to detect a signal, which has found widespread use in radio engineering [3-5], is that a signal event is recorded when its envelope ex-

ceeds a certain threshold level. For this purpose, a comparator is used as a comparison device. Its threshold level is usually chosen minimally above the noise level. At the moment when the input signal reaches the threshold level, the comparator registers this event by changing the polarity of its output voltage to the opposite

If we consider the signal of the envelope fragment of the processed melody as a whole, then in this case the task of detection is reduced to determining the moments of the amplitude bursts of this signal. Due to the random nature of changes in the level of the envelope, the use of a comparator with a constant threshold level to solve the problem of detection is impractical [6]. This is confirmed by the following.

Figure 1 shows oscillograms of a fragment of a melody played on a piano and its envelope. In this case, this signal for the comparator is input. Registration of the moment of occurrence of the next sound occurs when it crosses the envelope of a given threshold level.

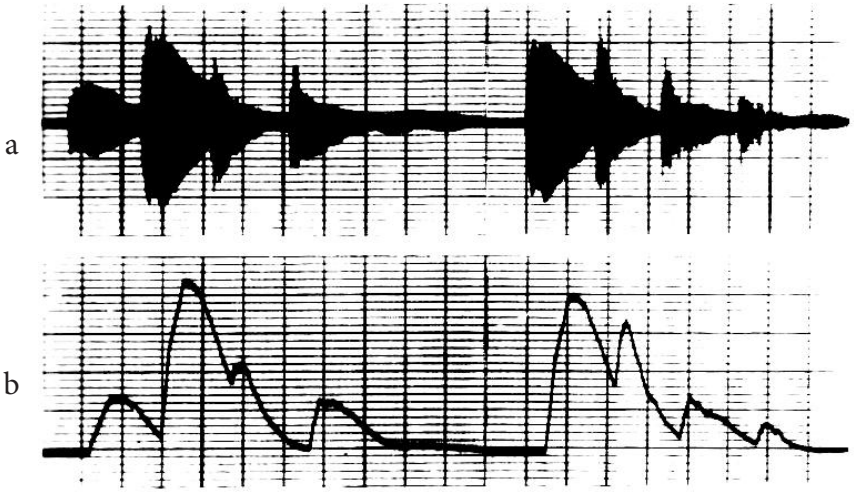

Figure 1 - *Oscillograms:*
a - a fragment of a real melody;b - his Hilbert envelope

It is easy to establish in the figure that it is impossible to choose such a constant threshold level of the comparator, at which the moments of occurrence of all sounds of a melody passage would be recorded. The choice of a single, constant threshold level leads to the registration of one and the omission of other sounds.

In this case, the device will have a “sound skip” error. Another option is possible. Due to the pulsating nature of the envelopes of some sounds in the process of their prolonged sounding (Figure 2), the envelope may re-intersect with a threshold level. This leads to the error “false alarm”, that is, to the registration of the appearance of a new sound in the melody, when it actually was not.

It is obvious that the percentage of errors such as “sound skip” and “false alarm” in the operation of such a device will be significant. However, the number of these errors can be significantly reduced if the threshold signal of the comparator is chosen in a certain way..

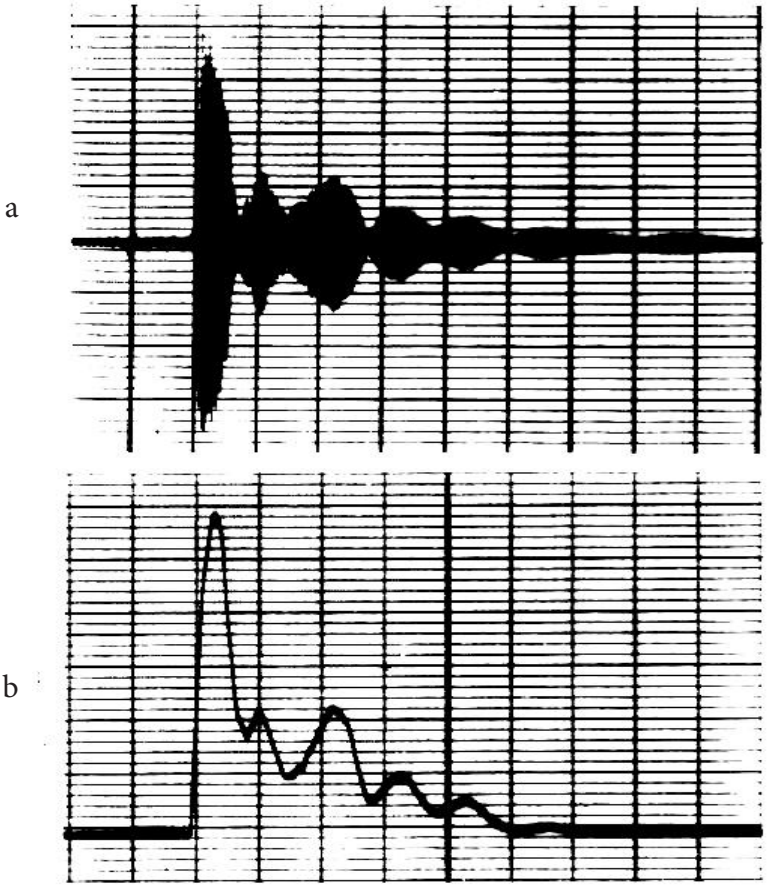

Figure 2 *- Example of possible signal amplitude ripple (a) and its envelope (b) at a long piano sound*

The essence of the proposed method for detecting disturbances of the amplitude of the signal is that the threshold signal of the comparator is formed from the signal applied to its **input**.

When forming the threshold signal, it is proposed to use the well-known property of a quadrupole with a limited bandwidth to distort the shape of the wideband signal [3, 7-8]. In particular, the signals at the output of two quadrupoles with any, but the same input effects, differ in shape from each other the more, the greater the difference in their bandwidths (it is assumed that the transmission coefficients of each of the quadrupoles in the passband are the same).

Let the Hilbert envelope extracted from the original audio signal [9] occupy the ΔFs frequency band. If it is simultaneously applied to two low-pass filters (LPF) with bandwidths ΔF_1 and ΔF_2, such that

$\Delta F_s > \Delta F_1 > \Delta F_2$

then in the spectrum of the envelope at the output of LPF1, as compared with the envelope at the output of LPF2, there will be more high-frequency components and it will change faster and more accurately reflect the process of changing the input signal than the envelope at the output of LPF2.

Denote the envelope at the output of LPF1 as the fast envelope $S_б(t)$, and at the output of LPF2 as the slow envelope $S_m(t)$.

The fast envelope $S_b(t)$ is fed to the input of the comparator, and to the slow envelope $S_m(t)$ we add some positive level of bias and use it as a threshold voltage. Then, at the site of attack of the next sound, Sb(t) will surely "catch up" with $S_m(t)$, and at some point in time their levels will match. A comparator will register this event by changing the polarity of its output signal.

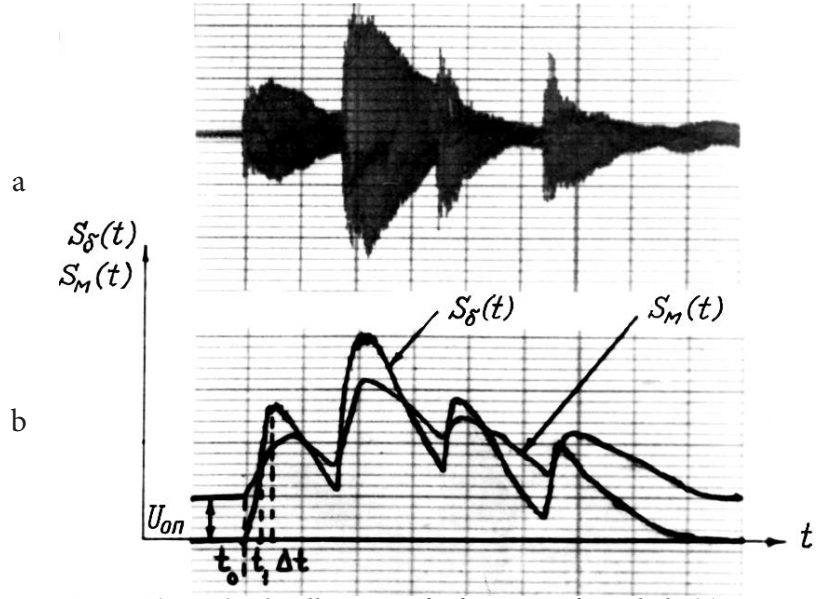

Figure 3 - *Oscillograms of a fragment of a melody (a) and its fast and slow envelopes (b)*

Thus, the formation of a comparator threshold signal by this method from its own input signal allows one to construct a detection device with a tracking threshold and to register the appearance of any short-term ripples of the input signal amplitude against the background of relatively slow changes in its average level.

Figure 3 shows an oscillogram of a fragment of a melody performed by the "legato" stroke on the piano and its fast $S_b(t)$ and slow $S_m(t)$ envelopes [2, 6].

Figure 3 shows:

$$U_{оп} = S_м(t_0) - S_б(t_0) \quad (1)$$

– the difference between the initial levels of fast and slow envelopes,

t_0 point in time corresponding to the beginning of the growth of both envelopes,

$t_1 = t_0 + \Delta t$ – crossing point $S_б(t)$ and $S_м(t)$.

Let us write the condition under which the event of mutual intersection of the levels of these two functions will occur. At the beginning of the time interval Δt, which includes this event, we have:

$$S_б(t_0) < S_м(t_0) \quad (2)$$

and at the end of the interval Δt we have:

$$S_б(t_0 + \Delta t) > S_м(t_0 + \Delta t) \quad (3)$$

Considering the functions $S_b(t_0)$ and $S_м(t_0)$ uniformly increasing on the interval Δt, we write:

$$S_б(t_0 + \Delta t) \approx S_б(t_0) + S'_б(t_0)\,\Delta t$$

$$S_м(t_0 + \Delta t) \approx S_м(t_0) + S'_м(t_0)\,\Delta t,$$

где $S'_б(t_0)$ и $S'_м(t_0)$ derivatives of specified functions at time t0.

Then inequality (3) can be rewritten as:

$$S_б(t_0) + S'_б(t_0)\,\Delta t > S_м(t_0) + S'_м(t_0)\,\Delta t.$$

Therefore, taking into account (1), in order for the amplitude of the input signal to increase in the time interval Δt, the levels of the two functions intersect the condition:

$$\frac{U_{оп}}{\Delta t} < S'_б(t_0) - S'_м(t_0) \quad (4)$$

The $U_{оп}$ value in the left part of inequality (4) is the initial offset between $S_m(t)$ and $S_b(t)$, which is introduced to determine the initial state of the comparator in the pause between sounds. Obviously, if the $U_{оп}$ value is chosen sufficiently small, then any, even the most insignificant, increases in the amplitude of the input signal can be recorded. Thus, in the operation of the sound attack detection device, errors of the "sound skip" type are excluded.

However, given the possible pulsating nature of some sounds in the stationarity and attenuation phases, it is necessary to eliminate errors of the "false alarm" type in the device operation. In other words, the task is complicated by the fact that the device must register only the moment of occurrence (attack) of the sound and skip the signal amplitude changes during possible pulsations. A prerequisite to the possibility of providing such a mode of operation of the device is the following.

For most musical instrument sounds [6, 10–11], the steepness of the temporal increase in amplitude in the pulsation segment (see Fig. 2) is always significantly less than the steepness of the increase during the attack of the sound. Consequently, to register disturbances with a certain steepness in the amplitude of the input signal, inequality (4) should be limited on the other hand.

If to designate:

$S'_{\text{ба}}(t)$ the steepness of the fast envelope in the attack site;

$S'_{\text{ма}}(t)$ the steepness of the slow envelope at the site of attack of the sound;

$S'_{\text{бп}}(t)$ the steepness of the fast envelope on the area of the pulsations;

$S_{\text{мп}}(t)$ the slope of the slow envelope on the area of the pulsations,

then, to eliminate the event of coincidence of the levels Sm(t) and Sb(t) in the portion of the signal ripple, the following condition must be met:

$$S'_{\text{бп}}(t) - S'_{\text{мп}}(t) < \frac{U_{\text{оп}}}{\Delta t} \quad (5)$$

Taking into account the new notation of inequality (4) and (5), we can combine:

$$S'_{\text{бп}}(t) - S'_{\text{мп}}(t) < \frac{U_{\text{оп}}}{\Delta t} < S'_{\text{ба}}(t) - S'_{\text{ма}}(t) \quad (6)$$

If to designate

$$\frac{S'_{\text{ба}}(t)}{S'_{\text{бп}}(t)} = \frac{S'_{\text{ма}}(t)}{S'_{\text{мп}}(t)} = m,$$

then inequality (6) can be rewritten in the form:

$$\frac{1}{m} < \frac{U_{\text{оп}}}{\Delta t\left[S'_{\text{ба}}(t) - S'_{\text{ма}}(t)\right]} < 1,$$

that, taking into account the dependence of the steepness of the signal rise on the LPF bandwidth [7-8], corresponds to the expression

$$\frac{1}{m} < \frac{U_{\text{оп}}}{2\,\Delta t(\Delta F_1 - \Delta F_2)} < 1 \quad (7)$$

In general, inequality (7) shows that for signals with m>1, one can always choose such values of $U_{\text{оп}}$, ΔF_1 and ΔF_2 for which the device will register only the moment of attack and will not react to changes in the signal amplitude during possible sound pulsations.

It should be noted that the described method allows detecting not only attacks of sound signals. It can be used to record the perturbation of the amplitude of signals of any nature, if they can be converted into electrical oscillations.

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形成标准住房的定性和定量参数
FORMATION OF QUALITATIVE AND QUANTITATIVE PARAMETERS OF STANDARD HOUSING

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注释。住宅的质量成为城市发展最重要，最具特色的特征之一。这是人口的素质。人类健康的需求没有变化。作者为活细胞，房屋和领土开发了许多定性和定量参数。已经确定。这是经济新奇的历史。您可以使用它是一个经验法则。投入运营，而不是在设计之初。

关键词：经济舱，质量标准。

Annotation. *The quality of the dwelling becomes one of the most important, defining characteristics of urban development. The process of improving housing in Russia under market conditions should be focused on quality requirements that anticipate the needs of the population. The purpose of the study is to identify the requirements for the quality of a mass market dwelling and their dynamics due to changes in human needs. The authors have developed a nomenclature of qualitative and quantitative parameters of the living cell, house and territory. The range of their values for standard housing has been determined. The scientific novelty lies in the development of a passport of the housing standard of economy-class housing, which allows to track changes in the development of the housing sector. Criteria for assessing the quality of housing can be used in the evaluation of design decisions on the principle of "anticipatory reflection", known in the theory of competition, that is, take into account consumer requirements that will be relevant at the time of putting housing into operation, and not at the beginning of design.*

Keywords: *economy-class housing, standard housing, housing standard, quality standard.*

When forming the new Russian housing policy, it is necessary to take into account the changing requirements for the quality of housing and the urban environment, the need to introduce new approaches to the design and industrial housing construction of energy-efficient, environmentally safe and comfortable dwellings in the economy-class segment [1].

Economy class housing implies an established upper limit of cost and a specific target group of consumers. Its cost should not exceed 35 (30) thousand rubles/m^2 or not more than 80% of the average market value. Designed for young families aged 25-40 with two or more children and a regulated lower income limit, which allows them to apply for a mortgage [2].

The share of economy-class housing in the structure of the housing stock of the country should be 50% according to SP 42.13330.2016 [3]. Opinions of experts tend to a big way: from 58 to 70% [4, 5]. Since 2018, the legislator has abandoned the term “economy class housing” for newly built housing and switched to the term “standard housing” [6]. This demonstrates the difficulties in identifying economy-class housing (standard housing) and the need to develop a typology of housing. Time stable for decades, simple and understandable typologies expire before our eyes [7]. It is necessary to investigate what qualities and properties standard housing should possess.

For the first time, the notion of a standard for artistic and social criteria of architecture was introduced by William Morris (1834-1896): “At the price of introducing this very standard of utility, universal and compulsory for all, the masses will be happy to have separate comfortable apartments and the opportunity to live in an architecturally organized environment. " [8].

In modern interpretation, the standard is a comprehensive regulation that prescribes both the characteristics of the dwelling itself and the requirements for its provision and operation [9].

Based on a retrospective analysis of the quality of buildings on the territory of existing residential buildings, the theory of utility in justifying quality assessment criteria on a scale of relationships, an empirical approach for generalizing and comparative analysis of domestic and international experience, developed a passport of standard housing (Fig. 1).

Consider the concept of "housing standard" as a qualitative and quantitative level of housing. The quality standard of the dwelling is set by a very wide range of indicators: architectural, technological, constructive, engineering, sanitary and hygienic, ecological, operational.

The architectural and typological components of the standard are, first of all, recommended as social types of dwellings. The second most important architectural and typological indicator is the normalized dimensions of housing units and individual premises. The constructive components of the standard include the

recommended structural systems and schemes of residential buildings, construction technologies and materials. The engineering and technical components of the standard imply a certain level of engineering and sanitary equipment. Sanitary and hygienic components of the standard are closely interrelated with architectural, structural and engineering. The environmental components of the standard, which are closely related to sanitary and hygienic, include all those requirements that protect human health from the adverse effects of the natural and artificial environment. The quality of the dwelling is largely created by the standards of its operation: standards for energy, water and heat supply, removal of drains and debris, regulated by the frequency and content of preventive measures (from certification of elevators and meters to combating rodents and insects), repairs and duration of operation equipment.

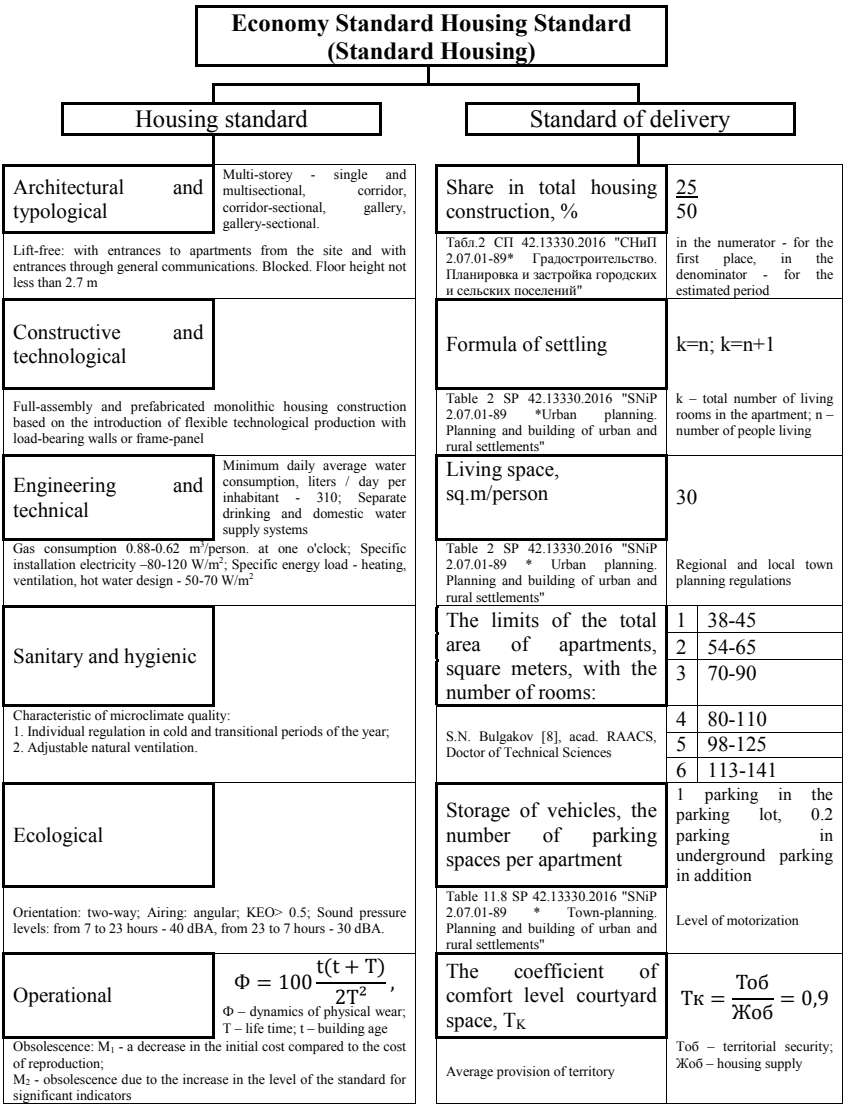

Figure 1. *Passport of housing economy class standard.*

Buildings can be maintained in the “self-destruction” mode, in the “normal mode”, and “correctly” [10]. The formula given in the standard corresponds to the normal mode, under which the terms of current and capital repairs are respected [11]. Special attention

requires the elimination of moral obsolescence of the second form due to the presence of high dynamics in the characteristics of consumer demand and the transformation of needs in changing the structure of the home and the characteristics of its functioning.

Maximizing the utility of the home is achieved through both qualitative and quantitative characteristics. The quantitative characteristics include the total area of the apartment $F_{общ}$ and the ratio of the living area ($F_{ж}$) to the total ($F_{общ}$) - the planning factor K_1.

In 1919, the norms of the RFSFR Narkomzdrav, on the basis of the minimum required air volume per person (about 30 m^3), established a living space standard of at least 8.25 m^2 per inhabitant. The norms of 1989 - SNiP 2.08.01-89 - switch to provision with a total area of 16 m^2 / person apartment, SNiP 2.07.01-89 * - 18 m^2/ person, SNiP 2.07.01-89 ** - 20 m^2/person. In the joint venture 42.13330.2011 (as in the 2016 edition), the indicator is differentiated depending on the type of apartment in terms of comfort: for standard housing - 30 m^2/person. Abroad, the level of housing security varies from 15 m^2/person in Hong Kong to 89 m^2/person in Australia.

Studies have shown that in order to provide a person with the space necessary for normal life, this indicator should be at least 28 m^2/person. [12]. At the end of 2015 in Russia accounted for an average of 23.9 m^2/person. [one].

For the first time, the requirement for family settlement of apartments, an indication of the size of their total area, composition and size of premises appeared in the rationing of the prewar period of the 1930-1941s. Indicators of the lower limits of the total area by types of apartments appeared in the 1960s (SNiP II - L. 1-62). In SNiP II - L. 1-71, the upper limits of the total area of apartments were normalized [13]. Economy class apartment in an apartment building has an area of not less than 20 and not more than 150 m^2 [14].

An analysis of domestic and foreign experience in housing construction allows us to recommend the following areas for a comfortable dwelling (table 1.1).

Table 1 - *Recommended areas of apartments for comfortable construction in cities and urban-type settlements (Russia) [15].*

Comfort level	The total area of apartments, m^2, with the number of rooms							
	1	2	3	4	5	6	7	8
Low level of comfort, k = n-1	36-56	55-84	72-112	90-140	198-168	126-196	-	-
Average comfort level, k = n	-	56-64	84-86	112-128	140-160	168-192	196-224	-
High level of comfort, k = n + 1	-	-	64-76	96-114	128-152	160-190	192-228	224-266
SNiP 2.08-01-89*	28-36	53	65	77	95	108	-	-

Urban science is increasingly coming to the conclusion that, in addition to standards, a flexible regulator of real estate parameters, primarily in private ownership, should be urban planning standards for its quality. At the level of household in general, the quality level of the land plot per average area (cubicure) of a room in an apartment (single-family house) could indicate its quality level [16].

As part of the implementation of the project "Formation of a comfortable environment in the city of Bratsk", based on the analysis of 377 sections of multi-storey buildings in 14 microdistricts of the city, a classification of households was developed according to the level of provision of territories. The evaluation criterion was the coefficient of comfort level of the courtyard space T_k, which is the ratio of the security of the territories to the housing security of the residents of this territory. Three groups were distinguished: with high security (T_k to 1.3), medium (T_k to 1.1) and low (T_k to 0.9). The area of the residential yard is calculated taking into account the driveways and places of storage of vehicles, and involves the summation of areas when applying a multi-level solution.

In the conditions of growing automobilization, permanent storage of individual vehicles in the residential area without compromising the comfort of the courtyard space is possible only in the underground parking [17].

On the basis of the adopted quality standards, the volume and structure of the housing fund of cities, the need for territories of different town planning value should be predicted, land surveying should be carried out, town planning regulations should be established in the "Rules for planning and development".

Given the emerging market nature of housing and the need to maintain a balance of supply and demand, the country's construction complex should be focused on quality requirements that anticipate the current needs of the population. To this end, the existing system of design and standardization should be replaced, fixing existing needs and thus orienting design solutions to yesterday's requirements, to a system of anticipating rationing of quality requirements for dwellings designed for a reasonable pre-emption of the population's needs and establishing a quality standard for the housing for the foreseeable period.

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