



SCIENTIFIC RESEARCH OF THE SCO COUNTRIES: SYNERGY AND INTEGRATION

上合组织国家的科学研究：协同和一体化

Proceedings of the
International Conference

Date:
May 22

Beijing, China 2024

上合组织国家的科学研究：协同和一体化
国际会议

参与者的英文报告

International Conference
“Scientific research of the SCO
countries: synergy and integration”

Part 1

2024 年 5 月 22 日。中国北京
May 22, 2024. Beijing, PRC

Proceedings of the International Conference
**“Scientific research of the SCO countries: synergy
and integration”** - Reports in English

(May 22, 2024. Beijing, PRC)

ISBN 978-5-905695-82-7

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

作者对所引用的出版物，事实，数字，引用，统计数据，专有名称和其他信息的准确性负责

These Conference Proceedings combine materials of the conference – research papers and thesis reports of scientific workers. They examine technical, juridical and sociological aspects 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.

ISBN 978-5-905695-82-7

©Scientific publishing house Infinity, 2024

©Group of authors, 2024

CONTENTS

ECONOMIC SCIENCES

改善俄罗斯联邦税收制度的发展

Improving the development of the tax system of the Russian Federation

Bloshenko Tatiana Alekseevna 9

俄罗斯区域投资项目实施情况分析

Analysis of the implementation of regional investment projects in Russia

Bloshenko Tatiana Alekseevna 18

在创新项目中形成互动管理系统的现代方法

Modern approaches to the formation of an interaction management system in an innovation project

Gavchuk Denis Vasilievich 26

俄罗斯医药市场的互联网品牌传播

Brand communication on the Internet in the Russian pharmaceutical market

Beschastnova Svetlana Petrovna 33

中国房地产市场的金融风险

Financial risks in the real estate market in China

Lin Li Xin, Barkar Aleksandr Aleksandrovich 38

JURIDICAL SCIENCES

激进伊斯兰主义出现的认识论原因和瓦哈比派心理学作为犯罪学和法律心理学的科学概念

Epistemological reasons for the emergence of radical Islamism and psychological Wahhabite profile as a scientific concept of criminology and legal psychology

Voronin Sergey Eduardovich 43

俄罗斯联邦家庭立法合法化的可能性和前景 使用婚姻合同对配偶个人非财产关系进行法律规范

Possibilities and prospects for legalization by family legislation of the Russian Federation legal regulation of personal non-properate relations of spouses using a marriage contract

Mosienko Tatyana Aleksandrovna, Chobanyan Kristina Olegovna 52

当前涉外收养存在的问题

Current problems of foreign adoption

Mosienko Tatyana Aleksandrovna, Priyma Alexander Vyacheslavovich 58

根据联邦合同法登记不公平供应商：当前问题 Register of unfair suppliers in accordance with the federal law on the contract system: current problems <i>Gladkov Vladimir Stanislavovich, Torokhov Yuri Sergeevich</i>	63
提高打击资助恐怖主义领域立法的有效性 Improving the effectiveness of legislation in the field of countering the financing of terrorism <i>Uzhakhov Magomed Karkhanovich</i>	68

PEDAGOGICAL SCIENCES

有效的课程计划策略 Strategies for effective lesson-planning <i>Rybakova Anna Sergeevna, Smirnov Alexander Andreevich</i>	74
为有特殊需要的儿童使用折纸技术制作工艺品提供组织和方法支持 Organizational and methodological support for the production of crafts using the origami technique by children with special needs <i>Tusheva Elena Sergeevna, Fedulova Daria Andreevna, Tkachenko Anastasiia Vladimirovna</i>	78

PHILOLOGICAL SCIENCES

俄英虚拟术语二次命名的比较分析 Comparative analysis of the secondary nomination of Russian and English virtual terminology <i>Kekeeva Tatiana Mikhailovna, Agadzhanova Aknur Agadzhanovna, Menglinova Anastasiya Nickolaevna</i>	85
双关语在英语媒体文本标题中的作用 The role of a pun in the headlines of English-language media texts <i>Kekeeva Tatiana Mikhailovna, Menglinova Anastasia Nikolaevna</i>	91

PHILOSOPHICAL SCIENCES

对日常生活现象的哲学和方法论分析 Philosophical and methodological analysis of the phenomenon of everyday life <i>Borsyakov Yuri Ivanovich, Nikishin Sergey Vyacheslavovich</i>	95
--	----

PSYCHOLOGICAL SCIENCES

心理因素对青少年学生应对行为形成的影响问题 Before the problem of psychological factors on the formation of coping behaviors among young students <i>Labeznaya Larisa Petrovna</i>	105
研究低头族人的沟通问题以及心理咨询的重要性 Studying communication problems in people with phubbing and the importance of psychological counseling <i>Rodermel Tatyana Alekseevna, Samoilova Sofya Sergeevna</i>	112

CULTURAL STUDIES

媒体艺术对城市文化形象塑造的影响与作用

The Influence and role of media art on the shaping of the city's cultural image

Tan Xizhu..... 117

ART HISTORY

区块链在时尚行业：NFT技术的实践、前景与挑战

Blockchain in fashion industry: practice, prospects and challenges of NFT technology

Volodeva Natalya Aleksandrovna 125

BIOLOGICAL SCIENCES

Engleria (Leonova) Tzvel 组的交叉杂交种。(Typha l., 香蒲科) 分布于顿河三角洲

Intersection hybrid of section Engleria (Leonova) Tzvel. (Typha l., Typhaceae) in the Don delta

Krasnova Alla Nikolaevna, Pol'china Tanya Nikolaevna..... 136

MEDICAL SCIENCES

Age-related features of disturbances in the circadian rhythm of respiratory rate in children with acute renal failure

Muhitdinova Hura Nuritdinovna, Mamatkulov Bahrom Basimovich..... 140

儿童急性肾功能衰竭昼夜节律指数和心率昼夜节律的年龄相关差异

Age-related differences in the circadian index and circadian rhythm of heart rate in acute renal failure in children

Muhitdinova Hura Nuritdinovna, Mustakimov Alisher Abduvaliyevich, Fathullayeva Dildora Murojon qizi 150

急性肾衰竭患儿呼吸频率昼夜节律紊乱的年龄相关特征

急性胰腺炎治疗中存在的问题

Problematic issues in treatment acute pancreatitis

Kostirnoy Aleksandr Vasilevich, Gerbali Oksana Yurievna..... 160

环形吻合器痔切除术后住院或门诊治疗痔疮的术后疼痛

Postoperative pain in treating hemorrhoids on an in- or out-patient basis after circular stapled hemorrhoidectomy

Satanova Karina Amantaevna, Fursov Alexandr Borisovich, Klyshbekov Nurzhan Albekovich, Fursov Roman Alexandrovich..... 166

斯塔夫罗波尔国立医科大学学生睡眠障碍的评估

Assessment of sleep disorders in students of Stavropol state medical university

Arova Sofia Vitalievna, Vlasova Yulia Gennadievna, Raevskaya Anastasia Igorevna 174

考试期间学生心理情绪状态的评估

Assessment of the psycho-emotional state of students during the examination session

Khidriev Khamzat Magometovich, Mirzoyan Anastas Mirzoevich, Kusogonov Alkhayat Tagirovich, Raevskaya Anastasia Igorevna 181

TECHNICAL SCIENCES

哈萨克斯坦交通基础设施数字化的主要方向

The main directions of digitalization of Kazakhstan's transport infrastructure
*Tazhigulova Gulmira Olzhabayevna, Tazhigulov Almas Amantaevich,
Kosybayev Zhanat Zkryevich, Kizdarbekova Makpal Zhyrenbayevna,
Seitov Ruslan Mukhtarovich*188

新建和改建铁路平面剖面计算机辅助设计通用模型与方法

General model and method of computer-aided design of the plan and profile of
new and reconstructed railways
Bogdanov Andrey Ivanovich194

监控收缩领域的国家和国际标准

Monitoring of national and international standards in the field of constrictions
Uzhakhov Karkhan Mochkievich, Ulbieva Irina Salakhovna.....207

评估路面纹理和摩擦力的阈值

Threshold values for evaluating texture and friction of road surfaces
Malikov Muhammad Ahmad ogli.....213

天然石材物理力学性能的研究

The study of the physical and mechanical properties of natural stone materials
Nalgiev Rashid Taysamovich, Ulbieva Irina Salakhovna.....220

PHYSICAL AND MATHEMATICAL SCIENCES

在注入能量下从 U-70 加速器中提取质子束的晶体

Crystal extraction of a proton beam from the U-70 accelerator at injection energy
*Chesnokov Yuri Andreevich, Reshetnikov Sergey Fedorovich,
Savin Danil Alexandrovich*227

GEOLOGICAL AND MINERALOGICAL SCIENCES

无机复合材料的结构形成对生物组分的依赖性

Dependence of structural formations of inorganic composites on biocomponents
*Tolstoy Alexandr Dmitrievich, Yaremchuk Maksim Vitalevich,
Solovyov Sergey Victorovich*231

DOI 10.34660/INF.2024.21.65.148

UDC 336.61

改善俄罗斯联邦税收制度的发展
**IMPROVING THE DEVELOPMENT OF THE TAX SYSTEM OF
THE RUSSIAN FEDERATION**

Bloshenko Tatiana Alekseevna

Doctor of Economic Sciences, Leading Research Worker

*Financial University under the Government of the Russian Federation,
Moscow, Russia*

抽象的。 本文讨论了股票购买者的税收问题，股票购买者很有可能在此基础上被认定为税务代理人，并在向个人支付收入时被要求代扣个人所得税。 分析了收入来源和改进税收立法的方向。 本文对税收立法进行了分析，指出缺乏法律确定性，需要对俄罗斯联邦税法进行修订。

关键词：个人所得税、出售股票、收入、预扣税、税务代理、预算政策、税收政策。

Abstract. *The article discusses the issues of taxation of buyers of shares, who with a high degree of probability can be recognized as a tax agent on the basis and will be required to withhold personal income tax when paying income to individuals. Sources of income and directions for improving tax legislation are analyzed. The article presents an analysis of tax legislation, establishing a lack of legal certainty that requires amendments to the Tax Code of the Russian Federation.*

Keywords: *personal income tax, sale of shares, income, withholding tax, tax agent, budget policy, tax policy.*

Introduction

Improving the tax system is aimed at stimulating the development of economic activities, the creation and use of innovations in industries. The revenue side of the budgets of the budget system of the Russian Federation is subject to constant changes, which is due to the high role of macroeconomic parameters and the structure of revenues of the budgets of the budget system of the Russian Federation [3; 4]. Carrying out an analysis of tax legislation and identifying contradictions is aimed at introducing changes to the Tax Code of the Russian Federation.

The purpose of the study is to analyze tax legislation in order to improve it for the purpose of determining the tax base for personal income tax when selling shares.

Materials and methods

This article analyzes regulatory legal acts and conducts a comprehensive study of the calculation and payment of personal income tax when selling shares.

A systemic and institutional approach was used in conducting the study.

Results

A Russian organization that purchases shares can with a high degree of probability be recognized as a tax agent and is obliged to withhold personal income tax when paying income to individuals.

Discussion

The main directions of development of the tax system are presented in [1]. Increasing the level of budget planning is presented in works [2; 5; 6]. In terms of eliminating contradictions in tax legislation, this analysis was carried out, based on the norms of tax law.

So, when determining the tax base for personal income tax in accordance with paragraph 1 of Art. 210 of the Tax Code of the Russian Federation (hereinafter referred to as the Tax Code of the Russian Federation), all income of the taxpayer received by him both in cash and in kind, or the right to dispose of which he has acquired, is taken into account, including income in the form of material benefits, determined in accordance with Art. 212 of the Tax Code of the Russian Federation. As a general rule, the income of individuals who are tax residents of the Russian Federation in the form of income from the sale of shares of Russian organizations is subject to personal income tax at a rate of 13/15% (paragraph 3, paragraph 5, paragraph 1, Article 208, paragraph 1, Article 209, paragraph 1 Article 224 of the Tax Code of the Russian Federation), while in Art. 217 of the Tax Code of the Russian Federation provides a list of income that is not subject to taxation (exempt from taxation). According to clause 17.2 of Art. 217 of the Tax Code of the Russian Federation are not subject to taxation, in particular, income received from the sale of shares specified in paragraph 2 of Art. 284.2 of the Tax Code of the Russian Federation, provided that on the date of sale of such shares they were continuously owned by the taxpayer on the right of ownership or other property right for more than five years.

Clause 2 Art. 284.2 of the Tax Code of the Russian Federation provides for the following types of shares:

- shares constitute the authorized capital of organizations, no more than 50% of whose assets, according to financial statements as of the last day of the month preceding the month of sale, directly or indirectly consists of real estate located on the territory of the Russian Federation;
- shares of Russian organizations as of the date of their sale or other disposal (including redemption) are classified as securities traded on the organized securities market, and as of the same date they are shares of the high-tech (innovative) sector of the economy.

We proceed from the premise that an individual holder of shares of PJSC “A” continuously owns shares of PJSC “A” by right of ownership for a period exceeding 5 years. Since the shares of PJSC “A” do not belong to the shares of companies in the high-tech (innovative) sector of the economy, the income of the specified individual may be exempt from personal income tax if the share of real estate located in the Russian Federation, which is directly or indirectly owned by PJSC “A”, does not exceed 50% of the company’s assets. Analysis of the share of Russian real estate of PJSC “A”.

When paying income to an individual, the Russian organization that purchases the shares is recognized as a tax agent for personal income tax. The Tax Code of the Russian Federation does not provide for the obligation of a tax agent to provide documentary evidence of the possibility of applying the exemption provided for in clause 17.2 of Art. 217 Tax Code of the Russian Federation. At the same time, according to paragraphs. 4 - 5 p. 1 tbsp. 226 of the Tax Code of the Russian Federation, tax agents, when determining the tax base on the basis of a taxpayer’s application, take into account actual and documented expenses that are associated with the acquisition and storage of the relevant securities and which the taxpayer incurred without the participation of a tax agent. Despite the fact that these provisions do not provide for the tax agent’s obligation to take into account the grounds for exemption from personal income tax of an individual’s income, we believe that if an individual provides such confirmation to the tax agent, the latter should take into account such information for the purposes of applying the exemption from Personal income tax.

When paying income to an individual, the Russian organization that purchases the shares is recognized as a tax agent for personal income tax. The Tax Code of the Russian Federation does not provide for the obligation of a tax agent to document the possibility of applying the exemption provided for in clause 17.2 of Art. 217 Tax Code of the Russian Federation. At the same time, according to paragraphs. 4 - 5 p. 1 tbsp. 226 of the Tax Code of the Russian Federation, when determining the tax base on the basis of a taxpayer’s application, tax agents take into account actual and documented expenses that are associated with the acquisition and storage of the relevant securities and which the taxpayer incurred without the participation of a tax agent.

Despite the fact that these provisions do not provide for the tax agent’s obligation to take into account the grounds for exemption from personal income tax of an individual’s income, we believe that if an individual provides such confirmation to the tax agent, the latter should take into account such information for the purposes of applying the exemption from Personal income tax.

Moreover, from a practical point of view, it is the individual who is interested in applying the exemption, because the tax agent withholds tax from the income

amount rather than paying it from his own funds. In this regard, we recommend that an individual selling shares of PJSC “A” provide documentary evidence of the conditions for fulfilling the benefit to LLC “B”, in particular:

- documents confirming continuous ownership of shares for at least 5 years;
- calculation of the share of real estate located on the territory of the Russian Federation in the assets of PJSC “A” or the financial statements of PJSC “A”, on the basis of which it can be confirmed that the assets of PJSC “A” contain no more than 50% of real estate located on the territory RF.

The Tax Code of the Russian Federation does not contain specific instructions for calculating the direct or indirect share of real estate located on the territory of the Russian Federation (hereinafter referred to as Russian real estate) as part of the organization’s assets. In this regard, for the purposes of our calculation, we were guided by the explanations of the Ministry of Finance and the Federal Tax Service of Russia, which were developed and subsequently specified in a series of letters starting in 2004 (see letters of the Ministry of Finance of Russia dated November 15, 2004 No. 03-08-05, dated January 24, 2005 No. 03-08-05, letter of the Federal Tax Service of Russia dated 02/07/2013 No. ED-4-3/1828@, etc.).

In these letters, the regulatory authorities propose to calculate the share of real estate based on the book value of the organization’s assets and the book value of its real estate located on the territory of the Russian Federation. The approach proposed by the Ministry of Finance and the Federal Tax Service of Russia to calculating the share of Russian real estate in the assets of organizations based on data on book value was also supported at the court level (see, for example, decisions in case No. A81-4077/2013, including at the level ruling of the Supreme Court of the Russian Federation dated December 18, 2014 No. 304-KG14-3122).

For calculation purposes, the most detailed instructions are used, given in the letter of the Federal Tax Service of Russia dated November 20, 2019 No. SD-4-3/23559, as well as letters of the Ministry of Finance of Russia dated December 3, 2019 No. 03-08-05/93884, dated December 9, 2019 No. 03-03-06/1/95589 and others, which are proposed to be used for the purpose of calculating the share of Russian real estate also in subsequent letters of the Ministry of Finance of Russia dated November 5, 2020 No. 03-08-13/96571, 03.05.2021 No. 03-03-06/ 1/15900, 08.10.2021 No. 03-03-07/81649, dated 12.12.2022 No. 03-03-06/1/121346, dated 30.01.2023 No. 03-08-05/6978.

Letters from the Ministry of Finance and the Federal Tax Service of Russia provide explanations on the procedure for calculating the share of Russian real estate in the assets of an organization for the purposes of applying paragraphs. 5 p. 1 art. 309 of the Tax Code of the Russian Federation and paragraph 2 of Art. 284.2 Tax Code of the Russian Federation. Since the condition regarding the share of Russian real estate of no more than 50% in the assets of the organization, provided

for exemption from personal income tax and corporate income tax (withholding tax), is identical, and also since clause 17.2 of Art. 217 of the Tax Code of the Russian Federation contains a reference to paragraph 2 of Art. 284.2 of the Tax Code of the Russian Federation, we calculated the share of real estate in accordance with the specified clarifications of the Ministry of Finance and the Federal Tax Service of Russia.

According to the explanations of the regulatory authorities, the total share of the organization's assets, directly or indirectly consisting of Russian real estate, is defined as the sum of the shares of direct and indirect ownership of such real estate by the organization, calculated separately according to the formulas proposed by the regulatory authorities.

The letters of the Ministry of Finance of Russia further clarified that it is legal to calculate the share of Russian real estate in the assets of an organization on the basis of the book value of assets reflected in the accounting (financial) statements of the organization drawn up in accordance with the requirements of the legislation of the Russian Federation on accounting. Similar clarifications were given by the Russian Ministry of Finance not only regarding withholding tax, but also regarding personal income tax, for example, in letters dated November 19, 2021 No. 03-04-05/93514, dated March 30, 2022 No. 03-04-05/25669, dated 05/11/2022 No. 03-04-05/43062.

For the purposes of calculations, regulatory authorities recommend using data on the book value of assets according to the accounting records of organizations closest in time to the date of determination of such a share of financial statements (interim (for example, quarterly or semi-annual) or annual), unless otherwise established by the Tax Code of the Russian Federation. These clarifications are given in relation to withholding tax, while the provisions of international agreements and Russian tax legislation in this part do not contain clarifications regarding the date for calculating the share of real estate in the assets of a Russian organization. At the same time, according to paragraph 2 of Art. 284.2 of the Tax Code of the Russian Federation, to which clause 17.2 of Art. 217 of the Tax Code of the Russian Federation, the calculation must be made according to the financial statements on the last day of the month preceding the month of sale of shares, which is also confirmed by the Ministry of Finance in letters dated 07/05/2023 No. 03-03-06/1/62627, dated 07/07/2023 No. 03-03-06/1/63472.

According to the above-mentioned instructions of the Ministry of Finance and the Federal Tax Service of Russia, the share of an organization's assets directly consisting of Russian real estate is defined as the ratio of the company's Russian real estate to the total assets of such a company. Namely, the above-mentioned share is determined by the formula given in accordance with the designations in letters of the Federal Tax Service of Russia dated November 20, 2019 No. SD-

4-3/23559@ and the Ministry of Finance of Russia dated December 3, 2019 No. 03-08-05/93884.

The share of assets of organization “A” directly consisting of Russian real estate ($H_{прА}$) is defined as the ratio, expressed as a percentage, of the total book value of Russian real estate objects recorded on the balance sheet of organization “A” (H_A) to the total assets of this organization “A” (AA) according to formula (1):

$$H_{прА} = \frac{H_A}{A_A} \times 100\% \quad (1)$$

The share of assets of organization “A” indirectly consisting of Russian real estate ($H_{косвА}$), expressed as a percentage, is determined based on the book value of investments of organization “A” in the authorized (share) capital of organization “B” ($B_{лБ}$) and (or) in a collective investment instrument “B” and the share of assets of organization “B”, consisting of Russian real estate

$$\left(\frac{H_B}{A_B} \right) \quad (2):$$

$$H_{косвА} = \frac{B_{лБ} \times \frac{H_B}{A_B}}{A_A} \times 100\% \quad (2)$$

For the purposes of calculating the share of Russian real estate in the assets of an organization, a collective investment instrument is understood to be a Russian or foreign structure without the formation of a legal entity (in particular, a fund, partnership, partnership, trust, other form of collective investment and (or) trust management).

In a similar manner, the share of assets of organization “A”, indirectly consisting of Russian real estate, is calculated in relation to investments in the authorized (share) capital of each organization (investments in collective investment instruments) recorded on the balance sheet of organization “A”.

The total share of the assets of organization “A”, directly or indirectly consisting of Russian real estate, is determined as the sum of the above shares of assets (3):

$$H_{пр и косвА} = H_{прА} + H_{косвА} \quad (3)$$

Example:

The book value of Russian real estate in the balance sheet of organization “A” is 1 million rubles.

The book value of financial investments in shares of organization “B” is 10 thousand rubles. There are no other financial investments in the capital of other companies, as well as in collective investment instruments.

The book value of other assets of organization “A” is 440 thousand rubles.

The book value of Russian real estate in the balance sheet of organization “B” is 100 million rubles.

There are no financial investments in the balance sheet of organization “B”.

Other assets on the balance sheet of organization “B” - 50 million rubles.

Then the share of assets of organization “A” consisting of Russian real estate (4):

$$H_{\text{пр и косв}_A} = \left(\frac{H_A}{A_A} + \frac{Вл_B \times \frac{H_B}{A_B}}{A_A} \right) \times 100\% = \left(\frac{1 \text{ млн} + 10 \text{ тыс.} \times \frac{100 \text{ млн}}{150 \text{ млн}}}{1 \text{ млн} + 10 \text{ тыс.} + 440 \text{ тыс.}} \right) \times 100\% = \frac{1\,006\,667}{1\,450\,000} \times 100\% = 69\% \quad (4)$$

The share of assets directly or indirectly consisting of Russian real estate in relation to organization “B” and other organizations in the capital of which organization “A” directly or indirectly participates is determined in the same order (5):

$$H_{\text{пр и косв}_B} = H_{\text{пр}_B} + H_{\text{косв}_B} \quad (5)$$

It should be taken into account that if the total book value of Russian real estate recorded on the balance sheet of organization “A” ($H_{\text{пр}_A}$), and investments of organization “A” in the authorized (share) capitals of other organizations (investments in collective investment instruments) ($Вл_i$) is less than 50 percent of total assets of organization “A”, then it is fair to conclude that the assets of such organization “A” consist of Russian real estate less than 50 percent (6):

$$\frac{H_{\text{пр}_A} + \sum_{i=B}^n (Вл_i)}{A_A} \times 100\% < 50\% \Rightarrow H_{\text{пр и косв}_A} < 50\% \quad (6)$$

For a foreign organization that has Russian real estate, the indicators are determined on the basis of the financial statements of such a foreign organization, compiled in accordance with the standards established by the personal law of such a foreign organization, and accounting registers in rubles at the exchange rate on the date of preparation of the financial statements.

It should be borne in mind that the definitions of the term “real estate” in the legislation of the Russian Federation and agreements on the avoidance of double taxation may differ.

In particular, paragraph 1 of Article 130 of the Civil Code of the Russian Federation classifies aircraft and sea vessels and inland navigation vessels subject to state registration as immovable things.

In this regard, the value of these assets should be taken into account as part of Russian real estate for the purposes of applying subparagraph 5 of paragraph 1 of Article 309 of the Civil Code of the Russian Federation, but should not be taken into account as part of Russian real estate for the purposes of applying an international agreement on the avoidance of double taxation, if such agreement states that the data assets are not considered as real estate.

Such differences in the interpretation of the term “real estate” must be taken into account when calculating the share of Russian real estate in the assets of an organization for the purposes of applying the Civil Code of the Russian Federation or an international agreement of the Russian Federation.

Taking into account that the indicators necessary for the correct calculation of the share of Russian real estate in the assets of an organization may not be in the published forms of financial (accounting) reporting of organizations, until changes are made to the Code defining the procedure for determining the share of Russian real estate and regulating the exchange of information necessary for the implementation of the specified calculation, tax agents are recommended to apply for the necessary information to the organizations in respect of which it is necessary to make the specified calculation of the share of real estate.

The specified information may be presented to tax agents, in particular, in the form of the total value of the share of Russian real estate in the assets of the organization, calculated by such organization independently after receiving a corresponding request from the tax agent.

In accordance with paragraphs. 2 p. 1 art. 228 of the Tax Code of the Russian Federation, individuals independently calculate and pay taxes based on the amounts received from the sale of their property and property rights.

Explanations from regulatory authorities confirmed that the provisions of this norm also apply to the sale of securities, including shares (see, for example, letter of the Ministry of Finance of Russia dated December 24, 2019 No. 03-04-06/101068).

At the same time, in accordance with Federal Law dated September 29, 2019 No. 325-FZ in Art. 226 of the Tax Code of the Russian Federation were amended. In accordance with the current edition of the Tax Code of the Russian Federation, paragraph 3, clause 1, art. 226 establishes that Russian organizations and individual entrepreneurs who make payments under agreements for the purchase and sale (exchange) of securities concluded by them with taxpayers are also recognized as tax agents. The explanatory note to the relevant bill states that the changes are aimed at reducing the administrative burden of individuals by eliminating the obligation to declare income from the sale (exchange) of securities and introducing tax agency in these cases.

Conclusion

With the addition to clause 1 of Art. 226 of the Tax Code of the Russian Federation changes in the provisions of paragraphs. 2 p. 1 art. 228 of the Tax Code of the Russian Federation remained in the previous edition. In the event that income from the sale of shares is subject to personal income tax (i.e., the conditions for exemption from taxation specified in clause 17.2 of Article 217 of the Tax Code of the Russian Federation are not met), the Russian organization that purchases

the shares can with a high degree of probability be recognized as taxable agent on the basis of paragraph. 3 p. 1 art. 226 of the Tax Code of the Russian Federation and will be required to withhold personal income tax when paying income to individuals.

Failure by a tax agent to fulfill its obligation to withhold tax is grounds for bringing it to tax liability (a fine of 20% of the amount subject to withholding, based on Article 123 of the Tax Code of the Russian Federation).

At the same time, the Ministry of Finance of the Russian Federation takes a consistent position that a Russian organization that has made a payment under a share purchase and sale agreement concluded by the said Russian organization with an individual taxpayer is recognized as a tax agent for personal income tax in relation to the amount of such payment (letter from the Ministry of Finance of Russia dated March 31 .2023 No. 03-04-06/28797, dated 03/31/2023 No. 03-04-05/28820, dated 05/29/2023 No. 03-04-06/49051).

Thus, it is advisable to clarify the procedure for calculating and paying personal income tax when paying income to individuals under share purchase and sale agreements.

References

1. *Bloshenko T.A. Taxation of organizations during mining and complex processing of mineral raw materials: theory and practice / T.A. Bloshenko. - M.: KURS, 2020 - 304 p.*
2. *Karaev A.K. The impact of financialization and inequality of income distribution on economic growth, investment processes and innovation // Economics. Taxes. Right. 2018. V. 11. No. 6. pp. 57-68.*
3. *Ponkratov V.V., Karaev A.K., Masterov A.I., Shmigol N.S., Sigarev A.V., Bondarenko N.O., Yakovlev N.D. Fiscal rules in relation to market resource revenues: Russian experience, best foreign practices, new approaches to design / ed. V.V. Ponkratova. - M.: Shelest, 2020. - 224 p.*
4. *Ponkratov V.V. Improving the quality of budget planning in Russia // Finance. 2018. No. 8. P. 6-12.*
5. *Ponkratov V.V., Kuznetsov N.V. Tax incentives for investment activity in Russia // University Bulletin. 2017. No. 11. pp. 134-140.*
6. *Solyannikova S.P., Alandarov R.A., Gorlova O.S., Karaev A.K., Makashina O.V., Masterov A.I., Ponkratov V.V., Sedova M.L., Tyurina Yu.G., Frumina S.V. Federal budget for 2019-2021: balance or economic growth? // Finance: theory and practice. 2018. V. 22. No. S11. pp. 4-41.*

俄罗斯区域投资项目实施情况分析
**ANALYSIS OF THE IMPLEMENTATION OF REGIONAL
INVESTMENT PROJECTS IN RUSSIA**

Bloshenko Tatiana Alekseevna

Doctor of Economic Sciences, Leading Research Worker

*Financial University under the Government of the Russian Federation,
Moscow, Russia*

抽象的。文章探讨了区域投资项目实施过程中地勘工作的税务核算问题。

分析了完善税收立法的方向。本文对税收立法进行了分析,指出实施区域投资项目中地质勘探工作的会计缺乏法律确定性,这需要修订俄罗斯联邦税法和其他规范地下活动的监管法律法案 用户。

关键词: 地下用户、区域投资项目、税收政策、税收制度、地质勘探、资本投资。

Abstract. *The article discusses the issues of tax accounting for geological exploration work during the implementation of regional investment projects.*

The directions for improving tax legislation are analyzed. The article presents an analysis of tax legislation, establishing the lack of legal certainty in accounting for geological exploration work in the implementation of regional investment projects, which requires amendments to the Tax Code of the Russian Federation and other regulatory legal acts regulating the activities of subsoil users.

Keywords: *subsoil user, regional investment project, tax policy, tax system, geological exploration, capital investments.*

Introduction

In order to improve the main directions of tax policy, develop a unified methodology and further tax control for the future, an analysis of the conceptual apparatus is carried out, the interpretation of which currently leads to a lack of legal certainty between the tax authorities and the taxpayer.

Improving the tax system is aimed at stimulating the development of types of economic activity, creating conditions for investment activity and innovation in industries. Carrying out an analysis of tax legislation and identifying contradictions is aimed at introducing changes to the Tax Code of the Russian Federation and developing the regulatory function of taxes.

The purpose of the study is to analyze tax legislation in order to improve the regulatory function of taxes.

Materials and methods

This article analyzes regulatory legal acts and conducts a comprehensive study of the attribution of geological exploration results to capital investments in the implementation of regional investment projects on the territory of the Russian Federation.

Results

In relation to subsoil users, in order to implement an investment project, at the initial stage of investment it is necessary to carry out geological exploration work (GEW), the costs of geological exploration should be included in the volume of capital investments, including for tax accounting purposes when implementing regional investment projects.

Discussion

The development of the methodological foundations of investment policy is enshrined in Rabi [2]. State guarantees for the implementation of investment projects as a tool for ensuring economic growth are listed in works [5; 6].

Fiscal rules regarding market resource revenues are presented in [3; 4].

The main directions of development of the tax system for subsoil users are set out in [1].

According to the geological and economic criteria for assessing deposits, the accounting of mineral reserves is summarized according to the following principles:

According to geological information:

- reserves are divided into on-balance reserves, the development of which is of industrial importance, and off-balance reserves, the development of which is unprofitable.
- according to the level of operating conditions and development technology, industrial reserves are divided into categories: A, B, C1 and C2.
- forecast resources of categories P1, P2, P3 are assessed, mining and geological information on the study of the latter, in comparison with industrial reserves of category C2, is lower, the efficiency of their development will be quite expensive.

Subsoil users carry out geological exploration work in search of new sources of mineral raw materials; this type of work is necessary to justify investment investments.

Subsoil use is “...a stage-by-stage process that consists of regional geological research, prospecting, assessment, exploration, trial operation, additional exploration, industrial production, primary processing, enrichment, transportation and sale of finished products...” [1].

In accordance with paragraph 3 of Art. 25.8 of the Tax Code of the Russian Federation, in order to comply with the conditions for inclusion in a regional in-

vestment project (RIP), when determining the volume of capital investments, the costs of creating (acquiring) depreciable property, bringing it to a state suitable for use, costs of carrying out design and survey work are taken into account, new construction, technical re-equipment, modernization of fixed assets, reconstruction of buildings, purchase of machinery, equipment, tools, inventory (excluding costs for the purchase of cars, motorcycles, sports, tourist and pleasure boats, as well as costs for the construction and reconstruction of residential premises).

In accordance with the Federal Law of February 25, 1999 N 39-FZ “On investment activities in the Russian Federation, carried out in the form of capital investments,” capital investments are capital investments - investments in fixed capital (fixed assets), including costs for new construction, reconstruction and technical re-equipment of existing enterprises, acquisition of machinery, equipment, tools, inventory, design and survey work and other costs.

In accordance with clause 5 of the Order of the Ministry of Finance of Russia dated September 17, 2020 No. 204n “On approval of Federal Accounting Standards FSBU 6/2020 “Fixed Assets” and FSBU 26/2020 “Capital Investments” for accounting purposes, capital investments are understood to be determined in accordance with designated by the Standard, the organization’s costs for the acquisition, creation, improvement and (or) restoration of fixed assets. Capital investments include, in particular, costs for: a) the acquisition of property intended for use directly as fixed assets or parts thereof or for use. in the process of acquiring, creating, improving and (or) restoring fixed assets;

b) construction, construction, production of fixed assets;

c) radical improvement of land;

d) preparation of design, working and organizational-technological documentation (architectural projects, construction permits, etc.);

e) organization of the construction site;

f) implementation of designer’s supervision; g) improvement and (or) restoration of fixed assets (for example, completion, retrofitting, modernization, reconstruction, replacement of parts, repairs, technical inspections, maintenance); h) delivery and bringing the object into a condition and location in which it is suitable for use for the intended purposes, including its installation, installation;

i) carrying out commissioning and testing.

Design and survey work (D&R) - a set of works to carry out engineering surveys, develop feasibility studies for construction, prepare projects, working documentation, draw up estimate documentation for the construction (new construction, expansion, reconstruction, technical re-equipment) of objects, buildings, structures .

Survey work represents a complex of technical and economic studies of the construction area. Depending on the contractual relationship, they are carried out by the customer of design and construction or the general designer.

Engineering surveys are aimed at obtaining information about the natural conditions of construction, which should serve as an important part of the initial data for drawing up the project (collection of initial data about the terrain for the design of construction projects). This includes obtaining information about the soils underlying the future facility, the topography, the condition of neighboring buildings and structures, utilities on the site, etc. Survey work is carried out for the correct design of the facility.

Thus, the costs of design and survey work belong to one of the types of capital investments, since they are a significant and necessary stage in the construction of facilities.

In accordance with Art. 1 Federal Law “On investment activities in the Russian Federation, carried out in the form of capital investments” N 39-FZ capital investments mean investments in fixed capital (fixed assets), including costs for new construction, reconstruction and technical re-equipment of existing enterprises, purchase of machinery, equipment, tools, inventory, design and survey work and other costs.

The costs of design and survey work as part of capital investments for RIP purposes are taken into account during the period of validity of the RIP.

According to the Decision of the KhMAO Arbitration Court dated July 5, 2017 in case No. A75-8674/2016, to justify the amount of costs, the investor presented the following documents:

- balance sheet for account 08 “Investments in non-current assets”;
- contract for design and survey work;
- accounting certificate;
- Acceptance certificate of completed work under the contract for design and survey work;
- invoice for the contract for design and survey work.

In accordance with paragraph 1 of Art. 257 of the Tax Code of the Russian Federation, fixed assets are understood as part of the property used as means of labor for the production and sale of goods (performance of work, provision of services) or for the management of an organization with an initial cost of more than 100,000 rubles.

In accordance with paragraph 1 of Art. 272 of the Tax Code of the Russian Federation, expenses accepted for tax purposes are recognized as such in the reporting (tax) period to which they relate, regardless of the time of actual payment of funds and (or) other form of payment.

In accordance with paragraph 2 of Art. 272 of the Tax Code of the Russian Federation, the date of material expenses is recognized as: the date of transfer of raw materials and materials into production - in terms of raw materials and materials attributable to the goods produced (work, services); the date of signing by

the taxpayer of the certificate of acceptance and transfer of services (work) - for services (work) of a production nature.

In accordance with Art. 6 Law of the Russian Federation dated 02.21.1992 N 2395-1 "On Subsoil" geological exploration includes the search and assessment of mineral deposits, as well as geological study and assessment of the suitability of subsoil areas for the construction and operation of underground structures not related to mining.

Geological exploration work (GER) is a complex of various special geological and other works carried out with the aim of searching, discovering and preparing for industrial development of mineral deposits. Geological exploration work includes the study of the patterns of location, conditions of formations, structural features, material composition of mineral deposits with the aim of predicting them, searching, establishing the conditions of occurrence, preliminary and detailed exploration, geological and economic assessment and preparation for industrial development.

The general goal of geological exploration is to scientifically substantiate, systematically and cost-effectively provide the mining industry with proven reserves of minerals and to study methods for their complete, comprehensive and economically rational extraction during the exploitation of deposits, taking into account environmental protection. Geological exploration work involves a comprehensive command of the work, that is, along with the search and exploration of mineral deposits, all associated mineral components are also studied, the possibilities of their utilization are clarified, hydrogeological, mining and other studies are carried out, natural-climatic, geographical-economic, socio-economic and other conditions for field development.

Geological exploration work includes:

Regional and large-scale types of surveys: geological, topographical, geodetic, geophysical, geochemical, aerial photography, space and others;

Various types of prospecting, geological exploration, hydrogeological, engineering-geological work, analytical-mineralogical-technological and other studies.

In accordance with paragraph 1 of Art. 261 of the Tax Code of the Russian Federation, expenses for the development of natural resources are recognized as expenses of the taxpayer for geological study of subsoil, exploration of minerals, carrying out preparatory work, and carrying out work on sidetracking production wells.

Expenses for the development of natural resources, in particular, include:

expenses for the search and evaluation of mineral deposits (including audit of reserves), including expenses associated with the construction (drilling) and (or) abandonment (preservation) of wells (except for those recognized as depreciable property), mineral exploration and (or) hydrogeological surveys carried out on a

subsoil plot in accordance with licenses or other permits from authorized bodies obtained in the prescribed manner, as well as expenses for the acquisition of the necessary geological and other information from third parties, including government agencies;

expenses for preparing the territory for mining, construction and other work in accordance with established requirements for safety, protection of land, subsoil and other natural resources and the environment, including the construction of temporary access roads and roads for the removal of mined rocks and minerals and waste, preparation of sites for the construction of relevant structures, storage of fertile soil layer intended for subsequent land reclamation, storage of mined rocks, minerals and waste;

expenses for compensation for complex damage caused to natural resources by taxpayers during the construction and operation of facilities, for resettlement and payment of compensation for the demolition of housing during the development of fields. These expenses also include expenses stipulated by contracts (agreements) with government authorities of the constituent entities of the Russian Federation, with local governments and (or) tribal, family communities of indigenous peoples, concluded by such taxpayers.

In accordance with paragraph 2 of Art. 261 of the Tax Code of the Russian Federation, expenses for the development of natural resources are taken into account in the manner prescribed by Article 325 of the Tax Code of the Russian Federation.

These expenses are recognized for tax purposes from the 1st day of the month following the month in which these works (stages of work) are completed and are included in other expenses.

expenses for prospecting and evaluation of mineral deposits, as well as expenses for sidetracking of production wells are included in expenses evenly over 12 months;

expenses for preparing the territory for mining, construction and other work, as well as expenses for compensation for complex damage caused to natural resources, are included in expenses evenly over two years, but not more than the service life.

In accordance with paragraph 6 of Art. 261 of the Tax Code of the Russian Federation, expenses for the acquisition of work (services), geological and other information from third parties, as well as expenses for independent work on the development of natural resources are accepted for tax purposes in the amount of actual expenses.

Depending on the specific type of expense, expenses are grouped as:

total expenses for the developed area (field) as a whole. General expenses include: expenses for searching and evaluating mineral deposits, mineral explora-

tion, hydrogeological surveys, as well as expenses for acquiring the necessary geological and other information from third parties;

expenses related to individual parts of the territory of the developed site. The designated costs include the costs of preparing the territory for mining, construction and other work in accordance with established requirements for safety, protection of land, subsoil and other natural resources;

expenses related to a specific facility created during the development of the site. These expenses include expenses directly related to the construction of structures, which in the future, based on the decision of the taxpayer, can be recognized as permanently operated fixed assets.

In accordance with paragraph 3 of Art. 325 of the Tax Code of the Russian Federation, when carrying out geological prospecting work, geological exploration work for mineral exploration and when carrying out work on sidetracking of production wells, the amount of expenses incurred by the taxpayer is determined on the basis of acts of work performed under contracts with contractors, as well as on the basis of amounts actually expenses incurred by the taxpayer.

Expenses incurred under an agreement with a contractor are included in other expenses from the 1st day of the month in which the corresponding certificate of completion of work (stages of work) under this agreement is signed. The expenses incurred in equal shares are included in other expenses within the time limits provided for in Article 261 of the Tax Code of the Russian Federation.

Current expenses for the maintenance of facilities associated with the development of natural resources (including labor costs, expenses associated with the maintenance and operation of temporary structures, and other similar expenses), as well as expenses for additional exploration of the deposit or its sections located within the mining or land allotment of an organization, the full amount is included in the expenses of the reporting (tax) period in which they were incurred.

From the above circumstances, it follows that, at their core, design and survey work and geological exploration work have different economic goals, according to which the costs of survey work are classified as capital investments, while the costs of geological exploration are not subject to inclusion in capital investments:

Purpose of design and survey work: Carrying out work for the purpose of construction (new construction, expansion, reconstruction, technical re-equipment) of facilities, buildings, structures. Engineering surveys are aimed at obtaining information about the natural conditions of construction, which should serve as an important part of the initial data for drawing up the project (collection of initial data about the terrain for the design of construction projects). Design and development costs are included in capital investments.

The purpose of geological exploration: search, discovery and preparation for industrial development of mineral deposits. Exploration costs are not included in

capital investments, which is a contradiction from the point of view of investment and development of deposits by subsoil users due to the fact that the subsoil user will not be able to begin development of deposits without carrying out geological exploration work.

In paragraph 3 of Art. 25.8 of the Tax Code of the Russian Federation states that "... when determining the volume of capital investments, the costs of creating (acquiring) depreciable property and bringing it to a state suitable for use are taken into account...".

And from the point of view of taxation, each type of designated work has its own taxation specifics and should not contradict the economic essence of investments and the specifics of the activities of subsoil users.

Conclusion

The tax system is one of the main instruments for regulating investment activity. Thus, in relation to subsoil users, in order to implement an investment project at the initial stage of investment it is necessary to carry out geological exploration, the costs of geological exploration should be included in the volume of capital investments for tax accounting purposes when implementing a regional investment project.

References

1. *Bloshenko T.A. Taxation of organizations during mining and complex processing of mineral raw materials: theory and practice / T.A. Bloshenko. - M.: KURS, 2020 - 304 p.*
2. *Molchanova, N.P. Development of methodological foundations of investment policy as an integral part of financial science / N.P. Molchanova // Audit and financial analysis. - 2016. - No. 5. - pp. 239-246.*
3. *Ponkratov V.V., Karaev A.K., Masterov A.I., Shmigol N.S., Sigarev A.V., Bondarenko N.O., Yakovlev N.D. Fiscal rules in relation to market resource revenues: Russian experience, best foreign practices, new approaches to design / ed. V.V. Ponkratova. - M.: Shelest, 2020. - 224 p.*
4. *Ponkratov, V.V. Tax incentives for investment activity in Russia / V.V. Ponkratov, N.V. Kuznetsov // Bulletin of the University (State University of Management). - 2017. - No. 11. - P. 134-140.*
5. *Sanginova, L.D. State guarantees in the implementation of investment projects as a tool for ensuring economic growth: foreign and domestic experience / L.D. Sanginova // Economics. Taxes. Right. - 2017. - No. 1. - pp. 83-90*
6. *Sanginova, L.D. State guarantees of the Russian Federation as an instrument of financial support for investment projects: current practice and development prospects / L.D. Sanginova // Economics and entrepreneurship. - 2015. - No. 6-2. - pp. 97-104.*

在现代项目中形成互动管理系统的现代方法
**MODERN APPROACHES TO THE FORMATION OF AN
INTERACTION MANAGEMENT SYSTEM IN AN INNOVATION
PROJECT**

Gavchuk Denis Vasilievich

Postgraduate

Higher School of Entrepreneurship, Tver, Russia,

Member of the Federation of Restaurateurs and Hoteliers,

Moscow, Russia

注解。 考虑了创新企业形成过程中出现的问题, 包括目前俄罗斯创新项目的管理和营销。 通过对俄罗斯创新的分析, 我们发现该业务领域与欧洲和美国国家相比具有共同点和独特之处。 此外, 作者证明了在所有商业领域利用创新的迫切需要。

关键词: 项目、项目管理、创新、创新流程、能力、项目管理标准。

Annotation. *The problems arising during the formation of innovative business, including management and marketing of innovative projects in Russia at the present time, are considered. As a result of the analysis of innovations in Russia, the common and distinctive features of this business segment are noted in comparison with the countries of Europe and the USA. In addition, the authors prove the vital need to use innovation in all sectors of business.*

Keywords: *Project, project management, innovation, innovation processes, competencies, project management standards.*

In the modern world, we often hear words such as “project”, “innovation”, “management mechanisms” and others and therefore minimize their meaning, but when we get down to it, these terms have a significant role in the modern world. Only the introduction of the latest developments and technologies can ensure the pace of development of companies that meets the conditions of a growing market and increased competition. Innovation (innovation) is understood as an introduced or being implemented innovation that provides increased efficiency of processes and (or) improved quality of products that is in demand by the market. The innovation process is the process of consistently transforming an idea into a product. It is a systemic, comprehensive process of generating new knowledge, introducing and disseminating it in the market space. [1, p.42]

Project management is the application of processes, methods, skills, knowledge and experience to achieve specific project objectives in accordance with project acceptance criteria within agreed parameters.

A project is the application of knowledge, skills, tools and techniques in project activities to meet project requirements. In turn, project management is the professional activity of managing resources through the application of methods, tools and management to successfully achieve set goals as a result of the implementation of a set of interrelated activities with certain requirements for timing, budget and characteristics of the expected results. According to Kulaev A.A. Project management is understood as a set of methods for managing the process of creating complex objects in a short time.

Thus, project management tools have become fundamental in strategic management, especially in the context of the transition to an innovative economy.

The increasing role of scientific and technical potential in modern business has led to the fact that the competitiveness of companies is increasingly determined by the process of continuous improvement of technology. The transition to an innovative economy at the national level, in addition to solving the macroeconomic problems of modern society, requires serious innovative changes in the management of the main link of any economy, radical reform of the mechanisms for managing innovation processes and the creation of support measures from the state, and in the companies themselves in the development and development of innovative decisions.

Currently, in developed countries, the issues of managing innovative projects and the formation of an innovative economy are the subject of special attention of economic science. Unfortunately, in Russia, unfortunately, not enough attention has been paid yet, although the search for new and improvement of existing methods of economic growth is a fundamental problem of the country's sustainable development in connection with the transition of the world economic system to post-industrial management methods based mainly on the formation of a knowledge economy.

The innovative business created today in Russia generally corresponds to the pattern adopted in developed countries. However, in our country this practically does not work due to two main reasons: - the lack of an organized and effectively managed process of creation and commercialization of the results of intellectual activity in companies; - lack of effective demand for innovation from the real sector of the domestic economy, i.e. the same companies, but already acting as consumers of innovative business products. It is only thanks to the creative activity of our compatriots that the presence of a large number of specialists with good engineering and management education on innovative projects in Russia continues to emerge and develop. However, analyzing the potential effective demand for their inventions, they usually conclude that their markets are located abroad [2, p.30].

The need to focus on a foreign user leads to the fact that many Russian innovation projects are implemented in other countries, where domestic specialists are transferred or transferred (for relatively little money) to the results obtained at the initial stage of the project.

According to expert estimates, Russia spends only 1.2% of GDP on research and innovation activities, with about 60% of this amount coming from budget investments, while in the USA, this figure is 2.6-2.7% of GDP in year, and in the countries of the European Union and Japan the share of expenditures on innovative projects reaches 2.7-3.1% of GDP per year. Considering these data, we can say that government support for Russian innovative business is not active enough and ineffective. Unlike their European or Chinese colleagues, authors of innovative projects in Russia do not have tax benefits.

The rent that most of our small businesses have to pay is approximately 10 times higher than the rent of similar firms in the West. Therefore, it is not surprising that the number of innovative projects in Russia is very small. To change the situation for the better, it is necessary to improve significantly the financial situation and morale of the domestic innovator, providing him with the opportunity to receive financial support, tax breaks, the necessary production capacity and the opportunity for public recognition of services to the country. In Russia, it is necessary to create a legislative framework that supports innovative entrepreneurs and provides them with a number of advantages [3, p.30].

In a country that has stated its goal of transitioning from a resource economy to an innovation economy, industrial policy must include active and effective support for innovative projects. At the same time, solving the problem of innovation in the Russian economy at the macro level is not enough to obtain practical results from investments in a new national innovation system. It is also necessary to increase the level of innovative development of the main participants in this process – the companies themselves. They should be primarily interested in developing and implementing innovation as a means of providing strategic leadership. The fact that innovation should be the basis for companies to achieve strategic competitive advantage does not require any proof.

Michael Porter, the world's leading authority on competitive strategy, states bluntly: "Every successful company employs its own strategy, but the nature and evolution of all successful companies is essentially the same. The company achieves competitive advantage through innovation." As you know, innovations are the results of human intellectual activity, which were implemented in the form of a new or improved product (work, service) sold on the market, a new or improved technological process used in practice.

Innovation includes all changes (innovations) that were first used in a company and brought economic or social benefits to it. In addition, innovation includes new or improved types of products (services); new methods of production and distribu-

tion (warehousing, delivery and sale) of the product; development of new markets; formation of new strategic guidelines for the company; new schemes for obtaining financial results, new methods of using and accounting for financial resources.

In general, innovation can be defined as know-how, innovation, improvement. The main thing is that innovative projects are the engine of modern business; they help it develop and keep up with the times. The word “project” is used as a synonym for the words “company”, “business” and implies that any business or company can be a project, and a business project has the opportunity to grow into a “startup” into a medium and / or large company, business, corporation. The word “start-up” indicates a certain stage of business development [4, p.55].

In modern practice of innovative entrepreneurship, there has already been a fairly stable typification of the stages that an innovative (knowledge-intensive) project goes through: preseed (pre-seed stage), seed (seed stage), start-up (start), early stage (early growth), expansion (expansion) , exit (exit). It makes sense to focus on the starting stage, which is characterized by the presence of a registered legal entity, the beginning of sales of an innovative product with its simultaneous refinement and improvement, a lack of financing, instability of sales, a small team consisting of the owner and his team.

Unfortunately, in Russia 90% of startups fail. What is the reason for such sad statistics? The success of any innovation project depends on the quality of project management as much as technical and market advantages. Therefore, projects are often assessed in terms of not only their potential effectiveness, but also the ability to effectively manage to realize this potential.

Innovative management performs functions that determine the formation of the structure of the management system. There are two types of innovation management functions: - functions of the subject of management; - functions of the control object. The management subject can be one or a group of employees who perform the targeted work of the management object. The object of management is innovation, the innovation process and economic relations between participants in the innovation market. The connection between the subject of management and the object of control is carried out through the transfer of information, which is the management process.

Innovation management techniques can be divided into the following groups:

- 1) innovations affecting only production;
- 2) affecting both production and the implementation, promotion and dissemination of innovations;
- 3) affecting only the implementation, promotion and dissemination of innovations.

Techniques that only affect the production of innovations have the sole purpose of creating a new product or a new operation (technology) with high quality

parameters. These techniques include benchmarking, marketing research techniques and innovative marketing planning.

The second group of innovative management techniques includes innovation engineering, innovation reengineering, and brand strategy. The structure of the third group includes the price management technique, before the market, the manager. The main goal of all the techniques of this group is to speed up the sale of innovations with the greatest benefits and efficiency at the present time and greater returns from this sale in the future.

When talking about the problems of innovative business, we cannot ignore innovation marketing. Poor development of marketing at innovative enterprises and scientific and technical projects. Marketing support for the creation of new products is one of the most significant and serious problems of an innovative company. Approximately 30% of new products do not bring any profit and become unprofitable. The high degree of risk of innovative products is confirmed by the experience of many projects. The characteristics of the market and the specificity of the goods have a great influence on its introduction into the market. There are many reasons why new products fail on the market. The main ones are incomplete market analysis, product shortcomings, lack of effective marketing activities, too high costs, competitive activity, poor support when products enter the market, and production problems.

However, there are factors that contribute to the success of the product:

- competitive advantage of the product (features that make the product more attractive to the buyer);
- marketing activities of the company (the ability to predict and understand the behavior of the buyer and the market as a whole in relation to the new product);
- availability of technological equipment.

However, as already mentioned, technological advantage alone, unfortunately, is not an absolute guarantee of any commercial success. Therefore, for any innovator or innovative company, there comes a time when you must pay attention to marketing factors.

Innovation can be called a separate unique market in the field of know-how. If we compare its characteristics with the conventional market, it is impossible not to notice its versatility. All possible aspects of the relationship that may arise between the seller and the buyer are touched upon, which have a significant impact on the company's marketing policy.

There are several main features of this market:

- originality of the product (product characteristics, technologically complex implementation, high costs of its production in the first stages);
- market innovations for the company (especially for a small innovative company that is at the initial stage of development);

- uncertainty of the product (and often the manufacturing company) for the market;

- inability to predict customer behavior;
- low price elasticity of demand.

In this regard, pricing becomes limited;

- small market capacity (especially for products containing high quality and high level of technology);

- absence of direct competitors, since there is a monopoly on intellectual property;

- the development of the company's theoretical area and obtaining certain results in it, together with a well-structured company promotion policy, can significantly improve the company's rating among buyers; - understanding the relationship between the marketing of innovative products and the level of innovative potential of consumers. [5, p.70]

The fact is that many new products are not simply sold due to the general technological backwardness of many sales markets. The problems of promoting innovative, unfamiliar products to the market are primarily associated with the risk of unpredictability of customer reactions. This is typical for companies operating in any industry, but for the high-tech market, where the rate of product updates is especially high, this is most relevant.

An innovative product can "fail" without proper consumer preparation and without a well-thought-out strategy for bringing this product to market.

As already mentioned, the specifics of the innovative market determine the features of innovative marketing. This manifests itself in the following:

- it is necessary to search and study potential consumers in several sectors at the same time, since often the results of scientific and technological development are intersectoral in nature;

- selling innovative products requires a long and consistent advertising campaign, since the buyer must "mature": he needs to be explained in detail the meaning and benefits of innovation, otherwise he simply will not buy this product because he is not familiar with it;

- innovative products must not only satisfy qualitatively new needs or old needs, but also provide additional advantages that are understandable to consumers compared to existing analogues and substitutes.

When promoting complex scientific and technical products on the market, you should be guided by an experienced, so-called collective consumer ("purchasing center", which may include employees from different departments, from purchasing to production)

- the sale of innovative products requires lengthy negotiations, since high-tech products both in the commodity and consumer markets are products of prelim-

inary selection, and therefore the purchase is carried out through procedures of multiple comparisons and discussions with experts;

- very often the technical complexity of innovative products is associated with the organization of good after-sales service. In other words, there is no service - there is no commercial success for the new product. An example is the promotion of hybrid cars to the market, the distribution of which was limited not only by their price, but also by the insufficient development of infrastructure to service them at the first stage;

- the image of an innovative company is significantly influenced by the results of theoretical research by employees, so they can be used in PR campaigns. In addition, for innovative businesses, conferences, scientific forums and other forms of communication in the professional community can serve as channels for marketing communications;

- the complexity of an innovative product creates special prerequisites for the formation of a so-called holistic product, where all its real and potential advantages are considered in a comprehensive manner. The Russian market is open to new and improved products and at the same time is large enough to accept various competing products.

Currently, project management processes, including innovative ones, are regulated by various standards, which undergo constant changes and, despite their long life, are popular and relevant.

In our opinion, despite the high degree of risk, the implementation of innovative processes in project management is the future; this will ensure the competitiveness and sustainability of enterprises using the project approach.

References

1. Andreev, V. *Key factors for the success of Russian innovation projects in the real sector of the economy* // V. Andreev // *Issues. economy.* - 2019. - No. 11. - P. 41-61.

2. Borzhesh A. M. *Algorithmization of innovation management processes in oil and gas corporations* // *Bulletin of the Volga University named after V.N. Tatishcheva.* 2018. T. 2, No. 3. pp. 27-37.

3 Vakhromov E.N. *Regional economics in the multi-level structure of a market economy*/E.N. Vakhromov // *Bulletin of Irkutsk State University.* 2018. – No. 2. –P. 26–30.

4. Medvedev, V.P. *Innovation as a means of ensuring the competitiveness of an organization* / V.P. Medvedev. - M.: Master, 2018. - 945 p.

5. Fatova S. A. *The role of modern marketing communications tools for the development of the media industry* // *Petersburg Economic Journal.* 2018. pp. 68-76

DOI 10.34660/INF.2024.58.89.151

俄罗斯医药市场的互联网品牌传播
**BRAND COMMUNICATION ON THE INTERNET IN THE RUSSIAN
PHARMACEUTICAL MARKET**

Beschastnova Svetlana Petrovna

Lecturer

State University of Management

抽象的。 文章讨论了俄罗斯医药市场品牌关系设计的特点, 改进品牌关系系统的工具和要素, 并考虑了关系构建系统的技术和工具。 文章对医药市场的品牌品类进行了分类, 并通过互联网推广的实际应用来推广其中的一些品牌品类的特点。

关键词: 药品营销、药品品牌、品牌传播策略、药品、制药公司、传播、药品市场。

Abstract. *The article discusses the features of designing brand relationships in the Russian pharmaceutical market, improving the tools and elements of the brand relationship system, and considers the technologies and tools of the relationship building system. The article provides a classification of brand categories in the pharmaceutical market, and the features of promoting a number of them through the practical application of Internet promotion.*

Keywords: *pharmaceutical marketing, pharmaceutical brand, brand communication strategy, pharmaceuticals, pharmaceutical company, communications, pharmaceutical market.*

The brand in the pharmaceutical market has become a symbol of quality, reliability and innovation, which allows manufacturers to increase market share and increase competitive advantages. In this regard, more and more Russian pharmaceutical companies are realizing that investing in brand development is the key to success in building a modern pharmaceutical business, and brand development is the process of creating and communicating its unique characteristics to the consumer. The brand concept of pharmaceutical manufacturers consists of ideas and goals that pharmaceutical companies strive for to achieve image attractiveness and, as a result, achieve success. The concept helps highlight the brand's personality and promotes business

Brands on the pharmaceutical market should be divided into several categories:

- corporate brand: the brand name is the same as the company name. For example, Darnitsa (ointment “Cortonitol - Darnitsa”);
- family brand: a general name for goods from different product categories, the purpose of which is to transfer positive experience from one product category to another;
- range brand: a name for products from different categories, but to solve one problem. For example, the assortment group of the Oxy company contains both medications for the treatment of skin diseases (“Oxy-5”) and medicinal cosmetics, which are intended for the prevention of acne (“Oxy - washing lotion”);
- individual brands: brands that cover one product category but contain several varieties.

For example, “Coldrex tablets” – a hot drink” and “Coldrex Knight – syrup to relieve cold symptoms.”

A brand in the pharmaceutical industry also has its own properties and characteristics, for example:

- advantages, etc. consumers buy not the properties, but the benefits of a particular drug. In this connection, for successful brand promotion, the qualities of the product are provided in the form of advantages, which can be both rational and emotional. For example, Coldrex tablets, designed to relieve cold symptoms, have their advantage - the drug is expensive and proven by its consumers. Rationality here acts as a property of its purpose, emotionality, as an effective and proven product. The drug has the property of relieving many symptoms. The brand of this drug is known throughout the world, which is extremely important for the consumer.

- Value, etc. the brand is endowed with specific information on the consumer’s value system. For example, the value of the antibiotic Bactroban lies in the effective use and treatment of skin diseases. In this regard, the manufacturer highlights value that coincides with a high set of advantages.

- Individuality, etc. The consumer has an association with the concept of brand with certain properties and characteristics of the product that are necessary to satisfy his needs.

Thus, the development of branding in the pharmaceutical market is just beginning its journey. Today, successful pharmaceutical manufacturers build effective interaction with the consumer, taking into account his requests and suggestions. They use various marketing techniques to create and maintain positive brand perception. It is also worth noting the fact that mass advertising is gradually giving way to more subtle and targeted methods of promotion, and successful Russian brands of pharmaceutical manufacturers have already achieved significant results in the minds of consumers.

To achieve their goals, brands need to actively use Internet marketing, which is one of the effective means in the pharmaceutical field. Creating a brand on the Internet allows you to attract the attention of your target audience and establish trusting relationships with your clientele. Thanks to the Internet, a brand can take an expert approach to displaying pharmaceutical products or services, as well as create long-term connections with customers.

According to Yandex.Radar, more than 60% of users search for information from mobile devices. And pharmacy is a rather specific field, and therefore this figure can reach up to 90%. Also, social networks play an important role in brand formation. Active brand promotion through social networks allows you to establish a continuous dialogue with customers, increase brand awareness, and strengthen your image. High online rating – the Internet allows you to attract more customers. Optimizing site content, using keywords in descriptions, links and tags, and working to improve the user experience can increase search visibility and attract new customers.

The communication strategy must be tailored to the individual needs of each client. Thus, an effective Internet communication strategy allows brands to stand out from competitors and attract the attention of their target audience. Internet marketing, social networks and search engine optimization are the main tools for achieving your goals. At the same time, it is important to follow the needs of customers and create personalized offers. To successfully promote a pharmaceutical brand, it is important to use non-standard solutions - slogans and designs must be memorable, commercials may contain unexpected elements. However, it is also necessary to take into account the views of consumers, using their preferences and new cultural trends to promote products. To determine the effectiveness of promotions, as well as to identify the properties of drugs that contribute to an increase in their consumption, special studies are conducted.

The use of non-standard solutions and taking into account customer opinions allow pharmaceutical brands to successfully promote and strengthen their position in the pharmaceutical market. Clinic workers also believe that accessibility and completeness of information about a medicinal product are key when choosing a pharmaceutical brand. They rely on clinical trials and peer recommendations. Thus, it is obvious that for medical workers, information resources are an important factor when deciding whether to prescribe a particular drug to a patient. In general, the availability and completeness of information about a drug are one of the main criteria when choosing a pharmaceutical brand and drug, both for the audience in general and for doctors and clinic workers in particular.

The study also shows that physicians obtain drug information from pharmaceutical representatives, scientific publications, and fellow physicians. Despite this, most doctors express distrust of the information received from represent-

atives of pharmaceutical companies, considering it subjective and biased. Drug costs also have a high impact on patient choice. Since many patients are willing to refuse treatment due to the high cost of drugs, this can negatively affect their health. In this regard, it is important to ensure the availability of medicines for all segments of the population.

Thus, to achieve optimal drug consumption, it is necessary to take into account the preferences and needs of both doctors and patients, as well as ensure that doctors are informed about new drugs and their methods of use. A survey conducted among medical workers showed that they highly appreciate the originality of Russian-made drugs, as well as the purity of the active ingredients. Patients share the same opinion, for whom the rapid action and safety of the drug are also important. An important factor for successful promotion in the market is an attractive brand and packaging that can interest the buyer. And also, the cost and availability of information.

When deciding to purchase a drug, experience in its use also plays an important role for medical institutions and clinics. For doctors and patients, drug brands have a psychological value, being perceived as a lifestyle or ordinary consumer products. Thus, successful drug branding requires an integrated approach. Developing a brand strategy on the Internet is an important step for successful promotion in the market. First of all, it is necessary to determine the goals and objectives of the strategy, and then select the appropriate tools to achieve them.

Automated marketing planning programs allow you to analyze data about consumers, competitors, the market and other factors that influence business success. They integrate information from different departments of the enterprise and provide suitable means for analysis, taking into account many parameters and complex calculations, and offer recommendations on pricing, promotion, distribution and other aspects of marketing. Thus, automation of the data analysis process allows for more effective marketing detail, thereby working on building a successful brand.

Also, effective marketing activity is a strategic partnership - co-branding, the purpose of which is to create and promote a joint product or service. One of the main advantages of this technology is that it allows companies to expand their audience reach and increase sales. Through collaboration, companies can pool their resources and knowledge to create a product that meets the needs of different customer segments. In addition, co-branding helps increase audience loyalty, as well as minimize production and marketing costs. Partners can share the costs of development, as well as its promotion on the market. However, co-branding also has its drawback – reputational risks. If one of the partner companies gets into a scandal or violates professional standards, this can negatively affect the other company. In this regard, it is necessary to carefully select partners, set conditions, and

exercise control. Only then is it possible to achieve fruitful results and strengthen positions in the pharmaceutical market.

Internet marketing, social networks and employer branding are also effective means for creating a successful brand and set goals for pharmaceutical companies. The use of non-standard solutions and taking into account customer opinions allow pharmaceutical brands to successfully promote and strengthen their position in the pharmaceutical market. Thus, information resources are an important factor when deciding whether to prescribe a particular drug to a patient. Developing a brand strategy on the Internet is an important step for successful promotion in the market, which is implemented through banners, YouTube advertising, as well as social networks and blogger reviews.

A communications strategy for pharmaceutical brands is critical to achieving the desired impact. It must be remembered that the information strategy must be flexible to meet changing trends and the needs of the target audience.

Thus, pharmaceutical manufacturers and pharmacy chains must take care of their reputation, as well as create positive impressions among potential customers. To do this, it is necessary to analyze the wishes of the target audience, as well as develop appropriate strategies for attracting and retaining professional employees based on a loyalty program.

References

1. Bertrand D. *Modern marketing technologies, globalization and conflicts* / D. Bertrand. – M.: Publishing house: Foundation for the Development of Conflictology, 2017. – 396 p.
2. Krasnyuk I. *Marketing in commercial activities. Textbook* / I. Krasnyuk. – Publisher: Phoenix, 2015 – 400 p.
3. *How to promote pharma in digital today: specific tips on advertising and IT solutions.* – Access mode: <https://vc.ru/marketing/465273-kak-segodnya-prodvigat-farmu-v-digital-konkretnye-sovety-po-reklame-i-it-resheniyam> (Date of access: 05/08/2024).
4. Ponomareva A.M. *Advertising activities: organization, planning, effectiveness assessment* / A.M. Ponomareva. – M.: ICC “MarT”, 2004. – 240 p.
5. *Pharmaceuticals: in search of best practices.* // *Standards and quality*, 2014. - No. 12. – pp. 44-47.
6. Khmelkova N.V. *What determines brand elasticity?* / N.V. Khmelkova // *Marketing and marketing research*, 2022. – P. 56.
7. Shchepilov K.V. *Media research and media planning* / K.V. Shchepilov. – M.: RIP-Holding, 2005. – 222 p.

中国房地产市场的金融风险
FINANCIAL RISKS IN THE REAL ESTATE MARKET IN CHINA

Lin Li Xin

Master's student

Saint Petersburg State University of Economics

Barkar Aleksandr Aleksandrovich

Ph.D. in Economics, Associate Professor

Saint Petersburg State University of Economics

注解。 本文探讨了与中国房地产市场相关的各种金融风险，并概述了这个占中国 GDP 很大一部分的行业由于其高杠杆性质和中国政府实施的政策而如何面临这些风险。 作者讨论了此类风险对国内和全球经济的影响，特别强调了“三条红线”政策及其对房地产开发商的影响。 他们还涉及房地产违约的更广泛后果以及家庭财务稳定与房地产行业健康的相互作用。

关键词：中国、房地产市场、金融风险、政府政策、“三条红线”、杠杆。

Annotation. *The article explores the various financial risks associated with the real estate market in China and outlines how this sector, which accounts for a significant portion of China's GDP, faces them due to its highly leveraged nature and the policies implemented by the Chinese government. The authors discuss the implications of such risks on both the domestic and global economy, particularly highlighting the “three red lines” policy and its impact on real estate developers. They also touch on the broader consequences of real estate defaults and the interplay of household financial stability with the health of the real estate sector.*

Keywords: *China, real estate market, financial risks, government policy, “three red lines”, leverage.*

Over the past twenty years, the Chinese real estate market has rapidly developed into one of the main sectors the country's national economy, gaining the status of one of the locomotives of Chinese economic growth. According to IMF, it provides up to 20% of economic activity [1], and the famous economist Kenneth Rogoff estimates the contribution of this sector to the gross domestic product at 29% [2]. Not surprisingly, with the growing influence of this sector on the national economy, a number of risks have emerged, which should be taken into account both when investing in real estate projects and when determining the development strategy of the state as a whole.

One of the key risks in the PRC real estate market is the highly leveraged economy. As one of the two largest economies in the world, China has accounted for about one third of global GDP growth over the last decade [1], with its share in global lending to the non-financial sector increasing from 8% to 20% [3].

On the one hand, credit has provided the PRC with high growth themes; on the other hand, the recent turmoil in the Chinese real estate sector and the payment difficulties faced by several large Chinese real estate developers such as Evergrande illustrate the risks inherent in a highly leveraged business model.

As a capital-intensive industry, real estate companies develop under an operating system whereby they obtain loans from banks, use them to purchase land and construct buildings, and then use the land and buildings as collateral to obtain new loans for new projects upon completion. In this regard, the industry is characterized not only by a high share of borrowed funds, but also by high turnover.

Over the past 10 years, the share of debt in the assets of publicly traded Chinese real estate companies has ranged from 73% to 80% [4]. These figures are not out of the ordinary for the sector, although they are above the comfortable range of 40-60%, which makes companies more vulnerable in the period of rising interest rates we are in from 2022.

Not surprisingly, the rising cost of borrowing has already triggered several defaults in China on U.S. dollar-denominated debt, including by large real estate developers such as Country Garden, which failed to pay the coupon on offshore debt in full.

At the same time, a significant part of borrowed funds comes from the so-called “shadow banking sector” represented by non-banking financial institutions. This is due to the fact that the Chinese authorities’ policy of gradual deleveraging is increasingly restricting classical commercial banks from providing sufficient amounts of debt financing. “Shadow banking sector” does not have to comply with these requirements and therefore can circumvent capital adequacy restrictions, often using not always bona fide formulations, supposedly “guaranteeing” to the investor a certain return and its collateralization by the central government, which is not true.

Another important risk factor is the sensitivity of the PRC real estate market to the policies of the government, which exercises control over the real estate market by implementing policies in several key areas:

1) *Elimination of temporary imbalances.* Such measures include limiting the amount of real estate in ownership, banning the sale of real estate within a certain period of time, as well as controlling the prices of areas with high demand and setting price limits for new buildings [5].

2) *Management of land resources.* In this direction it is worth highlighting the policy of organizing land auctions as a channel for regulating the pace of de-

velopment of the real estate market, in the conditions of state ownership of urban land [6] and the adoption of zoning laws to determine the types of development in specific areas in order to form certain models of urban development, including the so-called “new urban areas” – zones that include residential, commercial and industrial real estate, created in order to more evenly distribute the population and economic development of the city.

3) *Macroprudential regulation*. In this direction, the most striking example is the “three red lines” policy adopted in August 2020. The “Three Red Lines” policy adopted by the Central Bank of China and the Ministry of Housing in August 2020 is the most striking example. The measure mandates certain financial covenants: “debt to assets” of no more than 70%; “debt to equity” of no more than 100% and “cash and cash equivalents to short-term debt” of no less than 1. Depending on how developers comply with these “red lines” they are divided into four categories: “red”, “orange”, “yellow” and “green”. Developers in the “red category” have violations in all three and are prohibited from and increase in interest obligations. “Orange category” companies have violations in two indicators and the annual growth rate of their interest liabilities cannot exceed 5%. Enterprises in the “yellow category”, i.e. with one violation only one indicator crosses the line, and they are allowed to increase their debt by no more than 10%. If all covenants are met, then borrowings can be increased by 15% annually [8].

Since the “three red lines” policy was enacted, more than half of public developers have had a violation of one of the red lines [9]. Although the Chinese authorities’ initiative in itself has a good purpose of financial recovery of the industry, in reality it led to the fact that in the context of shrinking demand for residential real estate from households since the beginning of the COVID- 19 pandemic, developers began to suffer from a lack of liquidity and, as a consequence, many companies found themselves at risk of default. Difficulties in repaying debts led to an even greater increase in the cost of debt financing and made it difficult for developers to restore liquidity positions in a timely manner.

Finally, another risk factor is household demand, a decline in which could increase stress among developers and in the economy as a whole. Household welfare is increasingly dependent on the development of the real estate market, and all risks related to the financial soundness of developers can negatively affect household income and hence consumption. Similarly, products provided to households by the shadow banking sector intertwine the risks of the non-bank financial sector and households. As household debt levels in China are rising sharply, the interdependence of risks in the private sector has led to the emergence of systemic risks in China that may have negative spillover effects both at home and abroad.

It should be taken into account that most real estate developers in China are internally financed, and prepayments for housing not yet built provide a signifi-

cant part of their liquidity [10]. In the decade leading up to the pandemic, housing prices rose significantly relative to household incomes, in part because consumers chose to invest their substantial savings in real estate in the face of a shortage of attractive savings alternatives. The expectation of further increases in house and land prices allowed developers to borrow quickly, and land sales provided local authorities with crucial revenue.

In order to spur falling demand from households, the PRC government has started to take measures to ensure the completion of pre-sale housing to avoid mortgage defaults, reduce mortgage rates and down payment requirements. Developers, in turn, were given the opportunity to extend the maturity of loans.

The PRC government's priority for 2024 is economic growth, so analysts expect an increase in budget expenditures in conjunction with the easing of monetary policy. The expected budget deficit may be more than 3.5% [11]. The Chinese authorities referred to the so-called "three categories of major projects" the program of affordable housing, reconstruction of urban settlements and emergency public facilities. Obviously, the PRC government's goal is to provide housing for low-income households, which in the long term can alleviate pressure on the commercial market and help restore consumer and investor confidence.

Despite all the risks in the Chinese real estate market, experts estimate that the risk of systemic default is limited, given the debt structure of the real estate sector and the government's deleveraging efforts in recent years. The amount of outstanding debt is estimated at 60 trillion yuan (\$8.9 trillion). Of this, 65% is mortgage debt and 35% is corporate debt. The relatively high down payments that homeowners must make should help curb large-scale mortgage defaults. Meanwhile, nearly 70% of total corporate debt (~\$3.1 trillion) is bank loans [11]. Lower rates across the board should also ease the financial pressure on real estate developers.

Thus, the Chinese real estate market is currently experiencing a situation in which a number of risks have materialized. This forces investors to be extremely careful, as the problems in the PRC real estate market determine the general state of not only the Chinese, but also the global economy. From the perspective of an external investor in equity and debt instruments of companies from this sector, we recommend selecting only those issuers that fall into the "green category" according to the "three red lines" policy.

From the perspective of a Chinese real estate investor, it is essential to have sufficient information on current government regulation not only at the PRC level, but also in a particular province and municipality. The same applies to the prospects of a particular regional market, as the differences in price dynamics between small, medium and large cities, as well as between regions, have only increased over the past decades. Among the key factors to be taken into account are the dynamics of the population's income in the region, the pace of its economic devel-

opment, the demand for different types of real estate, as well as the potential yield both for long-term rental and for a speculative exit strategy in a few years (taking into account all potential tax costs and regulatory restrictions).

Literature

1. Hoyle H., Jain-Chandra S. *China's Real Estate Sector: Managing the Medium-Term Slowdown* // International Monetary Fund. URL: <https://www.imf.org/en/News/Articles/2024/02/02/cf-chinas-real-estate-sector-managing-the-medium-term-slowdown> (date of reference: 14.05.2024).

2. Rogoff K., Yang Y. *Has China's Housing Production Peaked* // *China & World Economy*. - 2021. - № 29. - P. 1 - 31.

3. Dieppe, A., Gilhooly, R., Han, J., Korhonen, I., Lodge, D. *The transition of China to sustainable growth - implications for the global economy and the euro area* // *Occasional Paper Series - January 2018*. - No 206.

4. *China Listed Company: Debt to Asset Ratio: Real Estate* // CEIC. URL: <https://www.ceicdata.com/en/china/financial-data-of-listed-company-debt-to-asset-ratio/cn-listed-company-debt-to-asset-ratio-real-estate> (date of address: 14.05.2024).

5. Koss R., Shi X. *Stabilizing China's Housing Market* / Koss R., Shi X. // IMF. URL: <https://www.elibrary.imf.org/view/journals/001/2018/089/article-A001-en.xml#A01fn10> (date of reference: 14.05.2024).

6. Yang Z., Ren R., Liu H., Zhang H. *Land leasing and local government behavior in China* // *Urban Studies*. - April 2015. - Vol. 52, No. 5. - C. 841 - 856.

7. Qi Y., Song Q., Zhao X., Qiu S., Lindsay T. et al. *China's New Urbanization Opportunity: A Vision for the 14th Five-Year Plan* // *Coalition for Urban Transitions*. URL: https://urbantransitions.global/wp-content/uploads/2020/05/China's_New_Urbanization_Opportunity_FINAL.pdf (accessed 14.05.2024).

8. Shen S. C. *Analysis of the impact of the 'three red lines' policy on the real estate industry* // *National circulation economy*. - 2022. - № 16. - P. 76-78.

9. Sun P., Wang Y. *Analysis of Real Estate Risk Analysis & Countermeasures Based on the Chinese Market* // *Proceedings of the 2nd International Conference on Financial Technology and Business Analysis*. - 2023. - P. 73-80.

10. Apostolou A., Al-Haschimi A., Ricci M. *Financial risks in China's corporate sector: real estate and beyond* // *European Central Bank*. URL: <https://www.swissre.com/institute/research/sigma-research/Economic-Insights/china-property-market.html> (date of address: 14.05.2024).

11. Dai X., Chen Y. *China's property market downturn. The risk of (global) financial contagion contained* // *Swiss Re Institute*. - URL: <https://www.swissre.com/institute/research/sigma-research/Economic-Insights/china-property-market.html> (date of address: 14.05.2024).

DOI 10.34660/INF.2024.78.81.153

激进伊斯兰主义出现的认识论原因和作为犯罪学和法律心理学科学概念的心理瓦哈比派概况

**EPISTEMOLOGICAL REASONS FOR THE EMERGENCE OF
RADICAL ISLAMISM AND PSYCHOLOGICAL WAHHABITE
PROFILE AS A SCIENTIFIC CONCEPT OF CRIMINOLOGY AND
LEGAL PSYCHOLOGY**

Voronin Sergey Eduardovich

Doctor of Law, Professor

Siberian Institute of Business, Management and Psychology,

Krasnoyarsk, Russia

抽象的。这篇文章致力于探讨现代世界中激进伊斯兰教的实际问题。文章作者得出合理的结论：瓦哈比主义（萨拉菲教义）是英国特勤局军情五处于1728年实施的一次成功的战术组合。这次特别行动的目的是使穆斯林世界最终分裂为逊尼派和什叶派。英国情报特工 MI-5 Abd al-Wahhab 于 1735 年撰写了著名的《一神论》。这本书是现代沙特阿拉伯国家的思想基础。《一神教之书》歪曲了《古兰经》和《圣行》中穆斯林圣战部分的主要规定。

关键词：伊斯兰教、宗教、瓦哈比主义、概况、恐怖分子、专业知识、极端主义、犯罪学。

Abstract. *The article is devoted to the actual problems of radical Islam in the modern world. The author of the article comes to the reasonable conclusion that Wahhabism (Salafi teachings) was a successful tactical combination carried out in 1728 by the British secret service MI-5. The purpose of this special operation was the final split of the Muslim Ummah between Sunnis and Shiites. British intelligence agent MI-5 Abd al-Wahhab wrote his famous Book of Monotheism in 1735. This book is the ideological foundation of the modern state of Saudi Arabia. The Book of Monotheism distorts the main provisions of the Koran and Sunnah in the part of the Muslims' Holy War of Jihad.*

Keywords: *Islam, Religion, Wahhabism, Profile, Terrorist, Expertise, Extremism, Criminology.*

1. The Concept of Wahhabism in Modern Islam

The concept of Wahhabism came from the name of the creator of this religious teaching, Salafi Abd-al-Wahhab. It is reliably known that the grandfather of the

founder of Wahhabism, Mohammed ibn Abd-al-Wahhab, Shalman Karkushi, was a Jew, moreover, a secret Jew - the so-called «denme». Denme are Ottoman crypto-Jews, posing as true Muslims in the 18th century. In 1703, Shalman Karkushi was exiled by the Ottoman authorities first to Egypt and then to city Nejd (Saudi Arabia) for heresy and secret communication with the Jews, where he successfully continued his subversive activities on the ideological front. [16]

This subversive extremist work was continued by Shalmon's grandson Karkushi Abd-al-Wahhab, who was recruited by British intelligence MI-5 in 1728. The new British Secret Service agent Abd-al-Wahhab got a very difficult task: to split the Muslim Ummah between Sunnis and Shiites. This is the old Jewish principle of the Talmud: «divide and conquer». Abd-al-Wahhab, commissioned by the British secret service, wrote his famous Book of Monotheism (Kitab ad-Tawhid). This book is currently banned in Russia. In the book, Abd-al-Wahhab distorts the texts of the Koran and the hadith of the Prophet Mohammad. Unfortunately, the Book of Monotheism is the main book for Muslims in Saudi Arabia today. [2]

The basic principles of Wahhabism differed from the classical model of Islam in their rigidity and uncompromising attitude. At the center of the Wahhabi doctrine lay the principle of strict monotheism, even the fundamental pillar of Islam - "There is no God but Allah, and Muhammad is the Prophet of Allah" was interpreted in such a way that only Allah should be worshiped, but not Muhammad. The consequence of this provision was a ban on visiting the holy places of Islam - the graves of Muhammad and his associates. This was explained by the fact that this practice leads to the deification of the prophet and, accordingly, is a step towards polytheism. [1]

Al-Wahhab was uncompromisingly disposed in matters of innovations that go beyond the Quran and Sunnah, these sources were considered the highest degree of knowledge, and going beyond them was an unacceptable sin. The "gates" for the interpretation of the Quran and Sunnah, according to the Wahhabis, have been closed since the Hanbalist school of Muslim Orthodox thought took shape. The principle of "takfir" (disbelief), which occupies a special place in Wahhabi ideology, assumed the possibility of declaring Muslims infidels who do not share the Wahhabi vision of religion. [2]

For the Wahhabis, such hypocrites were many times worse than the Jews and Christians, since, unlike the latter, they hid their alien face for piety. Taking into account the danger of these members of society for the Muslim community, it was considered necessary to expose and execute them. The duty of true believers was proclaimed the conduct of jihad against the pagans, which included all Muslims who did not share Wahhabist attitudes.

The rigid formulation of the basic principles of the doctrine and their brutal implementation in practice played a certain positive role, since they were able to

ensure the unity of society, thereby making their contribution to the formation of the Saudi state. However, after the task of restoring Islam in Arabia and creating a state was successfully accomplished, the ideology of Wahhabism underwent a certain evolution towards softening and subsequently moved closer to normative Islam.

Saudi Arabia's claim to a leading role in the Muslim world, the country's involvement in the world economy, the need to build relationships with other states determined a rearrangement of priorities. Thus, the ideology of Saudi Arabia is currently a much milder analogue of classical Wahhabism. [2]

In the official documents of the Kingdom, in the statements of senior officials, nowhere is Wahhabism mentioned as an official religious doctrine. The Wahhabist movement is usually spoken of in a historical context or when considering purely religious issues. Most often, the word Wahhabism is used to denote religious and political extremism correlated with Islam, the official ideology of the Kingdom of Saudi Arabia. Wahhabis mean either the carriers of the ideas that make up the teachings of Abd-al-Wahhab, or members of the groupings who are guided by this teaching.

Everything that has anything to do with this teaching is characterized as Wahhabism, although the Wahhabis themselves strive not to call the religious teachings of Ibn Abd-al-Wahhab, or the modern official doctrine of the Kingdom of Saudi Arabia, or the ideology of movements and groups that accept and spreading Wahhabi ideas and implementing Wahhabi attitudes in the world (including in Russia).

The most important reason for the unwillingness of the Wahhabis to be called Wahhabis is that then the accusations put forward by Muslims against the Wahhabis will be implicitly recognized - that the Wahhabis are heretics within the framework of Islam, that is, people who follow a special religious teaching developed by a specific person (Muhammad ibn-Abd-al-Wahhab) in a specific period of time (XVIII century) and did not exist before in this form and with such content. The Arabic word heresy (*bidah*) comes from *badaa*, i.e. «To introduce new», and means a blamed, rejected innovation. [1]

The fact that such accusations against the Wahhabis on the part of Muslims have been accompanying them from the moment the movement arose can be seen from the preface to the aforementioned Book of Monotheism by Ibn Abd al-Wahhab. Therefore, the Wahhabis do not call themselves Wahhabis and call themselves either simply Muslims (*muslimun*), or monotheists (*muwahhidun*), or Salafis - «followers of beneficent ancestors» (*Salafiyun*).

The foundation of Wahhabism is the doctrine of jihad - the Holy War against the infidels. The main way to fight is to kill the infidels. The main sanction for all «infidels» is the deprivation of their lives. So, if a person does not follow Sharia,

as the Wahhabis understand this, then he is «unfaithful». And according to the Wahhabis, «the Almighty said:» The one who allowed such a thing is the unbeliever who should be killed «if he does not return to the Law of Allah and His Messenger.»

The killing of the «infidels» should, according to the Wahhabis, be carried out in a systematic and orderly manner - in the form of a jihad against the «infidels.» Jihad as an armed struggle is, in the opinion of the Wahhabis, a condition for the dissemination of their teachings. Jihad is directed against «infidels», «polytheists» and «hypocrites».

Wahhabis indicate different types of jihad. For example, «Jihad is of four types:

1. Jihad against Shaitan;
2. Jihad against the soul;
3. Jihad against the infidels;
4. Jihad against the “hypocrites”. [2]

However, in the Wahhabi literature distributed in Russian, there are no details about “jihad against the shaitan” or “jihad against the soul.” All Wahhabite postulates of jihad relate to jihad against “infidels”, “polytheists” and “hypocrites”, that is, those whom the Wahhabis declare as such. [3]

Jihad is defined as “an armed struggle from the standpoint of Islam.” The goals of jihad as an armed struggle are as follows (the sequence of points differs in different Wahhabist publications):

- **firstly**, an armed struggle against all who hinder the spread of the Wahhabi doctrine and its monopoly domination. Armed struggle for the sake of the word of Allah above all else, and the whole religion was entirely devoted to Allah. The elimination of any obstacles that hinder the spread of the call to Allah. Protecting religious dogmas and Islamic Akidah from any dangers that threaten them.

- **secondly**, the purpose of the Wahhabi jihad as an armed struggle is to fight all “infidels”, “polytheists” and “hypocrites”. [4]

Fight against paganism and pagans, since Allah absolutely does not allow anyone else to be attached to Himself. Armed struggle against hypocrites. True, the «infidels» can be saved from murder if they accept Islam or recognize the power of the Wahhabis. The leader of the Muslims, having met the atheists, calls on them to convert to Islam. If they refuse, then they should be paid a poll tax, otherwise - an armed struggle.

But, reasonably, and this will not save them from murder. After all, these people can at any moment be accused by the Wahhabis of being «hypocrites». [2]

Thirdly, jihad as an armed struggle is waged to protect Muslims and their native land.

At the same time, there is one very important nuance - to defend Islam by armed means, the Wahhabis call on Muslims and their native land in the event of a

potential enemy, that is, one whose intentions can be regarded as hostile by them. Peace in the Wahhabi interpretation is the abstinence required by circumstances from obligatory jihad as an armed struggle.

The conduct of Jihad depends on the extent to which it is possible. And this is how the Meccan verses (earlier verses of the Qur'an), which speak of peace, forgiveness while Muslims are still weak, and the Median verses (later), which mandate to fight and participate in hostilities when Muslims are will gain strength. [2]

Summarizing what has been said, I conclude: Wahhabism (Salafi) is the right-wing radical wing of the Sunnis. The teachings of the Wahhabis are the state religion of Saudi Arabia. The Taliban movement in Afghanistan also uses the teachings of al -Wahhab as an ideological basis.

2. Psychological Profile and its Place in Modern Criminology

The method of constructing a «psychological profile of a criminal» has long been widely recognized both in forensic science and in the search business. The psychological profile (portrait) of a criminal, as a rule, is used to describe the features and specific details of the criminal's actions, based on the analysis of objects of the material world and the basic laws of psychology, which allows us to call it one of the methods of psychodiagnostics of the scene. In addition, we believe that this method can be considered as one of the options for forensic forecasting. [10]

For the first time, US criminologists started talking about the possibility of diagnosing the scene with the help of a psychological portrait of a criminal. The studies carried out by them have shown that it is possible to draw conclusions about the lifestyle, criminal characteristics and place of permanent residence of the so-called. A “serial criminal” based on data showing where, when and how the crimes were committed by him . [7]

The experience of everyday practice of the FBI employees gradually formed the concept of the so-called internal logic of crime. Its principles can be illustrated. For example, the assumption that a well-designed and organized crime is committed by a person who, in general, tends to carefully plan and shape his life.

One of the main hypotheses in creating a psychological portrait of a criminal is the assumption that the way the criminal commits the first crime will have some similarity with the way he commits other crimes. The second hypothesis is the assumption about the predetermination of the distance between the house of the criminal and the place where he committed the crime. The third is the hypothesis about the specificity of crimes. [8]

If there is a possibility that, when committing a particular type of crime, the offender exhibits a certain sequence of actions, then the question arises about his “professionalism”. It is important here that, as expected, criminals have a number of the same type of criminal «repertoire» and, at the same time, individual characteristics.

However, in the foreign forensic literature, there is a point of view according to which young criminals tend to use eclectically different models of crimes, that is, to commit different types of crimes. The latter circumstance significantly complicates the task of psychodiagnostics of the scene of the incident. [11]

The research carried out by American scientists has resulted in the following:

1) Revealing stable connections between the crime scene, its method, the nature of the trace picture; frequency of criminal acts and victimological characteristics of the victim.

2) Possibility of creating a search model of a probable criminal based on one or another feature of the scene.

3) Possibility of psychological and psychiatric identification of suspects and accused by correlating them with search models. [10]

Attempts to investigate the cause-and-effect relationships between the social and psychological characteristics of the criminal's personality and the mechanism of the crime committed by him using the mathematical apparatus found their expression in the construction of the equation of the so-called fundamental (canonical) correlation. This procedure aims to objectively analyze the relationship between two groups of variables. In other words, this is an attempt to derive complex regression equations that contain a number of variable criteria, as well as a certain number of predictive variables. [15]

“On one side of this equation are the variables necessary for investigators, extracted from information about the crime, on the other - the characteristic features of the criminal, which have search value.

So, if A_1, \dots, A_n means the offender's action (including, for example, time, place and victim's choice), and C_1, \dots, C_m means the characteristic features of the offender, then the weight ratios between F_1, \dots, F_n (where F is the correlation coefficient of stable features of the crime mechanism) and K_1, \dots, K_m (where K is the correlation coefficient of stable traits in the psychological profile of the offender) can be written with an equation of the following form:

$$F_1 A_1 + \dots + F_n A_n = K_1 C_1 + \dots + K_m C_m \quad \ll [11]$$

As can be clearly seen from this equation, there is a directly proportional relationship between data on the mechanism of crime and data on the identity of the offender. We believe, rightly in this regard, D. Kanter notes that “... if such orthodox equations could be derived for any additional series of crimes, then this would serve as a powerful auxiliary basis for forensic science and amazing psychological paradoxes in the theory of criminal behavior”. [14]

In the domestic scientific literature, attempts are also made to psychodiagnose of crime scene using the method of constructing psychological portraits of potential criminals. The peculiarity of such studies is that most of the works devoted to this problem choose the personality of a sexual maniac as the object of research.

And this is not accidental, since a crime of this type has an important system-forming factor - seriality, which allows you to study this phenomenon using systemic and situational methods. In this regard, the results of the study of the famous psychiatrist A.O. Bukhanovsky, who compiled a probable portrait of Chikatilo, which completely coincided with the real one. [13]

As for the psychological profile of the Wahhabite, here the situation is complicated by the fact that there is no most important determinant necessary to derive the equation of canonical correlation - the severity of crimes, unless one considers a person's adherence to the Salafi doctrine as a stable sign of committing crimes of the type under study (Salafia). Building the psychological profile of the Russian Wahhabite, we based on the materials of criminal cases initiated on the grounds of Article 282 of the Criminal Code of the Russian Federation «Incitement of national, racial or religious hatred», as well as Article 205 of the Criminal Code of the Russian Federation «Terrorism». In our research, we deliberately did not touch upon the problem of shahids, which requires independent study and goes beyond the scope of the research tasks of this article. [12]

So, based on the materials of criminal cases we have studied, the average Russian Wahhabite is a young man between the ages of 18 and 25 with a secondary or secondary vocational education. As a rule, this is a native of the North Caucasus, although this rule already has its own, moreover, very alarming exceptions.

For example, the famous Wahhabite and leader of the Caucasian separatists Said Buryatsky (Alexander Tikhomirov), liquidated by the special services of Russia in March 2010, was a native of Buryatia.

I conducted a survey using a lie detector for the Russian Wahhabite Viktor Vlasov in Krasnoyarsk in 2017. The lie detector showed that Vlasov does not consider the murder of a representative of another religious denomination a crime and a great sin. Vlasov believed that Allah encourages the killing of any unbeliever. At the same time, the Wahhabite Vlasov showed a mystical horror of Allah. I saw existential fear in the eyes of this religious fanatic. It was fear as an element of religious mystical consciousness, which in Islam is called "Tariqat".

As a rule, a young man who has accepted the teachings of the Salafis comes from a large family, being the youngest child in the family. Very often he occupies, both in the family and in the school collective, the position of an "outsider", which, in a short time, will inevitably oppose the young man to the hostile world around him. Since by nature he does not possess leadership qualities, being a "follower", then very quickly such an insecure young man falls under the influence of guys who have pronounced leadership qualities. As a result, after graduating from a lyceum or college, the "search for oneself" and the desire to acquire a more significant social status (in fact, this is the same sublimation according to Freud) than he had in school and family, brings these young men to Islamic extremist

organizations (as in our country, for example, in Moscow and St. Petersburg, very often such “seeking” guys “searching for themselves” leads to skinheads).

Further, the ideological work of the Wahhabis with such people is built according to the following scheme: using the fact that they studied at school rather poorly, and also, as a rule, are deprived of the ability for analytical thinking, the alims (teachers of Islam) force them to learn a huge number of suras in Arabic ... By the way, the late Said Buryatsky was credited with remembering by heart 40 hadiths “Navavi with Sharh”, “Akida Tahavi” and “Umda-tul Akhkam”. Thoughtless “cramming” of the Qur’anic texts in Arabic (note that a similar psychotechnique of zombification with the help of endless mantras is practiced by the Hare Krishnas in relation to their followers), coupled with the massive preaching of extremist content against the infidels (“kafirs”) soon bears its long-awaited fruits: “ripe “The young man is deeply imbued with the ideas of” jihad “and wants to turn in reality all his accumulated anger against the hated infidels -” swine-eaters “. And then this ideological platform of the young Wahhabite is inevitably superimposed on the military romance of the “forest brotherhood”, the beautiful rituals of worship of the “warriors of Islam” in the “field” conditions and other ideological nonsense that has become significant for this disoriented young man - unfortunately, now already well aware, where and against whom to direct their irrepressible, absolutely “blind” energy of destruction. As a result of such rather skillful manipulations of alims (ulema) with the mind of a young man, he is now absolutely convinced that the killing of “non-combatants” (women, old people, children) is an act fully approved by Allah, hospitably opening the gates to the long-awaited The Kingdom of heaven. [2]

While developing the topic of national and religious psychotypes of criminals, we, of course, are aware of the delicacy and complexity of this problem. At the risk of being accused of chauvinism, as well as of all mortal sins by representatives of various confessions, at the same time, we believe that the national - religious psychotype of a criminal is not a product of pseudoscientific fantasy, but a phenomenon of objective.

References

1. Gavlo V.K. *Theory and practice of investigating crimes in the field of migration security: Monograph* / V.K.Gavlo, S.E. Voronin, I. V. Nikitenko, Krasnoyarsk: Publishing house of the Siberian Institute of Business, Management and Psychology. 2022.-P.236.
2. Voronin, S.E. *Psychotypological approach in the system of forensic knowledge: Monograph* / S.E. Voronin, R.L. Akhmedshin, T.A. Alekseeva. Krasnoyarsk: Publishing house of the Siberian Institute of Business, Management and Psychology. 2021.- P.73

3. Voronin, S.E. *Moral and psychological foundations of operational-search activity and criminal proceedings: Monograph* / S.E. Voronin. - Krasnoyarsk: Publishing house of the Siberian Institute of Business, Management and Psychology, 2021.- P.114

4. Voronin, S.E. *Organization of a criminal community: criminal-legal and criminalistic aspects* / S.E. Voronin, E.S. Voronina, A.M. Zheleznyakov. - Krasnoyarsk: Publishing house of the Siberian Institute of Business, Management and Psychology, 2022.- P.108

5. Voronin, S.E. *Dialogues about criminal proceedings in Russia: Monograph* / S.E. Voronin. Khabarovsk: Publishing house of the Far Eastern Institute of the Ministry of Internal Affairs of the Russian Federation. 2021.- P.126

6. Voronin, S.E. *Situational modeling in forensic examination [Text]* / S.E. Voronin. - Krasnoyarsk: Publishing house of the Krasnoyarsk State Agrarian University, 2021.- P. 121.

7. Voronin, S.E. *Actual problems of modern forensic science [Text]* / C.E. Voronin, I. V. Nikitenko, D.A. Stepanenko. - Krasnoyarsk: Publishing house of ANO VO «Siberian Institute of Business, Management and Psychology», 2020.- P.102

8. Voronin, S.E. *Theory and Practice of Investigation of Crimes Associated with Illegal Extraction of Aquatic Biological Resources [Text]* / S.E. Voronin, M.N. Tokarev. - Krasnoyarsk: Publishing house of the Siberian Institute of Business, Management and Psychology, 2021.-P.136.

9. Voronin, S.E. *Forensic Science: Workshop / Study Guide* / S.E. Voronin. Krasnoyarsk: ANO VO «Siberian Institute of Business, Management and Psychology», 2022.-P.99

10. Hazelwood, R.R. and Bargess, A. (eds) *Practical aspects of Rape Investigation: a multidisciplinary approach*. Moscow: Publishing house «Science». 2021.-P.78

11. Barges, A.W. and Douglas I.E. *Sexual Nomicide: Patterns and motives*. Moscow: Publishing house «Science». 2021.-P. 134

12. Tabachnick, B.D. Fidell, L.S. *Using Multivariate Statisting*. Moscow: Publishing house «Science». 2021.-P. 54

13. Akhmedshin R.L. *Legal and methodological support of border activities*. Monograph / R.L. Akhmedshin, S.E. Voronin. Krasnoyarsk: Publishing house of the Siberian Institute of Business, Management and Psychology. 2022- P.146

14. Kanter, D. *Psychological profile of a criminal* / In collection. «Problems of using non-traditional methods in solving crimes.» Moscow. 2021.- P. 37

15. Poznyshhev, S.V. *Criminal Psychology: Criminal Types*. Mnography. Moscow: Publishing House «Legal Literature». 2021.-P.25

16. Luneev, V.V. *Crime of the XX century*. World Criminological Analysis. Moscow: Publishing house «Science». 2021.-P. 168

俄罗斯联邦家庭法合法化的可能性和前景 使用婚姻合同对配偶的个人非财产关系进行法律规范

POSSIBILITIES AND PROSPECTS FOR LEGALIZATION BY FAMILY LEGISLATION OF THE RUSSIAN FEDERATION LEGAL REGULATION OF PERSONAL NON-PROPERATE RELATIONS OF SPOUSES USING A MARRIAGE CONTRACT

Mosienko Tatyana Aleksandrovna

*Candidate of Legal Sciences, Associate Professor,
Professor*

Rostov State Economic University

Chobanyan Kristina Olegovna

Master's student

Rostov State Economic University

抽象的。在本文中，作者揭示了俄罗斯巩固婚姻合同中配偶个人非财产关系的法律规制的一个重要而紧迫的问题。文章还对外国立法进行了比较分析，并在此基础上得出适当的结论和改进俄罗斯联邦现行家庭立法的建议。

关键词：家庭、配偶、配偶财产关系、婚姻合同、配偶个人非财产关系、家庭法、公证、法院、缔结婚姻合同的法律后果。

Abstract. *In this article, the authors reveal an important and pressing problem of consolidating the legal regulation of personal non-property relations of spouses in a marriage contract in Russia. The article also provides a comparative analysis with foreign legislation and, on its basis, draws appropriate conclusions and proposals for improving the current family legislation of the Russian Federation.*

Keywords: *family, spouses, property relations of spouses, marriage contract, personal non-property relations of spouses, family law, notary, court, legal consequences of concluding a marriage contract.*

Current Russian legislation gives spouses the right, at their own discretion, to change the legal regime of their property to a contractual regime by concluding a marriage contract among themselves.

This most important legal advantage more precisely and comprehensively emphasizes the presence in legislation of instruments aimed at ensuring peace and stability in marriage. Thanks to this instrument, spouses are free to determine for

themselves the terms of the financial relationships that arise between them, as well as the ways of disposing of the property under their joint control.

Such a tool, in our opinion, contributes to the development of enormous flexibility in the system of relations between spouses related to property, which is certainly very important for a huge number of families.

Soviet and post-Soviet legislation did not provide for the consolidation of a contractual regime for the property of spouses, but only a legal regime was in effect.

In the Soviet Union, there was no marriage contract as such, since the principles of family law, and especially property relations, were completely different and not similar to those that exist in the present period. Moreover, the country had a planned economy without market elements; public property law was in force, which recognized all property acquired by spouses in marriage as common to both, and its use and distribution were regulated by relevant norms and laws.

Thus, in the event of a divorce, the property of the spouses was subject to division equally, in order to achieve social equality in this aspect.

Soviet law assumed a socialist community of family property, and the priority task of the state was to ensure equality of spouses in personal non-property and property relations.

It was precisely on the basis of the principle of equality that in the Soviet Union there was no institution of a marriage contract, as such. Instead, the principles of social justice and collectivism created the basic foundation of family and property relations between spouses who officially registered their marriage with the registry office.

But in modern conditions of rapidly changing times and socio-economic upheavals, in the Russian Federation there has been a need to establish a more flexible and personal approach to regulating the relations of spouses, which directly relate to property relations. It is precisely to regulate such an issue that modern legislation provided for the possibility of concluding a marriage contract both before registering a marriage and subsequently, which allows the spouses to determine the legal regime of their finances and property themselves.

It should be noted that with the help of a marriage contract, it is possible to foresee possible risks in advance and determine ways to resolve conflict situations without infringing on the rights of the spouses. At the same time, spouses can end the marriage in a civilized manner, avoiding a lengthy trial related to the division of property.

In addition to the property rights and obligations of spouses, the law also establishes personal non-property rights and obligations arising in connection with their intangible benefits.

Typically, authors include the following as intangible benefits:

- personal integrity;
- honor and good name, and other internal intangible benefits of a non-property nature.

In Part 3 of Art. 42 of the Family Code of the Russian Federation (hereinafter referred to as the RF IC) expressly states that it does not regulate personal non-property relations of spouses. This part contains a list of what should not be included in a marriage contract, namely, a marriage contract cannot limit the legal capacity or capacity of the spouses, their right to go to court to protect their rights; regulate personal non-property relations between spouses, the rights and obligations of spouses in relation to children; provide for provisions limiting the right of a disabled, needy spouse to receive maintenance; contain other conditions that place one of the spouses in an extremely unfavorable position or contradict the basic principles of family law[1].

The above indicates that the regulation and consolidation of personal non-property relations of spouses in a Russian marriage contract is prohibited.

It also does not include the following provisions:

- financial support for children;
- behavior of spouses in the family;
- adultery, etc.

The legalization of a marriage contract is enshrined in law not only in Russia, but also in foreign countries. This agreement in any country is considered as a way to protect directly and indirectly the property relations that arise between spouses.

Let us turn to the experience of foreign countries. Due to the fact that legislation in the West developed much more actively and in one paradigm, such an instrument as a marriage contract became more widespread, unlike in Russia. It should be noted that in a number of foreign countries, a marriage contract between spouses still regulates personal non-property marital relations.

In our opinion, the reason for this gap in domestic legislation is the late emergence of the institution of a marriage contract in the Russian Federation. As a result, in foreign countries the practice of applying a marriage contract is more extensive, and in Russia the lack of widespread use of a marriage contract is still an urgent problem.

Globally speaking, in Russia the institution of a marriage contract is becoming more popular, as in countries of foreign law and order. It must be said that abroad, a marriage contract is a common practice among wealthy citizens who want to protect their savings, however, due to the blurring of the differences between the middle class and the wealthy, the masses are increasingly using such a flexible instrument to regulate relationships.

In Russia, the marriage contract has not yet become as widely used as in Western countries, which, in our opinion, is due to several reasons:

Thus, due to rapidly changing legislation, a large percentage of citizens are still not aware of the existence of such an institution as a marriage contract or do not understand its significance at all.

Moreover, the stereotype of mistrust between spouses who have entered into a marriage contract still prevails in society. The conclusion of such an agreement, if not directly condemned in society, then leads to a prejudiced attitude towards the spouses.

As noted above, the advantage of a marriage contract in regulating property relations between spouses is significant and has been repeatedly proven in practice in developed countries, including Russia.

Therefore, it is extremely important, and sometimes simply necessary, to promote this instrument of interpersonal relations between spouses among citizens of the Russian Federation, while explaining its significance and advantages.

In our opinion, a law should be developed that would allow persons entering into marriage to be consulted by the registry office on the issues of concluding a marriage contract.

It is also important to change the attitude of society towards this institution and show that a marriage contract is a very important and effective legal instrument in achieving stability and harmony between persons entering into a marriage.

Moreover, T.P. Volchenkova in her work expressed the opinion that the main distinguishing feature between a marriage contract in the USA and in Russia is the fact that Russian legislation prohibits the regulation of personal non-property relations of spouses by a marriage contract, while American legislation does not provide for such restrictions. US law establishes only general prohibitions on certain conditions, for example, restrictions on children's rights to financial support. That is, a marriage contract in the USA may contain various non-property rights and obligations of spouses [2, p. 33], which, in our opinion, should be enshrined in Russian family law.

So, according to A.P. Sokol, P.V. Sokol, like Russian law, the French Civil Code (hereinafter referred to as the French Civil Code) establishes a ban on the inclusion in a marriage contract of conditions relating to personal non-property relations between spouses. But Article 1388 of the French Civil Code contains only the provision that in their marriage contract "spouses cannot deviate from the obligations or rights arising for them from marriage, nor from the rules on parental rights, on the management of children's property assigned by law and about guardianship" [3, p. 54].

Based on the foregoing, we can conclude that at the present time, the study of the current problem of the lack of possibility of regulating personal non-property relations of spouses by a marriage contract under Russian legislation requires more scientific research by civil scientists and legal regulation in general.

In our opinion, personal non-property relations of spouses are closely interconnected with property relations, and cannot exist separately without each other.

The need to borrow provisions of foreign legislation in matters of regulating adultery through the terms of a marriage contract seems to be more justified.

The use of marriage contracts in the Russian Federation will lead to clearer regulation of issues affecting personal non-property and property relations of spouses. The practice of applying a marriage contract, in our opinion, will help prevent conflicts and disputes between spouses in the event of adultery.

Of course, in modern Russia, the regulation of personal non-property relations should be introduced into the terms of the marriage contract, thus protecting the interests of a conscientious spouse, especially since infidelity by one of the spouses is the reason for the termination of family and marital relations.

We believe it is necessary to amend the Family Code of the Russian Federation, giving spouses the right to include conditions and sanctions in the case of adultery in the marriage contract. Moreover, these same sanctions can be of a completely different nature and take different forms, including division of property or monetary compensation, etc.

For example, citizens who have registered their relationship can agree that in the event of adultery of one of the spouses, the other has the right to half of all property acquired during the marriage relationship.

We believe that the provisions of Part 1 of Art. 42 of the RF IC, in our opinion, should be stated in the following wording: “Spouses have the right to determine in a marriage contract their rights and obligations for mutual maintenance, ways of participating in each other’s income, the procedure for each of them to bear family expenses; determine the property that will be transferred to each of the spouses in the event of divorce, as well as include in the marriage contract any other provisions relating to the property relations of the spouses; spouses also have the right to determine in the marriage contract provisions related to adultery, other dishonest behavior, including property liability.

We also believe that the consolidation of such a legislative innovation into the family legislation (RF IC) will help strengthen the institution of the family and preserve traditional values in Russia.

Making such changes, in our opinion, can be a major step towards creating strong and stable families, which in turn will contribute to the development of society as a whole.

Enshrining in law the rights and responsibilities of spouses will help avoid disagreements and conflicts, even if the spouses decide to end the marriage due to other circumstances.

Of course, it will not be possible to regulate all aspects of the relationship between spouses, but the most basic and frequently encountered disputes in judicial and legal practice can be stipulated in a marriage contract.

It can also be said that the legislation on a marriage contract can contribute to a more balanced choice of partners when creating a family, since a marriage contract will allow to include a number of important aspects for spouses, such as the regulation of personal non-property relations, but in the absence of the consent of one of the spouses it will indicate that that he is not sure about his future family life.

Thus, the proposed changes in the legal regulation of the marriage contract will allow citizens entering into marriage or spouses living in family relationships to streamline not only property issues, but also personal non-property ones. It seems necessary to note that both society and the state should be interested in creating a strong and happy family.

Bibliography

1. *Family Code of the Russian Federation dated 29 December 1995 № 223-FZ (as amended on 31 July 2023) // Russian newspaper. 27.01.1996. № 17.*
2. *Volchenkova T.P. Comparative analysis of the marriage contract in Russia and the USA // Domestic jurisprudence. 2019. № 1 (33). – Pp. 33-35.*
3. *Sokol P.V., Sokol A.P. The institution of the marriage contract in Russia and France, comparative analysis // Notarial Bulletin. 2021. № 6. – Pp. 47-56.*
4. *Mosienko T.A., Tuguz M.A. Problems of legal regulation of the marital property regime in Russia and China: comparative legal analysis // Science and education: economy and economics; entrepreneurship; law and management. 2024. № 3 (166). – Pp. 51-58.*

当前外国人收养的问题
CURRENT PROBLEMS OF FOREIGN ADOPTION

Mosienko Tatyana Aleksandrovna

*Candidate of Legal Sciences, Associate Professor, Professor
Rostov State Economic University*

Priyma Alexander Vyacheslavovich

*Master's student
Rostov State Economic University*

抽象的。文章指出了当前与外国因素相关的问题。作者建议不仅要改进家庭立法,还要改进刑事立法,以实现更优化和适当的收养,因为没有父母照顾的儿童需要社会和整个国家的额外保护。

关键词: 法院、监护和托管当局、俄罗斯联邦儿童权利专员、失去父母照顾的儿童、检察官、收养、法院判决、调解、养父母候选人。

Abstract. *The article identifies current problems associated with the foreign element. The authors propose to improve not only family, but also criminal legislation for more optimal and appropriate adoption, since a child left without parental care needs additional protection from society and the state as a whole.*

Keywords: *court, guardianship and trusteeship authorities, Commissioner for Children's Rights in the Russian Federation, children left without parental care, prosecutor, adoption, court decision, mediation, candidate for adoptive parents.*

The paragraphs of Article 38 of the Constitution of the Russian Federation establish that the family, motherhood and childhood are under the protection of the state, and the care of children and their upbringing are equal rights and responsibilities of parents [1].

The relevance of the article is justified by the fact that, unfortunately, not all children in Russia are under family care and, as a rule, are recognized as orphans or children without parental care. According to statistical data announced by Deputy Minister of Labor and Social Protection of the Russian Federation A.V. Vovchenko at the 95th session of the Committee on the Rights of the Child in Geneva, in Russia in 2023, 35 thousand orphans were in specialized institutions. And the total number of orphans decreased from 491.5 thousand in 2013 to 375.7 thousand in 2023. The number of children left without parental care annually is at the level of 36.7 thousand people [3].

We can identify several positive trends that are helping to reduce the number of orphans and children left without parental care: an increase in the number of children placed in foster families, the state's policy of preserving blood families, strengthening efforts to prevent orphanhood, improving the financial well-being of citizens of the Russian Federation, rule-making activities government bodies, etc.

Adoption is one of the most important institutions in the matter of protecting childhood, rights and legitimate interests of the child. Adoption is understood as a legal act by virtue of which legal relations arise between the adoptive parent and the adopted child, equated by law to the relationship of blood parents and children, and arising on the basis of a court decision. Foreign adoption is an adoption in which the key is the presence of a foreign element, which is expressed in the fact that the adopted person and the adoptive parent have different citizenships.

Article 124 of the Family Code of the Russian Federation [2] establishes that the adoption of children by foreign citizens is allowed only in cases where it is not possible to transfer these children for upbringing to families of citizens of the Russian Federation permanently residing in the territory of the Russian Federation, or for adoption to relatives of the children, regardless of citizenship and the places of residence of these relatives.

Speaking about foreign adoption, it is worth noting that the number of cases of adoption by foreigners of Russian orphans and children left without parental care has decreased significantly from 2012 to the present. Thus, according to the Ministry of Education of the Russian Federation, in 2012 foreigners adopted 2,604 Russian children, and in 2018 only 289 children. Thus, foreign adoption in Russia decreased by 9 times [4].

In our opinion, this reduction has a number of reasons related to the legal regulation of the adoption of children by foreign citizens, which is aimed at the well-being and protection of Russian children from unscrupulous foreign adoptive parents.

In this regard, several pressing problems of foreign adoption can be identified. One of the most important current problems of foreign adoption is the issue of monitoring compliance with the rights and legitimate interests of adopted children. This control is carried out by consular offices of the Russian Federation in the countries of adoptive parents, but this control, in our opinion, has a number of shortcomings.

Thus, after arriving in the country of residence, foreign adoptive parents must register their adopted child at the consular office of the Russian Federation. After this procedure, consular offices are required to check and require reports from adoptive parents regarding the living conditions of the adopted children, their health, socialization and education, and to confirm the information, confirmation in the form of photographs is attached to the report.

There are common cases when foreign citizens ignore this obligation or provide false data.

Thus, Russian authorized bodies are faced with a situation where:

– firstly, failure to provide reports by adoptive parents, despite their obligatory nature, will not lead to the imposition of sanctions against such adoptive parents. Thus, the lack of reports cannot be grounds for prosecution and cancellation of adoption;

– secondly, there is no clear legal mechanism that can prevent the provision of false information in the report about the actual condition of the adopted child, the degree of his legal and social protection.

Based on these and other reasons, consular offices of the Russian Federation, guardianship and trusteeship authorities may experience difficulties in fully monitoring the maintenance and upbringing of adopted Russian children by foreigners.

The problem of mediation in the adoption of Russian children by foreigners is also relevant. Despite the expressly established ban on intermediary activities in the process of adoption of children (Article 126.1 of the RF IC), this practice still takes place. According to the law, adoption must take place directly between the adoptive parent and the child being adopted, without the participation of third parties, with the exception of specialized government bodies. However, there are often situations when a private individual, under the guise of an accompanying person, undertakes to work with the documents necessary for the adoption procedure, which naturally contradicts the legislation of the Russian Federation, receiving for this material compensation from candidates for adoption.

The presence of such intermediaries is dangerous because their participation jeopardizes the rights and even the life of the child, since the intermediary may conceal certain information, there may even be pressure on the child, and much more. Therefore, in our opinion, it is necessary to improve the mechanisms of control and supervision over compliance with this prohibition through inspections and monitoring of the adoption process to identify and suppress intermediary activities.

The issue of adaptation of adopted children to a new family and social environment is relevant. It is no secret that the expectations of the adoptive parents may not coincide with reality, since the child initially lived in an environment in which behavioral patterns, social habits, religious and ethical values differed from those of the adoptive parents. These disagreements can hinder the creation of a healthy family climate.

Determining the authenticity of the documents provided by adoption candidates also causes heated debate when it comes to intercountry adoption. Since there may be doubts about the authenticity of certificates received privately from doctors, tax agents, and so on. When collecting this type of document, in our opin-

ion, a corruption component cannot be ruled out. There are also frequent cases of incorrect or deliberately inaccurate translations and their inconsistency with the original documents.

The problem of canceling foreign adoption is relevant. When the court satisfies the application of foreign citizens for adoption, the civil registry office, on the basis of a court decision, makes changes to the relevant documents of the child. At the same time, to preserve the secrecy of adoption, some states in their legislation provide for the right of parents to remove the adoption note from the child's birth certificate or do not allow the cancellation of adoption at all. Based on this, situations are possible when a foreign state may not take into account the decision of a Russian court to cancel the adoption and do not return the child to Russia for a long time.

Thus, in the institution of foreign adoption there are a number of problems that require prompt solutions, since they potentially threaten the constitutional rights and freedoms of minors who have the status of adopted children and are located outside of Russia.

It seems necessary not only to streamline the current situation with international adoption, but also to include the Commissioner for Children's Rights in the constituent entity of the Russian Federation as a participant in the civil process on the territory of Russia, who, in our opinion, is obliged to report on his participation in the civil case on adoption to the Commissioner for Children's Rights rights of the child of the Russian Federation.

Based on the above data, officials in the case of improper adoption and its cancellation must be prosecuted under Article 156 of the Criminal Code of the Russian Federation [6]. All this, in our opinion, will allow adoptions burdened with a foreign element to be carried out more efficiently and will contribute to the preparation, verification and proper translation into Russian of documents for filing a lawsuit in order to protect the rights and interests of minors left without parental care.

We believe that the range of entities involved under Article 156 of the Criminal Code of the Russian Federation should be expanded and should include the Commissioner for Children's Rights in a constituent entity of the Russian Federation and the Commissioner for Children's Rights in the Russian Federation.

Bibliography

1. The Constitution of the Russian Federation (adopted by popular vote on 12 December 1993, with amendments approved during the all-Russian vote on 1 July 2020) // Official Internet portal of legal information. – <http://pravo.gov.ru>, 06.10.2022.

2. *Family Code of the Russian Federation dated 29 December 1995 № 223-FZ (as amended on 31 July 2023) // Russian newspaper. 27.01.1996. № 17.*

3. *Opening speech by the head of the Russian interdepartmental delegation at the 95th session of the Committee on the Rights of the Child, Deputy Minister of Labor and Social Protection of the Russian Federation A.V. Vovchenko when presenting the combined 6th and 7th reports of the Russian Federation on the implementation of the provisions of the Convention on the Rights of the Child.*

– https://geneva.mid.ru/glavnaa/-/asset_publisher/4QbYFW4eSXTx/content/vystuplenie-a-v-vovcenko-na-95-j-sessii-komiteta-po-pravam-rebenka.

4. *Sad statistics: the scale of adoption of Russian children by foreigners has been calculated. – <https://www.forumdaily.com/grustnaya-statistika-podschitany-masshtaby-usynovleniya-rossijskix-detej-inostrancami>.*

5. *Lameikina E.Yu. Problems of legal regulation of international adoption // Law and Law. 2019. № 11. – P. 71-75.*

6. *Criminal Code of the Russian Federation dated 13 June 1996 № 63-FZ (as amended on 4 August 2023) // Collection of legislation of the Russian Federation. 1996. № 25. Art. 2954.*

DOI 10.34660/INF.2024.37.16.156

根据联邦合同制度法登记不公平供应商：当前问题
**REGISTER OF UNFAIR SUPPLIERS IN ACCORDANCE WITH
THE FEDERAL LAW ON THE CONTRACT SYSTEM: CURRENT
PROBLEMS**

Gladkov Vladimir Stanislavovich

*Candidate of Legal Sciences, Associate Professor
Rostov State Economic University*

Torokhov Yuri Sergeevich

*Master's student
Rostov State Economic University*

抽象的。 本文讨论了在国家和市政采购系统中维护无良供应商（承包商、表演者）登记册的当前问题。 作者确定了不当履行合同义务以及逃避签订合同的法律后果，并提供了所研究问题的统计数据。

关键词： 供应商、承包商、登记册、合同依据、国家（市）采购、采购领域统一信息系统、合同、仲裁法院。

Abstract. *The article discusses current issues about maintaining a register of unscrupulous suppliers (contractors, performers) in the system of state and municipal procurement. The authors determine the legal consequences of improper fulfillment of obligations under the contract, as well as evasion from concluding a contract, and provide statistical data on the problem under study.*

Keywords: *supplier, contractor, register, contract basis, state (municipal) procurement, unified information system in the field of procurement, contract, arbitration court.*

The register of unscrupulous suppliers (contractors, performers) (hereinafter referred to as RUS) is a special mechanism provided for in Article 104 of Federal Law № 44-FZ dated 5 April 2013 «On the contract system in the field of procurement of goods, works, services to meet state and municipal needs» [1] (hereinafter referred to as Law № 44-FZ).

It should be noted that a similar register is provided for in Article 5 of the Federal Law of 18 July 2011 № 223-FZ «On the procurement of goods, works, services by certain types of legal entities» [2]. This article discusses the application of RUS in accordance with Law № 44-FZ.

The concept of a register of unscrupulous suppliers was also present in the past fundamental law in the field of procurement, which was replaced by Law № 44-FZ – Federal Law of 21 July 2005 № 94-FZ «On placing orders for the supply of goods, performance of work, provision of services for government and municipal needs» (Article 19) [3].

Part 1 of Article 104 of Law № 44-FZ provides for the maintenance of the RUS in the unified information system in the field of procurement (hereinafter referred to as the UIS) by placing in it the federal executive body authorized to exercise control in the field of procurement of relevant information. Such a body is the Federal Antimonopoly Service of Russia.

The grounds for inclusion in the RUS are evasion from concluding a contract, as well as non-fulfillment or improper fulfillment of obligations stipulated by the contract (Part 2 of Article 104 of Law № 44-FZ).

It seems necessary to consider the improper fulfillment of obligations under the contract. Law № 44-FZ provides for the right of the customer to make a decision on unilateral refusal to fulfill the contract on the grounds provided for by the Civil Code of the Russian Federation [4] for unilateral refusal to fulfill certain types of obligations, provided that this was provided for by the contract (Part 9 of Article 95) . If the customer has made the appropriate decision, he sends an appeal to the control body to include in the RUS the person whose contract was terminated.

If, as a result of the competitive procedure, the participant does not sign the draft contract sent by the customer within the period regulated by law, the customer places in the Unified Information System a protocol on the participant's evasion from concluding the contract and also sends on the same day an application to include the participant in the RUS (Part 6 of Article 51 of the Law № 44-FZ).

Thus, Law № 44-FZ provides 2 grounds for inclusion in the RUS.

As of 2022, there were 71,528 records in the RUS, of which 12,690 were included in 2022. Based on the grounds for inclusion in the RUS, there are 21,836 entries for evasion of concluding a contract (2,018 included in 2022), for non-fulfillment/improper fulfillment of obligations under the contract (termination of contract) 49,692 register entries (10,672 included in 2022). In total, as of 2022, there were 36,661 procurement participants in the RUS [5].

Information in the register is excluded after two years from the date of inclusion in the RUS, or if the decision of the control body is canceled by a court decision, or if it is impossible for the persons specified in the entry in the register to influence the activities of the procurement participant as of the day the procurement participant is recognized as having evaded conclusion of a contract or on the day of termination of the contract (Part 9 of Article 104 of Law № 44-FZ).

Based on this norm, the legislator equalizes the liability of a person who evaded concluding a contract and a person who improperly fulfilled his obligations

under the contract. We believe that such an equation requires a revision of this norm by the legislator. It seems advisable to provide a shorter period for procurement participants included in the RUS on the basis of evasion from concluding a contract.

Thus, in addition to malicious intent, there may be cases where a participant is recognized as having evaded confinement without malicious intent on the part of the participant, as well as on «formal» grounds.

The customer recognizes the participant as having evaded concluding a contract if they are not provided with security for the contract, but there are no intentions to evade concluding the contract. Application security and contract security can be provided in the form of an independent guarantee (complying with the requirements of the law and the procurement notice). Thus, if the bank refused to issue an independent guarantee to the procurement participant (and they were not provided with cash performance security), then it can be included in the RUS [6].

Also, a participant may be included in the RUS if the independent guarantee provided as security for the performance of the contract does not meet the requirements of the notice (for example, the wrong arbitration court is indicated to consider disputes under the independent guarantee).

Of course, evasion from concluding a contract is a violation on the part of the procurement participant, causing harm to the customer. However, it is controversial that avoiding concluding a contract in terms of consequences is comparable to improper fulfillment of obligations under the contract.

The presence or absence of intent in the actions of a participant is recognized by a decision of the Federal Antimonopoly Service. There may be cases in which the control body approaches this issue too formally and includes the participant in the RUS.

For example, an employee of an organization fell ill and was unable to conclude a contract on an electronic trading platform, while all the goods provided for in the contract had already been prepared and ready for delivery. The Supreme Court of the Russian Federation in its decision recognized that the control body should not formally approach the issue of inclusion or non-inclusion in the RUS and is obliged to assess the significance of the violation [7].

One of the ways to determine a supplier provided for by Law № 44-FZ is a competition. This method is characterized by the fact that in addition to the price criterion, there are other criteria for determining the winner. The most common and applied criterion is «qualification of procurement participants» [8]. To confirm qualifications, procurement participants submit executed contracts for a subject similar to the procurement object.

Often, unscrupulous participants provide unreliable contracts. It seems that the provision of unreliable documents as evidence of experience should be the basis

for inclusion in the RUS and it is necessary to provide an appropriate basis for unscrupulous procurement participants.

Inclusion in the RUS is an effective measure of responsibility towards procurement participants. However, there are a number of aspects that require attention from the legislator. The development of entrepreneurship is one of the objectives of state economic policy; participation in public procurement for some business entities is the main or one of the main ways of earning money, which may be hampered by inclusion in the RUS.

Bibliography

1. Federal Law of 05.04.2013 № 44-FZ (as amended on 14.02.2024) «On the contract system in the field of procurement of goods, works, services to meet state and municipal needs» // Russian newspaper. 12.04.2013. № 80.

2. Federal Law of 18 July 2011 № 223-FZ (as amended on 4 August 2023) «On the procurement of goods, works, services by certain types of legal entities» // Russian newspaper. 22.07.2011. № 159.

3. Federal Law of 21 July 2005 № 94-FZ (as amended on 2 July 2013) «On placing orders for the supply of goods, performance of work, provision of services for state and municipal needs» // Russian newspaper. 28.07.2005. № 163 (lost force).

4. Civil Code of the Russian Federation (part one) dated 30 November 1994 № 51-FZ (as amended on 24 July 2023) // Collection of legislation of the Russian Federation. 1994. № 32. Art. 3301.

5. Consolidated analytical report of the Ministry of Finance on the results of monitoring the purchase of goods, works, services to meet state and municipal needs, as well as purchases of goods, works, services by certain types of legal entities for 2022. – https://minfin.gov.ru/ru/document?id_4=301945-svodnyi_analiticheskii_otchet_o_rezultatakh_monitoringa_zakupok_tovarov_rabot_uslug_dlya_obespecheniya_gosudarstvennykh_i_munitsipalnykh_nuzhd_a_takzhe_zakupok_tovarov_rabot_uslug_otdelnymi_vidami_y_uridicheskikh_lits_za_2022_g.

6. Resolution of the Federal Arbitration Court of the Volga District dated 21 March 2023 in case № A12-8810/2022. – <https://sudact.ru/arbitral/doc/aEPosNWduGYj>.

7. Ruling of the Supreme Court of the Russian Federation dated 16 October 2023 in case № A40-47485/2022. – <https://sudrf.cntd.ru/document/1303435955>.

8. Decree of the Government of the Russian Federation dated 31 December 2021 № 2604 (as amended on 31 October 2022) «On the assessment of applications for participation in the procurement of goods, works, services to meet state and

municipal needs, amendments to paragraph 4 of the Decree of the Government of the Russian Federation dated 20 December 2021 № 2369 and the recognition as invalid of certain acts and certain provisions of certain acts of the Government of the Russian Federation» // Collection of legislation of the Russian Federation. 2022. № 3. Art. 577.

提高打击资助恐怖主义领域立法的有效性

IMPROVING THE EFFECTIVENESS OF LEGISLATION IN THE FIELD OF COUNTERING THE FINANCING OF TERRORISM

Uzhakhov Magomed Karkhanovich

Postgraduate

Moscow State University named after M.V. Lomonosov

注解。 总体而言,完善俄罗斯联邦打击资助恐怖主义立法需要采取综合办法,不仅包括修改立法,还包括建立合作机制、加强预防控制措施、加大对违法者的处罚力度、提高透明度和报告、培训和提高认识。 这些措施将有助于更有效地打击恐怖主义融资,维护国家和国际安全。

关键词: 恐怖主义、恐怖主义融资、立法、国际合作、安全。

Annotation. *In general, improving the legislation of the Russian Federation on countering the financing of terrorism requires an integrated approach, which includes not only changes in legislation, but also the development of cooperation mechanisms, strengthening preventive control measures, increasing penalties for violators, improving transparency and reporting, as well as training and raising awareness. These measures will help to more effectively combat the financing of terrorism and protect national and international security.*

Keywords: *terrorism, terrorist financing, legislation, international cooperation, security.*

Countering the financing of terrorism is a serious issue that requires a comprehensive approach at both the national and international levels.

Although there are various measures and mechanisms to counter the financing of terrorism, the success of their implementation depends on many factors, and the possibility of terrorist financing cases cannot be excluded. It is important to continue to improve and improve the countermeasures system, as well as to increase awareness and coordination at the international level.

The level of detection of crimes in general and the financing of terrorism in particular depends on how clearly the signs of a crime are defined in the law. This requirement is satisfied when a person can find out from the wording of the relevant article, and, if necessary, with the help of judicial interpretation, what actions or omissions will entail criminal liability for him

In note 1 to Article 205.1 of the Criminal Code discloses the concept of “terrorism financing”, which is understood as the provision or collection of funds or the provision of financial services with the understanding that they are intended to finance the organization, preparation or commission of at least one of the crimes provided for by the Criminal Code of the Russian Federation (Articles 205, 205.1, 205.2, 205.3, 205.4, 205.5, 206, 208, 211, 220, 221, 277, 278, 279 and 360) (1), or financing or other material support of a person for the purpose of committing at least one of these crimes, or to support an organized group, illegal armed group, criminal community (criminal organization) created or being created to commit at least one of these crimes.

In practice, it is not always possible to provide evidence of financial services “with knowledge” in the context of countering the financing of terrorism. This is due to several reasons:

- Hidden nature of transactions: Financial transactions related to terrorist financing are often conducted covertly and using anonymous or fake data. This makes it difficult to establish and prove intent to provide financial services to support terrorism.

- Difficulty in Determining Intent: Determining the intent of a financial institution or individual to provide financial services for the purpose of supporting terrorist organizations can be challenging. It is not always possible to determine whether they were aware of their participation in criminal activity or whether they acted through oversight.

- Lack of documentary evidence: In some cases, there may not be sufficient documentary evidence to support the intent to provide financial services for the purpose of financing terrorism. This may be caused by the use of encryption, anonymous accounts, or other methods to hide traces.

- Difficulties in collecting information and evidence: Gathering evidence in international transactions or in relation to complex financial schemes can also be challenging due to different jurisdictions, technical limitations and other factors.

- Legal restrictions and obstacles: Legislation may sometimes provide protection to financial institutions and financial service providers, which creates obstacles to collecting evidence and prosecuting such individuals.

Overcoming these challenges requires continued improvement of legislation, increased cooperation between law enforcement agencies and financial institutions, and the development of new technologies and data analysis methods to identify suspicious activity.

The development of new technologies and data analysis methods plays an important role in the fight against terrorist financing. Here are some examples of such technologies and methods:

- Artificial Intelligence and Machine Learning: The use of machine learning and artificial intelligence algorithms allows you to analyze large volumes of data

and identify patterns and anomalies that may indicate suspicious activity. For example, cluster analysis techniques can be used to identify group activity among financial transactions.

- **Big Data Analysis:** Collecting and analyzing large volumes of structured and unstructured data from various sources (transaction logs, open sources, social networks, etc.) helps identify relationships and patterns that may indicate terrorist financing.

- **Risk analysis and monitoring systems:** The development of specialized risk analysis and monitoring systems allows you to automate the processes of identifying suspicious financial activity. These systems can automatically analyze financial transactions and highlight suspicious transactions for further investigation.

- **Blockchain technologies:** Blockchain technologies provide the ability to create transparent and immutable registers of financial transactions. This can help improve the tracking and analysis of financial flows, making them less susceptible to manipulation and abuse.

- **Digital identification and biometric technologies:** The use of digital identification and biometric technologies allows for more reliable identification of clients of financial institutions, which reduces the possibility of anonymous transactions related to the financing of terrorism.

These technologies and data analytics techniques can significantly improve the ability of law enforcement agencies and financial institutions to identify and disrupt terrorist financing, increasing the effectiveness and efficiency of countering this type of crime.

Modern technologies that make it possible to track suspicious transactions along the path of their use for terrorist financing do not give grounds to regard the act of the original source as intentional.

Here are a few reasons why this might be the case:

- **Insufficient Evidence of Intent:** Even if suspicious transactions were discovered, there is insufficient evidence to establish that the person carrying out the transactions acted with the intent to finance terrorism. It may have been an accidental or innocent act.

- **Need for additional investigations:** Sometimes additional investigation and collection of additional data is required to fully understand the context of suspicious activity. Without this additional information, it is impossible to make definitive conclusions about a person's intentions.

- **Legal or legitimate explanations:** Some suspicious transactions may have legal or legitimate explanations that are not related to terrorist financing. For example, suspicious activity may be related to unprofessional financial management, accounting errors or lack of awareness.

- **Unforeseen circumstances:** Sometimes a person's actions may be the result of unforeseen circumstances or external influences that were not associated with the intentional financing of terrorism.

It is therefore important that investigations into suspicious transactions include not only the use of technology and data analysis, but also consideration of context, additional checks and evidence collection to ensure a fair and accurate determination of the intentions of those involved in these transactions.

Proving intent to finance terrorism can be a complex process, especially in international practice. Legislation in this area varies across countries, but the general approach is to establish the intentional provision of financial resources or support to terrorist organizations or their activities.

To change the content of Article 205.1 (the article in the Criminal Code of the Russian Federation concerning the financing of terrorism) in order to clearly determine intent, the following changes or additions can be made:

- Clear definition of intent: The text of the article should clearly indicate that in order to recognize the financing of terrorism, the presence of intent must be proven, that is, the intention to provide financial resources for supporting terrorist activities or organizations.

- Clarification of intent criteria: Additionally, it should be clarified that intent to finance terrorism can be established based on criteria such as knowledge that the funds will be used for terrorist purposes, or the intention to support a specific terrorist organization.

- Link to terrorist activity: The text of the article may also indicate that the intent to finance terrorism must be linked to a specific terrorist activity or organization, and evidence of this link must be provided.

- Mandatory establishment of motive: To recognize the financing of terrorism, it is necessary to establish that the person provided financial resources with the aim of achieving terrorist goals or facilitating terrorist activities.

- Extending liability: Consideration may need to be given to extending liability to persons who knowingly participate in terrorist financing but do not directly provide funds, for example through the provision of services or assistance to a terrorist financing organization.

Making such changes to the text of the article can help clarify and unambiguously determine the intent to finance terrorism, which will increase the effectiveness of law enforcement practice and the fight against this type of crime. However, any changes in legislation must be based on careful analysis and consideration of international experience and standards.

Thus, based on the above, we come to the following Conclusion:

Indeed, changes in the composition of Article 205.1 of the Criminal Code of the Russian Federation should be carried out taking into account the balance between protecting the rights and freedoms of citizens, ensuring public safety and compliance with international standards and human rights. This balance is a fun-

damental principle of the rule of law and ensures fairness and legality in legislation and its application.

Taking this into account, when changing the composition of Article 205.1, legal scholars point to the following aspects:

- Clear definition of intent: The text of the article should clearly indicate the criteria for establishing intent to finance terrorism in order to avoid the wrongful prosecution of citizens for accidental or unintentional participation in financial transactions that may be innocent.

- Compliance with international standards and human rights: Changes to Article 205.1 must be consistent with international standards for combating the financing of terrorism and protecting human rights. This includes ensuring that punishment is proportionate, that the trial is fair and that the rights of the accused are protected.

- Ensuring public safety: Changes to Article 205.1 should contribute to a more effective fight against the financing of terrorism and ensure public safety. This could include expanding liability for financial support of terrorist activities and strengthening measures to prevent such activity.

All these aspects must be taken into account when developing and amending Article 205.1 of the Criminal Code of the Russian Federation in order to comply with the principles of fairness, legality and effectiveness in the fight against the financing of terrorism.

In international practice, international conventions and agreements, such as the UN Convention for the Suppression of the Financing of Terrorism, are widely used, which define standards and principles for combating such crimes.

International conventions and agreements play a key role in establishing standards and principles for combating the financing of terrorism. One of the most significant documents in this area is the United Nations Convention for the Suppression of the Financing of Terrorism, adopted by the UN General Assembly in 1999(2).

The UN Convention for the Suppression of the Financing of Terrorism sets out obligations for States Parties to prevent, suppress and punish financial support of terrorism. This document also defines a number of key terms, such as “terrorist financing”, “cross-border terrorist financing” and others, which ensures uniformity in the interpretation of these concepts at the international level.

According to this convention, states parties are required to take various measures, including legislative and administrative, to combat the financing of terrorism, as well as cooperate with each other in the exchange of information and joint actions.

There are a number of other international and regional documents and initiatives aimed at combating the financing of terrorism, such as UN Security Council Resolution 1373 (2001) (3), Financial Viability in the Fight against Terrorism (FATF), etc.

According to UN Security Council Resolution 1373, acts of international terrorism constitute a threat to international peace and security and which reaffirms the need to combat by all means in accordance with the Charter of the United Nations the threats to international peace and security posed by terrorist acts.

These international standards and agreements play an important role in ensuring unity of effort among States in the fight against the financing of terrorism and establish the basis for cooperation in this area.

Since 2010, Russia has regularly reported on progress in improving its national AML/CFT system at FATF plenary meetings.

In October 2013, the sixth report was presented, based on the results of which our country was removed from monitoring until a new round of mutual evaluations was held. In March 2019, a visiting mission to Moscow took place. At the October plenary meeting of the FATF, the delegation of the Russian Federation led by Director of Rosfinmonitoring Y.A. Chikhanchin demonstrated significant achievements of the national system for combating money laundering and the financing of terrorism and the proliferation of weapons of mass destruction (AML/CFT/CFT). In total, according to the ratings, the Russian Federation entered the top five countries in terms of the effectiveness of the national “anti-money laundering” system in the world. Russia is subject to a standard monitoring procedure, which includes the submission of regular reports.

The fundamental difference between Russian legislation and international legislation in countering the financing of terrorism is mainly due to differences in legal norms, regulatory methods and compliance mechanisms.

Countering the financing of terrorism requires appropriate legislation and regulation at both the national and international levels. This may include the introduction of measures to control proactively financial transactions, the obligation of banks and financial institutions to provide information on suspicious transactions, as well as mechanisms for freezing the accounts and assets of suspected individuals.

It is proposed to amend the legislation of the Russian Federation to expand the concept of terrorist financing to include new methods and tools used by terrorist organizations to finance their activities. Creation of more effective mechanisms of interdepartmental and international cooperation for the exchange of information and coordination of actions in the field of combating the financing of terrorism.

References

1. *Criminal Code of the Russian Federation. Revision dated 04/06/2024*
2. *United Nations Convention for the Suppression of the Financing of Terrorism, (adopted by UN General Assembly resolution 54/109 of December 9, 1999) by the UN General Assembly in 1999.*
3. *UN Security Council Resolution 1373 (2001).*

有效的课程计划策略
STRATEGIES FOR EFFECTIVE LESSON-PLANNING

Rybakova Anna Sergeevna

*Candidate of Philological Sciences, Associate Professor
State Social and Humanitarian University*

Smirnov Alexander Andreevich

*Senior Lecturer
State Social and Humanitarian University*

抽象的。本文的目的是研究有效且高效的课程计划策略,这些策略将满足所有必要的要求和标准,并反映学生在课堂上学习内容的真实情况。作者列举了课程计划策略的主要步骤,为每个步骤提供了在课堂上可能执行的任务的完整和详细的描述。作为研究方法,作者参考了理论方法(概括和分类)和实践方法(观察、比较和描述)。

关键词: SMART 目标、学生学习目标、内容、评估、形成性评估。

Abstract. *The purpose of this article is to examine strategies for effective and efficient lesson planning that will meet all necessary requirements and standards, as well as reflect a realistic picture of what students are learning in the classroom. The authors enumerate the main steps in lesson planning strategies providing each with full and detailed descriptions of the possible tasks implemented in the classroom. As research methods, the authors refer to both theoretical (generalization and classification) and practical methods (observation, comparison and description).*

Keywords: *SMART objectives, student learning objective, content, assessment, formative assessments.*

When starting lesson planning, the first and foremost step is to look back at your course student learning objectives. Remember that these need to be observable and measurable and use verbs from Bloom's Taxonomy. Here is a formula to create objectives that are observable and measurable—we can create SMART objectives [Doran, 1981]. SMART stands for: *Specific - Measurable - Attainable - Results-Focused - Time-Focused*. Writing SMART learning objectives may seem like a time-consuming task, but it is time well spent. With clear objectives we can begin to outline sections of our course and determine tasks and activities for the day's lesson.

So, the *first step* in lesson-planning is to choose the course student learning objective that your lesson will be focusing on.

The *second step* in lesson planning is to plan out the actual lesson. Before you plan the lesson, it is helpful to think about any difficulties students might have with the content. For example, students may struggle with the key terms in English, or they might find it hard to discuss processes in a small group. We might also think that students will struggle with remembering the differences between these terms. When we plan our lesson, we can think about how we can help students with these struggles.

Here is a useful template on how to organize your class. Keep in mind that for each of these steps, you'll need to consider duration of how long each will take, and also any textbooks or materials you'll use.

First, have a warm-up where you prepare students for the class, perhaps focusing on a few English vocabulary terms or grammar points that they will need in order to understand the lesson. Create a handout, PowerPoint slides, or brief activity to review key terms. Next, you can do a mini-lecture on your topic, being sure to include student support for helping them learn during lectures. Third, you can do an in-class interactive activity that will allow the students to develop both their English skills and their content knowledge/skills. And finally, finish class by re-grouping to summarize the content at the end of class. Remember that you can have a couple of rounds of mini-lectures and activities, as long as you have enough class time.

The *third step* in your lesson plan is identifying any assessments you will do during the lesson. For example, maybe you will do a formative assessment during the in-class interactive activities. You could give the students a chart to complete during class in small groups, and collect the chart at the end of class time to determine how well students are learning the content.

So, the first part in the lesson is a warm-up activity. A word cloud visualizes course material, with the size of the word indicating how frequently it is used in the original text. You can make word clouds using free online tools. Simply copy the text from an article and paste it into the online word cloud generator. Most of these tools allow users to modify the colors and format of the word cloud. Word clouds help students recognize how much of the vocabulary they may already know and begin thinking about the topic of the lesson. You can show them online tools such as online dictionaries that will pronounce words for them. You can encourage students to try these resources out of class and to practice pronouncing these words during class in their small group discussions.

After the warm-up comes a mini-lecture. You can use online interactive polls or questions during content delivery. You can keep an open-ended poll running while you deliver your mini-lecture. This allows students to ask questions infor-

mally. You can also try online mini-quizzes during your lecture to ensure that students are following along. You can add the questions directly to your presentation and have the students use their computers or mobile devices to answer.

After the mini-lecture comes an in-class interactive activity. In a lecture-focused classroom this portion of the lesson may be relegated to homework, but by providing students time during class to show evidence of meeting our lesson objectives, we can measure how much of the course content they understood.

Technology-related strategies make class more interactive. Ask students to log into forms or documents during class, or to complete something during class is that you can collect what they produce and use it as a formative assessment. You can also use social media. Ask the class a question and have them reply to a hashtag, and then show answers on the screen and lead a discussion.

Using the flipped classroom model is another way to reduce the amount of lecture time needed. In this model, the instructor records videos of their lectures, or uses existing videos they find online, and puts them online for students to watch as homework. Then in class, students work together on activities or questions that are based on the video lectures they watched for homework. The flipped classroom approach can be a part of any course. You can make your own videos in many ways, for example, you can record yourself speaking in front of your computer, or you can do a screen-casting recording where you just record your screen, and on your screen you have your slides.

The flipped classroom model is also useful for larger classes, since structuring in-class interactive activities can be more challenging in large classes. Of course, there are advantages to teaching large courses. More students means that you can have more diversity in your class, in terms of students' having different learning experiences, different viewpoints, different questions and ways of thinking about things, or different ways of learning. Engaging with diverse classmates and learning together can be very motivating for students. Many of the strategies mentioned earlier help keep students in large classes engaged. You may recall that these strategies include using word clouds for warm-up activities, using polling software to ask questions to students and also allow students to ask you questions during lectures, or using small group discussions.

In addition, other things to try to build interactivity in large classes are to create a supportive environment, such as by using students' names by using namecards or a seating chart; ensuring that students get sufficient feedback from their peers or from you as the instructor; and moving around the room as much as possible when you lecture and also during group work time.

After one or more in-class interactive activities, it is time to re-group to summarize, where you'll most likely use a slide or other visual to briefly outline the main points from the day's lesson. And you'll likely answer any final student questions, before going over the homework for next class.

The final component of your lesson plan that you will want to consider is formative assessments. You will want to think of what type of information you can gather from your students in order to plan future instruction and perhaps to give them a grade. You will also want to think of how to give them feedback. Options include feedback you give in a rubric or comments, peer review, or automatic feedback from an online quiz. If you collect students' answers, you can use them for a formative assessment. You don't need to assign a grade, but you can review their answers to see what percentage of the groups wrote the correct answer. If it is less than perhaps 60% of the class, you might want to review the topic in the next class session. For feedback, you have a few options. One is that you give or post the correct answers so that students can see them and compare the answers to their own; another is that you could write feedback on students' papers and return the paper to the groups. Or, you could meet with each group in the next class and discuss the feedback in person. For feedback, you can focus on the main ideas and on the key words as well. The underlying idea with the formative assessment is that you can look at student work to determine how well they are meeting course student learning objectives and make any adjustments if necessary.

To sum up, there is much to be said about writing a lesson plan. In this paper we tried to summarize the main tips, but the whole list of how to make your class interactive and engaging for students is endless.

References

1. Doran, G.T. (1981) *There's a SMART Way to Write Management's Goals and Objectives*. *Journal of Management Review*, 70 p.

为有特殊需要的儿童使用折纸技术制作工艺品提供组织和方法支持
**ORGANIZATIONAL AND METHODOLOGICAL SUPPORT
FOR THE PRODUCTION OF CRAFTS USING THE ORIGAMI
TECHNIQUE BY CHILDREN WITH SPECIAL NEEDS**

Tusheva Elena Sergeevna

*Candidate of Pedagogical Sciences, Associate Professor
Moscow Pedagogical State University*

Fedulova Daria Andreevna

*Student
Moscow Pedagogical State University*

Tkachenko Anastasiia Vladimirovna

*Student
Moscow Pedagogical State University*

抽象的。本文讨论了对有特殊需要的儿童在课外时间使用折纸技术制作工艺品的组织和方法支持。介绍了组织圈惩戒发展工作的经验。重点关注解决一般发展、社会文化和实际问题，旨在增加儿童的社交活动，发展他们的学生能力，并通过令人兴奋的休闲时间形式在儿童团队中营造创造性氛围。

关键词：组织和方法支持、有特殊需要的儿童、用纸工作、使用折纸技术制作工艺品、课外活动、休闲。

Abstract. *The article discusses organizational and methodological support for the production of crafts using the origami technique by children with special needs during extracurricular hours. The experience of organizing circle correctional and developmental work is presented. Attention is focused on solving general developmental, sociocultural and practical problems aimed at increasing the social activity of children, developing their student competence, and creating a creative atmosphere in the children's team through exciting forms of leisure time.*

Keywords: *organizational and methodological support, children with special needs, working with paper, making crafts using the origami technique, extracurricular activities, leisure.*

Working with paper is the most important link in the overall system of correctional and developmental work. Organized in extracurricular activities, it is supported by the solution of general developmental, sociocultural and practical

tasks aimed at increasing the social activity of children, developing their student competence, and nurturing positive personality traits. Since we are talking about children with special needs, the solution of the identified problems correlates with the formation of personal, cognitive, regulatory and communicative basic learning activities (BLA). The interpretation of their corrective focus on the production of origami crafts is mediated by the pronounced technical characteristics of the actions performed and the outstanding subject-matter correlation of the final result [5; 7]. In practice this is determined:

- developing interest in origami and introducing this type of manual labor to life; focused attention on the productivity of activities, the result of which is the production of handicrafts. To get the finished product, children need to master the skills of paper folding: do the work carefully, slowly, consistently; show patience and diligence; treat paper with care; decide on the purpose of the craft, presenting it as a toy, decoration or gift (personal BLA);

- the formation of elementary ideas about origami as an object-transforming human activity with a creative signature. Based on the essential characteristics of paper, ideas about its properties and qualities are expanded. Particular attention is paid to students' mastery of generalized and specialized methods of folding paper, the possibilities of designing and modeling products, and the use of simple improvised means that enhance their expressiveness. The corrective focus of origami is expressed in the development of skills necessary to perform work tasks and aimed at correcting deficiencies in cognitive activity through the activation of observation, attention, perception, thinking, speech, which are directly related to cognitive mental processes. Development of mental actions implemented in the process of analyzing and comparing products to be manufactured, determining techniques and stages of work (cognitive BLA);

- maximum reliance on technological maps and the algorithm of actions inherent in the origami technique. The issues of planning and maintaining the order of work performed, monitoring the accuracy of execution by comparison with a sample, evaluating the result obtained, and the correlation of the origami figure with the real object (regulatory BLA) are updated;

- development of students on a communicative basis of productive cooperation with participants in educational relations. For this purpose, situations are created that have communicative formative significance and support the desire of younger schoolchildren with intellectual disabilities to participate in the discussion, express their own opinions, ask questions, conduct a dialogue, formulate a detailed statement in the process of making crafts and summing up (communicative BLA).

Children's mastery of the origami technique contributes to the targeted practical application of knowledge and skills acquired in mathematics lessons, speech practice, and visual arts. Generalization of pedagogical experience made it possible to identify and present this continuity, referring to the following facts:

– the ability to focus on the sides and angles of geometric shapes (square and triangle) is necessary to follow the sequence of actions, correctly fix the fold location (top, bottom, right, left edge of the sheet, towards the middle), geometric transformations in the process of work (transforming a square into a rectangle or triangle);

– following verbal instructions requires mastering the appropriate terminology (fold, bend, iron, square, triangle, corner, side, middle);

– adding expressiveness to crafts is facilitated by adding details and adding additional elements;

– manufactured products can be used for exercises in quantitative and ordinal counting (as demonstration material), for demonstrating cards (typesetting ruler);

– accompanying origami with folklore forms (proverbs, tongue twisters, nursery rhymes), riddles, short poems, creating plot-thematic compositions in which game actions unfold with ready-made crafts, allows you to make the process of constructing from paper interesting and entertaining, evoking positive emotions. Thus, turning to origami is associated with sociocultural subordination and a focus on creating a creative atmosphere and exciting forms of leisure time.

Club work on making crafts using the origami technique, organized on the basis of the “Family Center for Diagnostics and Development of Children and Youth” in Moscow, began with examining children to see if they knew what origami is, whether they had to fold three-dimensional paper figures, state of manual skill, accuracy and clarity of actions performed by the fingers. Of the 15 junior schoolchildren surveyed, only 3 children were able to give the correct name of a paper craft. 5 children indicated personal experience in making such crafts. During finger games, all children showed difficulties in the development of fine motor skills, which manifested themselves in insufficient coordination of the fingers: the children were unable to accurately align the fingers of the right and left hands (fingers shake hands), or consistently bend the fingers towards the thumb (rings). When changing poses (goat-cat), switching from one movement to another was difficult. Children experienced difficulties in alternating the sequence of movements, could not change from one position to another at a given pace, movements were slow and imprecise. The leading hand performed alternating poses at a slow pace; as soon as the pace accelerated or the movements were performed by the other hand, the alternation of poses disintegrated. The same was observed when performing the task with both hands. The vast majority have encountered problems holding scissors and performing the technical side of tasks, especially when it comes to cutting out round shapes. The children did not know how to cut a straight line and could not make an even cut. Some did the work incredibly quickly, others, on the contrary, slowly, which in both cases did not lead to high-quality completion of the task. The children showed interest in folding the paper and

eagerly began tearing it into small pieces. The results obtained updated the issues of involving children in the process of making crafts using the origami technique and developing organizational and methodological support for this type of work.

Organizational and methodological support for the production and playing of ready-made origami crafts in extracurricular activities should be approached based on the understanding that the solution of general developmental, sociocultural and practical problems is revealed through the storyline of the lesson, the use of methodologically adapted techniques and methods of action for the successful production of crafts and the meaningful content of tasks. The implementation of an integrated approach involves the integration of the tasks listed above, taking into account the functional integrity of the correctional and pedagogical impact.

In the process of making crafts using the origami technique, students develop subject-transformative activity, in which a three-dimensional figure is obtained from a flat sheet of paper [2; 6]. Thus, children's mastery of paper folding techniques is focused on a result that is significant for students, but in order to obtain it, they need to perform a certain number of successive operations that require coherence and accuracy of finger movements [4]. Along with this, there is a process of thematic subordination of the product of activity to the pedagogical plan - designing the content of classes [1; 3].

The content of the classes we offer is systematized based on the complexity of paper folding techniques and is presented in the form of making crafts using the origami technique, from the first to the fifth order. Crafts of the first order involve making figures using the origami technique by folding a square shape once diagonally (the basic shape is a triangle): butterfly, bird, bunny, dog, fox, bull. Making second-order crafts is aimed at strengthening the skill of folding a square diagonally with the addition of curly cutting out the necessary elements (basic shapes - water bomb, frog): fish, butterfly, frog. Crafts of the third order are performed on a similar basic basis of the second order with multidirectional bending of the corners and a new basic form - pancake: crab, Kvaka-zadavaka. In the process of making crafts of the fourth order, a square sheet of paper is folded like an accordion (the basic shape is a book): a mouse, a pig. Crafts of the fifth order (the basic form is a kite) involve strengthening the skills of repeatedly folding a square diagonally and bending corners: kite, rabbit, goose, elephant.

Let us imagine the structure of the description of each order, which includes:

- a brief description of folding paper in the appropriate order;
- samples of the step-by-step production of a homemade toy and its final result in the form of instruction cards that schematically display the sequence of operations performed:

- material for playing with ready-made crafts, which contains riddles, poems, songs, games to imitate the movements of a figurine and game tasks with a correctional and developmental orientation;

– a module of crafts of each order is played out in plot-thematic compositions on panels (“In a forest clearing”, “Forest school”, “I fly a kite”, etc.), with the participation of parents, board tales are invented and acted out.

To clarify, we focus on a number of other points:

– playing with crafts is carried out with the aim of increasing students’ interest in origami, expanding their life experience in conducting leisure activities by introducing them to the origami culture;

– the musical repertoire activates the emotional perception of the finished craft, which is facilitated by its thematic correlation with the content of the song and/or imitation of the movements performed (we fly like butterflies, jump like bunnies) accompanied by music;

– illustrative material used for reading poems and playing out plot-thematic compositions on panels, made with children or selected on an artificial intelligence platform that performs creative functions;

- for each craft, children are given the task of showing how the figure is folded to their parents;

- exhibitions are organized based on the results of completed work.

Equal importance is attached to the development of manual skills and fine motor skills of students; compliance with safety precautions when working with paper and tools. Thus, to develop manual skills and fine motor skills, exercises are performed at each lesson that activate and stimulate the motor functions of the arms, hands and fingers. When compiling a set of exercises, we took into account the tactile sensitivity of children and their preferences in choosing the exercises themselves, which were selected with a focus on developing paper folding skills. For example, *exercises for developing manual skills*: lacing, tying knots, braiding from strips of fabric, turning items (gloves, mittens, socks) inside and out, bending and tearing paper into pieces; pouring bulk mass (sand, cereals) into different containers. *Exercises to strengthen the hands*: rotation of the hands (separately with the right/left hand, with both hands at the same time), playing with the ball (hitting the floor, throwing it at a target, into a basket in front of you and behind your back), rotating the plumes, playing with massage balls. *Exercises to strengthen the fingers*: Su Jok, fingers shaking, flexion and extension of the fingers (separately with each hand, with both hands at the same time), rings, clicks, hoots.

When it comes to compliance with safety precautions, you should adhere to the instructions, information about which is present in all guidelines. Therefore, we will not make an exception to the rules and, understanding their importance, will present them in our work. We act in accordance with the following rules for working with paper:

- We carry out work on a flat, smooth table surface. At the same time, it is important to understand that an adult can easily make a craft by weight and use any

available material for this. However, before a child with special needs achieves such “mastery”, he needs to master the most basic techniques of folding paper, for which he needs a table with a flat and smooth surface;

- from the very beginning, we teach children to maintain working order on the table, for which we select a convenient arrangement of the materials needed at the moment for crafts: at the workplace, scissors should lie with the blades closed with sharp ends facing away from them, at the end of the work, scissors, pencils, felt-tip pens must be returned to the same place from where they were taken - into the stand. Paper scraps as work progresses should be placed in a special waste container, since they (the scraps) will be useful for other types of work. All these rules are regularly discussed with children, and accuracy in work is assessed and praised;

- if there is a need to pass the scissors to another person, we focus the children’s attention on the fact that the scissors must have closed blades and they must be passed by holding the closed sharp ends. Mastering this rule will require not only verbal instructions, but also repeated demonstrations and training exercises.

Over the course of the year of club work, there was a tendency for the development of the children’s team, both children and parents became interested in the work, children began to better understand instructions, became more attentive, actively participated in playing with crafts, and there was not so significant, but progress in finger work hands when folding paper. However, it is not possible to completely overcome all difficulties. Considering that we are focusing on children with special needs, we should proceed from the need for long and painstaking work.

In conclusion, we note that we do not claim primacy in the development of methodological aspects of making and playing crafts using the origami technique with children with special needs. However, we believe that the topics we have touched upon and the options for organizational and methodological support for making crafts using the origami technique for children with special needs will be of interest to both beginners and experienced specialists, especially teachers of inclusive practice and parents raising a special child. This applies to everyone who is involved in the process of sociocultural adaptation of children through correctional and developmental technologies of training, education and productive interaction. The potential of the center allows us to adapt the sociocultural environment to the individual characteristics of children with special needs and enrich their life experience with new impressions.

References

1. Afonkin, S. Yu., Afonkina, E. Yu. "Origami lessons at school and at home." – 5th ed. – M.: Akim, 1998. – 207 p.
2. Afonkin S. Yu., Afonkina E. Yu. *Fun origami lessons at school and at home*. St. Petersburg; Publishing house «Literature», 2001. – 204 p.
3. Barskova, T. M. *The use of origami in teaching // Educational almanac*. 2019. No. 10 (24). pp. 8-10. URL: <https://f.almanah.su/24.pdf>
4. Bogomolova O.V. *Origami with a child: a teaching aid for preschool and primary school age*. – Moscow: – MEFPI, – 2018. – 128 p.
5. Mishina G. A., Strebeleva E. A., Shilova E. A, Martyshevskaya D. M. *Structure of personal achievements of schoolchildren with mental retardation (intellectual impairments) // Special education*. – 2022. – No. 1 (65). – pp. 119-132 URL: <https://cyberleninka.ru/article/n/struktura-lichnostnyh-dostizheniy-shkolnikov-s-umstvennoy-otstalostyu-intellektualnymi-narusheniyami> (date of access: 05/15/2024).
6. Serzhantova, T. B. *Origami. The best models*. – M.: – Iris-press, – 2016. – 144 p.
7. Shkerina T. A., Zharova A. V., Rozinkevich V. S., Filippova K. T. *Diagnostics of communicative educational actions of primary school students with mild mental retardation // Vestnik KSPU im. V.P. Astafieva*. – 2021. – No. 3 (57). – P. 27-34. URL: <https://cyberleninka.ru/article/n/diagnostika-kommunikativnyh-uchebnyh-deystviy-obuchayuschih-sya-mladshego-shkolnogo-vozrasta-s-legkoy-umstvennoy-otstalostyu> (date of access: 05/15/2024).

DOI 10.34660/INF.2024.45.60.160

俄英虚拟术语二次命名的比较分析

**COMPARATIVE ANALYSIS OF THE SECONDARY NOMINATION
OF RUSSIAN AND ENGLISH VIRTUAL TERMINOLOGY**

Kekeeva Tatiana Mikhailovna

*Candidate of Philological Sciences, Associate Professor
Kalmyk State University named after B. B. Gorodovikov,
Elista, Russian Federation*

Agadzhanova Aknur Agadzhanovna

*Master's Student
Kalmyk State University named after B. B. Gorodovikov,
Elista, Russian Federation*

Menglinova Anastasiya Nickolaevna

Elista Lyceum, Elista, Russian Federation

注解。 文章对俄语和英语虚拟术语二次命名进行了比较分析。 由于二次命名是利用语言中已有的主格手段来命名新的现实对象，网络术语在网络传播者之间不断互动，是网络技术动态发展的表现之一。 它们反映了互联网的新能力和功能，以及在线环境中形成的社区的具体特征。

关键词：网络术语、分析、二次提名、异同、传播、现代社会。

Annotation. *The article provides a comparative analysis of the secondary nomination of virtual terminology in the Russian and English languages. Since secondary nomination is the use of nominative means already existing in the language to name new objects of reality, Internet terms constantly interact between Internet communicators being one of the manifestations of the dynamic development of network technologies. They reflect the new capabilities and functionality of the Internet, as well as the specific features of communities formed in the online environment.*

Keywords: *Internet terminology, analysis, secondary nomination, similarities, differences, communication, modern society.*

In the Internet space, its own linguistics with its new terms and phrases is developing rapidly. Internet terms are one of the manifestations of the dynamic development of network technologies and constant interaction between Internet communicators. The large number of English words that have penetrated into the

Russian language is explained by the international prestige of the English language and the processes of world globalization. Currently, Russian society is experiencing a genuine “boom” of Anglicisms and Americanisms, and this phenomenon is especially clearly manifested in Internet terminology [Kekeyeva 2024].

The study of Internet terms is becoming a problem that requires an interdisciplinary approach, including linguistics, information technology, psychology, philosophy, sociology and journalism.

Terminology in the Internet sphere is significantly unknown. This means that terms used in this field are rarely recorded in lexicographic publications. More often, such terms are included in the general computer language. A collection of Internet terms in different languages can only be found in electronic format in the form of amateur dictionaries about Internet technologies.

Studies of secondary nomination in the sphere of Internet terminology of Russian and English languages make it possible to observe similar patterns and differences between these two terminological systems, based on general trends in the development of term systems of both languages in the online sphere.

Firstly, both languages have codified terms:

- *compatible* (*совместимый*),

- *оптимизатор* (*специалист, занимающийся оптимизацией сайтов*).

Both languages have many colloquial terms in their internet terminology:

geek (*компьютерщик*),

личка (*private message*)

Secondly, Internet terms are formed from a common basis. This fact gives rise to the emergence of international Internet terms:

- *online* *онлайн*

- *website* *веб-сайт*

- *account* *аккаунт*

- *virus* *вирус*

Thirdly, Internet terms are formed using various word-formation models:

- collocation – *keyword* (*ключевое слово*), *интернет-сервер*;

- affixation – *portable* (*портативный*), *кликер*;

- abbreviation – *API* (*Application Programming Interface*), *рунет*.

Thus, the Internet terminology of the Russian and English languages has its own characteristics, but in general, it has a lot in common in both languages.

When analyzing the terminology of the English and Russian languages of the Internet sphere, it was revealed that the dominant methods of expanding the terminological system in these languages are different. In the English language, the use of abbreviations in the form of abbreviations predominates, and in the Russian language, borrowings predominate, mainly from the English language.

We noted that the use of secondary nomination as a way to expand Internet terminology is used much less frequently than other methods. Nevertheless, scientific interest in this method of forming Internet terms does not wane.

First of all, it should be noted that in both languages there are different types of secondary nomination. First, this is a transfer of name, when a word that already has a certain meaning begins to be used to designate another object or phenomenon. There is also a change in semantic scope when an existing word begins to acquire new meanings or loses one or more of them.

Another common form of secondary nomination is semantic tracing paper. In this case, the word or expression is translated literally, preserving the original meaning, but without taking into account the features of both languages. Phonetic tracing is a process in which the sound and pronunciation of a word or expression become the basis for creating a new term or name.

Another type of secondary nomination is an eponym, when a new word is formed on the basis of a proper name. This occurs when the name of something is associated with the name of an individual or other entity.

However, it should be noted that these methods of secondary nomination show different percentages in the two languages. This may be due to differences in the development and functioning of these language systems.

In the Internet terminology of English and Russian languages, the main attention is paid to the transfer of names. However, at the same time, the frequency of use of various types of secondary nomination differs. In Russian Internet terminology, semantic tracing paper is in second place in popularity. This type of secondary nomination is often used in the Russian language due to the increase in borrowings of English words in various fields, including Internet terminology. On the other hand, in the English language this form of secondary nomination is one of the least productive. According to the quantitative analysis, it ranks only fourth in terms of use in the analyzed material.

The second place in frequency of use in the Internet space of the English language is occupied by a change in the semantic volume of a commonly used word, which is transferred to the Internet terminology system. This method is less common in Russian, but is also productive.

Phonetic tracing paper is predominantly used in the Russian language. Most likely, this is due to the presence of widely used slang terms in the Russian terminology system of the Internet sphere, which usually acquire a colloquial meaning in connection with phonetic adaptation. In English, phonetic calque is used quite rarely.

Eponyms are more common in English Internet terminology. In the Russian language, terms formed from proper names arise less frequently than using other methods of secondary nomination.

The following table clearly presents the results of a comparative analysis of the ways of forming Russian and English Internet terms through secondary nomination.

Table

No.	Secondary nomination methods	Russian language		English language	
		quantity	percent	quantity	percent
1	Transfer of name	48	58.6%	58	69%
2	Semantic tracing paper	13	15.9%	4	4.8%
3	Changing semantic scope	10	12.2%	12	14%
4	Phonetic tracing paper	9	10.8%	2	2.5%
5	Eponym	2	2.5%	8	9.7%
6	Total	82	100%	84	100%

When studying the formation of Internet terms in Russian and English, one can note the similarity in the use of various methods of secondary nomination.

Name transfer acts as the main method of secondary nomination in the Russian and English languages and is divided into similar subgroups: metaphorical transfer, functional transfer and metonymic transfer.

It is interesting to note that the percentages between these categories are also similar in both languages. In both term systems, metaphorical transfer occupies a dominant position. Functional transfer is in second place in use in both languages. Metonymic transfer is used much less frequently. In the process of secondary nomination of terms from commonly used vocabulary, similarities are observed in the system of changes in semantic volume. Basically, in the Internet sphere, a narrowing of the meaning of general literary units prevails. However, value expansion is used much less frequently.

Thus, the conducted research in the aspect of comparative analysis of Internet terminology in the Russian and English languages, formed with the help of secondary nomination, allows us to conclude that the principles of secondary nomination are similar in both languages. The main types of such a nomination are the same, and the dominant options are also the same. However, some differences in the processes of secondary nomination in English and Russian are explained by the lexical compatibility of words, the grammatical composition of languages and ways of expressing expressive meaning.

By examining the characteristics of English and Russian Internet terms, we found that the virtual terminosphere has a significant impact on terminology in both languages. Today, Internet terminology is a separate system of terms that goes beyond computer terms. A distinctive feature of Internet terms that coincide in both languages is the presence of both codified terms and their colloquial variants, which are often not reflected in dictionaries. Another similarity is that terms

in the Internet sphere of both languages often have common bases and can be international. However, the semantic scope of these terms may differ due to differences in the lexical compatibility of words. There are also clear differences in the way Internet terms are formed in both languages. Although the main methods of replenishing terminology (borrowing, word formation and secondary nomination) are applicable in both English and Russian, the main way of forming terms in English is abbreviation, while borrowings from English are more often present in Russian Internet terminology.

Thus, the study of secondary nomination in the field of Internet terminology in English and Russian allows us to draw important conclusions. We found that the process of term system formation in both languages is similar in nature. The main methods of secondary nomination that we have identified include transfer of name (in various forms - metaphorical, metonymic and functional), change in semantic volume (both expansion and narrowing of meaning), semantic tracing paper, phonetic tracing paper and eponyms. Interestingly, these different types of secondary nomination can be observed in both languages. The only thing that differs is the percentage of these species within the analyzed material.

References

1. Abdurakhmanova M.U. *Term as a nominative unit of language // Universum: philology and art history: electronic. scientific magazine* 2020. No. 9(76). URL: <https://universum.com/ru/philology/archive/item/10702>.
2. Kekeeva T.M., Zodbinova A.V., Menglinova A.N. *Replenishment of Internet terminology through secondary nomination (based on the English and Russian languages) // Materials of International University Scientific Forum Practice Oriented Science: UAE – RUSSIA – INDIA, UAE -Part 1, May 8, 2024. - pp. 54-62.*
3. Leichik V.M. *Terminology: subject, methods, structure. - Ed. 3rd. - M.: LKI Publishing House, 2007. - 256 p.*
4. Tselepidis, N.V. *Features of the Internet as a means of intercultural communication among youth [Text]: dis. ...cand. cultural studies / N.V. Celepidis. - M., 2009. - 190 p.*
5. Shcherba L.V. *Language system and speech activity. - M.: Editorial URSS, 2004. - 432 p.*

List of sources of examples

<https://www.samsung.com/us/support/troubleshooting/TSG01111234/>
Oxford [https](https://)
<https://ria.ru/>

TSRYA<https://znachenie-slova.ru>

<https://www.easytechjunkie.com>

<http://www.bolshoyvopros.ru/questions/>

<https://iz.ru/1298251/mariia-nemtceva/bot-voiny-kak-khakery-atakuiut-smi-i-gosstruktury>

TSRYA<https://seo.slovaronline.com/186>

Vesti.ru, 2020.11NKRYA

<https://www.twitter.com/>

DOI 10.34660/INF.2024.98.55.161

双关语在英语媒体文本标题中的作用
**THE ROLE OF A PUN IN THE HEADLINES OF ENGLISH-
LANGUAGE MEDIA TEXTS**

Kekeeva Tatiana Mikhailovna

*Candidate of Philological Sciences, Associate Professor
Kalmyk State University named after B. B. Gorodovikov*

Menglinova Anastasia Nikolaevna

Student

“Elista Lyceum”, Elista, Russian Federation

抽象的。本文研究了英语媒体文本标题中双关语的语言和认知特征。分析了利用双关语吸引读者注意力、传达隐含意义的方式和方法，以及双关语在营造幽默效果中的作用及其对读者信息感知的影响。

关键词：双关语、媒体文本、头条新闻、大众传媒、认知语言学、文体学、文体手段、语言游戏。

Abstract. *This article examines the linguistic and cognitive features of the pun in the headlines of English-language media texts. The ways and methods of using puns to attract readers' attention and convey hidden meaning are analyzed, as well as the role of puns in creating a humorous effect and their impact on the reader's perception of information.*

Keywords: *pun, media texts, headlines, mass media, cognitive linguistics, stylistics, stylistic device, language game.*

The main essence of the communication process is the understanding of the message being transmitted. A number of stylistic techniques are aimed at creating ambiguity, among which is a pun.

But the pun acquires special importance in media headlines in order to attract the reader's attention to the content of the article due to the non-standard form of the title, and in a succinct, compressed form conveys the necessary information about the subject and ideas of the article, which causes a sense of aesthetic pleasure in the reader.

A pun is one of the more striking and, at the same time, one of the most ambiguously interpreted stylistic techniques. In our study, by a pun we mean a stylistic device based on the linguocreative playing of the meanings of a word or a

word as part of a phrase (free or stable) as a result of the bisociative realization of several meanings of this unit. There are a number of stylistic phenomena similar in form and stylistic effect. This can include pun, wordplay, double actualization of phraseological units, zevgma, morphological transformation (contamination) of words, bringing their phonetic and/or graphical form closer together. These phenomena have been studied and are being studied both in domestic and foreign linguistics, since their differentiation is of some difficulty and interest to linguists (I.R. Galperin). In the English-speaking linguistic tradition, a pun is interpreted quite broadly and combined with wordplay.

The pun has been studied in terms of its nature, structure, and limitations compared to other linguistic phenomena. It has also been examined in relation to how it functions in various types of discourse, including artistic and persuasive discourse. This technique is commonly employed in expressive language for different discourse and genre purposes. The pun can serve various functions, such as compositional, semantic, and ideological ones in artistic speech. It can attract attention in public speaking, advertising, and the media, and can also be found in scientific writing, journalistic essays, and philosophical works.

The key cognitive basis for the dual nature of puns lies in bisociation, which refers to the simultaneous mental association of an object or idea with two unrelated concepts. Cognitive dissonance, on the other hand, refers to the presence of contradictory relationships between various elements within a knowledge system.

Puns, being inherently bisociative in nature, have the potential to generate a sense of cognitive dissonance among readers due to their unconventional structure. The level of this dissonance can vary depending on the extent of logical inconsistencies between the two meanings of a pun and the reader's expectations upon first encountering its title and reading the associated article.

Considering the relationship between puns and their broader context, it can be noted that the level of cognitive dissonance experienced by readers varies and is inversely proportional to their degree of bilingualism.

We can discuss various stylistic effects created by puns, such as increased expressiveness in speech, aesthetic enjoyment for the reader when a pun is encountered in the text, deception of expectations, and associated comedic impact.

Puns, as a linguistic and cognitive model, have a complex, two-dimensional structure that is modified by the author based on the context during the process of transforming thoughts into linguistic form (encoding) and then interpreted in a specific manner by the reader (decoding). If puns are used in media headlines, their meaning and interpretation require a thorough understanding of the surrounding context. This includes the title, subtitle, introductory paragraph, body text, and any accompanying images. Therefore, puns should be analyzed within the broader narrative of the article.

To address the complexities associated with pun usage, we examined both external and internal factors that contribute to their creation. Frame structures serve as cognitive frameworks for understanding the underlying meaning of puns. The frame analysis technique has previously been successfully applied to explore the mechanisms behind humorous elements in various text genres.

For English-language news headlines, it is common to see the use of stylistic convergence. This is the combining of two or more different stylistic devices within a single piece of text in order to achieve a specific purpose. There are various ways in which stylistic convergence can be achieved in headlines, ranging from simple combinations of just two techniques to more complex combinations involving three or more techniques. A study on the convergence of puns (a form of word play) and other similar devices found that some of the most common combinations include puns combined with antithesis (contrast) or allusion (reference to another work).

The effectiveness of a pun depends on the specific combination used and the context in which it is used. The most common combination seen is the use of a pun alongside antithesis. This may be due to the complementary nature of these two devices, as they both involve contrast and opposition. Additionally, both puns and antithesis rely on the idea of contradiction, which can be a powerful tool in creating memorable headlines.

For instance, the exhibition “Seeing the Unseen” [<https://www.theguardian.com/culture/2018/may/>] aims to open up the universe for teenagers through the use of puns and contrasts between the concepts of “unseen” and “seeing”. The Scienceworks Museum has taken a novel approach to engaging young people in science, technology, engineering, and mathematics (STEM) subjects, with promising results.

On the other hand, the use of puns in conjunction with allusions is less frequent, as allusions typically refer to well-known individuals, events, or concepts, which are inherently distinct and therefore challenging to integrate with other stylistic devices that rely on duality.

Stylistic convergences of a pun with an allusion are much more rare, which is also determined by the nature of this technique: an allusion is a reference or an indication of a well-known phenomenon, event, or person who, by definition, is unique and infrequently possesses some kind of duality. For example:

1. «All roads lead back to Mark Meadows

Lordy, there are texts: The Jan. 6 committee is heading into an escalating legal battle with allies of former president Donald Trump as it last night voted to hold his former chief of staff in criminal contempt» [www.washingtonpost.com].

The pun in the title “All roads lead back to Mark Meadows” is based on the phraseology “All roads lead to Rome” / “All roads lead to Rome”, i.e. “you can achieve your goal in different ways.”

The article says that US Congressman Mark Meadows is entering into a lawsuit with allies of former President Donald Trump, accusing him of contempt of court, administration and fraud in the presidential election.

A frame analysis of a number of examples has shown that the difference between puns and wordplays is not always related to differences in frame structures, and may be a matter of form. It seems that ultimately, it is the formal difference between these two techniques that determines their ability to create stylistic convergence with other stylistic devices.

Due to its peculiar structure, puns can play a leading or secondary role in these convergences, depending on the stage at which they are correctly decoded in relation to the rest of the text. When a pun takes center stage in a convergence, it causes the reader to dissociate from the text and experience cognitive dissonance, due to the presence of other stylistic elements in the convergence as well. The interpretation of stylistic convergence involving a pun in the title requires the recipient to familiarize themselves with at least some pre-textual information or the text of the article that follows the title. This is determined by the structure of the pun, which implies the simultaneous implementation of several lexical meanings within one unit.

The issue of differentiating related stylistic devices is extremely important and relevant in modern linguistics, in general, and stylistics, in particular. Many such devices are characterized by a degree of proximity in both form and the effects they produce, which considerably complicates their differentiation process. In English-language tradition, puns and wordplay have been combined and not distinguished. Criteria for differentiating puns from related techniques can, in our view, only be developed as a result of detailed analysis of their linguistic and cognitive structures.

References

1. Belova, Yu. A. *Strategies for interpreting the meaning of newspaper headlines in British media texts. Dissertation ... PhD in Philology – Ufa, 2009. – 201 p.*
2. Belyayevskaya, E. G. *Constructing conceptual foundations of media discourse: The role of spatial and temporal structures. Cognitive studies of language, No. 30, 2017. - 31-34 pp.*
3. Galperin, I. R. *Text as an object of linguistic research. M.: Nauka, 1981. – 139 p.*
4. Koestler, A. *The Act of Creation. London: Hutchinson, 1964. – 751 p.*
5. Gr. Ritchie, *The Linguistic Analysis of Jokes. London and New York: Routledge, 2014. – 278 p.*

DOI 10.34660/INF.2024.30.51.162

对日常生活现象的哲学和方法论分析
**PHILOSOPHICAL AND METHODOLOGICAL ANALYSIS OF THE
PHENOMENON OF EVERYDAY LIFE***

Borsyakov Yuri Ivanovich

Doctor of Philosophical Sciences, Full Professor

Nikishin Sergey Vyacheslavovich

Candidate of Philosophical Sciences, Associate Professor

Voronezh State Pedagogical University

抽象的。对日常生活现象的哲学分析使我们能够识别现实理论模型的基本结构，并预见即将发生的社会文化事件的后果。对日常生活现象的科学和理论研究揭示了存在真理变得具体和令人信服的时间和空间。这表明日常文化已被20-21世纪的现代西方哲学所同化

关键词：日常现实、模型、个性、生活、事件、语言、人。

Abstract. *Philosophical analysis of the phenomenon of everyday life allows us to identify the fundamental structures of theoretical models of reality and foresee the consequences of upcoming socio-cultural events. The scientific and theoretical study of the phenomenon of everyday life reveals the time and space in which the truth of existence becomes concrete and convincing. It is shown that everyday culture is assimilated into modern Western philosophy of the 20th-21st centuries*

Keywords: *everyday reality, model, personality, life, event, language, person.*

In the 20th century There have been serious changes in the methodology of the humanities, which in their significance and consequences are not inferior to the revolution in natural science. We are talking about a significant transformation of the generally accepted paradigms in which the humanities were seen as the activity of great people. The philosophy of everyday life forms new values and social priorities in the living space of modern civilization. Since in social knowledge the main topic of research is the individual, who creates herself, creates herself as an individual, unique, inimitable being and herself creates the forms and structures of her daily existence, her life, collective living conditions with other people, therefore, the scientific principle of the entire array of social sciences is the philosophy

* This research was supported by the Ministry of Education of the Russian Federation within the framework of the state task in the field of science (topic number OTGE-2024-0004)

of man, which shows that a person creates his own being, his existence. In this case, the logic of research moves to clarify the meaning of the everyday existence of the individual as uniqueness, to comprehension and dialogue that overcome the loneliness of the existence of the person himself. Therefore, the main topic of research is the dialogue “I and the Other” and how this dialogue is realized in everyday, everyday situations.

Everyday existence itself becomes existential, determined by the logic of the life world, in this world a person is able to demonstrate his unique qualities, creates and shapes the logic of everyday life, the meaning and purpose of his existence, and also through communication with the outside world (other “Selves”), he breaks his everyday lonely existence and at the same time creates his own originality and uniqueness. Therefore, the study of the everyday existence of the individual is the main task for all philosophical and social knowledge. At the same time, the category of the everyday is determined by the stability, stability of structures and situations that are formed in society, in which a person creates his own uniqueness. The formation of oneself in the circumstances of everyday existence acquires the logic of familiar social practices that determine the essence and meaning of the philosophical research of the individual and society. Everyday phenomena of life become common practice in which a person realizes the main problem of his existence - to form his essence until it is given to him. In this logic of the development process, the individual is forced to immerse himself in the familiar, ordinary and everyday structures of his life world, the main features of which are public and social connections. Man is a multistructural, bio-psycho-social being, but at the same time, a holistic being. “A person is always inclined to consider his immediate environment as the center of the universe and turn his individual private life into a model for the entire universe” [Cassirer, 1988, p. 17] Everyday life becomes specialized, acquires a one-dimensional character, which prevents a person from overcoming his one-dimensionality, forming his integrity. Man forms himself as a whole with the help of his kind and essence of spirit. Therefore, a person’s understanding of his uniqueness and uniqueness, continuity and integrity through his type of everyday reality gives the integrity itself a random and unique element. In different everyday situations, a person acts differently. Such situations require from the individual a defining manifestation of his qualities, which are an essential aspect of his integrity. The study of personality through a system of a certain type of everyday practice, through the application of scientific methods of social sciences and humanities, claims to have a special truth about the personality itself.

Therefore, the ordinary, everyday existence of an individual in the structure of the relationship “person – society” becomes contradictory. A person always strives to define himself as a whole through the production of his uniqueness. The society in which a person exists forms various types of daily practice necessary

for the development of the multidimensionality of the personality, overcoming one-dimensionality, and the realization of hidden talents and gifts. At the same time, society, by providing specific types of everyday practice necessary for the formation of spiritual, material, social, technological and other forms of everyday existence of an individual, does not always treat this individual as an end, but rather as a means. This contradiction is one of the main contradictions in the daily existence of the individual, which she strives to resolve throughout the entire history of human existence.

It should be noted that not a single life situational model, not a single type of everyday practice is the final correspondence to the multidimensional nature of the personality itself. At the same time, without an appropriate choice of everyday and specialized forms of social practice, it is impossible to achieve a holistic personality in the structure of social reality. Therefore, in existential, everyday existence, a person is faced with the main life problem of choosing a type of social activity that would contribute to the formation of a dominant personality ability. But at the same time, it allowed the individual to determine his integrity and his uniqueness, his uniqueness and at the same time his own multidimensionality in the world of everyday life. The everyday life of the individual himself is based on a natural attitude, on common sense. Everyday reality is given directly. The world of everyday life always relates to a person; it is human-sized. This is his own daily reality. It is subjective and presented in the form of practical goals, life practice.

E. Husserl [Husserl, 1994, p. 19 – 162] came quite close to the analysis and phenomenological understanding of the vital, everyday world. The philosopher's research was carried out through the study of the structures of consciousness. The emergence of consciousness as an everyday, life-world is the philosophical wisdom captured by Husserl from the word-formation structure of natural language: consciousness becomes fundamentally open, non-thematic, pre-subject, hermeneutic. Consciousness appears as a life experience of the everyday, and the concept of "life world" is introduced into phenomenology. Husserl criticizes naturalism and science for attempting to know and understand the world in itself, solely as objective, independent of the consciousness and everyday practices of man.

In the natural sciences, the everyday world is the opposite of the subject. Natural sciences have hypertrophied the objective characteristics of the everyday world, turned the world into an object, thereby losing their foundation. Husserl believes that the time has come to return the objective world of everyday life to its original position, to turn the world upside down, to make out of the theoretical world of the natural sciences a vital, everyday world that is not opposed to consciousness, but, on the contrary, constitutes, together with consciousness, a single horizon as an intersubjective condition existence of a world of everyday practical structures.

The horizon of the everyday world is the background against which consciousness encounters this world itself. The horizon has no certainties, the horizon is pre-subject. For Husserl, the a priori, pre-subject form is the horizon of the everyday world. The world, according to Husserl, is not a subject formation. Since consciousness is intentional in principle, consciousness is already objective, and desires, ideas, thinking in general are meaningful. Consciousness is intentional and, as a “horizon”, is already filled, has preliminary knowledge about the object, since it is initially directed towards the object - this is the essence of the objectivity of consciousness. This point will become central to philosophical hermeneutics. The “horizon” as a non-thematic (pre-subject) plane of consciousness will be at the basis of M. Heidegger’s “pre-understanding” and, further, in the position about the hermeneutics of everyday Being. The life world and horizon are forms of actualities in which the forms of the future of our everyday life are concentrated. In a very simplified way, one can distinguish between the life world and the horizon as actual-spatial and actual-temporal aspects of everyday life experience, as inter-subjective conditions for the meeting of consciousness with the everyday world.

With the concept of time, or duration, Husserl associates such a character of perception of the surrounding world as everyday life and evidence. “Evidence... cannot mean unconditional confidence in a point-like temporary existence...” [Husserl, 1994, p. 89], The essence of evidence is that evidence and everyday life are “temporal extension”, which does not have “empirical substance” in its content. Everyday life has differences in itself, but is not separate, everyday life is the “inextricable unity” of the perception of an object, it is the “First-given”; the elements of evidence differ from each other (verschieden), but are not separated (geschieden). The content of evidence and everyday life is the “consciousness of unity”, which underlies the life world of everyday life, says Husserl.

The phenomenon of everyday life can be understood as an extra-scientific space of human existence. The everyday life of an individual is filled with concerns about organizing himself as a social being. The world of everyday life requires constant repetition, says M. Heidegger, such repetitions extinguish the creative breakthroughs of the individual himself. Thus, the everyday life of M. Heidegger is represented by the following characteristics: “ambiguity”, “curiosity”, “anxious dispensation”, etc. “The being of man can never be determined with sufficient originality through the previous, i.e. metaphysical interpretation of man as a rational living creatures.” [Heidegger, 1993, p.144] These characteristics do not define true human existence; in this case, the phenomenon of everyday life takes on a negative character, and everyday reality appears as an inauthentic reality, a reality of groundlessness, lost life guidelines and open publicity. Heidegger notes that modern man is invariably accompanied by a concern for the present, which shapes human life, turns it into everyday chores, and directs it into the world of

everyday life. This concern is aimed at existing objects, at reorganizing the world. According to Heidegger, the individual tries to hide from such freedom, to escape into the unfree consciousness of the masses, to be like everyone else, this leads to the standardization of individuality in the world of everyday life.

Heidegger understands the everyday lifeworld as a “place” in which an individual lives constantly (that is, it has meaning only when it comes exclusively to the existence of the person himself). Heidegger forms the world of everyday life as a system of relations between existing processes and things that are constantly in the integrity of mutual references and never leave it. Heidegger’s “Dasein” is found among these processes, objects and things, and is involved in everyday practices with them. At the same time, the everyday world of “Dasein” has a number of features that help to understand the basis for the characteristics of the existentials of true and false existence that emerge from it: inconspicuousness, spontaneity, self-intelligibility, unaccountability, but the meaninglessness of everyday reality does not receive an unambiguous assessment from Heidegger. “Then isn’t this our demand for human beings, this attempt to prepare a person for the demands of existence, driven by concerns about man? What else is “care” directed at, if not at returning a person to his essence?” [Heidegger, 1993, p. 195].

The conversation is about a significant breakdown between the in-itself and the for-itself, which determines the basis for the formation of the phenomenon of the everyday in various semantic variants: “neutral” and “negative.” The logic of everyday life in itself is formed by spatial and temporal characteristics in which the subject encounters the world of the absurd, there is a significant gap between man and the world, and in this case we see an example of absurdity that reaches its apogee, it is determined by such categories of everyday life as irrationality, illogicality, accident. The “image” of everyday life in Heidegger’s philosophy becomes rooted in its being. At the same time, Heidegger offers a neutral characterization of everyday life and the everyday structures of a person’s life world; for him, the world of everyday life has a positive dimension insofar as it serves the main goal that he defines: the discovery of everyday logical structures in which the meaning of the individual’s existence and the meaning of the world itself will become clear. “... what a person is - that is, in the traditional language of metaphysics, the “essence” of a person - rests in his existence. Existence understood in this way, however, is not identical to the traditional concept of *existentia*, meaning reality in contrast to *essentia* as possibility” [Heidegger, 1993, p. 199].

Theoretical work in the field of humanities is striking in its obvious shift of interest from the history of scientific rationality to the study and study of the everyday world. Professional philosophers are beginning to become interested in the world of everyday life, which determines the actions and behavior of people no less than the world of scientific theories and hypotheses. The interest of the sci-

entific community is concentrated on the phenomenon of everyday life. It is not considered something simplified; on the contrary, it deserves the most serious and careful study, because theoretical science, which exists and stands out against its background, cannot do without the everyday. The world of everyday interactions, including the habits and rules of human behavior, is increasingly used as a kind of basic foundation for theoretical knowledge. Research in the field of humanities took place on the basis of recognition of the importance of the cultural-anthropological dimension, thanks to which not only the idea of a person, but also his home, clothing, etc. turned out to be very important elements of that everyday space in which, in fact, the formation of humanity takes place.

Philosophical analysis, study and understanding of everyday disciplinary practices helps to understand the real functions of scientific models and classifications, and to control the consequences of social events. The study of the disciplinary practices of everyday life reveals the “chronotope” in which this or that truth becomes concrete and convincing. Therefore, it is important to determine the specifics of the “everyday” category. First of all, it is necessary to distinguish it from the phenomenon of cognition and research, where we are interested in objective truth and new information. A significant difference between everyday life and theoretical and scientific knowledge is its reproduction and repeated repetition. It is not so much a matter of the difference between disciplinary and verbal acts, as Foucault argued, but rather a matter of repetition and habit. Frequently repeated verbal practices also become an important part of everyday life due to repetition, which is unnecessary from the point of view of scientific truth, which does not need to be known by many. The truth is always the truth, even if only one person knows it. It is necessary to create such everyday practices in which the assembly of a person’s social structure occurs. This applies to all groups and strata of society. In this case, truth becomes part of everyday experience through repetition, which creates the very reality of the everyday world.

M. Heidegger spent a long time studying ancient Greek philosophy, which first coined the concept of “being.” If we carry out a semantic translation, then in modern language the ancient Greek “being” should mean “to be present”: “the essence of this presence is deeply hidden in the original name of being... in the presence, the present and duration rule unreflectively and secretly, time rules. Being as such... reveals its hiddenness in time. Thus, time indicates unconcealment, i.e. the truth of being” [Heidegger, 1993, p. 33], everyday life.

Heidegger uses the idea of intersubjectivity, expressed by the concept of “intentionality.” Language as a tale about being is the primary layer of everyday life, which introduces a person into being. Language, according to Heidegger, is not a function of man, not a property of being, but an event (subject) of being. Heidegger contrasts the term “event” with the traditional concept of philosophy

“subject”: “event” is understood as a co-existence, a co-existing being - language and man in time. An event is a temporary accomplishment of language, the realization of language through a person. This is the linguistic nature of everyday life. A person does not create a word every time he speaks: the word is the messenger of being-time, with the help of the word a person listens to the existence of everyday life. Language, according to Heidegger, is hermeneutic. Language brings a message from the very source of being, language speaks “in the language” of everyday existence, therefore being is also hermeneutical. But being is not given to everyone to hear, because, as was said at the very beginning of the story about Heidegger, not everyone thinks about being, about the meaning of human existence and the truth of being. Existence is given to hear and understand only to poets. The poet does not consider himself a creator; he, listening to everyday existence, speaks on behalf of this existence. The constitutive moment of being-in-the-world is everyday speech. Speech is understood by Heidegger as language in its implementation, as living speech, i.e. Along with the elements of natural language - vocabulary and grammar, intonation and silence are an integral part of speech. To understand yourself, your everyday existence, which alone can be the truth of existence, you need to listen to everyday language, to everyday speech.

Language, since it reveals the truth of everyday existence, is a prerequisite for understanding. It is from language that a person draws a preliminary understanding of existence, of himself, of the world of everyday forms. Language, therefore, describes the circle of pre-understanding, i.e. a preliminary understanding of the truth of being, such an everyday existence from which there is no need to leave. The requirement to find a way out of the circle is connected, according to Heidegger, with an incorrect understanding of being, with the interpretation of being as an existent. The everyday existence of a person, the everyday life world as a whole, is an event (co-existence). These are not isolated substance worlds. These are horizons, at the point of intersection of which, at every moment of time, a glimmer of everyday existence as truth appears.

Husserl, on the contrary, showed that transcendental phenomenology has sufficient means to discuss the problems of the everyday world. The everyday world is a spatio-temporal world of things, perceived before and beyond any science. It does not require additional justification; in relation to it, the natural attitude is justified, all manifestations of which in science and philosophy Husserl mercilessly criticized. A. Schutz develops these ideas and poses the problem of describing the basic structures of pre-scientific, everyday practices that are taken for granted by participants in the lifeworld. “The life world is understood as that area of reality that is inherent as a simple given to a normal waking adult person of sound mind. We call a simple given everything that we experience as undoubted, that is, any state of affairs that for the time being is unproblematic for us” [Schuetz,

Luckmann, 1975. p. 22]. Consequently, the life world of everyday life is a special reality, characteristic only of man. The everyday life world receives a fairly simple definition from A. Schutz: this world, along with the world of history, “is an area of reality in which a person takes part with inevitable and regular repetition. Mutual understanding between a person and his fellow tribesmen is possible only within this area in which interaction with them occurs. Only in the everyday life world is it possible to constitute a common environment of communication. [Schuetz, Luckmann, 1975, p. 23].

The interpretation and construction of the everyday, life world is based on accumulated personal experience and assimilation of the experience of other people. Thanks to this, the typification of phenomena and the ordering of new everyday experience occurs. Experience arises from the attention a person pays to a situation. When faced with a similar situation, a person activates his memory and tries to solve the problem based on accumulated everyday generalizations. This is the formation of semantic, repeating everyday connections. This generalization is further applied; it becomes everyday typification. Typing is not an abstract generalization. Typification is pragmatically oriented and consists in identifying the current meaning of the state of affairs based on the variety of their meanings and assessments. The main form of reflection of typical patterns of experience is ordinary language, in which most typifications of human everyday experience are objectified. Habits, as the results of repeating everyday typifications to solve problems, form a natural attitude. But this taken-for-granted experience sometimes begins to fail. In this case, the natural everyday attitude is modified. But that rarely happens. Typically, we interpret the world as we know it. The life world, according to E. Husserl, is intersubjective. A. Schutz paid special attention to this and noted that in it people exist for each other, that they perceive and give meaning to each other. We assume that they perceive the world in the same way as we do, and on this basis we enter into various social everyday relationships.

The premise that constitutes the everyday world as social is the thesis of the “interchangeability of perspectives.” Thanks to it, it is assumed that another, being in our place, would perceive things as we do, and we, in his place, would perceive things in his everyday perspective. The world becomes accessible to us through experiences that accumulate and form everyday experience. Current experiences use past experiences. By summarizing experience, a person comprehends meaning. But in phenomenological sociology we are not talking about a concept, idea or essence. Meaning means the existence of a connection between two units of social experience (phenomena) and thereby the assumption of something underlying the phenomena, namely, the social everyday order. The process of constructing the everyday life world, according to T. Lukman, [Lukman, 199, pp. 39-323] is at the same time the construction of its meaning. Not all everyday experiences are

brought to the level of consciousness, but only those that coincide with the idea of the social order of a particular subject.

Social experience turns into typical, everyday experience, forming a stock of knowledge. With its help, a subjective world is created, and there is an awareness of oneself as part of the social everyday world, common with other people and existing before our birth. This creates the objective world of everyday life, which sets a certain framework for subjective consciousness and action. The everyday world is a reality that we strive to change through our actions, which itself changes our actions. Therefore, our natural attitude is fundamentally pragmatic: we act in our everyday life world, which sets the limits of our freedom. Discussing the question of the significance of phenomenological sociology, H. Abels [Abels, 1998, p. 98-124] indicates that it explores how a person organizes everyday reality step by step. Phenomenological sociology studies not just the routine of everyday thinking, but reveals how ideology and other forms of social consciousness are realized in it. These are always processes in which there is a shift in boundaries and an erosion of the forms and styles of the everyday. Changes can begin at different levels, as a manifestation of the atypical, marginal, as a change in norms and the rejection of rigid assessments of their violation, as the loss of the soil of old everyday norms, as a change in them in the course of carrying out productive action. Norms, in fact, turn out to be transobjective and transsubjective, because they are both beyond everyday experience and beyond ordinary practical interaction. Therefore, dividing innovation claims into justified and unfounded turns out to be short-sighted. The significance of innovative experience is based, firstly, on the insurmountability of the other. Therefore, innovation is a response to the challenge of another. Secondly, innovative experience is irreversible and incommensurable with the old one; it excludes the position of a third person, who can take the place of a judge and decide the question of the correct relationship between tradition and innovation. Innovative claims cannot be universal, because they are not a consequence, a special case of the law. Any order lags behind the creative potential of man, who is not only an ascetic, but also a productive, ecstatic being. This unusual does not lie in some sphere of the hidden or intimate; on the contrary, the unusual is the other side of the everyday. In the postmodern picture of the world of everyday life, not only the subject, but also the object is blurred. So, if phenomenologists cried out: "To the things themselves!", then postmodernists, on the contrary, get rid of the world of things. The rejection of the idea of integrity, hierarchical structure, centrality and harmonious ordering of the world leads to the birth of the so-called "postmodern sensitivity" [Lyotard, 1998 pp. 7-160], an attitude towards perceiving the world as chaos, "ruins". Chaoticity permeates all levels of existence, consciousness in this situation turns out to be the result of "comprehension of the broken world" of everyday life.

References

1. *Abels H. Romance, phenomenological sociology and qualitative sociological research // Journal of Sociology and Social Anthropology. 1998. V. 1. No. 1.*
2. *Husserl E. Collected Works. V.1. – M.: Gnosis, 1994.*
3. *Lyotard J. The state of postmodernity Publishing house “Institute of Experimental Sociology”, 1998 Publishing house “Aletheia” (St. Petersburg), 1998 Translation by N.A. Shmatko, 1998.*
4. *Cassirer E. Experience about man: Introduction to the philosophy of human culture / The problem of man in Western philosophy: - M.: Progress, 1988. p-552.*
5. *Lukman T. Social construction of reality. Treatise on the sociology of knowledge M. 1995.*
6. *Heidegger M. Time and Being. Articles and speeches. M.: Respublika, 1993.*
7. *Schuetz A., Luckmann T. Strukturen der Lebenswelt. Bd. 1. Neuwied, 1975.*

DOI 10.34660/INF.2024.59.96.163

心理因素对青少年学生应对行为形成的影响问题
**BEFORE THE PROBLEM OF PSYCHOLOGICAL FACTORS ON
THE FORMATION OF COPING BEHAVIORS AMONG YOUNG
STUDENTS**

Labeznaya Larisa Petrovna

*Candidate of Psychological Sciences, Associate Professor
Lugansk State Pedagogical University*

抽象的。文章揭示了国内外研究者对于教育过程中心理因素对学生行为应对策略形成的影响问题的主要研究思路。笔者通过对这一问题的理论和方法分析以及自己的观察,得出结论:影响行为应对策略形成过程的心理因素有主动行为因素和被动行为因素、使用行为因素等。内外部资源、情绪状态因素和认知因素。

关键词: 决定因素、适应、应对行为、应对策略、学生青年。

Abstract. *The article reveals the main approaches of foreign and domestic researchers to the problem of the influence of psychological factors on the formation of coping strategies of behavior among students in the educational process. As a result of the theoretical and methodological analysis of this problem and his own observations, the author comes to the conclusion that the psychological factors influencing the process of formation of coping strategies of behavior are factors of active and passive actions, factors of the use of internal and external resources, the factor of emotional state and cognitive factor.*

Keywords: *determinants, adaptation, coping behavior, coping strategies, student youth.*

Students of higher educational institutions are of interest as a generation that in the near future will play a leading role as an intellectual and productive force in modern society. Analyzing the activities of students throughout the entire period of study at a university, one can notice the characteristic features for each course of study, which differ in setting goals, implementing tasks, reactions of the regulatory-volitional, affective-emotional and cognitive spheres.

Thus, among the main tasks of first-year students, one can highlight the process of adaptation of students to a new educational institution; educational process (university requirements, rights and responsibilities of students, etc.); the new social status of the student and the form of interaction with fellow students and

university teachers. This period for first-year students is characterized by a high level of conformism, the absence of a differentiated approach to the social and socio-psychological roles being mastered and implemented. During the next two courses, one can notice a more active personal involvement of students in the educational process and social activities of the university. 2nd and 3rd year students continue to receive general cultural training, develop general professional and special competencies, develop educational, professional and interpersonal contacts, and expand the range of socio-psychological and socio-professional roles. During this period, the process of adaptation to a higher educational institution can be considered completed. Further, in the 4th–6th years, students complete their full professional training and resolve issues related to employment or continuation of postgraduate studies.

Analyzing the psychological characteristics of students, we can say that high-quality professional training depends not only on cognitive abilities, interest and motivation, but also on the development of integrative mechanisms of self-awareness, worldview and activity of the student's life position, as well as on effective psychological defenses and behavior strategies in conditions critical situations. In this regard, the very process of developing coping behavior strategies among students in the early stages of studying at a university is very important, which in future educational, professional activities and life will ensure overcoming all crises and will contribute to the successful development of the individual and his professional growth.

One of the fundamental factors in regulating an individual's behavior is the style of coping behavior. In this regard, "coping" is considered as "continuously changing cognitive and behavioral attempts to manage specific external and (or) internal needs, which are defined as excessively frustrating and exceeding personal resources." Coping behavior develops on the basis of the individual's available coping resources: "I" concept, locus of control, empathy, affiliation, sensitivity to rejection, receptivity to social support with the help of coping strategies. Coping strategies are a person's real response to an emerging threat as a way to overcome stress [3].

Based on the analysis of the literature on the problem of the formation of coping strategies of individual behavior (V. Ababkov, J. Amirkhan, R. Lazarus, M. Perret, S. Folkman and many others), it can be argued that a significant part of the research in this area relates to the definition correlation interdependencies between their indicators and individual psychological characteristics of the individual.

However, the concept that affects the mechanisms and structure of coping strategies of behavior – the "concept of strategic behavioral characteristics" by D. Bass [3] – has become the most famous and widely developed. These studies determine a significant correlation between individual psychological properties and personal

behavior strategies, where special importance is attached to the analysis of internal and external factors. Thus, we can distinguish two main approaches, differing in the characteristics of their research tasks and scientific and methodological basis, indicating differences in the definition of the concept of “behavior strategy.”

The first approach examines the social determinants of strategic behavioral characteristics. Within the framework of this approach, a significant role belongs to the direction in the study of external determinants of strategic behavioral characteristics, in particular social situations. For example, S. Worchel considers a conflict situation as “one of the possible reasons for the formation of aggressive behavior strategies” [3].

An alternative to the first is an approach that studies the internal specific determinants of behavior strategies - individual psychological characteristics of the individual (D. Bass). D. Bass suggests exploring strategies taking into account two main aspects.

First, the origin of individual differences in the process of personality ontogenesis is analyzed. Strategies, in this case, are defined “as stable characteristics of an individual’s behavior, that is, having constancy throughout a person’s life.” They are referred to as “genetically determined behavioral strategies” (F. Gabbay). In this case, the leading internal factors are genetically determined determinants, personality traits and intellectual abilities.

Secondly, the individual psychological characteristics of the personality, manifested in behavioral strategies and interactions in society, are analyzed. And these identified differences are designated as evolutionary-genetic or socio-psychological determinants. They are presented as species-specific behavioral characteristics and characterize the behavior of both an individual and a group. The main component, in this case, is the specific behavior of the individual in society associated with the implementation of adaptive tasks.

It should be noted that among the psychological factors influencing the formation of coping strategies of behavior in a student environment, the main role belongs to attitude (Sh. Nadirashvili, T. Ponomarenko, D. Uznadze), intellectual abilities (D. Brown, G. Rozin, T. Wales), individual psychological characteristics of the individual (D. Bass), gender and age differences in the use of certain behavioral strategies (G. Egorova, T. Meshkova).

Thus, three main types of behavioral strategies can be distinguished. Firstly, a certain choice of your environment. Secondly, it causes specific reactions in others. Third, performing certain types of interactions in your environment.

Analyzing the psychological essence of coping strategies of behavior in general, we define action as a unit of constructing a line of behavior. Of great importance in this case is their orientation and factor conditionality, which influences the choice of one or another coping strategy. The strategy of behavior, like the

behavior itself, has a complete character in the form of a certain result, which is set before the start of movement in the form of a goal. In this case, the goal itself can be a specific image, it can be outside the person's consciousness, and at the same time have a blurred image of the result.

If we consider behavior from the point of view of functional load, then the following components can be distinguished: goal, as the basis for managing behavior; orientation as a system of purposeful actions that provide concretization of the situation and activation of previous experience; assessment, as the choice of a specific plan to achieve a goal; control that ensures the beginning and end of behavior; feedback, consisting of monitoring the implementation of the plan and achievement of the goal.

The complex organization of action can be divided into two phases: preparatory and executive. Orientation and choice of plan belong to the preparatory phase; execution, regulation of action, control over execution, correction, completion of action belong to the executive phase.

Thus, if we highlight the goal as one of the main functional elements in the construction of a behavioral strategy, then we can determine that the dynamics of the origin of the goal comes from needs, and therefore arises at the very beginning of determining behavioral tactics. Since a goal is most often an image of a result that exists in a person's imagination, it can be in a passive or active state.

Analyzing the conditions for the formation of coping strategies, many authors consider the value disposition of an individual as a factor influencing the nature of the strategy of its further behavior. Each person, interacting with society, borrows from social experience and transforms it into personal prosocial or asocial goals [2]. This phenomenon is quite important and enriches the individual's internal plane with value orientations and attitudes of society.

Thus, the dynamic characteristics of the goal are determined by three necessary conditions: needs, situation and past experience of satisfying the individual's needs. Each need is characterized by a stable group of goals that determine one or another line of behavior of the individual. Based on the specifics of the direction of behavior, its strategies can be divided into two levels: material and intangible. Each person in his life independently determines goals that reflect his social status in the group, which characterizes his position and role. Most often, these are sociogenic, intangible needs associated with the structure of relationships; they consist in achieving a certain psychological state, which, in turn, determines the internal goals and needs of the individual.

Thus, one more parameter is highlighted - this is the quality of the goal, its belonging to one or another group, which, in turn, presupposes a kind of hierarchy in the correlation of goals and needs (A. Maslow, Sh. Nadirashvili, M. Rokeach, V. Yadov).

The second level of formation of coping strategies of behavior is means or instrumental characteristics. Here you need to pay attention to the individual's ability to use internal resources (previously acquired experience, psychophysiological resources of the body, cognitive abilities, creativity) and the ability to use the conditions of the situation as a means to achieve a goal.

The third level is the final result. The important point is to evaluate the result itself. It can be emotional when a person experiences a feeling of satisfaction or dissatisfaction.

The next significant factor in the formation of coping strategies of behavior is the personality disposition, considered by V. Yadov, which includes the motivational-value sphere and a system of fixed attitudes. V. Yadov considers the predispositions fixed in social experience to perceive and evaluate the conditions of activity and act in these conditions in a certain way [7].

We find a reflection of dispositional views in the theory of attitude of D. Uznadze, where the dynamic influence of attitude on the behavior of an individual is observed. This influence includes five aspects: the state of consciousness, the nervous system, the expressed readiness to react to the external environment, the organization of such a mood, and its connection with past experience. Considering personality disposition as a system of fixed attitudes and motivational-value orientations, we can note the difficulties of fixing it. The attitudinal disposition of a person has a hierarchical structure similar to the classification of needs. The first level includes elementary fixed attitudes, devoid of modality and awareness. The second level includes socially fixed attitudes, more precisely a system of social attitudes containing an emotional (evaluative) component, a cognitive (rational) and behavioral (behavioral disposition). The third level contains the general dominant orientation of interests, formed on the basis of a tendency to identify with the sphere of social activity. And finally, the fourth level is the highest level of value orientations of life and the means to achieve them. The decisive role of this level is the self-regulation of behavior [5].

So, we can identify a system of psychological factors that influence the formation of coping strategies of individual behavior. At the same time, it is important to pay attention to the fact that need is the source of human activity (V. Asmolov, I. Bzhalava, D. Kiknadze, A. Leontyev, D. Uznadze, etc.). Needs are characterized by dynamism and mobility, and can develop along with the development of the individual and society [1; 6].

We are close to the position of D.A. Kiknadze, who identifies the following groups of factors influencing individual behavior: society and nature (relationships); materiality and spirituality (needs); encouragement and motivation to action; decision to act; internal readiness for action (installation); action (installation implementation) [1].

The most acute problem of updating adaptive strategies of coping behavior of an individual, as we have already said, concerns first-year students as a special socio-age group that chooses the main life goals, decides on life plans and strategies for implementing a life path, and begins to independently implement a life position (G. Abramova, L. Antsiferova, S. Bühler, E. Kologrivova) [4].

A group of psychological factors influencing the formation of coping strategies of an individual's behavior causes, in turn, various compensatory reactions of the human psyche: negativism, instability in decision-making, lack of self-criticism, increased demands on others, fixation on one's feelings and experiences, which, in in turn, lead students to sustainable maladaptation, not allowing them to form coping strategies of behavior that are adequate to the situation.

Thus, during the training of boys and girls in higher educational institutions, it is necessary to create favorable and safe conditions for the successful adaptation of the student's personality in the youth environment of the university, their psycho-emotional well-being and the harmonious development of the personality as a whole. The main components of the formation of adaptive coping behavior of students are their awareness, ability to control the situation, high resistance to stress, focus, as well as the ability to learn adequate tactics of behavior in difficult situations.

Concluding the consideration of the structure of coping strategies of behavior, we determine the psychological factors influencing the process of their formation. Psycho-emotional well-being and its influence on the formation of coping strategies of behavior among students is inextricably linked with the factors of active actions or inactions taken; disclosure of internal and use of external resources; a positive or negative psycho-emotional state, expressed through the individual's attitude towards his own goals or capabilities; intelligence on which analysis, planning, calculation and evaluation depend. Psychological factors have a different nature and influence on the formation of coping strategies of behavior among students. Firstly, these are the components that make up the strategy itself, namely: the action factor in active or passive form, depending on the level of motivation; the factor of resource use is reliance on one's own strengths and personality traits or support from other people; factor of the emotional intensity of the strategy, including the state of the subject and the attitude of his capabilities and abilities; cognitive factor, which includes the actions of theoretical behavior: analysis, calculation, planning, evaluation, both positive and negative. And, secondly, this is the motivation and interests of the individual himself.

References

1. Kiknadze D.A. *Needs. Behavior. Education* / D.A. Kiknadze. – M.: Mysl, 1968. – 148 p.
2. Kryukova T.L. *Methods for studying coping behavior: three coping scales* / T.L. Kryukova. – Kostroma: KSU named after. H.A. Nekrasov, 2010. – 62 p.
3. Libina A.B. *Styles of responding to stress: psychological defense or coping with difficult situations* / A.V. Libina, A.V. Libin // *Human style: psychological analysis* / Ed. A.V. Libina. – M.: Smysl, 1998. – P. 190–204.
4. Maklakov A.G. *Personal adaptation potential: its mobilization and forecasting in extreme conditions* / A.G. Maklakov // *Psychological Journal*. – 2001. – V. 22, No. 1. – P. 16–24.
5. Melnikova N.N. *Classification of adaptive behavior strategies* / N.N. Melnikova // *Theoretical, experimental and practical psychology: collection of articles. scientific works* / Under the ed. of Baturin. – Chelyabinsk: Publishing house of South Ural State University, 2001. – V. 3. – P. 13–23.
6. Sergienko E.A. *Subjective regulation and coping behavior* / answer. ed. E.A. Sergienko, T.L. Kryukova // *Psychology of coping behavior: materials of the international. scientific-practical conf.* - Kostroma: KSU named after. N. A. Nekrasov, 2007. – P. 64–66.
7. Yadov V.A. *On the dispositional regulation of social behavior of a person* / V.A. Yadov // *Methodological problems of social psychology*. – M., 1975. – P. 89–105.

研究低头族人的沟通问题以及心理咨询的重要性

STUDYING COMMUNICATION PROBLEMS IN PEOPLE WITH PHUBBING AND THE IMPORTANCE OF PSYCHOLOGICAL COUNSELING

Rodermel Tatyana Alekseevna

*Candidate of Philosophical, Associate Professor, Head of Department
Surgut State University*

Samoilova Sofya Sergeevna

*Student
Surgut State University*

抽象的。本文讨论了“低头族”的理论问题，以及其表现的严重后果。作者假设低头族对个人随后与社会互动的影 响。分析了移动设备和社交网络中低头通话的使用情况。这篇文章还重点讨论了心理学家与低头族患者互动的重要性。

该出版物对低头族和沟通障碍之间的联系进行了实证研究。其中特别关注问题的主要标志。介绍了心理咨询结构中已识别标记的工作顺序。在文章的最后，邀请心理学家顾问研究“低头族”的概念，并参加专门课程，以在与客户互动时形成有效的策略并选择解决此问题的工具。综上，得出结论。

关键词：低头族、心理咨询、智能手机成瘾、沟通障碍、虚拟成瘾者、低头族、现代生活中的“手风琴”。

Abstract. *This article discusses the theoretical aspects of “phubbing”, as well as the serious consequences of its manifestation. The authors assume the influence of phubbing on subsequent interactions of the individual with society. The use of phubbing from mobile gadgets and social networks is analyzed. The article also focuses on the importance of the psychologist’s interaction with clients suffering from phubbing.*

The publication presents an empirical study of the connection between phubbing and communication disorders. in which special attention is paid to the main markers of the problem. The sequence of work with identified markers in the structure of psychological counseling is presented. At the end of the article, psychologists-consultants are invited to study the concept of “phubbing” and take special courses to form an effective strategy and select tools for solving this problem when interacting with clients. In conclusion, conclusions are drawn.

Keywords: *phubbing, psychological counseling, smartphone addiction, communication disorders, virtual addicts, phubbists, “accordion” in modern life.*

In the context of modern technogenic digital society, this article examines the phenomenon of phubbing, which manifests itself in the form of ignoring a partner in real communication in favor of using gadgets. In the studied foreign studies in the field of psychology, we consider phubbing as an addiction to mobile devices and social networks, which can lead to Internet addiction and problems of self-control. We consider people who exhibit this behavior to be called “fabbists.”

The concept of “phubbing” includes addiction to the use of mobile gadgets and social networks and is becoming a significant problem in our time. Thanks to scientific and technological progress, phubbing is becoming more common among various groups of the population, including people of different genders and ages. People are now having difficulty exercising self-control when using smartphones, which can have a negative impact on their psychological and emotional well-being. It is important to continue research and develop measures to prevent and overcome phubbing to ensure healthy and balanced use of technology in everyday life. [2]

Often, mobile devices take the place of real life, making us feel like we’ve learned something important through video rather than through verbal communication. One of the reasons for the fear of missing something important is the presence of a huge amount of information on the Internet - from serious news to short videos. Lagging behind up-to-date information can lead to the loss of interest of the social environment in a person, since he will not have common topics for discussion, which is sometimes called a “accordion” in modern life. Although phubbing may seem like a minor phenomenon, it actually poses a serious threat to both the individual and society as a whole. It’s ironic that people get distracted by their phones, trying to improve their social connections with people on the other end of the screen, while forgetting about the real people around them. [1]

The difference between the phenomenon of phubbing and virtual addictions is manifested in several aspects: with phubbing, there is no loss of the individual’s previous interests, while virtual dependent individuals experience a loss of interest in real life; phubbers do not exhibit negative physiological disorders characteristic of virtual addicts; Unlike people with virtual reality addiction, who limit their time in virtual reality, phubbers also pay attention to other aspects of life, which allows them to balance their interests and concerns. [3]

The significance of a psychologist’s interaction with clients suffering from phubbing is due to a number of factors that must be taken into account:

1. The fabricated individual is often unaware of his actions, which requires special attention and understanding from a specialist.
2. Phubbing can cause irreparable damage to various areas of a person’s life, which emphasizes the need for timely intervention and correction of this behavior.

3. Signs of phubbing may be difficult to distinguish from phone addiction, highlighting the importance of competently diagnosing and distinguishing between these conditions.

4. Phubbing often manifests itself through certain striking signs and symptoms, which requires a special approach and methods of working with a specialist.

5. In domestic psychology, research and study of the problem of phubbing is just beginning to gain momentum compared to the Western world, which emphasizes the importance of further scientific research in this area.

In November 2023, an empirical study was conducted on the connection between phubbing and communication disorders among students of the Surgut University. One of the diagnostic materials was the “Phubbing Scale” technique, the authors of which are: O. A. Ekimchik and T.L. Kryukova. This technique aims to measure the overall level of phubbing, the level of obsession with a smartphone and the level of communication impairment. The sample consists of 48 students (13 boys and 35 girls) of Surgut State University from 17 to 24 years old. The study was conducted online using the Google Forms online tool.

The Phubbing Scale (E. Karadağ, et al, 2015) includes 10 items that are rated on a 5-point Likert scale. Instructions: “You have 10 statements. Read them carefully and rate the situations that are currently happening in your life on a scale where 1 - never, 2 - rarely, 3 - sometimes, 4 - often, 5 - always [12].

The chosen methodology contains two subscales: firstly, “communication disruption” reflects the difficulty (interruption, distortion) in communicating with other people; secondly, “obsession” with the phone, meaning that the person is too dependent on using the smartphone and spends too much time on it. Also, the technique measures the overall level of phubbing.

This technique was translated by three experts from English into Russian, and a back translation into English was also made to assess the equivalence of statements. For psychometric testing, the following were used: reliability analysis, correlation analysis, Pearson coefficient, confirmatory factor analysis for structural modeling, parametric comparison methods: t - Student’s test for independent groups, t - Student’s test for dependent groups, included in the IBM SPSS Statistics 21.0 and IBM package SPSS AMOS.

When processing the study, we correlated the respondents’ responses by levels, where

Level 1 - “I have never encountered this phenomenon” (0-2 points); *Level 2* - “Rarely or sometimes encountered this phenomenon” (2-3 points); *Level 3* - “I constantly encounter this phenomenon” (3 points and above).

Based on this, we have compiled charts for each scale.

Diagram 1.
Analysis of the “Communication Impairment” scale diagram



The majority of subjects (81%) have a high level of communication impairment, which manifests itself through insufficient communication efficiency, misunderstanding of messages, conflict situations, misunderstandings, etc.

Diagram 2.
Analysis of the scale diagram “General level of phubbing”



Analyzing this scale, we see that half of the subjects have a high level of phubbing (50%), which manifests itself as the inability to look away from the phone while talking with an interlocutor or under other circumstances.

Conclusion of the study: based on the analysis of two diagrams, we see that the majority of subjects have a medium or high level of phubbing and a level of communication impairment. This confirms our assumption that these two criteria are closely related in people’s lives.

Taking into account the information presented above, we presented the possibility of psychological counseling. Also, the features were identified when a client approaches the problem of phubbing; it is extremely important to analyze the communication skills of the individual and his social integration, since these aspects are closely interrelated and can influence the nature and manifestation of this phenomenon.

To be successful in the work of a psychologist-consultant with communication disorders, it is advisable to implement an integrated approach, which uses various methods that have proven their effectiveness.

1. Psychological counseling when working with people suffering from communication disorders is aimed at understanding the value of communication and developing active listening skills.

2. Group therapy provides an opportunity to practice communication and social interaction skills in a supportive environment, which helps develop confidence and communication skills.

3. Social skills training is an important aspect of treatment for communication disorders and includes a variety of techniques to improve communication and develop interpersonal interactions.

4. Parental and family interventions play an important role in supporting children with communication and promoting successful social adaptation. It is important to teach parents to work with children with similar problems.

It should be noted that the effectiveness of methods may vary depending on the individual characteristics of each person. Therefore, it is important to carry out individual planning and adaptation of approaches to each specific case. Thus, timely seeking professional help from patients and their loved ones as part of the problem of phubbing markers will contribute to the successful overcoming of violations in communication and social adaptation, which will certainly affect the improvement of the quality of life.

References

1. Kozulina, N. S., Karachev A. Yu., Akhmedzyanova E.V. / *Phubbing is an unfavorable factor in the development of competencies among university students // Modern studies of social problems. 2016. No. 10 (66). pp. 56-65.*

2. Kryukova, T. L., Ekimchik O. A. / *Phubbing as a threat to the well-being of close relationships // Consultative psychology and psychotherapy. 2019. V. 27. No. 3. P. 61-76.* Kryukova, T. L., Ekimchik O. A. / *Phubbing as a threat to the well-being of close relationships // Consultative psychology and psychotherapy. 2019. V. 27. No. 3. P. 61-76.*

3. Kuropyatnik D.L., Kulibaba N.V. / *On the issue of preventing phubbing as a predictor of destructiveness of communication // Problems of modern pedagogical education. 2021. No. 71-3.*

DOI 10.34660/INF.2024.47.55.165

媒体艺术对塑造城市文化形象的影响和作用
**THE INFLUENCE AND ROLE OF MEDIA ART ON THE SHAPING
OF THE CITY'S CULTURAL IMAGE**

Tan Xizhu

Postgraduate

Moscow State University named after M.V. Lomonosov,

Moscow, Russia

内容摘要。 本文探讨了媒体艺术在当代社会中的作用及其对城市文化形象塑造的多方面影响。媒体艺术将现代科技与艺术创作相结合，以各种形式展现在城市的公共空间中，不仅为城市带来了新的文化活力，也改变了人们对城市文化的认知和体验。它提升了城市的文化品位和审美水平，促进了城市与世界的文化交流，带动了经济发展，尤其是旅游业及相关产业的发展。然而，媒体艺术在塑造城市文化形象方面的作用并非没有争议。人们关注的问题包括媒体艺术的前卫性和实验性可能与传统文化相冲突，其商业化倾向可能影响其艺术完整性。

总之，媒体艺术作为一种新兴的文化形式，与城市文化有着天然的融合性，是城市文化创新和发展的的重要途径。同时，也要注意媒体艺术可能带来的商业化倾向，努力保持其艺术性和创新性。这样，媒体艺术才能真正成为城市文化形象不可或缺的一部分，为城市文化发展注入新的活力。

关键词：媒体艺术 / 科学技术 / 艺术创作 / 城市文化经济 / 旅游业 / 文化影响

Abstract. *This paper emphasizes the important role of media art in shaping the cultural image of urban environments. By combining modern technology with artistic expression, media art introduces new cultural dynamics that transform urban cultural perceptions and experiences. It enriches urban aesthetics, facilitates global cultural exchanges and stimulates economic growth, especially in tourism and related industries. Despite its positive impact, media art's relationship with urban culture is also complex, facing criticism that it may conflict with traditional values and risks to its artistic integrity from commercialization. Ultimately, media art has become an important force for urban cultural innovation, and a balance needs to be struck between commercial impact and maintaining artistic authenticity in order to truly enrich the urban cultural landscape.*

Keywords: *Media Art Urban Cultural Image. Technological Integration. Artistic Creation. Cultural Vitality. Tourism Industry. Cultural Exchange. Cultural Influence.*

1 Significance of the Study

Media art, as an emerging art form, has already had a profound impact on the cultural image of cities globally. In today's society, media art has become an important driving force for urban cultural innovation, as well as a key factor in enhancing the image and attractiveness of cities. Through media art, cities can show their unique cultural charm and innovative spirit, thus enhancing their global popularity and influence. The influence and effect of media art on the shaping of city's cultural image are mainly reflected in the following aspects: Firstly, media art can enrich the cultural connotation of the city. Firstly, media art can enrich the cultural connotation of the city. Media art works often have a strong sense of the times and innovativeness, and through the display of media art, the city can present its deep cultural heritage and unique artistic style, thus enhancing the cultural connotation and taste of the city. Secondly, media art can promote the innovation and development of the city. As an emerging art form, media art cannot develop without the support and innovation of science and technology. Through media art, the city can attract a number of excellent science and technology enterprises and innovative talents, thus promoting the city's economic development and industrial upgrading. Again, media art can enhance the cultural influence of the city. Media art works often have a wide range of social attention and influence, through the display of media art, the city can attract more tourists and cultural activities, thus enhancing the city's cultural influence and popularity. Finally, media art can enhance the cultural confidence and sense of belonging of city residents. Media art works often reflect the living conditions and cultural pursuits of urban residents, and through the display of media art, urban residents can better recognize and understand their own cultural identity, thus enhancing their cultural confidence and sense of belonging. To summarize, media art has an important influence and role in shaping the city's cultural image. Through media art, cities can show their unique cultural charm and innovative spirit, attract more tourists and innovative talents, enhance the cultural influence and popularity of the city, and thus promote the innovation and development of the city.

1.2 Research Purpose and Content

As an emerging art form, media art has played an increasingly important role in the shaping of urban cultural image in recent years. This study aims to explore the influence and role of media art on the shaping of urban cultural image, with a view to providing useful reference and inspiration for the development of urban culture in China. The purpose and content of the study are, firstly, to sort out and define the concept of media art, and analyze its current development in China. Secondly, it explores the internal mechanism of media art on the shaping of urban cultural image, including the communication power, innovativeness and interactivity of media art. Then, through the case study method, representative urban

media art projects are selected to analyze the specific role of media art in the shaping of urban cultural image. Finally, in view of the current situation and problems in the development of urban media art in China, corresponding countermeasures and suggestions are put forward to provide reference for the shaping of China's urban cultural image. This study hopes to provide theoretical support and practical guidance for the development of China's cities in the field of media art through an in-depth discussion of the relationship between media art and the shaping of the city's cultural image.

2. Concepts and Classification of Media Arts

2.1 Definition and Development History of Media Art

Media art, an innovative fusion of media technology and artistic creation, spans diverse forms like digital, installation, interactive, and virtual reality art. Rooted in digital technology, it leverages software and hardware to craft unique expressions across images, sound, text, and animation. Its evolution from the 1950s through experimental, digital, and network stages reflects a journey of technological exploration and artistic expansion. Media art stands out for its technical ingenuity, artistic innovation, cultural resonance, and interactive experiences, profoundly influencing urban cultural imagery with its dynamic expression and engagement. This art form's continuous evolution underscores its significant role in shaping contemporary cultural landscapes and fostering deeper societal connections through technology and creativity.

2.3 Classification of Media Art

As an emerging art form, media art has been widely noticed and applied worldwide. In the process of shaping the city's cultural image, media art has an important role and influence. There are many classifications of media art, and the following will focus on several common forms of media art and their influence and role in shaping the city's cultural image. The first thing we need to understand is digital media art. Digital media art is a new type of art based on digital technology and combining a variety of art forms. It can include animation, game design, virtual reality and other forms. Digital media art in the shaping of the city's cultural image can create a unique city image through the combination of creativity and technology, attract more people and attention, and enhance the city's popularity and reputation. Secondly, it is public art. Public art refers to art creation and display in public space, including street art, installation art, public sculpture and so on. Public art can break the monotony and ordinariness of urban space, increase the artistic atmosphere and cultural heritage of the city, and improve the quality of life and aesthetic level of urban residents. Again, it is new media art. New media art is a form of art based on the Internet and digital technology, including network art, interactive art, virtual art and so on. New media art can quickly form topics and influence through the dissemination of network platforms, and positively pro-

mote the city's cultural image. Finally, it is experimental media art. Experimental media art is a kind of art form for the purpose of exploration and innovation, including experimental movies, experimental music, digital art and so on. Experimental media art can provide fresh elements and perspectives for the shaping of the city's cultural image and increase the city's artistic charm and attractiveness. To summarize, there are many classifications of media art, and each kind of media art has its unique characteristics and charm. They each play an important role and influence in shaping the cultural image of the city. Through the rational use and innovative development of these media art forms, new vitality and connotation can be injected into the cultural image of the city, and the competitiveness and attractiveness of the city can be enhanced.

3. Connotation and value of urban cultural image shaping

3.1 Connotation of urban cultural image

Urban cultural image is the spiritual symbol of the city, which reflects the history, tradition, values and spiritual outlook of the citizens. The connotation of urban cultural image is rich and diverse, including the city's historical and cultural heritage, urban spatial layout, urban architectural style, urban public service facilities, urban environmental quality, urban cultural activities and other aspects. The historical and cultural heritage of a city is the core connotation of the city's cultural image. The more historical and cultural heritage a city has, the richer its cultural heritage is and the more distinct its cultural image is. Urban historical and cultural heritage includes ancient buildings, historical neighborhoods, historical sites, historical parks, etc., which are the witnesses of urban history and important carriers of urban cultural inheritance. Urban spatial layout and urban architectural style are also important connotations of urban cultural image. Different cities have different spatial layouts and architectural styles, which reflect the differences in geographic environment, historical traditions and citizens' lifestyles. Urban spatial layout includes urban master plan, urban neighborhood layout, urban public space layout, etc., which determine the spatial form of the city and the quality of life of the citizens. Urban architectural style includes ancient architecture, modern architecture and traditional architecture, etc., which are important reflections of the city's cultural image. Urban public service facilities and the quality of urban environment are also one of the connotations of the city's cultural image. Urban public service facilities include facilities for education, medical care, culture, sports, transportation, etc. They are an important part of urban life and a reflection of the city's cultural image. The quality of urban environment includes air quality, water quality, greening, city appearance and other aspects, which is directly related to the quality of life of the citizens and the image of the city. Finally, urban cultural activities are an important connotation of the city's cultural image. Urban cultural activities include cultural festivals, cultural exhibitions, cultural perfor-

mances, cultural exchanges and so on, which are an important part of urban culture and a reflection of the city's cultural image. Urban cultural activities can not only enrich the spiritual and cultural life of citizens, but also enhance the cultural taste and image of the city. In general, the connotation of urban cultural image is multi-faceted, which includes the city's historical and cultural heritage, urban spatial layout, urban architectural style, urban public service facilities, the quality of the urban environment, urban cultural activities and other aspects. A city with a good cultural image can not only attract more people, logistics and information flow, but also enhance the competitiveness of the city and promote the development of the city.

3.2 The value of urban cultural image

The value of urban cultural image is that it can reflect the history, culture and characteristics of a city, which is an important part of the city's soft power. The value of urban cultural image is reflected in the following aspects: Firstly, urban cultural image has recognition value. Every city has its unique historical and cultural background, which is reflected in the city cultural image, enabling people to quickly recognize and understand the city. For example, Beijing's urban cultural image is represented by the Forbidden City, Tiananmen Square and other historical buildings, which reflects its long history and cultural heritage; while Shenzhen's urban cultural image is centered on modernization and innovation, which shows its youthful and energetic city characteristics. Secondly, urban cultural image has communication value. Urban cultural image can be spread through various media to enhance the city's popularity and reputation. A unique and attractive urban cultural image can attract more tourists and investment and promote the development of the city. For example, Chengdu has successfully attracted a large number of tourists and promoted the development of tourism through the city's cultural image of "Land of Heavenly Capital". Again, urban cultural image has cohesion value. City cultural image can unite the public's emotions, enhance the public's sense of identity and sense of belonging to the city. A city with a good urban cultural image can inspire the pride of the citizens, prompting them to participate more actively in the construction and development of the city. For example, Shanghai's urban cultural image of "Hai Nabai Chuan, the pursuit of excellence" as the slogan, inspired the citizens' sense of pride and the spirit of upward mobility. Finally, urban cultural image has innovative value. Urban cultural image is not static, with the development of the times and changes in the city, urban cultural image also need to be constantly innovated and updated. This kind of innovation can not only make the city cultural image to maintain vitality, but also can promote the innovation and development of the city. For example, Hangzhou has successfully attracted a large number of Internet enterprises and talents and promoted the development of the local economy by creating the city cultural image of "Internet

City”. To sum up, the value of urban cultural image lies in its ability to reflect the city’s characteristics and history, and its functions of identification, dissemination, cohesion and innovation, which is of great significance in enhancing the soft power of the city and promoting the development of the city.

4. The Influence and Role of Media Art on the Shaping of Urban Cultural Image

4.1 Innovating and Promoting Urban Cultural Image through Media Art Practices and Dissemination

Media art, as a distinctive and emerging form of art, plays a pivotal role in both shaping and promoting the cultural image of modern cities. Its innovative expressions and unique charm not only offer new aesthetic experiences but also breathe life into the cultural innovation and development of urban environments. Media art distinguishes itself by encouraging audience participation and interaction, thereby breaking away from the confines of traditional art forms and integrating more deeply into everyday life. This integration enriches the cultural landscape of cities, making them more diverse and appealing.

Media art’s practical impact on urban cultural images is significant. It often uses the city itself as a canvas and theme, reflecting its spirit and characteristics through artistic endeavors that resonate with both residents and visitors. This not only enhances cultural enjoyment but also boosts tourism and the city’s reputation. Furthermore, the innovative practices within media art open up new avenues for cultural development, allowing cities to explore and preserve their cultural heritage while embracing and integrating global cultural elements, thus crafting a unique cultural identity.

The dissemination and promotion of media art further amplify its influence on urban culture. By showcasing the city’s cultural nuances and innovation through various media art forms, it strengthens the city’s cultural influence and attracts investment and talent, contributing to the economic vitality of the cultural sector. Moreover, media art’s global appeal and accessibility can elevate a city’s international image, drawing in tourists and investors from around the world.

Additionally, media art fosters a sense of belonging and pride among city residents by connecting them more closely to their urban environment and culture. This connection not only enhances residents’ understanding and appreciation of their city but also stimulates cultural creativity and innovation.

In summary, media art significantly impacts the aesthetic shaping and promotion of urban cultural images. Its role in enhancing cultural diversity, economic development, international reputation, and community engagement underscores the need for cities to support and promote media art actively. By doing so, media art can continue to be a vital force in the ongoing cultural innovation and development of urban spaces.

4.2 Aesthetic Enhancement and Sustainable Development of Urban Cultural Image through Media Art

Media art, as a contemporary and evolving art form, significantly influences the urban cultural landscape, offering fresh aesthetic perspectives and fostering innovation within cityscapes. It diversifies expression through digital images, virtual reality, and other emerging technologies, enhancing urban aesthetics and broadening the public's aesthetic horizons. Media art transcends traditional artistic boundaries, integrating various art forms to create unique works that contribute to the city's artistic atmosphere and innovative growth. Furthermore, it strengthens a city's cultural soft power, boosting international visibility and fostering cultural exchanges by attracting global audiences and artists through exhibitions and festivals.

Media art's interactivity promotes community engagement, facilitating cultural exchange and understanding among diverse urban populations. It plays a crucial role in shaping cities' cultural images, making them more vibrant and globally competitive by leveraging its inclusivity, innovation, and interactivity. The sustainable development of media art within urban environments involves the creation and display of artworks, integration with urban spaces, innovation and research, and popularization through education. These efforts not only enhance the city's cultural charm but also its scientific, technological, and creative capacities.

In summary, media art is pivotal in guiding the aesthetic development and sustainable growth of urban cultural images. Through its unique expressions and interactive capabilities, it enriches urban life, encourages cultural diversity, and positions cities on the global stage as centers of cultural innovation and exchange. Future strategies should focus on harnessing media art's potential to further shape vibrant and inclusive urban cultural landscapes.

Conclusion

In today's society, media art, as an emerging form of culture, has far-reaching impact and influence on the shaping of the city's cultural image. Media art not only brings new cultural vitality to the city, but also provides a new aesthetic experience for city residents, further enhancing the cultural taste and image of the city. First of all, media art can enrich the public cultural space of the city. Through the integration of media art, the public space of the city becomes more vivid and interesting, attracting the attention of a large number of citizens and tourists. Media art works are often strongly interactive and participatory, enabling the audience to participate more actively in art creation and appreciation, thus improving the utilization efficiency and cultural value of public space. Secondly, media art helps to enhance the city's cultural innovation ability. As an emerging art form, media art requires continuous exploration and innovation. This innovative spirit is not only reflected in the media art itself, but also can affect the cultural innovation atmos-

phere of the whole city. Through the promotion of media art, the city's cultural innovation will be more active, further enhancing the city's cultural soft power. Again, media art can promote the development of cultural industry in the city. As a cultural industry with wide market prospects, media art has an important role in promoting the economic development of the city. The development of media art industry will drive the rapid development of related industry chain and bring more economic benefits and employment opportunities for the city. At the same time, media art can also attract more cultural and creative talents, providing strong talent support for the city's cultural innovation and development. Finally, media art helps to enhance the cultural influence of the city. Media art works often have unique aesthetic value and wide dissemination power, which can attract more attention and discussion. Through the dissemination of media art, the cultural image of the city will be more distinctive and three-dimensional, further enhancing the cultural influence of the city. To summarize, media art's shaping of the city's cultural image has the influence and effect of enriching public cultural space, enhancing cultural innovation ability, promoting the development of cultural industry and improving cultural influence. In the process of urban development, the role of media art should be fully utilized as an important means and way to enhance the cultural image of the city.

References

1. *Bianchini, F. and Parkinson, M. (Eds) (1993) Cultural Policy and Urban Regeneration: The West European Experience. Manchester: Manchester University Press.*
2. *Bram, B. and Ra, L. (1996) Tourism marketing images of industrial cities, Annals of Tourism Research, pp. 201-221.*
3. *Butler, R.W. (1990) The influence of the media in shaping international tourist patterns, Tourism Recreation Research, 15(2), pp. 46-53.*
4. *Evans, G. (2003) Hard-branding the cultural city-from Prado to Prada International Journal of Urban and Regional Research, 27(2), pp.417-440.*
5. *Hannigan, J. (1998) Fantasy City: Pleasure and Profit in the Postmodern Metropolis. London: Routledge.*
6. *Hannigan, J. (2003) Introduction to IJURR Special Issue from the Symposium on Branding, the Entertainment Economy and Urban Place Building, International Journal of Urban and Regional Research, 27(2) pp. 352-360.*
7. *Lynch, K. (1960) The Image of the City. Cambridge, MA: MIT Press.*
8. *R. Cybriwsky Changing patterns of urban public space. Observations and assessments from the Tokyo and New York metropolitan areas Cities(1999)*

DOI 10.34660/INF.2024.63.41.166

时尚行业的区块链：NFT技术的实践、前景与挑战
**BLOCKCHAIN IN FASHION INDUSTRY: PRACTICE, PROSPECTS
AND CHALLENGES OF NFT TECHNOLOGY**

Volodeva Natalya Aleksandrovna

Candidate of Art Criticism, Associate Professor

Temirbek Zhurgenov Kazakh National Academy of Arts

抽象的。本研究旨在分析区块链和 NFT 技术在时尚行业的实际实施，确定其使用前景，并确定参与者在此过程中面临的关键问题。已经确定，区块链技术（包括 NFT）在时尚行业的使用有可能显著提高生产的透明度以及以数字和物质形式呈现的设计对象的真实性，改变奢华时尚的销售模式 产品并传播该领域的创新。行业。区块链技术，特别是 NFT 的积极实施，有望对商业模式、品牌与消费者之间的互动体验以及数字艺术和设计对象的感知特征产生重大转变。与此同时，NFT 的使用也伴随着一系列挑战，包括区块链技术的网络安全、版权保护和环境友好等问题。

关键词：时尚产业、服装设计、区块链、NFT、数字服装、虚拟时尚、时尚数字化、数字化转型。

Abstract. *This study is aimed at analyzing the practical implementation of blockchain and NFT technologies in the fashion industry, identifying prospects for their use, as well as identifying key problems faced by participants in this process. It has been established that the use of blockchain technology, including NFTs, in the fashion industry has the potential to significantly increase the level of transparency of production and authenticity of design objects presented in both digital and material form, change the sales models of luxury fashion products and spread innovation in this sector. industry. The active implementation of blockchain technologies, in particular NFTs, promises a significant transformation of business models, the experience of interaction between brands and consumers, and the characteristics of the perception of objects of digital art and design. At the same time, the use of NFTs is accompanied by a number of challenges, including issues of cybersecurity, copyright protection and environmental friendliness of blockchain technologies.*

Keywords: *fashion industry, costume design, blockchain, NFT, digital clothing, virtual fashion, fashion digitalization, digital transformation.*

The last decade has been marked by dramatic changes that have affected all spheres of human life. Digitalization, virtualization, cloud computing and blockchain - these technologies have deeply penetrated everyday life. In the fashion industry, this process can be described as intense digital transformation. The purpose of this scientific research is to conduct a comprehensive analysis of the practice of using blockchain technologies, in particular the use of non-fungible token (NFT) technology in the fashion industry. Key objectives include exploring case studies of how NFTs are being used in the industry, identifying opportunities for virtual fashion, and exploring the challenges and limitations facing fashion brands. Analysis of these aspects will reveal the potential of blockchain technologies to improve the transparency of the production process and establish the authenticity of finished products, identify new prospects for the sale of luxury segment design objects through NFT tokens, and establish the impact of NFTs on the process of digital transformation of the fashion industry.

Blockchain is a decentralized and distributed digital database (registry) in which information is stored in the form of a chain of blocks. Each block contains a record of transactions, the blocks are connected to each other using cryptography methods, forming a continuous chain. The main characteristics of blockchain include decentralization, transparency, immutability, security, and automation through smart contracts.

The practice of using blockchain in the fashion industry includes several key aspects. First of all, blockchain technologies make a significant contribution to the formation of a sustainable fashion industry system. The technology allows you to create and track a reliable and detailed history of the origin of a fashion product and the raw materials from which it is made, control the conditions of production and storage of the product, and its movement during transportation from the manufacturer to the end consumer. This increases the transparency and reliability of the process. Blockchain technologies help in the fight against counterfeit products by ensuring the authentication, authenticity and quality of goods. The latter is especially important since the value of clothing and accessories often depends on their uniqueness and the prestige of the brand. NFTs make it possible to integrate the fashion industry into the Web 3.0 system, the main postulate of which is the interaction of all participants in the process through blockchain technologies.

An important stage in the development of NFTs was the emergence of ether (Ethereum) in 2015. Ethereum is a blockchain platform on which you can create smart contracts and various decentralized applications. Smart contracts are computer programs that automatically execute the terms of a contract once they have been met. Thanks to the flexible capabilities of Ethereum smart contracts, it has become possible to create not only exchangeable tokens (as is the case with cryptocurrencies), but also tokens with unique characteristics - NFTs. Thus, the

concept of NFT (Non-Fungible Token) arose in the context of the development of blockchain technologies and cryptocurrencies. Although the first steps in the development of these technologies were taken in the early 2010s, the popularity of NFTs in various fields has begun to gain momentum in the past few years.

NFTs are digital tokens that use blockchain technology to confirm the uniqueness and authenticity of digital assets or objects. The guarantee of security, non-fungibility and safety of NFT tokens is ensured by the very existence of the network, since the data is distributed among users and cannot be lost. Key characteristics of NFT: uniqueness, authenticity, ownership, applicability. Unlike cryptocurrencies such as Bitcoin or Ethereum, which are fungible and equal in value, NFT tokens are unique objects, each with its own unique identifier, characteristics and metadata. Thanks to this, it becomes possible to ensure the authenticity and integrity of digital assets. The owner of an NFT has ownership of the digital object or asset that the specific token is associated with. Digital objects represented in the form of NFTs include works of digital art, trading cards, three-dimensional models of various objects, including works of design.

NFT technologies quickly gained wide recognition and found application in various fields of human activity, including in the field of art and culture: fine arts, illustration, music, video games, design, and the fashion industry. NFT objects have become an object of interest for both collectors and investors. Various use cases for NFTs are generating active public discussions about the future of digital property and art.

One of the promising opportunities of blockchain technologies is their use to create digital collections of clothing models in NFT format. This is shaping new practices in the field of digital marketing in the fashion industry, interaction between brands and audiences, and the creation of unique digital assets, including virtual clothing and accessories.

The first examples of NFTs came in the form of digital trading cards in the game CryptoPunks, released in 2017. Each pixel artefact (10,000 cards were produced with a specific set of attributes) in CryptoPunks represented a unique token, making them coveted collectibles. However, the real explosion of interest in NFTs came in 2021, when a digital piece of art called “Everydays: The First 5000 Days” by American artist Beeple was auctioned at Christie’s for \$69.3 million. The painting became one of the most expensive works of art ever sold in the NFT format, and the case itself demonstrated the potential capabilities of the technology in the sale of luxury goods, art, and collectibles [1].

The first successful cases of using NFTs in the fashion industry include the implementation by the Under Armor brand of a collection of cross-platform digital sneakers, Genesis Curry Flow NFT. The collection, which consisted of 2,974 pairs of sneakers in five designs of varying rarity, was sold out in record time. The suc-

cess of the project was largely due to the choice of NBA player Stephen Curry as an ambassador, as well as the versatility of the digital shoes, which could be worn on your avatar in games such as Decentraland, The Sandbox and Gala Games [2].

Designer Terrence Zhou, known as Infinite, founder of fashion label Bad Binch TongTon, created the first NFT collection in March 2022 and presented it on the platform The Dematerialised. Here's what the designer says about his experience with NFTs: "Fashion as a physical medium has many limitations. Now fashion has benefited from the way NFTs have been created and people are developing an art ecosystem. People want to express themselves online and it's a huge part of our lives now. We're looking for authenticity online... For me, NFTs are a game changer in building our own fashion community and reclaiming the concept of ownership." [3] The author describes his NFT collection as a fashion experience created for the mind, not the body, thereby highlighting the peculiarities of digital fashion perception.

One of the most common examples of using NFTs in the fashion industry is when the asset is a digital twin of a real product, that is, the product exists in a phygital format (the term "phygital" is derived from two English words, physical and digital). Figitual objects provide brand clients with the opportunity to express themselves not only in the real but also in the virtual world, which was not the case before. Owning a digital twin of a product further increases the customer's sense of ownership of the brand's spirit and image.

Putting a collection up for sale for a limited time on the market is called a drop. Among the first brands to take advantage of the opportunity to trade digital luxury goods at auction is Dolce & Gabbana [4]. In September 2021, nine unique NFTs from the Collezione Genesi collection were put up for auction, in which only approved bidders were allowed to participate, once again emphasizing the exclusivity of owning this product. The authenticity of the digital objects and the security of the transaction were confirmed by the fact that the auction took place on the Polygon platform, and the NFT had 1 layer of Ethereum confirmation (layer 1 Ethereum).

Four of the auction items were exclusively digital: "The Impossible Tiara," a crown crafted from red emeralds and turquoise Paraiba tourmalines, and three men's blousons, "The Impossible Jackets," inspired by the art of Venice, crafted from a shimmering material. Baroque era.

According to the designers, transferring an object into the virtual world and "translating" it into digital language destroys the boundaries between two realities [5]. Each of the NFT objects was presented for sale as a package, including digital (and physical - if available) versions of the product, its original sketches from Dolce & Gabbana, access rights to future shows of the brand's haute couture collections, the possibility of a two-week exposition of all items in the flagship Dolce

& Gabbana store in Milan with the name of the collector, a two-week demonstration in any Dolce & Gabbana store of the owner's choice and a private tour of the Dolce & Gabbana "Alta Moda" atelier in Milan. Buyers of digital objects received the same privileges as owners of phygital items.

Thanks to this NFT adaptation from Dolce & Gabbana, luxury fashion is already undergoing a dramatic transformation. Expensive fashion products are most often bought not for their special aesthetic qualities and ergonomics, but in order to make their status clear, to indicate their belonging to the elite, and to define their uniqueness. In a case in point, the owner of token #6046 in the CryptoPunks game, valued at \$9.5 million, refused to sell it, considering the price insufficient, and also stating: "I am very closely associated with this NFT, and its sale will affect my online -identity" [6].

The value of digital luxury goods, like real objects, depends on their rarity and scarcity in the market, which turns NFTs into a type of collectible item, the same in status as works of art, jewelry, and antiques.

Brands are also using NFTs as an opportunity to reignite interest in their archival collections and give them new life, this time in the digital space. Thus, in 2022, the Paco Rabanne brand digitized iconic items that were already "unwearable, with the goal of immortalizing them in the history of world fashion in a virtual format. Based at Selfridge, a luxury clothing store, 12 brand models from various collections of the 1990s were presented as NFTs, made in a recognizable style - these are modular kinematic structures assembled from metal or plastic elements, and complex frame objects. The sales limit for each digital model was 56 copies, which is quite a lot by NFT standards. Unlike other sites, Paco Rabanne models could only be purchased in a real Selfridge store, and only for real money, and with the purchase there was a chance to receive not only a digital copy of the product, but also the original. This sales format, as conceived by Selfridge, was supposed to increase the flow of store visitors and create points of intersection between digital and material fashion. At the same time, excluding cryptocurrencies from the purchase process made the process easier for most buyers [7].

A number of fashion brands are using NFT technology to create transparent and secure loyalty programs, incentives and rewards for consumers, personalized commercial offers, and to track the effectiveness of marketing campaigns. Examples of this practice include the Louis Vuitton Via NFT project. Thus, the Louis Vuitton leather varsity jacket, first presented on the catwalk in the fall-winter 2024 collection, was then released for sale in NFT format. The digital copy of the brand's signature product, the Treasure Trunk, is available only to preferred customers and, to further enhance its value, is non-transferable as it is released in SBT format. SBT (Soulbound tokens) are unique non-financial tokens that are not transferable, they are issued in a single copy and are forever tied to one block-

chain address. According to the company's vision, the Treasure Trunk NFT will give owners access to the VIA Louis Vuitton NFT store portal, which will act as a gateway for those wishing to purchase other digital items from the brand, and each collectible item from the new collections will provide buyers with exclusive access to its physical analogues [8]. Thus, through VIA, Louis Vuitton has outlined its innovative approach to the concept of ownership and product exclusivity.

Especially for privileged users, the Louis Vuitton brand, together with designer and musician Pharrell Williams, released an NFT version of the iconic bag with the "Speedy bag" monogram. And in the future, the brand plans to continue the practice of selling luxury NFT objects.

The mixing of two realities, physical and digital, today consists not only in the creation of digital clothing and accessories, but also in the use of artificial intelligence technologies already at the stage of creating a fashion product. Thus, in July 2023, the Gucci fashion house presented a collection of NFTs for sale on the digital platform of the Christie's 3.0 auction house. The auction was presented under the title "Frequencies of the Future: Research in Generative Art and Fashion." The collection, the result of a creative collaboration between real people and generative neural networks, included 21 NFTs from AI artists Claire Silver and Emily Xie, and artificial intelligence decentralized autonomous artist Botto, who creates works of art based on collective feedback from the community [9]. The design of the objects presented by Gucci in this NFT line was based on the style of branded textiles and the famous line of "Bamboo 1947" bags with a recognizable bamboo handle. According to the idea, this project was designed to promote the development of creativity through the synthesis of art, fashion and technology, in particular generative systems, and to encourage both artists and the fashion industry to use Web 3.0 technologies.

According to Sebastian Sanchez, Christie's Digital Art Sales Manager, "The results that the authors have created range from the abstract to the literal and are absolutely breathtaking, changing the way we think about the use of algorithms and data to advance human creativity in various fields. My goal with this auction is to show the intersection, right now it's a spectrum. There are so many generative artists who do textile research, clothing research, pattern research, and then there are people who actually create literally 3D clothing, and what we present falls somewhere in that range."

Another interesting project related to the creation of virtual clothing through NFT is a collection of sportswear created as a result of a collaboration between the Adidas Originals and Prada brands. The release, titled "Re-Source", was inspired by the "Re-Nylon" line. Minimalistic clothes and shoes were made from special nylon - a product of recycling plastic waste. In this case, the buyer was offered real products, not just digital copies, and NFT tokens were used to confirm ownership.

The sales took place in the form of an auction, and part of the proceeds from the sale of NFTs were donated to charity. Thus, Adidas and Prada have outlined a course towards commitment to the values of sustainable fashion and digital transformation of their business [10].

Of particular interest in the context of the spread of NFT objects among the wider population are collaborations between fashion brands and gaming companies. Burberry was among the first luxury brands to introduce its products to the MMO (Massively Multiplayer Online Game) market. In partnership with Mythical Games, specifically for the Blankos Block Party game, the Burberry brand released its own branded in-game NFT accessories, including: a jetpack, armbands, pool shoes, which players can put on any Blanko character that they have. Not only accessories and clothing are sold, but also characters with branded attributes: a limited edition shark named Sharky B, decorated with the new summer Burberry TB monogram and inspired by the design of the company stores (retail showcase) “Animal Kingdom”. The character NFT token can also be purchased, upgraded, and sold on the Blancos Block Party Marketplace. In this way, the Burberry brand and the game developer create an entire online universe filled with fashion products, attractive to many players due to a sense of involvement in the brand’s values and a sense of elitism.

“For us, gaming is a unique space to test, explore and pilot digital innovations that embody our values and celebrate creativity in our communities. Partnering with Mythical Games seems like a natural next step, moving beyond our own games and bringing the Burberry universe into an established environment. It has been a fantastic experience to work so closely with Mythical Games to bring this new approach to customer experience to life,” said Rod Manley, Burberry Marketing Director [11].

This model of using NFTs is also associated with the concept of the formation and development of so-called metaverses. The Metaverse is a shared virtual spatial environment that merges physical and digital realities, where users can interact in real time through their avatars. The metaverse should be cross-platform, combining various virtual worlds and spaces, including gaming, work, and education, creating a single ecosystem where users are able to move between different applications and platforms. Other features of the metaverse include interactivity, its own economy, user identity and the ability to modify the avatar that represents him, with the last two factors directly related to blockchain and NFT technologies. At the moment, there is no need to talk about the existence of a single metaverse, but there is a fairly large number of autonomous cross-platform virtual spaces that are popular among certain social groups, most often among gamers. Thus, “Adidas Metaverse” works in collaboration with the “Bored Ape” yacht club, Gmoney NFT and PUNKS Comic. Nike, Adidas, Victoria’s Secret, Tommy Hilfger, Zara

and many others have applied to register a brand and distribute their media objects in the metaverse using blockchain technologies.

In turn, Adidas released an NFT collection called “Into the Metaverse”, which gives buyers access to an exclusive fan club. NFT holders will be able to purchase exclusive goods and make decisions about what products and experiences Adidas will release in the future [12].

The sportswear brand Nike owns such an innovation in the field of blockchain fashion as the “breeding” of virtual products. In December 2019, the Nike brand received a patent for “CryptoKicks”, which refers to the combination of a non-fungible token with the release of physical shoes. After making a purchase from a registered seller, the buyer receives a corresponding NFT, which uses blockchain technology to verify authenticity and ownership. If the item is subsequently sold or traded, the digital token also changes hands. Also, the “CryptoKicks” patent allows you to connect two pairs of virtual sneakers, changing the design, and get a new pair of virtual shoes, which will receive its own NFT token, which, in turn, can be sold [13].

Among the factors potentially hindering the active development of the use of NFT technologies in the industry are reasons of a technical, legal and sociocultural nature, including: high transaction costs, uncertainty of the legal status of digital assets and insufficient understanding of the principles of operation and benefits of the technology on the part of consumers. You should also take into account the limited market of potential buyers of NFT goods due to digital and economic inequality. In light of the above, we can come to the conclusion that blockchain and NFTs are more applicable and in demand in terms of ensuring the quality and authenticity of goods than in the field of selling digital luxury goods. Further research in this direction in order to solve the above problems will contribute to the successful integration of blockchain and NFT technology into the fashion industry.

Among the reasons why blockchain technologies are criticized are the high resource intensity of the technical support of the process, which requires a significant amount of electricity (which causes significant harm to the environment) and places special demands on computer resources, as well as leading to a quick exit from building video cards.

In addition, the integration of blockchain technologies into the business systems of fashion brands requires significant investments and the establishment of cooperation with blockchain platforms. Ensuring ease and convenience of payments is also a significant problem: few Internet users are owners of cryptocurrency wallets, which significantly reduces the number of potential customers. The high cost of NFT tokens compared to luxury goods is also a limiting factor.

A separate problem is compliance with copyright when creating and selling NFT tokens. For many creators and users of NFT objects, this issue is contro-

versial. A case in point is the legal dispute between Mason Rothschild, the Los Angeles-based artist and creator of the “MetaBirkin” NFT, and Hermes, a French company that has been making physical Birkin bags for nearly 40 years. It should be noted that Rothschild approached the creation of the NFT object creatively, changing the textures of the bag - from a zebra pattern to an image of Van Gogh’s *Starry Night*. Otherwise, the design, however, remained unchanged, Rothschild’s contribution to the artistic appearance of the product was extremely insignificant, and the NFT name contained an explicit reference to the original. As a result, the court concluded that Rothschild had infringed the Hermes trademark by borrowing the basic shape and style features of the original Birkin bag for commercial gain, but Rothschild himself strongly disagreed with this conclusion and filed an appeal. This case leaves open the question of determining the authorship of design objects presented in the NFT format [14].

Conclusions. Blockchain technologies and NFTs used in the fashion industry have been found to ensure supply chain transparency, ensure product authenticity, and improve consumer interaction by increasing their level of trust in brands.

In light of the fact that many fashion brands are successfully using NFT technology to create digital collections of clothing designs, sell virtual replicas of real goods or authenticate products, it is clear that these technologies are already driving the development of the fashion industry.

The practice of using NFTs in the fashion industry includes the following aspects:

- NFT can be used to authenticate and confirm the authenticity of fashion products. In this case, each product is associated with a unique digital token, which, thanks to the features of blockchain technologies, guarantees its origin and authenticity.

- Selling digital collections, unique luxury items and rights to use virtual goods allows brands to monetize their digital assets at a cost that is incomparable to the production of real things and expand their business beyond the traditional sale of goods in physical format. Thus, additional sources of income are created through NFTs.

- In response to the introduction of NFT technology, changes in fashion trends and consumer preferences are expected, including increased interest in digital collections of clothing and accessories, unique and new formats of interaction with brands, and attitudes towards NFTs as digital assets for investment.

The study points to the potential for growth in the use of NFT technology in the fashion industry in the future, driven by the prospect of improved blockchain infrastructure, evolving standards and regulation, as well as increased consumer awareness of the capabilities and benefits of NFT technology and the adoption of digital fashion culture.

References

1. *CryptoPunks, or “Rolex” in the NFT world // Crypto on vc.ru*. 2021. URL: <https://vc.ru/crypto/339473-cryptopunks-ili-rolex-v-mire-nft?ysclid=lvzmrzef8s401621623> (Date of access: 05/18/2024).
2. *Genesis Curry Flow // currybrand.com*. 2024. URL: <https://2974.currybrand.com/curry/drop> (Date of access: 05/18/2024).
3. *Maya Menon. “I like to design with impossibilities in mind”: Terrence Zhou on designing for form over function and staying true to his vision // Vogue*. 2022. URL: <https://vogue.sg/terrence-zhou-bad-binch-tong-tong/> (Date of access: 05/18/2024).
4. *Dolce & Gabbana launches its first NFT collection, “Collezione Genesi” // Medium*. 2021. URL: <https://medium.com/alpex/dolce-gabbana-launches-its-first-nft-collection-collezione-genesi-38801b995292> (Date of access: 05/18/2024).
5. *Dolce & Gabbana open the world of haute couture NFT // crypto on vc.ru*. 2021. URL: <https://vc.ru/crypto/288012-dolce-gabbana-otkryvayut-mir-haute-couture-nft?ysclid=lw0sn2z5ai700050755> (Access date: 05/18/2024).
6. *The investor refused a record 9.5 million dollars for his NFT // CryptoDNES*. 2021. URL: <https://cryptodnes.bg/ru/investitor-otkaza-rekordnite-9-5-miliona-za-svoeto-nft/> (Access date: 05/18/2024).
7. *Paco Rabanne revives his archival dresses in NFT format // World Fashion Channel*. 2022. URL: <https://wfc.tv/ru/stati/o-mode/paco-rabanne-2022/> (Access date: 05/18/2024).
8. *Kuzmicheva A. Louis Vuitton will release “hundreds” of non-transferable NFTs for €39 thousand // RBK Trends*. 2023. URL: <https://www.rbc.ru/crypto/news/647f088e9a7947b1ecb1515d?ysclid=lv0ota99yp667364378&from=copy> (Date of access: 05/18/2024).
9. *Christie’s and Gucci team up to create an NFT collection // Binance Square*. 2023. URL: <https://www.binance.com/ru/square/post/795572> (Date of access: 05/18/2024).
10. *Adidas and Prada released a joint NFT collection Re-Source // World Fashion Channel*. 2022. URL: <https://wfc.tv/ru/stati/o-mode/adidas-prada-nft/> (Date of access: 05/18/2024).
11. *Burberry announces Blancos Block Party collection // Yahoo.Live*. 2021. URL: <https://translated.turbopages.org/burberry-nfts-mythical-games-blankos-063414804.html/> (Date accessed: 05/18/2024).
12. *Adidas enters the Metaverse with NFT partnerships // Future on vc.ru*. 2021. URL: <https://vc.ru/future/329057-adidas-vhodit-v-metavselennuyu-s-nft-partners-tvami?ysclid=lwb30y32tw438412176> (Access date: 05/18/2024).

13. *Nike's CryptoKicks NFTs Could Introduce "Sneaker Breeding" to the World // Boardroom*. 2021. URL: <https://boardroom.tv/nike-cryptokicks-sneaker-offspring/> (Date of access: 05.18.2024).

14. *Case Review: Hermès International v. Rothschild // Center for Art Law*. 2024. URL: <https://itsartlaw.org/2024/05/07/case-review-hermes-v-rothschild/> (Date of access: 05/18/2024).

DOI 10.34660/INF.2024.22.81.167

Engleria (Leonova) Tzvel 组的交叉杂交种。 (Typha l., 香蒲科) 分布于顿河三角洲

INTERSECTION HYBRID OF SECTION ENGLERIA (LEONOVA) TZVEL. (TYPHA L., TYPHACEAE) IN THE DON DELTA

Krasnova Alla Nikolaevna

*Doctor of Biological Sciences, Senior Researcher
Institute of Biology of Inland Waters named after I.D. Papanin
of the Russian Academy of Sciences,
Borok, Yaroslavl region, Russia*

Pol'china Tanya Nikolaevna

*Researcher
Southern Scientific Center of the Russian Academy of Sciences,
Rostov-on-Don, Russia*

An introgressive hybrid is presented $\times Typha$ reddish-brown ($\times T.laxmannii \times T. angustata$) for the transformed hydrophilic flora of the delta. Don (Rostov region, southern European Russia). The emergence of the hybrid was facilitated by the increased exploitation of the arms of the delta, which affected the natural ecosystems of the delta. First of all, the changes affected aquatic and coastal aquatic plants, since the water in the branches (arms) was polluted and mineralized. In disturbed coastal areas (recreation areas) Dzhulka, in impoverished communities Phragmites communis Typhetum laxmannii appearance $\times Typha$ reddish-brown predetermined the actively ongoing processes of introgressive hybridization between Sarmatian populations *Typha* and Pliocenemigrant *T.laxmannii*.

Keywords: introgressive hybrid $\times Typha$ reddish-brown, genus *Typha* L., section Engleria (Leonova) Tzvel., river delta Don (Rostov region).

Introgression is a special type of hybridization in which there are backcrosses of spontaneous interspecific hybrids with the original parental species. Introgressants appear in man-made ecotopes such as reservoirs, canals, irrigation systems, and other water structures. Here, as R.I. Burda pointed out, a hydrophilic flora of a completely new type is formed based on indigenous species and migrant species [Burda, 1991].

The purpose of the work is to consider the taxonomy of the introgressive hybrid $\times Typha$ reddish-brown A. Krasnova & Pol'china.

The material for the study was provided by research conducted in August 2021 on the coasts of Julka Island, located in the southwest part of the Don Delta, near the mouth of the Peschany (Old Don) River into the Taganrog Bay of the Sea of Azov. The southern side of the island is crossed by the Azov-Don Sea Canal route. The coastal zone from the navigable canal is composed of sandy soil, while the northern shore is muddy. Due to the island's location on the maritime edge of the Don Delta, it is characterized by active aggradational and degradational processes. Currently, this part of the delta is under high anthropogenic pressure, which significantly increased after the commissioning of the Azov-Don Sea Canal. Its construction led to the penetration of brackish marine waters (salinity within 5 ‰), redistribution of river flow, and changes in the hydrological regime. The route method was used at designated stations. Collection of herbarium material was carried out using a standard technique (Shennikov's method). A comparative-morphological method (Wettstein-Komarov's method) was applied. For the study of pistil flowers, a USB Electronic eyepiece 5 MP digital camera was used (magnification 40–50). The herbarium material is stored in the Herbarium of IBIW RAS (IBIW).

As a result of the research, an introgressive hybrid \times *Typha reddish-brown* = \times *T.laxmannii* \times *T. angustata* A. Krasnova & Pol' china. Below is its description.

\times *Typha reddish-brown* A. Krasnova & Pol' china. Hibrid nova (sect. Engleria (Leonova) Tzvel. – *T. laxmannii* Lepech. pp

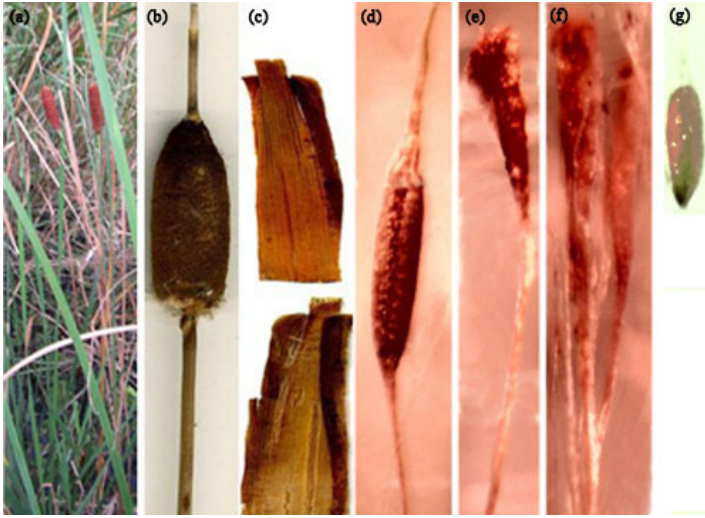
Perennial. The rhizome shorts. Stem 120–130 cm altitude. Cauline leaves with vagina 1.5 cm wide. Cauline leaf is narrow line, the edges are raised, from below is convex, on top gradually long-sharp. A vagina long with reddish-brown, membranous with rafids and tubercles on the inside. The staminate and of pistillate parts with intervale 3.0 cm. The stamen part falls off after flowering. Pistil part 7.5 cm long, 2.4 cm in diameter, oblong-oval, reddish-brown. Fruiting pistillate flower 0.75cm long. The stigma is oblong. with a broad membranous-wavy tubercle. The ovary is oblong-ovate, tubercle with a longitudinal suture. In fertile pestle flowers (carpodia) 0.5 cm long of clavate, with a short edge. Pericarp with tubercles and rafides. The seed is oblong-ovate, with tubercle, truncated at the top, narrowed below, beveled on one side. The hairs of the gynophore are numerous, expanded at the top with rafides, reach the stigma. Flowering VI–VIII, fruiting VIII–IX.

Type: Russia. Rostov region, delta of the Don River, coastal areas of Dzhul'ka Island, Sandy sleeve. The soils are alluvial. 21.09.2021, TN Pol' china (figure) (IBIW).

It grows along the branches (arms) of the Don River delta, in the extreme south-west of the Rostov region.

Differs from *T. laxmannii* Lepech. stem leaves with reddish-brown, membranous sheaths, with rafids and tubercle oblong-conical pistillate part; narrow ob-

long stigma; pericarp with rafids and tubercle small seeds truncated at the top, with tubercle on the surface; from *T. angustata* a small height of 120–130 cm.



Drawing. *Microfilesintrogressive hybrid* ×*Typha reddish-brown* A. Krasnova & Pol'china: (a) – general appearance of the introgressive hybrid; (b) – pistillate part of the inflorescence; (c) – stem leaf with tubercles and raphidas on the inner side; (d) – ovary with a longitudinal suture and tubercles; (e) – carpodium with tubercles, (e) – bundles of carpodia with tubercles; (f) – seed with tubercles

Figure. *Introgressiv hybrid microfiles* ×*Typha reddish-brown* A. Krasnova & Pol'china: (a) – general view of the introgressive hybrid; (b) – pistillate part of the inflorescence; (c) – stem leaf with tubercles and rafids on the outside and inside; (d) – ovary with tubercles; (e) – carpodium with tubercles; (f) – bunches of carpodia with tubercles; (g) – seed with tubercles.

×*Typha reddish-brown* in color and the presence of tubercles on the vegetative and generative organs, especially on the seed, it is closer to the Sarmatian paleo-seeds of the cattails *Typha tanaitica* Dorof. (Rostov region, Bogaevskaya), *Typha poltavica* Dorof. (in the Sarmatian in the south, in the Miocene and Pliocene in the middle zone of the Russian Plain), *Typha aspera* Dorof. (Moldova, Baimaklia), *Typha elliptica* Negru (north-eastern Moldova, early Sarmatian), and *Typha fusisperma* Negru (Sarmatian Moldova). It should be noted that P.I. Dorofeev [Dorofeev, 1982 (Dorofeev, 1982)] considered such seeds to be characteristic of cattails of the ancient Mediterranean floras (Tortonian - Sarmatian) of the southwest of the European part of the USSR. It is possible that ×*Typha reddish-brown* is a

transformed representative of this group of cattails of the marine brackish-water complex, which inhabited alluvial habitats in the southern waters of Russia.

Information about introgressive hybrids in *Typhaa* little [Krasnova, 2017]. It is known that such hybrids have greater potential for further evolution compared to the parent taxa. They are also a source of promising development lines [Takhtajyan, 2007].

References

1. Burda RI *Anthropogenic transformation of flora*. Kyiv: Naukova Dumka, 1991. 168 s. (In Ukraine).
2. Voikina A.V. *Accumulation of pesticides in the ecosystem components of the Taganrog and Yasensky bays of the Sea of Azov and their adaptive impact on hydrobionts* // Author's abstract. dis. Ph.D. biol. Sci. Rostov n/a. 2013. 24 p. (In English)
3. Dorofeev PI *K systematicheskie tretichnykh Typha* / PI Dorofeev // *Paleokarpologicheskie issledovaniya kainozoya*. Minsk: Nauka i tekhnika, 1982. pp. 5–26. (In Byelorussia).
4. Krasnova AN *Hydrophilic genus Rogoz Typha L. (within the former USSR)*. Yaroslavl': Printhouse–Yaroslavl', 2011. 186 s. (In English)
5. Krasnova AN *Intersection hybrid in the hydrophilic genus Typha L. oz. Zaulomskoye, Vologda Oblast (Severo-Dvinskaya vodnaya sistema)* // *Nauka i obrazovanie*. Yakutsk, 2017, No. 3. pp. 114–119. (In Russian).
6. Krasnova, AN *Convergence in the hydrophilic genus Typha L., in transformed reservoirs of European Russia* // *Biology of internal waters*. 2018. No. 3. pp. 103–106. DOI: 10.1134/S03209652218030245 (In Russian).
7. Pol'chin VV, Tolochko IV, Sushko KS, Moskovets A.Yu., SV, Biryukova. *Change of paleolandscapes in the Holocene epoch under the influence of natural and anthropogenic processes on the example of the water area of the Taganrog Bay and the adjacent section of the Don delta*. *Science of the South of Russia*. 2021. T. 17. No. 2. pp. 49–56. DOI:10.7868/S25000640210205 (In Russian).
8. Graebner PPTyphaceae ud Sparganiaceae // *Das Pflanzenreich*. Leipzig: In Engler A., 1900. Bd.2. IV, 8.18 s. (In Germani).
9. Kronfeld EM *Monographie der Gattung Typha Tourn. /Verh. Zool. – bot. (Gesellschaft.) Ges. Wien, 1889. 192 p. (In Germani)*.
10. Smith SG *Natural hybridization among three species of cattail (Typha) in California*. *Amery J. Bot.* 1962. V. 49. S. 678. (In California)
11. Smith SG *Experimental and natural hybrids in North American Typha (Typhaceae)* // *Amer. Mild. Nature*. 1967. V. 78, 2. S. 257–287. (In California)

急性肾衰竭患儿呼吸频率昼夜节律紊乱的年龄相关特征
**AGE-RELATED FEATURES OF DISTURBANCES IN THE
CIRCADIAN RHYTHM OF RESPIRATORY RATE IN CHILDREN
WITH ACUTE RENAL FAILURE**

Muhitdinova Hura Nuritdinovna

*Doctor of Medical Sciences, Full Professor
Center for the Development of Professional Qualifications
of Medical Workers*

Mamatkulov Bahrom Basimovich

*Head of Department
Tashkent Pediatric Medical Institute,
National Medical Children's Center*

抽象的。对 33 名儿童每小时连续监测呼吸频率 (RR) 结果的研究揭示了急性肾衰竭患者呼吸频率昼夜节律紊乱的与年龄相关的特征。入院当天, 所有患者均表现出呼吸频率昼夜节律中段增加的趋势。相对于幼儿指标, 第 2 组儿童每分钟 7 次呼吸、第 3 组每分钟 11 次呼吸的呼吸频率昼夜节律中值显著较低, 这与年龄相关的特征相对应呼吸系统的功能活动。第 1 组 RR 昼夜节律的幅度和每日波动是最不稳定和不稳定的, 因为在强化治疗期间需要重复机械呼吸支持 (MRS)。加重病情、降低血液透析和急性肾功能衰竭治疗效果的因素有肺炎、昏迷、MODS。第3组儿童急性肾功能衰竭的强化治疗效果相对较好, 在合并疾病相同的情况下, 泌尿系统的功能活动在较短的时间内恢复。呼吸频率和血流动力学变化之间缺乏可靠的显著相关性, 除其他外, 是由于引入镇静剂和镇静药物的压力限制治疗的效果, 这降低了呼吸系统代偿反应的严重程度。儿童急性肾功能衰竭。

关键词: 昼夜节律、呼吸频率、急性肾衰竭、儿童。

Abstract. *A study of the results of continuous hourly monitoring of respiratory rate (RR) of 33 children revealed age-related features of disturbances in the circadian rhythm of respiratory rate in acute renal failure. On the day of admission to the clinic, all patients showed a tendency to increase the mesor of the circadian rhythm of the respiratory rate. There was a significantly lower mesor value of the circadian rhythm of the respiratory rate in children of group 2 by 7 breaths per minute, in group 3 by 11 breaths per minute relative to the indicator of young children, which corresponded to the age-related characteristics of the*

functional activity of the respiratory system. The amplitude and daily fluctuations of the circadian rhythm of RR in group 1 turned out to be the most unstable and labile with the emergence of the need for repeated mechanical respiratory support (MRS) during intensive therapy. Factors aggravating the condition, reducing the effectiveness of hemodialysis and treatment of acute renal failure were pneumonia, coma, MODS. Intensive therapy of acute renal failure in children of group 3 turned out to be comparatively more effective, in whom, with the same concomitant diseases, the functional activity of the urinary system was restored in a shorter period of time. The absence of reliably significant correlations between changes in respiratory rate and hemodynamics is due, among other things, to the effect of stress-limiting therapy with the introduction of tranquilizers and sedative medications, which reduced the severity of the compensatory reaction of the respiratory system in acute renal failure in children.

Keywords: *circadian rhythm, respiratory rate, acute renal failure, children.*

Relevance. The degree of participation of the external respiration system in the compensatory mechanisms of hemodynamic restructuring and the homeostasis system as a whole in the process of adaptation under conditions of anuria caused by acute renal failure during a severe systemic inflammatory reaction of the body cannot be overestimated. Unfortunately, the most advanced respiratory support devices available in clinical practice are not able to fully provide complex, functionally intimately interconnected changes in the external parameters of the respiratory system, capable of timely restructuring in the constantly changing conditions of the internal environment of the body, which is in the stressful mobilization of protective systems in conditions of general inflammatory conditions. reaction to infection, aggravated by the lack of corrective and detoxification function of the kidneys in acute renal failure. In this regard, studying and improving methods for correcting external respiration is one of the leading tasks in intensive care of critical conditions, including those caused by acute renal failure [1-5]. In light of the above, we made an attempt to study and evaluate changes in the frequency of spontaneous breathing before transfer to mechanical ventilation, as well as after restoration of spontaneous adequate breathing in anuria caused by acute renal failure in children, depending on age, in the process of restoring the excretory activity of the urinary system.

Goal of the work. To study age-related features of the circadian rhythm of respiratory rate in the anuric phase of acute renal failure in children.

Material and research methods. The data of hourly monitoring of respiratory rate (RR) was studied in 33 children with acute renal failure who were admitted to the ICU of the National Medical Children's Center (NMDC) with oligo-anuria at the age of 6 months to 18 years. All patients underwent hemodialysis under the

control of hemodynamics, acid-base balance, respiratory system, supportive, antibacterial, anti-inflammatory, syndromic corrective intensive therapy. The results of the studies were studied in the following age groups: 12 patients aged from 6 months to 3 years (group 1) were in the ICU for up to 30 days. Group 2 combined the results of a study of monitoring data from 14 children aged 3.1 to 7 years (in the ICU - 20 days), in group 3 - 7 children aged 7.1-18 years (in the ICU 14 days). As presented in Table 1, tubulointerstitial nephritis was diagnosed mainly before the age of 7 years, amounting to 27% in group 1 and 30% in group 2. In the majority of patients, predominantly at an older age, the severity of the condition turned out to be due to MODS (38% of children). Acute cerebral insufficiency aggravated pathological deviations of homeostasis in 28% of children. In 13% of patients over 7.1 years of age, a chronic disorder of the functional activity of the kidneys was discovered for the first time.

Table 1.
Characteristics of patients admitted to the NDMC, in %.

Diagnosis	1 group (3 years)	2 group (3,1- 7 years)	3 group (7,1-18 years)
Tubulointerstitial neuritis	27% (9)	30% (10)	3% (1)
glomerulonephritis	9% (3)	9% (3)	6% (2)
Hemolyticouremic syndrome	3% (1)	0	0
Pneumonia	9% (3)	12% (4)	3% (1)
Coma	6% (2)	16% (5)	6% (2)
MODS	3% (1)	18% (6)	16% (5)
Chronic nephrotic syndrome	0	0	13% (4)

Hemodialysis in group 1 was carried out for 18 days, 12 days in group 2, 14 days in group 3, causing restoration of renal function and improvement of clinical and biochemical parameters of patients. Age-related characteristics were manifested in the limitation of the average duration of a hemodilysis session to the greatest extent in infants to 3 hours. While in the older groups the duration of each procedure increased to 5 hours in group 2 on days 7 and 12, in group 3 - on days 1 and 14. The duration of each session of the extracorporeal detoxification method was determined not only by the degree of blood purification and decongestant effect, but also by the state of compensatory resources, which at an early age were characterized by a greater tendency to generalize protective reactions, rapid exhaustion, and a high risk of complications (AHF, ARF, hemorrhagic syndrome, etc.), that is, anatomical and functional features of early age.

Results and its discussion. As presented in Table 2, on the first day, 41% of children in group 1, 50% in group 2 and 14% of children in group 3 needed mechanical respiratory support.

Table 2.
Dynamics of mechanical respiratory support depending on age

Days	Total number of patients			Mechanical ventilation performed			Spontaneous breathing		
	1 group	2 group	3 group	1	2	3	1	2	3
1	36% (12)	42% (14)	22% (7)	41% (5)	50% (7)	14% (1)	59% (7)	50% (7)	85% (6)
2	36% (12)	36% (12)	22% (7)	41% (5)	58% (7)	14% (1)	59% (7)	42% (5)	85% (6)
3	36% (12)	33% (11)	15% (5)	41% (5)	63% (7)	40% (2)	59% (7)	63% (4)	60% (3)
4	36% (12)	33% (11)	10% (4)	41% (5)	63% (7)	25% (1)	59% (7)	63% (4)	75% (3)
5	27% (9)	30% (10)	9% (3)	44% (4)	70% (7)	33% (1)	56% (5)	70% (3)	67% (2)
6	27% (9)	27% (9)	9% (3)	44% (4)	77% (7)	33% (1)	56% (5)	22% (2)	67% (2)
7	21% (7)	27% (9)	6% (2)	42% (3)	77% (7)	50% (1)	58% (4)	22% (2)	50% (1)
8	21% (7)	27% (9)	6% (2)	42% (3)	77% (7)	50% (1)	58% (4)	22% (2)	50% (1)
9	18% (6)	27% (9)	6% (2)	42% (3)	77% (7)	50% (1)	50% (3)	22% (2)	50% (1)
10	18% (6)	27% (9)	6% (2)	42% (3)	77% (7)	50% (1)	50% (3)	22% (2)	50% (1)
11	18% (6)	24% (8)	6% (2)	66% (4)	87% (7)	50% (1)	33% (2)	12% (1)	50% (1)
12	18% (6)	21% (7)	6% (2)	66% (4)	100% (7)	50% (1)	33% (2)	0	50% (1)
13	12% (4)	21% (7)	6% (2)	100% (4)	100% (7)	50% (1)	0	0	50% (1)
14	12% (4)	21% (7)	6% (2)	100% (4)	100% (7)	50% (1)	0	0	50% (1)
15	12% (4)	21% (7)		100% (4)	100% (7)		0	0	
16	12% (4)	21% (7)		75% (3)	100% (7)		25% (1)	0	
17	9% (3)	21% (7)		66% (2)	100% (7)		33% (1)	0	
18	9% (3)	21% (7)		66% (2)	100% (7)		33% (1)	0	
19	6% (2)	21% (7)		0	100% (7)		100% (2)	0	
20	3% (1)	21% (7)		0	100% (7)		100% (1)	0	
21	3% (1)			0			100% (1)		
22	3% (1)			0			100% (1)		
23	3% (1)			0			100% (1)		
24	3% (1)			0			100% (1)		
25	3% (1)			0			100% (1)		
26	3% (1)			0			100% (1)		
27	3% (1)			0			100% (1)		
28	3% (1)			0			100% (1)		
29	3% (1)			0			100% (1)		
30	3% (1)			0			100% (1)		

Over time, during intensive therapy, among the patients of group 1 with acute respiratory failure of the 3rd degree, adequate breathing was observed in 7 children in the first 4 days. However, due to the instability of the condition, mechanical ventilation continued in group 1 and on days 13-15 in 4 young children. In group 2, 50%, and in the next 2–11 days, more than half of preschool children required respiratory support during intensive care. Subsequently, on days 12-20, all 100% of patients (7) in age group 2 were transferred to mechanical ventilation

before transfer to the clinic at the place of residence. In the older age group, upon admission, 14% of children were on mechanical ventilation; in the following days, of the two remaining children in the ICU after transfer to the specialized department on days 7-14, 1 patient was on mechanical ventilation (Table 2). Table 3 presents the average data for the assessment of the phase structure of the circadian rhythm of the respiratory rate over the observation period, where a significantly lower value of the mesor of the circadian rhythm of the respiratory rate was revealed in children of group 2 by 7 breaths per minute, in group 3 by 11 breaths per minute, which corresponded to the age-related characteristics of functional activity respiratory system.

Table 3

Average values of parameters of the phase structure of the circadian rhythm of respiration rate per minute

Groups	Mezor	In acrophase	In bathyphase	Amplitude	Range of fluctuations per day
1	32±5	36±7	29±4	4±2	7±3
2	25±1*	27±1	22±1*	2±0,3	5±1
3	21±1*	23±2*	20±1*	2±1	4±1

*- significantly relative to the indicator in group 1

Table 4.

Dynamics of the mesor of the circadian rhythm of the RR

days	1 group	2 group	3 group
1	31±1	23±1*	23±1*
2	30±1	24±1*	21±0,4*
3	31±0,8	27±1*●	21±1*
4	31±1	27±1*●	21±1*
5	32±2	24±1*	24±1*
6	29±0,6	25±0,6*	21±1*'''
7	33±1	25±1*	20±1*
8	34±1	26±1*	21±1*
9	33±2	23±1*	21±0,4*
10	39±2●	27±2*●	21±1*
11	42±1●	25±1*	21±1*
12	42±1●		23±2*
13			19±1
14			23±1
18	44±1		
19	36±3		

20	26±0,6		
21	27±0,9		
22	28±1		
24	26±0,5		
25	28±1		
26	26±1		
27	25±0,6		
28	24±0,7		
29	25±0,6		
30	24±0,6		

Table 5.
Average circadian rhythm RR per minute

Hours	1 group	2 group	3 group
8	31±4	24±1*	22±1*
9	31±4	25±1	21±1*
10	33±6	25±1*	21±1*
11	33±7	25±2	20±1*
12	33±7	25±1	21±1*
13	32±6	26±1	21±1*
14	32±6	25±1	21±1*
15	31±5	25±1	21±1*
16	31±5	25±1	22±2*
17	31±5	26±2	22±1*
18	31±4	26±2	22±2*
19	31±5	26±1	22±1*
20	31±4	25±1	22±1*
21	32±5	25±1	21±1*
22	31±5	25±1	21±1*
23	31±4	25±2	21±1*
24	31±5	25±2	21±1*
1	31±4	26±1	22±1*
2	32±4	25±1	21±1*
3	31±4		21±1*
4	32±4		21±1*
5	32±5		21±1*
6	31±4		21±1*
7	31±4		22±1*

*-significant relative to group 1

"-reliable relative to group 2

●-reliable relative to the indicator in 1 day

On the day of admission to the clinic, a tendency towards an increase in the mesor of the circadian rhythm of the respiratory rate was revealed in all children. In group 1, an increase in the mesor of the circadian rhythm of RR was detected on the 10th day by 25%, on the 11th – 35%, on the 12th day – by 35% with transfer to mechanical ventilation due to increasing ARF. After 2 days of MCI, restored spontaneous breathing on the 18th day of intensive therapy indicated ARF with a 42% increase in the level of the mesor of the circadian rhythm of the respiratory rate with a gradual decrease in the studied indicator to the age norm in young patients by the end of intensive therapy (Table 4). In group 2, despite the lower value of the mesor of the circadian rhythm of the respiratory rate, which is characteristic of this age group, by 8–17 breaths per minute on days 1–11 relative to the indicator of group 1, in the next 12–20 days, 50% of patients required hardware respiratory support. The latter was due to concomitant pneumonia, coma, and MODS, which significantly aggravated the condition of preschool-age patients. In group 3, the most pronounced ARF led to the transfer to mechanical ventilation of 85% of children in the first 2 days. In the following days, the restoration of spontaneous breathing indicated an increase in the effectiveness of intensive therapy, when on days 7–14 only one patient remained on the MCI, who, after the restoration of adequate spontaneous breathing, was transferred to a specialized department on the 15th day. Thus, in group 1, on days 13–15, the increase in ARF necessitated transfer to mechanical ventilation with restoration of one’s own breathing in the following days (Fig. 1). The most unfavorable condition was identified in group 2 due to concomitant pneumonia, coma, and MODS. Thus, the factors aggravating the condition, reducing the effectiveness of hemodialysis and treatment of acute renal failure were pneumonia and coma in children under 7 years of age. Intensive therapy for acute renal failure in children of group 3 turned out to be comparatively more effective, in whom, despite the same concomitant diseases being identified, more advanced adaptive, compensatory capabilities associated with the relatively more mature anatomical and functional activity of the immune and other systems made it possible to restore the functional activity of the urinary system in a shorter period of time.

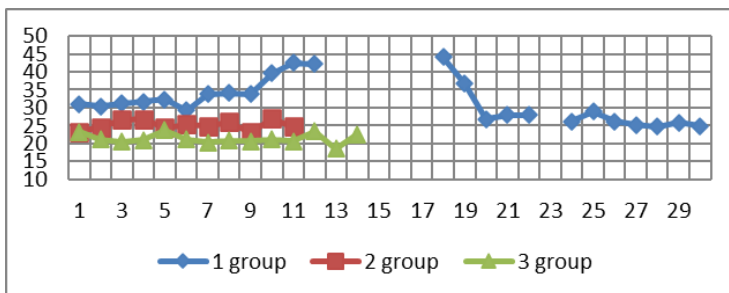


Figure 1. Dynamics of the mesor of the circadian rhythm RR per minute.

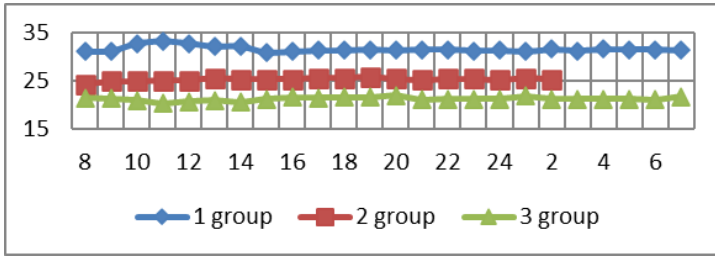


Figure 2. Average circadian rhythm RR per minute

The average circadian rhythm of the respiratory rate in each group corresponded to the age data in terms of respiratory frequency (Table 5, Fig. 2).

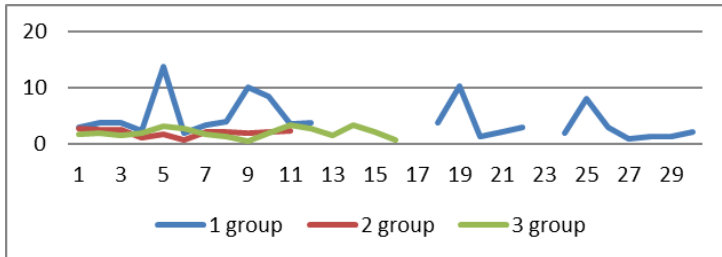


Figure 3. Changes in the amplitude of the circadian rhythm of heart rate

The amplitude (Fig. 3) and daily fluctuations of the circadian rhythm of the RR in group 1 (Fig. 4) turned out to be the most unstable and labile with the emergence of the need for repeated MRP during intensive therapy.

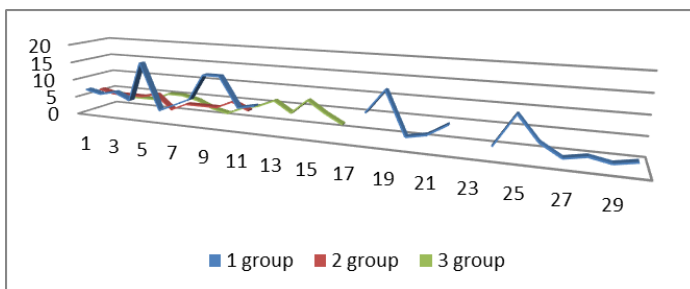


Figure 4. Dynamics of daily fluctuations in respiratory rate per minute

The longest inversion of the circadian rhythm of the respiratory rate was in group 3 (6 days), in group 1 (5) and group 2 (4 days) (Fig. 5).

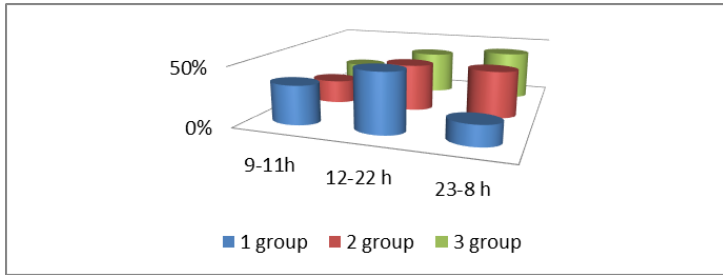


Figure 5. Duration of circadian rhythm inversion

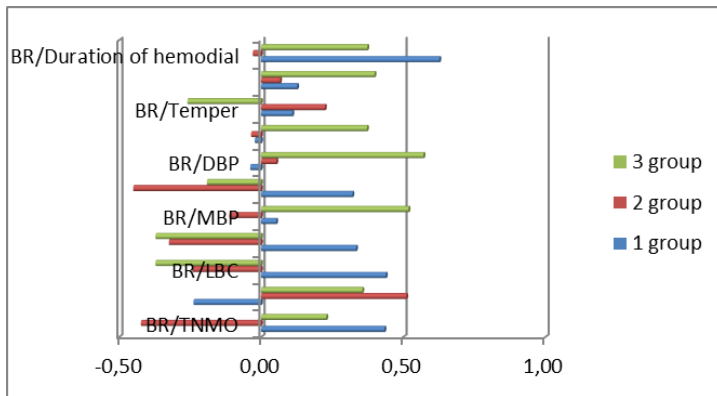


Figure 6. Correlation connections of black holes.

In group 1, a tendency towards increased breathing was revealed with increasing duration of the hemodialysis session (0.61). In group 2, the appearance of a tendency to increase breathing was facilitated by an increase in peripheral vascular resistance (0.51). In group 3, a tendency towards an increase in respiratory failure was noted with an increase in DBP (0.57) and MAP (0.52). The absence of significant correlations between changes in respiratory rate and hemodynamics is most likely due to stress-limiting therapy with the introduction of tranquilizers and sedative medications, which reduced the severity of the compensatory reaction of the respiratory system in acute renal failure in children (Fig. 6).

Conclusion. On the day of admission to the clinic, a tendency towards an increase in the mesor of the circadian rhythm of the respiratory rate was revealed in all children. A significantly lower value of the mesor of the circadian rhythm of the respiratory rate was revealed in children of group 2 by 7 breaths per minute, in group 3 by 11 breaths per minute relative to the indicator in young children, which corresponded to the age-related characteristics of the functional activity of the

respiratory system. The amplitude and daily fluctuations of the circadian rhythm of the respiratory rate in group 1 turned out to be the most unstable and labile with the emergence of the need for repeated MRP during intensive therapy. Factors aggravating the condition, reducing the effectiveness of hemodialysis and treatment of acute renal failure were pneumonia, coma, and MODS in children under 7 years of age. Intensive therapy for acute renal failure in children of group 3 turned out to be comparatively more effective, in whom, with the same concomitant diseases, the functional activity of the urinary system was restored in a shorter period of time. The absence of reliable significant correlations between changes in respiratory rate and hemodynamics is due, among other things, to stress-limiting therapy with the administration of tranquilizers and sedative medications, which reduced the severity of the compensatory reaction of the respiratory system in acute renal failure in children.

References

1. <https://cyberleninka.ru/article/n/ostraya-pochechnaya-nedostatochnost-u-detey-lektsiya>
2. https://www.rusnephrology.org/wp-content/uploads/2020/12/AKI_final.pdf
3. https://apps.who.int/iris/bitstream/handle/10665/85456/9241546700_rus.pdf?sequence=1&isAllowed=y
4. <https://www.ckbran.ru/cure/cardio-vascular-system/serdechnaya-nedostatochnost>
5. <https://compendium.com.ua/clinical-guidelines/lektsii-po-klinicheskoy-diagnostike-vnutrennih-boleznej/glava-19-odyshka-pri-zabolevaniyah-legkih/>

儿童急性肾功能衰竭昼夜节律指数和心率昼夜节律的年龄相关差异
**AGE-RELATED DIFFERENCES IN THE CIRCADIAN INDEX AND
CIRCADIAN RHYTHM OF HEART RATE IN ACUTE RENAL
FAILURE IN CHILDREN**

Muhitdinova Hura Nuritdinovna

*Doctor of Medical Sciences, Full Professor
Center for the Development of Professional Qualifications
of Medical Workers*

Mustakimov Alisher Abduvaliyevich

*Head of Department
Republican Scientific Center for Emergency Medical Care*

Fathullayeva Dildora Murojon qizi

*Anesthesiologist-resuscitator
Republican Scientific Center for Emergency Medical Care*

抽象的。儿童急性肾功能衰竭的昼夜心率节律时相结构平均值的年龄相关特征表现为第2组(3.1-7岁)昼夜心率节律中位数下降的趋势,第3组(7.1-18岁)的指标显著下降,每分钟减少27次。结果显示,第1组和第3组儿童的明暗时间交替对心脏功能没有影响,这是由于白天和夜间心率驱动功能的僵化所致。心脏活动的代偿性功能活动增加的趋势反映了发生心力衰竭的高风险,而动脉高血压、呼吸衰竭的进展、血液透析次数的增加以及由于心脏僵硬而导致的平滑度会促进心力衰竭的发生。7岁以上儿童急性肾功能衰竭的心率昼夜节律。昼夜心率节律的顶峰期峰值的变化在年龄较大的儿童中最为明显,这也可能是由于压力限制疗法效果较差所致。

关键词: 年龄差异、昼夜节律指数、昼夜节律、心率、儿童急性肾功能衰竭。

Abstract. *Age-related features of the average values of the phase structure of circadian heart rate rhythms in acute renal failure in children were expressed in a tendency towards a decrease in the mesor of the circadian heart rate rhythm in group 2 (3.1-7 years), a significant decrease in the indicator in group 3 (7.1-18 years) by 27 beats per minute. It was revealed that there was no effect on the heart function of alternating light and dark time in children in groups 1 and 3, which was due to the rigidity of the heart rate driver function during the day and night. The revealed tendency of compensatory-directed increased functional activity of cardiac activity reflects a high risk of developing heart failure, which is*

facilitated by arterial hypertension, progression of respiratory failure, an increase in the number of hemodialysis sessions, and smoothness due to the rigidity of the circadian rhythm of heart rate in acute renal failure in children over 7 years of age. The shift in the acrophase peak of the circadian heart rate rhythm turned out to be most pronounced in children of the older group, which may also have been due to less effective stress-limiting therapy.

Keywords: *age differences, circadian index, circadian rhythm, heart rate, acute renal failure in children.*

Relevance. One of the leading pathogenetic mechanisms for the development of acute renal failure is a hypersympathotonic reaction, which causes spasm of peripheral, including renal, vessels, ensuring the adequacy of compensatory centralization of blood circulation in conditions of dehydration (hypovolemia) and other stress reactions of the body. In healthy people, a certain cyclicity is observed in the functioning of the circulatory system: during the day, the heart beats more often than at night. One of the objective indicators of physiological cyclicity is the circadian index (CI). The calculation is made using the formula: $CI = \text{Average heart rate during the day (from 7.00 to 22.00)} / \text{Average heart rate at night (from 23.00 to 7.00)}$ The indicator is not affected by the age or gender of the subject. An exception is children under 1 year of age: due to the physiological characteristics of an infant, the CI may be slightly lower and averages 1.15. In practical medicine, deviations of this index are observed both in the direction of increase and decrease. The value of CI is within the range of 1.24 -1.44 USD. (M 1.32 + 0.06) is an indicator of the stable autonomic organization of the circadian rhythm of the heart. If the indicator persistently deviates downward, we can say that myocardial contractility has decreased, and the patient has developed irreversible changes in the myocardium and chronic heart failure. A decrease in CI of less than 1.2 is observed in diseases associated with autonomic “denervation” of the heart and is associated with a poor prognosis and a high risk of sudden death in patients at risk. However, in the literature there is not enough information on the dynamics of CI in the anuric phase of acute renal failure in children, the change in the indicator in depending on age, which served as the basis for this study [1-6].

Goal of the work. To study the features of the circadian index, circadian heart rate rhythm in children with acute renal failure during the period of anuria at the age of 3.1-7 years.

Material and research methods. We studied hourly heart rate monitoring data in 33 children with acute renal failure admitted to the ICU of the National Medical Center with oligo-anuria at the age of 6 months to 18 years. All patients underwent hemodialysis under the control of hemodynamics, acid-base balance, respiratory system, supportive, antibacterial, anti-inflammatory, syndro-

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

Results and its discussion.

Table 1.

Age-related features of the average values of the phase structure of circadian heart rate rhythms in acute renal failure in children (beats per minute)

Groups	Mesor	In acrophase	In bathyphase	Amplitude	Range of fluctuations per day
1	126±5	139±7	115±8	13±6	24±10
2	117±7	131±9	104±8	14±5	27±8
3	99±6*	115±12	89±8	15±8	25±11

*-significant relative to the indicator in group 1

Age-related features of the average values of the phase structure of circadian heart rate rhythms in acute renal failure in children were expressed in a tendency towards a decrease in the mesor of the circadian heart rate rhythm in group 2, a significant decrease in the indicator in group 3 by 27 beats per minute. A significantly significant difference in heart rate in the acrophase by 22 per minute, in the bathyphase by 26 per minute was also observed only between the indicators in groups 1 and 3. There were no significant age-related differences in the amplitude and daily fluctuations of heart rate (Table 1). On the day of admission, no significantly significant age-related differences in the mesor of the circadian rhythm of heart rate were detected (Table 2). Only on days 6–14 of intensive therapy was a decrease in the tendency to tachycardia in group 2 by 16–12 beats per minute ($p < 0.05$). In group 3, the heart rate mesor of the circadian rhythm turned out to be less than in group 1 by 16 per minute, remaining significantly less on all subsequent days of observation. In the average circadian rhythm, significantly significant age-related differences were revealed between the indicators of children in groups 1 and 3, with no effect on heart function during the day and night, which was due to the rigidity of the heart rate driver function during the day and dark (Table 3). The

latter was confirmed by the results of an analysis of age-related characteristics of CI, when the studied indicator in group 1 ranged from 1-0.9, in group 2 1.1-0.9 and in group 3 1.1 -0.9* units. (Table 4).

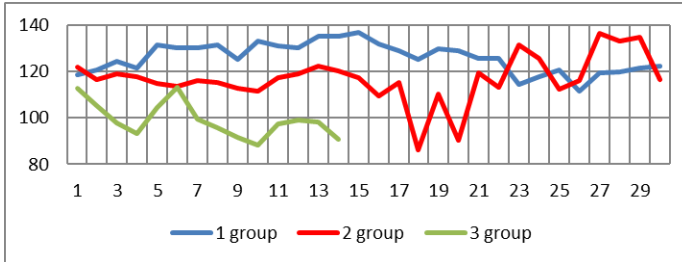


Figure 1. Dynamics of the mesor circadian rhythm heart rate per minute depending on age

Table 2.
Circadian rhythm mesor

Days	1 group	2 group	3 group
1	119±6	122±4	113±5
2	121±3	117±5	105±5*
3	124±3	119±3	98±5*
4	121±3	118±3	93±5*
5	131±2	115±4	105±9*
6	130±2	114±2*	113±6*
7	130±4	116±7*	100±3*
8	132±5	115±3*	96±4*
9	125±3	113±3*	92±4*
10	133±5	112±3*	88±5*
11	131±4	117±5*	97±4*
12	130±2	119±2*	99±9*
13	135±4	122±3*	98±1*
14	135±3	120±4*	91±5*
15	137±3	117±7	
16	132±4	109±5	
17	129±3	115±7	
18	126±6	86±7	
19	130±6	110±11	
20	129±5	91±6	
21	126±6	119±7	
22	126±7	113±11	
23	114±5	132±9	

24	118±6	126±8	
25	121±4	112±7	
26	111±5	116±6	
27	120±5	137±8	
28	120±7	133±6	
29	122±6	135±8	
30	122±5	117±7	

Table 3
Average circadian rhythm of HR

Hours	1 group	2 group	3 group
8	126±7	118±7	100±7*
9	126±7	118±8	99±7*
10	128±9	118±8	105±11*
11	125±9	119±9	100±10*
12	128±7	119±10	99±11*
13	128±8	117±10	100±8*
14	127±9	117±9	99±11*
15	127±8	116±10	104±13*
16	125±7	117±10	102±8*
17	127±7	118±9	100±7*
18	128±6	119±9	100±8*
19	127±7	118±7	99±7*
20	125±7	116±8	100±7*
21	125±7	117±11	99±8*
22	125±7	118±8	97±8*
23	126±6	116±10	100±8*
24	125±6	116±11	98±4*
1	125±5	115±11	99±4*
2	124±6	116±10	97±6*
3	126±6	117±8	97±5*
4	125±6	117±9	96±7*
5	127±7	116±9	97±6*
6	124±6	115±9	96±6*
7	124±6	117±7	95±5*

Table 4
Circadian HR index

Days	1 group	2 group	3 group
1	1,0	1,0	1,1

2	1,0	1,0	1,1
3	1,0	1,0	1,1
4	1,0	1,0	1,0
5	1,0	1,0	1,1
6	1,0	1,0	1,1
7	1,0	1,1	1,1
8	1,1	1,0	1,0
9	1,0	1,0	0,9
10	1,0	1,1	1,0
11	1,0	0,9	1,0
12	1,0	1,0	1,1
13	1,0	1,0	1,0
14	1,0	1,0	0,9
15	1,0	1,1	
16	1,1	1,1	
17	1,0	1,0	
18	1,1	1,0	
19	1,1	1,0	
20	1,0	0,9	
21	1,0	1,1	
22	0,9	1,0	
23	1,0	0,9	
24	1,0	1,1	
25	1,0	1,0	
26	1,0	1,0	
27	1,0	0,9	
28	1,0	0,9	
29	1,1	1,1	
30	1,0	1,1	

*- significant relative to the indicator in group 1.

As shown in the diagram, changes in the mesor of the circadian rhythm of heart rate occurred in waves (Fig. 1). Noteworthy is the tendency to increase the amplitude of oscillations in older age groups to 20 beats per minute in a near-weekly rhythm in group 3 and on days 16–30 in children of group 2. Different levels of heart rate fluctuations in the average circadian rhythm were due to anatomical and functional reserve capabilities in early (up to 3 years), pre-preschool (3.1-7 years), school age (7.1-18 years) in children with acute renal failure (Fig. 2).

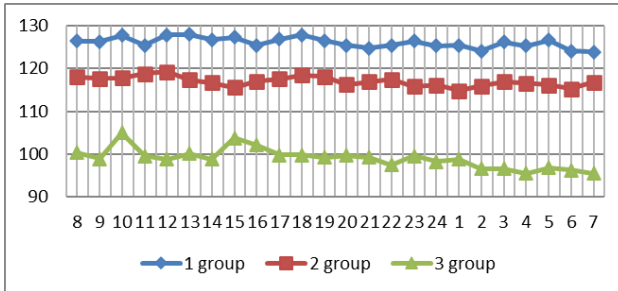


Figure 2. Average circadian rhythm of HR (beats per minute) depending on age.

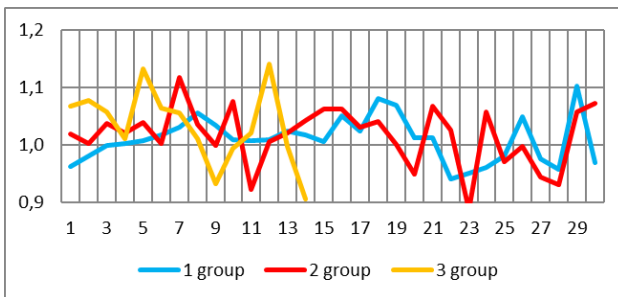


Figure 3. Age-related features of the dynamics of the circadian index (average day/average night) in acute renal failure in children

The study of the characteristics of the dynamics of CI did not reveal age-related differences, it was characterized by monotonic waves with fluctuations in the range of 1.1-0.9, indicating the absence of differences in the functional activity of the sinus node during the daytime and at night, while normally the figure reaches 1.2 -1.4 units (Fig. 3).

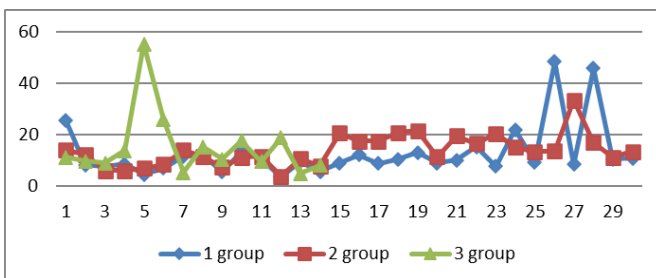


Figure 4. Dynamics of the amplitude of the circadian rhythm of heart rate

The most pronounced instability of sinus node function was revealed on day 5 in children of group 3, and on days 26-28 in children of group 1 (Fig. 4).

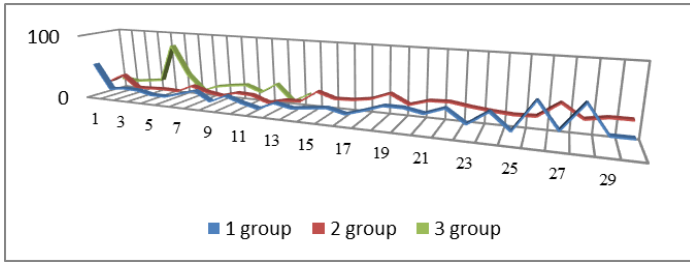


Figure 5. Daily fluctuations in heart rate per minute depending on age

Daily fluctuations in HR in group 3 on day 6 were 70 per minute, in group 1 on days 26-28 it was 50 per minute (Fig. 5). The longest inversion of the circadian rhythm of heart rate was in patients of group 1 - 5 days, in groups 2 and 3 for 4 days, which as a percentage of the total duration of treatment in the ICU was 16% in group 1, 13% in group 2 and 13% in group 3 – 29% (Fig. 6). Thus, the shift in the acrophase peak of the circadian heart rate rhythm turned out to be most pronounced in children of the older group, which may also have been due to less effective stress-limiting therapy.

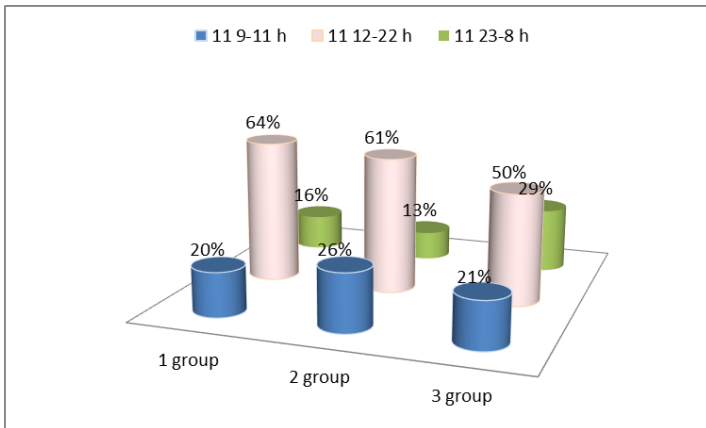


Figure 6. Duration of heart rate circadian rhythm inversion

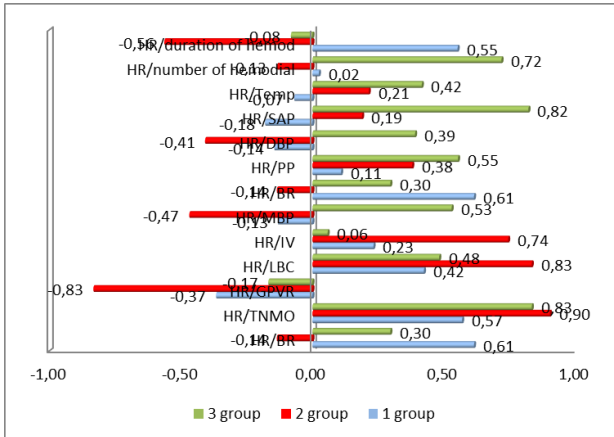


Figure 7. Correlation connections of the mesor of the circadian rhythm of heart rate

A direct dependence of MVP on heart rate was found in groups 2 (0.9) and 3 (0.83). In group 2, a more pronounced tachycardial reaction to effective vasodilator therapy was revealed (decrease in PR-0.83), as well as to an increase in CO (0.83) and SV (0.74), that is, an increase in heart rate to the formation of a hypercirculatory type of circulatory system function than in groups 1 and 3. The latter indicates a more pronounced physiological orientation of the restructuring of hemodynamic function to aggravate the inflammatory reaction of the body in children of group 2. In group 3, the tendency in arterial hypertension was accompanied by an increase in heart rate (0.82). An increase in the number of hemodialysis sessions in group 3 contributed to tachycardia syndrome (0.72).

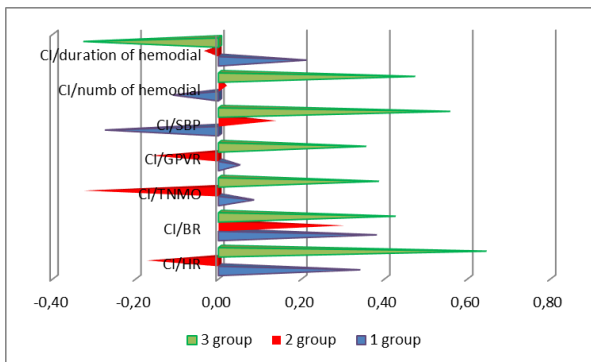


Figure 8. Correlation connections CI.

A comparatively more significant slope of the direct dependence of CI on heart rate (0.64), CI on RR (0.42), CI on SBP (0.56) and the number of hemodialysis sessions (0.47) was observed in children over 7 years of age (Fig. 8). The revealed tendency of compensatory-directed increased functional activity of cardiac activity reflects a high risk of developing heart failure, which is facilitated by an increase in SBP, progression of respiratory failure, an increase in the number of hemodialysis sessions, and smoothness caused by the rigidity of the circadian rhythm of heart rate in acute renal failure in children over 7 years of age.

Conclusion. Age-related features of the average values of the phase structure of circadian heart rate rhythms in acute renal failure in children were expressed in a tendency towards a decrease in the mesor of the circadian heart rate rhythm in group 2, a significant decrease in the indicator in group 3 by 27 beats per minute. It was revealed that there was no effect on the heart function of alternating light and dark time in children in groups 1 and 3, which was due to the rigidity of the heart rate driver function during the day and night. The revealed tendency of compensatory-directed increased functional activity of cardiac activity reflects a high risk of developing heart failure, which is facilitated by arterial hypertension, progression of respiratory failure, an increase in the number of hemodialysis sessions, and smoothness due to the rigidity of the circadian rhythm of heart rate in acute renal failure in children over 7 years of age. The shift in the acrophase peak of the circadian heart rate rhythm turned out to be most pronounced in children of the older group, which may also have been due to less effective stress-limiting therapy.

References

1. <https://tulrb.ru/info/interesnoe/chto-takoe-tsirkadnyj-indeks-i-zachem-ego-izmeryayut>
2. https://b-apteka.ru/articles/arterialnoe-davlenie-u-detey?utm_referrer=https%3A%2F%2Fb-apteka.ru/articles/arterialnoe-davlenie-u-detey?utm_referrer=https%3A%2F%2Fb-apteka.ru/articles/arterialnoe-davlenie-u-detey?utm_referrer=https%3A%2F%2Fb-apteka.ru/articles/arterialnoe-davlenie-u-detey
3. <https://karpov-clinic.ru/articles/kardiologiya/7363-norma-arterialnogo-davleniya-dlya-detey- tablitsa.html>
4. https://library.mededtech.ru/rest/documents/ISBN9785970459256/?anchor=paragraph_uat38f
5. <https://akrikhin.by/article-category/dlya-specialistov/osnovnye-differencialnye-pokazateli-u-detey.html>

急性胰腺炎治疗中存在的问题

PROBLEMATIC ISSUES INTREATMENT ACUTE PANCREATITIS

Kostirnoy Aleksandr Vasilevich

Doctor of Medical Sciences, Professor

Gerbali Oksana Yurievna

Doctor of Medical Sciences, Professor

Medical Institute named after. S.I. Georgievsky,

Simferopol, Russia

抽象的。总结111例不同引流方法治疗急性坏死性胰腺炎化脓坏死并发症的临床经验，并对34例采用坏死区被动引流的患者进行回顾性分析。在现代条件下使用纱布进行被动引流管引流的方法应该受到限制，因为它们的效率低下，无法将现有的坏死组织充分引流到网膜囊和腹膜后细胞间隙。在对照组（34名患者）中，采用被动引流术后死亡率为41.1%（14名患者），而在主要组（77名患者）中，采用现代手术干预方法并使用私人引流系统，术后死亡率为15.6%（12例）。

关键词：急性胰腺炎，化脓性坏死并发症，手术。

Abstract. *The summary of the clinical experience of treatment of 111 patients drainage by different methods in purulent-necrotic complications of acute necrotizing pancreatitis, with retrospective analysis of 34 patients who used passive drainage areas of necrosis. Methods for passive drainage tube drainage with the use of gauze in modern conditions should be limited, because of the inefficiency of them as adequate drainage at the existing necrotic tissue into the bursa omentalis and retroperitoneal cellular spaces. In the control group (34 patients), which was used for passive drainage of postoperative mortality was 41.1% (14 patients), and in the main group of 77 patients was used modern methods of surgical intervention with the use of a private drainage system, and postoperative mortality was 15.6% (12 patients).*

Keywords: *acute pancreatitis, purulent-necrotic complications, surgery.*

Introduction.

Treatment of patients with purulent-necrotic complications (PNC) of acute pancreatitis (AP) should be individual and depend on the mechanisms of development, variants of damage to the abdominal organs, omental bursa and retroperitoneal cellular spaces, signs of inflammatory reaction syndrome with the predicted risk of the disease.

Unfortunately, the recommendations of the American pancreatological school and according to the generally accepted classification of AP (Atlanta, 1992), and then revised in 2012, which pays attention only to localized forms of necrotizing pancreatitis (infected pancreatic necrosis, pancreatic abscess and infected pseudocyst) [1,6].

All complicated forms of necrotizing pancreatitis (prone to the spread of the inflammatory process) are absent in this classification, although they constitute the main problem of surgical treatment and high mortality.

In recent years, methods of complex treatment of necrotizing pancreatitis have been strengthened with blockers of pancreatic secretion against the backdrop of a decrease in the number of interventions in the early stages of the disease. But these drugs were introduced into the vascular bed, while at the same time there is no work on the supply of specific drugs that block the inflammatory cascade of inflammatory mediators directly into the organ - the pancreas and its surrounding tissues.

Rational opening and drainage of retroperitoneal phlegmons followed by closed flow lavage were supplemented by a number of new techniques, including the use of programmed necrosectomies through the formed omentobursostomy, as well as the use of minimally invasive laparoscopic technologies.

Techniques for puncture treatment of complicated postnecrotic pancreatic cysts and localized infected forms of AP in the omental bursa are becoming more widely used.

At the same time, almost all the main issues of surgical tactics for treating AP in the stage of purulent complications remain controversial:

- there are no clear criteria for the optimal timing of surgical intervention, its nature and volume;
- options for completing the operation;
- methods for draining foci of necrosis, especially in cases of widespread necrotic process.

Therefore, existing methods of surgical treatment (AP) and especially its infected forms, such as localized forms, as well as when retroperitoneal cellular spaces are involved, cannot satisfy surgeons with their results. Treatment of patients with PNC AP is the most problematic section of abdominal surgery. This fact is confirmed by high rates of postoperative mortality of 54-72% and the frequency of development of GNO during secondary infection, both of the organ itself and of the abdominal cavity and retroperitoneal space [2, 3].

Due to the topographic-anatomical location of the pancreas (P) and its surrounding tissue, a one-stage surgical procedure does not prevent the progression of the purulent-necrotic process, both in the omental bursa and in the retroperitoneal tissue spaces [6].

The exceptional variety of options for localization, distribution and nature of pathomorphological changes in the pancreas, surrounding organs and tissues during PNC determine the existence of equally diverse methods of surgical interventions and methods of their completion - drainage. It is on the stage of rational completion of surgical treatment (adequacy of drainage) of a purulent-necrotic focus that the “interruption” of the likelihood of secondary infection depends [1, 4].

Materials and methods.

This work reflects clinical experience in the treatment of PNC AP using various methods for draining foci of infected pancreatic necrosis.

All patients were examined according to generally accepted clinical and laboratory criteria, ultrasound monitoring of the abdominal organs, CT scanning of the abdominal cavity, chest radiography, 3-D modeling of the inflammatory process in the pancreas itself and its surrounding tissues, developed and put into practice. In addition, all patients received standard generally accepted infusion-detoxification, antibacterial, anti-secretory, antiulcer, immunomodulatory therapy according to Russian protocols for the management of patients with acute pancreatitis.

Patients with complicated forms of AP were divided as follows: fluid formation of the omental bursa - 14 patients, infected pancreatic necrosis in the form of fixed or sequestered areas of the gland and parapancreatic tissue - 24, infected pancreatic necrosis with symptoms of abscessation of the retroperitoneal tissue - 27, widespread retroperitoneal phlegmon - 9, purulent peritonitis – 3.

The surgical techniques used in the main group were as follows: long-term closed lavage, programmed relaparotomy, open management of controlled laparostomy.

The control group consisted of 34 patients with similar complications of AP, in whom methods of passive drainage of the infected necrosis focus + programmed relaparotomy using gauze-tubular drainages were used.

Results of the study and their discussions.

Depending on our changes in the processes occurring during OP, the entire period of practical work was analyzed by periods that were characterized by priority changes in our and generally accepted views.

At the first stage, when “active” management tactics were used and surgical technologies were used that did not stand the test of time (gauze tamponade, passive drainage of the omental bursa, pancreatic resection). All this was accompanied by the progression of the purulent-necrotic process and high postoperative mortality of up to 80%.

The second stage of our research was characterized by the evidence-based use of conservative therapy. During this period, we refused to perform pancreatic resections. However, early necrectomies were still used, followed by passive drainage of necrotic areas and the use of gauze swabs, even with their aseptic variants. In addition, we had high postoperative mortality rates of up to 75%.

The next stage was characterized by more significant diagnostic techniques (ultrasound, CT, 3-D modeling of the inflammatory process) - surgical interventions were performed according to strict indications and necrosectomies were performed at a later date (> 14 days from the moment of the disease).

Surgical interventions undertaken for infected pancreatic cancer should pursue the following goals: 1) interrupting the chain of the inflammatory process; 2) prevention of progression of the purulent-necrotic process; 3) prevention of the formation, late purulent-necrotic complications.

In our work over the past 5 years, we have categorically abandoned the use of passive drainage techniques and the use of gauze swabs for PNC. For the following reasons: with passive drainage using tubular drainages made of polyvinyl chloride, the latter cease to function after 12-24 hours as they become clogged with fibrinous deposits and sequestered necrotic tissues of the pancreas and retroperitoneal tissue [5]. The use of tampons is also ineffective in draining purulent-necrotic lesions, since after 4-6 hours the tampon turns into a “plug” soaked in pus, preventing the outflow of purulent exudate from the purulent-necrotic lesion [1], which necessitates the need to change tampons to maintain their drainage function every 6 hours, and this is an additional injury [6].

A negative attitude towards the use of gauze swabs and drainages was expressed at the XVI Congress of Russian Surgeons. The decision of the congress noted that tamponing of purulent cavities in modern surgery should be extremely limited and in many cases completely abandoned, since gauze does not drain foci of necrosis and has a negative effect on the process of tissue regeneration.

For the last 5 years, when draining infected foci of necrosis in the omental bursa and retroperitoneal space, we have been using our own drainage-sliding design, which allows us to maintain a functioning purulent-necrotic cavity for the maximum necessary time until it is completely cleansed, with subsequent transition to traditional tubular-glove drainage. The design is a tubular drainage system, which is installed in a purulent-necrotic cavity in a folded state and, when spontaneously expanded, takes the form of a purulent cavity that prevents the walls of this purulent-necrotic cavity from collapsing and sticking together.

An analysis of drainage in the control group of patients, where gauze-tube drainage and passive tubular drainage of purulent-necrotic areas were used, showed that in 34 patients in 30 (88.2%) cases there was a need for reinstallation and revision of areas of purulent-necrotic cavities. With active drainage using methods of “cleaning” the lumen of tubular drainages, out of 77 patients, 19 (24.7%) needed to replace the drainage due to the prevalence of the purulent-necrotic process in the retroperitoneal cellular spaces and at the time of mastering their own technique.

Clinical experience has shown that the long-term closed lavage technique is more effective in the treatment of localized forms of infected necrosis; compli-

cated forms of the disease, especially in the form of retroperitoneal phlegmon with purulent streaks in the paracolic spaces, “remain” outside the influence of active drainage and can lead to the formation of new purulent-necrotic cavities. Indirect confirmation of this can be the numbers of forced (“as needed”) relaparotomies against the background of closed lavage: with localized forms of the process, they were performed in 12% of patients, with widespread forms in 40%.

The method of “open” treatment of infected pancreatic necrosis through an omentobursostomy is indicated for localized forms and for phlegmon of the retroperitoneal tissue with purulent leaks into the paracolon with additional incisions along the mid-axillary line with an entrance into the retroperitoneal space. The technique of programmed relaparotomy is indicated for purulent pancreatitis and its early intra-abdominal abscesses that do not have a “dense” delimited capsule.

When analyzing clinical observations, it was found that the passive drainage method is equally ineffective in providing treatment conditions, regardless of the degree of prevalence of the purulent-necrotic process: in localized forms of the disease, postoperative mortality was even slightly higher than in common forms of purulent pancreatitis (43.5% - 36.1% respectively).

The main disadvantage of the method of passive drainage of the omental bursa is the slow evacuation of purulent-necrotic contents, which led to the persistence of severe endotoxemia, and in some cases, a complete cessation of outflow due to blockage of the drains.

In addition, the passive drainage method did not provide the possibility of drainage of large sequestrations, which determined the need to perform staged necro-sequestrectomies.

In the control group of patients, postoperative mortality was 14 patients (41.1%), and in the main group, where active drainage using a proprietary design was used in 12 patients (15.6%).

Conclusions:

1. The main cause of infected aseptic foci of necrosis (pancreatic abscess, purulent pancreatitis, purulent omentobursitis) of necrotizing pancreatitis is secondary infection, developing 3-5 days after passive drainage and the use of gauze packing.

2. Repeated surgical interventions in 75% of cases are caused by inadequate drainage of the purulent-necrotic focus of the omental bursa and retroperitoneal cellular spaces.

3. The method of completing surgery for purulent-necrotizing pancreatitis is determined by the nature, localization and extent of the pathological process.

4. Adequate drainage of areas of purulent-necrotic foci, both in the omental bursa and in the retroperitoneal cellular spaces, is primarily aimed at interrupting the inflammatory process and eliminating moments of secondary infection.

References

1. Kostyrnoy A.V., Bugaenko O.A., Karakursakov N.E. *Stages of change treatment programs for acute peritonitis*[Text] / A.V. Kostyrnoy., O.A. Bugaenko, N.E Karakursakov// *Surgery of Ukraine*. -2009.-No. 1 (29). - P. 056-060.
2. Kostyrnoy A.V. *Surgeon's tactics for purulent-necrotic complications acute pancreatitis* [Text] / A.V. Kostyrnoy // *Clinical surgery*.- 2000.- No. 5.- P. 57.
3. *Microflora of the surgical field and blood in surgical patients with increased risk of purulent-inflammatory complications* /V.V. Zhebrovsky, Yu.L. Krivorutchenko, O.N. Myasnikova, I.V. Kaminsky//*Clinical surgery*.- 2005.- No. 11-12.- P. 25.
4. Statsenko N.I., Useinov E.B., Mironov N.I. *Study of long-term results (quality of life) in patients after treatment with laparostomy*[Text] / Statsenko N.I., Useinov E.B., Mironov N.I. // *Crimean Journal of Experimental and Clinical medicine*. - 2012. - No. 1-2 (5-6).- P. 122-124
5. Tolstykh P.I. *Drainage in surgery, obstetrics and gynecology* [Text]/ P.I. Tolstykh, A.N. Ivanyan. - M.: *Medicine*, - 2000. - 295 p.
6. *Surgical treatment of widespread pancreatic necrosis* / V.S. Savelyev, M.I. Filimonov, S.Z. Gelfand, V.A. Sobolev // *Annals of Surgery*. - 1998. - No. 1. - p. 34-39.

环形吻合器痔切除术后住院或门诊治疗痔疮的术后疼痛
**POSTOPERATIVE PAIN IN TREATING HEMORRHOIDS ON
AN IN- OR OUT-PATIENT BASIS AFTER CIRCULAR STAPLED
HEMORRHOIDECTOMY**

Satanova Karina Amantaevna

endoscopist

University Medical Center,

Master's student

Astana Medical University

Fursov Alexandr Borisovich

MD, Doctor of Medical Sciences, Professor, Head of Department

Astana Medical University

Klyshbekov Nurzhan Albekovich

Doctoral student, Master of Medical Sciences

Astana Medical University

Fursov Roman Alexandrovich

MD, PhD

Astana Medical University

概括。 痔疮是人类最常见的结肠直肠疾病之一。 它的患病率如此之高，以至于三分之一的患者需要手术干预。 本文对痔疮患者的病史和痔切除术后并发症进行了简要分析。 对“大学医学中心”外科手术室（包括阿斯塔纳医科大学外科疾病科临床基地）总共850例手术、患者的早期和长期手术治疗结果进行了分析。 将200例吻合器环形痔切除术（SCH）与其他手术治疗方法的效果进行比较。 对环形吻合器痔切除术后住院或门诊治疗痔疮的术后疼痛进行了调查和分析。

关键词。 痔疮，手术治疗，痔疮切除术，并发症。

Summary. Hemorrhoids are one of the most common coloproctological diseases in humans. Its prevalence is so high that every third patient needs surgical intervention. The paper provides a brief analysis of case histories of patients with hemorrhoidal disease and complications after hemorrhoidectomy. A total of 850 operations, early and long-term results of surgical treatment of patients operated on in the surgical department of the “University Medical Center”, including at the clinical bases of the Department of Surgical Diseases of Astana

Medical University, were analyzed. The effectiveness of 200 operation stapled circular hemorrhoidectomy (SCH) was compared with other methods of surgical treatment. Postoperative Pain in Treating Hemorrhoids on an In- or Out-Patient Basis After Circular Stapled Hemorrhoidectomy was investigated and analyzed.

Keywords: Hemorrhoids, surgical treatment, hemorrhoidectomy, complication.

Stapled circumferential hemorrhoidectomy is a commonly used procedure to treat hemorrhoidal disease. The surgical technique is essentially equivalent to the method that originates from the Longo operation (sutured mucosectomy or Longo procedure). We followed generally accepted recommendations, as well as the technique of the operation.

In circular stapled rectal haemorrhoidectomy, a stapler is used to excise an annulus of rectal mucosa above the haemorrhoids. This reduces the size of internal haemorrhoids by interrupting their blood supply and reducing the available rectal mucosa with the potential to prolapse (Fig. 1; Fig. 2).

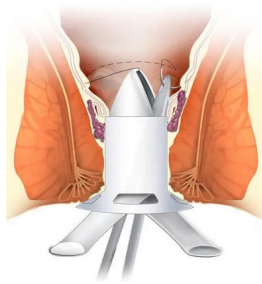


Figure 1. Insertion of a tube into the rectum, a circular surgical suture before applying a stapler suture

(Figure of the operation presented in the public domain, by Jay W. Marks, Thomas P. Sokol) https://www.medicinenet.com/stapled_hemorrhoidtomy/article.htm

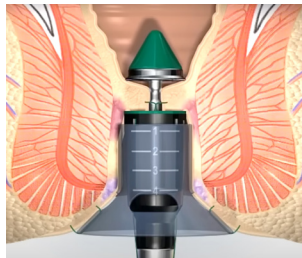


Figure 2. Stapler circular device in the rectum

By contrast, conventional surgical haemorrhoidectomy involves excision of haemorrhoidal tissue, anoderm and perianal skin.

Patient satisfaction after CSH is mainly related to postoperative pain and recurrence of hemorrhoidal symptoms. According to global statistics, hemorrhoids are one of the most common human diseases and the most frequent reason for patients to seek a consultation with a colorectal surgeon. [1]

At the same time, individual researchers acknowledge that currently, even after many years of research worldwide, there is no complete picture and scale of this disease among the population. [2]

It is widely believed that its prevalence ranges from 100 to 150 individuals per 1000 adult population, with hemorrhoids accounting for 34 to 41% of the structure of colorectal diseases. [3]

There are numerous methods for treating this disorder, the most common of which are the Milligan-Morgan procedure, ligation of hemorrhoidal nodes, and the HAL-RAR procedure (Hemorrhoidal Artery Ligation and Recto Anal Repair). [4]

Each of the aforementioned methods has its own set of advantages and disadvantages and may be associated with various early and late postoperative complications. [5] Recent global data has been comprehensively analyzed and systematized in a review article by Romaguera V.P. et al. in 2021. [6]

Thus, among the most frequent complications following operations for hemorrhoidal disease, clinicians attribute pain, urinary retention, and among the most severe are bleeding from anorectal wounds, development of purulent-inflammatory processes, and strictures of the anal canal. Various combinations of complications with significant pain syndrome should also be included in this category. The aim of our present study is to examine patient satisfaction based on the operative setting (outpatient versus inpatient treatment) in patients undergoing the CSH-operation for Grade III or IV hemorrhoids. Not many researchers have studied postoperative complications during operations in the hospital and outpatient clinic. For example, D. Kovacevic et al. (2021), [7] wrote in his study that so far, various publications have been published comparing surgical treatments for hemorrhoids, such as the Milligan-Morgan procedure, stapled mucosectomy (Longo procedure), and hemorrhoidal artery ligation.

The text then points out that in terms of complication rates, recurrence rates, and patient satisfaction, stapled mucosectomy has been proven to be a reliable procedure for grade III and IV hemorrhoids, despite a slightly higher recurrence rate. [8,9,10]

In addition, the Longo procedure can be performed safely in an outpatient setting. [11,12]

In most studies, however, clinical success tended to be measured by typical clinical endpoints (pain, relapse rate, bleeding, etc.), while eligibility for outpatient treatment was not a parameter of interest.

Materials and methods

The results of all patients who underwent SCH for grade III and IV hemorrhoids were analyzed retrospectively and prospectively.

A total of 200 people underwent surgical treatment.

The operated patients were selected using random statistical and reliable sampling. They were observed for a total of 2 years.

In our scientific observation, as in other studies, we adhered to the following principles.

The decision whether a patient was treated in an out- or inpatient setting was based on patient preference and surgeon recommendation. All patients signed an informed consent before the operation, allowing for their data to be used for scientific research.

To study postoperative pain, we completely repeated the method of D. Kovacevic et al. (2021).

However, unlike the above-mentioned researchers, we examined the operated patient at a doctor's appointment in the clinic or when visiting him at home.

The questionnaire was filled out on paper during the collection of information about complaints, about postoperative history, during the examination of the anal and perianal area (for the presence or absence of relapse).

Additionally, postoperative pain was queried using a visual analogue scale (VAS - range: 0–10, where 0 = no pain and 10 = worst possible pain). [13] Previously, in other studies, we found that the occurrence and prevalence of pain after different operations differ. For example, in patients undergoing surgery in general surgery departments, the prevalence of pain in the lower back, thoracic spine and neck increases with age. [14] We do not know what clinical picture of pain is recorded after stapled hemorrhoidal surgery, so we conducted our own study.

Statistical Analysis

In our calculations, we used all the indicators and stages of statistical calculations that scientists from Switzerland made and published in 2021. [7] Comparative analysis of overall satisfaction, complications, and pain intensity with respect to the hospitalization setting (in- or outpatient) were performed. All statistical analyses were performed using program Statistica 12 (USA). To evaluate the level of influence of the independent variables on the dependent variables, 2 types of analyses were conducted (Kendall rank correlation using the Tau-b statistic and chi-squared test of independence).

A retrospective analysis of medical records of patients diagnosed with hemorrhoidal disease I-IV stages, treated from 2022 to 2024, was conducted. During this period 850 operations were performed on patients aged 18 to 80 years.

Among women, the frequency of surgical interventions was 50.3%, while among men it was 49.7%.

A total of 400 hemorrhoidectomies were performed using the laser vaporization method, 200 CSH method, 150 - surgeries were conducted using the traditional Milligan-Morgan technique, and 100 hemorrhoidectomies were performed by placing ligating rings.

All methods were compared with each other on the basis of postoperative pain and quality of life after surgery.

Thus, we have determined that a total of 200 consecutives sutured mucosectomy - circular stapled hemorrhoidectomy (CSH) was performed during the study period. Of these, complete datasets of 100 patients (hospital) and 100 (policlinic) were available for final analysis. The rest of the patients, a total of 650 people were excluded by random sampling and other reasons. This cohort (143) included people who refused to participate in the observation, who changed their place of residence. There were no patients who died after the operation.

The patient collective of each hospital and polyclinics was comparable; dissimilarities were observed only in three variables (proportion of male-to-female patients, average age, and proportion of in-patient treatment), which did not affect the overall observations and correlations.

Observation results

A total of 45 (45%) reported pain after surgery. Of these, 28 patients had an intensity level of 4 or more on the VAS after surgery. The mean pain level was 5.8 ± 1.9 . The majority of patients who complained of pain were men ($n = 49, 72\%$). The mean VAS score did not differ significantly by gender. There were no differences or statistically significant correlations between postoperative pain intensity and hospitalization setting (inpatient or outpatient).

According to our data, in contrast to other researchers, there were insignificant differences. For example, by age and pain intensity. In general, pain levels decreased with increasing patient age, and patients over 60 years of age never reported pain above VAS (Figure 3).

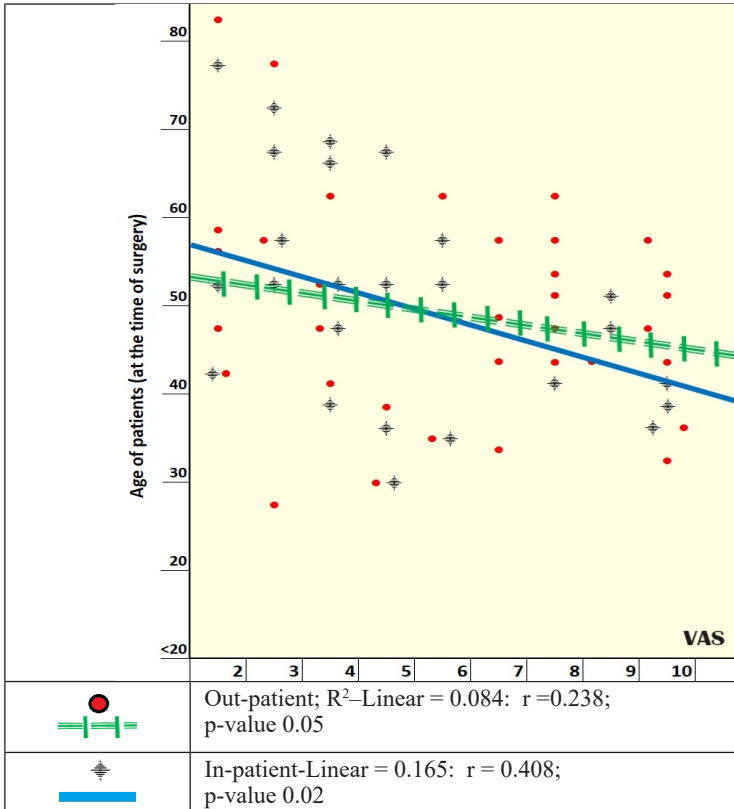


Figure 3. Statistical graphs of the correlation between the intensity of postoperative pain and the conditions of hospitalization (inpatient or outpatient).

When examined in outpatient and inpatient settings, there was no significant difference in reported pain levels.

Conclusions

Our research and results are consistent with other authors who have suggested that patient satisfaction after surgery is more related to pain. In our present study, postoperative satisfaction was primarily associated with postoperative complications such as age-related pain. To a lesser extent, it is related to the place where the operations were performed (the operations were performed inpatient or outpatient). Postoperative pain had the greatest impact on patient satisfaction. In our observation, the average VAS score was 5.8, which is slightly lower than the results of other known studies.

References

1. Sheikh P, Régnier C, Goron F, Salmat G. *The prevalence, characteristics and treatment of hemorrhoidal disease: results of an international web-based survey.* *J Comp Eff Res.* 2020 Dec;9(17):1219-1232. doi: 10.2217/cer-2020-0159
2. Gallo, G., Sacco, R., Sammarco, G. (2018). *Epidemiology of Hemorrhoidal Disease.* In: Ratto, C., Parello, A., Litta, F. (eds) *Hemorrhoids. Coloproctology.* Springer, Cham. https://doi.org/10.1007/978-3-319-51989-0_1-1
3. Shelygin Yu.A., Blagodarny L.A., Achkasov S.I. *Handbook of Coloproctology.* - Moscow: LitTerra, 2014. - 596 p.
4. Torrinha G, Gonçalves T, Sousa M, Högemann G, Goulart A, Carvalho AF, Leão P. *The effects of laser procedure in symptomatic patients with haemorrhoids: A systematic review.* *Front Surg.* 2022 Dec 12;9:1050515. doi: 10.3389/fsurg.2022.1050515
5. Moldovan C, Rusu E, Cochior D, Toba ME, Mocanu H, Adam R, Rimbu M, Ghenea A, Savulescu F, Godoroja D, Botea F. *Ten-year multicentric retrospective analysis regarding postoperative complications and impact of comorbidities in hemorrhoidal surgery with literature review.* *World J Clin Cases.* 2023 Jan 16;11(2):366-384. doi: 10.12998/wjcc.v11.i2.366
6. Romaguera VP, Sancho-Muriel J, Alvarez-Sarrdo E, Millan M, Garcia-Granero A, Frasson M. *Postoperative Complications in Hemorrhoidal Disease and Special Conditions.* *Rev Recent Clin Trials.* 2021;16(1):67-74. doi: 10.2174/1574887115666200406114218
7. D. Kovacevic, G. Gubler, M. Turina, M. K. Muller, A. Nocito, N. Attigah, M. Weber. *Postoperative Pain as a Decision-Making Tool in Treating Hemorrhoids on an In- or Out-Patient Basis After Stapled Mucosectomy (Longo Procedure).* *Int Surg* (2019) 104 (9-10): 461–466. <https://doi.org/10.9738/INTSURG-D-19-00012.1>
8. Rowsell M, Bello M, Hemingway DM. *Circumferential mucosectomy (stapled haemorrhoidectomy) versus conventional haemorrhoidectomy: randomised controlled trial.* *Lancet* 2000; 355 (9206): 779– 781
9. Mehigan BJ, Monson JR, Hartley JE. *Stapling procedure for haemorrhoids versus Milligan-Morgan haemorrhoidectomy: randomised controlled trial.* *Lancet* 2000; 355 (9206), 782– 785
10. Ribarić G, Kofler J, Jayne DG. *Stapled hemorrhoidopexy, an innovative surgical procedure for hemorrhoidal prolapse: cost-utility analysis.* *Croat Med J* 2011; 52 (4): 497– 504
11. Diurni M, Di Giuseppe M. *Hemorrhoidectomy in day surgery.* *Int J Surg* 2008; 6 (Suppl 1): S53– S55
12. Stolfi VM, Sileri P, Micossi C, Carbonaro I, Venza M, Gentileschi P et al *Treatment of hemorrhoids in day surgery: stapled hemorrhoidopexy vs Milligan–Morgan hemorrhoidectomy.* *J Gastrointest Surg* 2008; 12 (5): 795– 801

13. Funke F. *Vergleich Visueller Analogskalen und Kategorienskalen in Offline- und Online Design; Magisterarbeit im Studiengang Soziologie am Institut für Soziologie des Fachbereichs Sozial- und Kulturwissenschaften der Justus-Liebig-Universität Giessen; 2004*

14. Фурсов А.Б., Дюсенбаев Н.Н., Геринг Э.Я., Фурсов Р.А. Боль в спине после хирургической операции у больных ожирением // *Материалы Международных конференций. Израиль (Тель-Авив, 2020); / В сборнике: Современные проблемы науки и образования, Москва, 2020. С. 150-151. <https://search.rae.ru/?string=%C1%CE%CB%DC+%C2+%D1%CF%8%CD%5+%CF%CE%D1%CB%5+%D5%8%D0%D3%D0%3%8%D7%5%D1%CA%CE%9+%CE%CF%5%D0%0%D6%8%8+%D3+%C1%CE%CB%DC%CD%DB%D5+%CE%6%8%D0%5%CD%8%5%CC&type=title&mode=search&selino=1>*

斯塔夫罗波尔州立医科大学学生睡眠障碍的评估
**ASSESSMENT OF SLEEP DISORDERS IN STUDENTS OF
STAVROPOL STATE MEDICAL UNIVERSITY**

Arova Sofia Vitalievna

Student

Stavropol State Medical University

Vlasova Yulia Gennadievna

Student

Stavropol State Medical University

Raevskaya Anastasia Igorevna

Assistant

Stavropol State Medical University

抽象的。睡眠对于维持身体的所有生理功能起着关键作用。睡眠障碍是现代社会的常见问题之一。医学生最容易出现睡眠障碍，这与精神、心理和身体的高压力有关。对斯塔夫罗波尔国立医科大学的学生进行了一项研究，以确定睡眠障碍的频率，结果表明，大多数学生都有白天嗜睡的情况，因此他们在学习中注意到了问题。该研究还确定了主要的睡眠时间型。建议在制定培训计划时考虑所获得的信息，以保持未来医生的高水平教育。

关键词：睡眠障碍、医学生、睡眠时间型、生物节律。

Abstract. *Sleep plays a key role in maintaining all physiological functions of the body. Sleep disturbance is one of the common problems of modern society. Medical students are most susceptible to sleep disorders, which is associated with high mental, psychological and physical stress. A study was conducted among students of the Stavropol State Medical University to determine the frequency of sleep disorders, which showed that the majority of students have daytime sleepiness, and for this reason they note problems in their studies. The study also determined the predominant chronotype. It is recommended that the information obtained be taken into account when drawing up training programs to maintain a high level of education for future doctors.*

Keywords: *sleep disorder, medical students, chronotype, biorhythms.*

Sleep is one of the foundations of a healthy lifestyle. Sleep patterns are central to numerous human physiological functions, particularly learning, memory con-

solidation, neurocognitive function, and mental health. It is impossible not to emphasize the special influence of sleep and wakefulness on life processes, because it is in sleep that the body is restored [1].

Purpose of the study: to determine the frequency of sleep disorders and identify the most common chronotype among students of the Stavropol State Medical University (StSMU).

Materials and methods of research. The study included 87 4th year students of the Faculty of Medicine, 79 (90.8%) women, 8 (9.2%) men. The average age was 21.4 ± 0.06 years. A questionnaire has been developed that includes 2 sections: the first, consisting of 53 questions and containing data on age, gender, the presence of bad habits, high blood pressure, the presence of hallucinations, nightmares, asthma attacks, pain or leg cramps at night, heartburn, coughing or difficulty breathing after waking up, irritability, night sweats, headaches in the morning, excess weight, feeling paralyzed after waking up; the second section is the Horn-Ostberg test for determining chronotype, which contains 23 questions. Testing took place online. Statistical processing was carried out using Microsoft Excel software.

Results. It was noted that 21.8% (n=19) of respondents had bad habits, 19.5% (n=17) of students were overweight.

To the question “Do you have difficulty falling asleep?” 39.1% (n=34) of respondents answered in the affirmative; 28.7% (n=25) of students are afraid of not falling asleep. Thoughts that are “spinning” in the head prevent 51.7% (n=45) of respondents from falling asleep. 52.9% (n=46) of survey participants noted that they worry about trifles and cannot relax, 16.1% (n=14) wake up at night and cannot fall asleep, and 23% (n=20) wake up earlier in the morning than they would like and cannot fall asleep again. It takes 48.3% (n=42) of respondents more than half an hour to fall asleep.

40.2% (n=35) indicated a decrease in emotional background; 34.5% (n=30) of respondents answered affirmatively to the statement “my friends and family members say that I am often grumpy and irritable.”

9.2% (n=8) of respondents note the presence of snoring and at least once suddenly woke up with a feeling of lack of air, 2.3% (n=2) – stopping breathing during sleep. 13.8% (n=12) of respondents noted increased night sweats, rapid heartbeat or interruptions in heart function at night. 3.4% (n=3) of students experienced increased blood pressure.

Morning headache bothers 31% (n=27) of survey participants. Sleep during colds worsens in 34.5% (n=30) of students. Daytime sleepiness is experienced by 73.6% (n=64) of respondents, problems with concentrating during study are observed in 70.1% (n=61), and 27.6% (n=24) responded that they experience difficulties in studying due to drowsiness. 29.9% (n=26) of respondents often report “fog” in their heads.

16.1% (n=14) with sudden strong emotions (anger or surprise) feel severe muscle weakness in the limbs. 51.7% (n=45) of students had a “waking dream”. To the statement “I fell asleep during or immediately after a sudden physical effort,” 21.8% (n=19) of medical students answered in the affirmative. Sometimes, when falling asleep, 17.2% (n=15) of respondents experienced hallucinations. To the statement “I have to make a lot of effort to carry out daily duties,” 40.2% (n=35) of respondents answered “yes”; 12.6% (n=11) of students fell asleep while laughing or crying. Nightmarish dreams were noted immediately after falling asleep in 29.9% (n=26) of respondents. 25.3% (n=22) fall asleep several times during the day, 60.9% (n=53) have periods of overwhelming sleepiness during the day when they fall asleep despite their best efforts to stay awake. Episodes of feeling a paralyzed body after waking up (I was fully conscious, but could not move) in 28.7% (n=25) of the survey participants.

19.5% (n=25) of respondents confirmed the presence of frequent heartburn (burning sensation behind the sternum, in the throat), waking up at night with a feeling of sour or bitter taste in the mouth 9.2% (n=8), and 11.5% (n=10) are forced to use antacids almost every week due to stomach problems. 28.7% (n=25) of respondents have a hoarse voice in the morning. 9.2% (n=8) indicated night attacks of coughing or difficulty breathing; 13.8% (n=12) of survey participants answered affirmatively to the statement “I often have a sore throat.” 3.4% (n=3) suddenly wake up at night with a feeling of suffocation and cannot breathe for some time.

During periods of lack of physical activity, 16.1% (n=14) felt muscle tension in the legs, 40.2% (n=35) of students (or their loved ones) noticed twitching of the limbs during sleep. The statement “I was told that I often “shudder in my sleep”” was affirmative in 25.3% (n=22) of cases. At rest or while falling asleep, 13.8% (n=12) of people note the occurrence of unpleasant burning sensations or crawling sensations in their legs. 20.7% (n=18) of respondents had pain or cramps in the legs at night. Sometimes 24.1% (n=21) of respondents could not lie quietly at night due to discomfort in their legs and were forced to move them to relieve symptoms. 19.5% (n=17) of students woke up with the feeling that their muscles were stiff or sore. To the statement “even if I slept all night, I feel sleepy the next day,” 64.4% (n=56) of survey participants answered in the affirmative.

Among the 87 students surveyed, the predominant chronotype was “pigeon” - 63 participants (72.4%), in second place was “owl”, 20 students (23%), in third place was “lark”, 4 respondents (4.6%).

Discussions. According to the literature, the prevalence of sleep disorders ranges from 22% to 65%. They are associated with the influence of a number of endogenous and exogenous factors, including chronic diseases such as hypertension, diabetes mellitus and coronary heart disease [8]. Symptoms of stress - in

creased fatigue, insomnia, excessive daytime sleepiness, anxiety, irritability and depression, characteristic of medical students, are much less common among people engaged in physical labor [6]. Research shows that 70–76% of medical students have poor sleep quality. Sleep disorders in young people affect learning and intellectual-mnemonic functions, affect behavioral patterns and social functioning. Therefore, in the last decade, much attention has been paid to the problem of sleep disorders at a young age [2,9].

Sleep disturbance is a change in the quality and/or quantity of physiological sleep. Existing types of sleep disorders include: insomnia (insomnia), narcolepsy, obstructive sleep apnea syndrome, periodic movement disorder of the limbs, circadian rhythm disorder [4,8]. Insomnia or insomnia has become a pressing problem among medical students. Due to the high academic load, stress and responsibility associated with their future profession, many students experience sleep disorders. This not only reduces their quality of life, but can also negatively impact their academic and professional performance. To effectively solve the problem of insomnia in medical students, an integrated approach is required. This includes psychotherapy, lifestyle modification, and the introduction of prevention programs at the educational level. An in-depth study of the psychophysiological status of students will allow us to better understand the mechanisms of the development of insomnia in young people studying at medical universities. This will make it possible to develop targeted recommendations for educational institutions to create conditions that promote normalization of sleep in students [7,10].

Also, one of the important reasons for disturbances in sleep and wakefulness is the peculiarity of circadian rhythms. The daily routine of modern students is aimed at motivated social adaptation to the educational process, while medical students are under greater psychophysiological stress, because the amount of information that they absorb over 5-6 years of study corresponds to at least 3 cycles of higher education. Long-term “overload” contributes to the adjustment of lifestyle to the requirements of the educational process, which is often accompanied by a disruption of the “biological clock” of circadian rhythm and sleep. In chronobiological observations, daily cycles are characterized by chronotype, which is assessed using questionnaires - they make it possible to determine the individual characteristics of the daily cycle and the nature of adaptation to the daily routine [3].

Chronotype is the individual characteristics of the body’s daily rhythms, a type of temporary organization determined by the human constitution. Since ancient times, people have thought about the fact that a person has certain biological rhythms, on which a person’s daily routine and life as a whole depend, but only in 1939 did the American neurophysiologist N. Kleitman begin the scientific study of this issue, suggesting the existence of a basic 24- clock rhythm of sleep and wakefulness. Next, the Swedish psychologist O. Oquist began studying chronotypes,

and also developed the first questionnaire to determine them, in which 3 types were considered: “larks” - they get up early, are most active and productive in the first half of the day; “pigeons” - approximately 55% of people belong to them, average between a lark and an owl; “night owls” - get up late, fall asleep late, feel best in the evening and at night [5].

According to the study, 64 (73.6%) respondents indicated daytime sleepiness, and 61 (70.1%) had problems with their studies due to sleepiness. This may be a consequence of impaired sleep quality or lack of quantity, which is caused by mental, psychological and physical stress. Morning headache in 27 (31%) respondents can also be caused by a violation of the quantity and quality of sleep; such students were recommended to keep a headache diary. 46 (52.9%) students worry about trifles and cannot relax. Medical students who experience sleep disturbances associated with high levels of anxiety and stress are advised to eat a healthy diet, adhere to a “study and rest” regime, play sports, daily walks in the fresh air, avoid caffeine-containing products, and consult a psychologist.

An important role in reducing the quality of life of medical students is played by such sleep disorders as obstructive sleep apnea syndrome, signs of which were noted in 2 (2.3%) people, restless legs syndrome - in 12 (13.8%) respondents, sleep paralysis - in 25 (28.7%), hallucinations when falling asleep - in 15 (17.2%) students, nightmares - in 26 (29.9%). For such students, consultation with a neurologist is recommended.

The quantitative and qualitative characteristics of sleep can be affected by somatic diseases, such as gastroesophageal reflux disease (GERD), signs of which can be suspected in 17 (19.5%) respondents, noting heartburn after sleep, diseases of the cardiovascular system - in 12 (13.8%) of students note interruptions in heart function at night, 3 (3.4%) have high blood pressure, and 17 (19.5%) respondents are overweight. Such students are recommended to consult with specialized specialists - a therapist, gastroenterologist, cardiologist, endocrinologist.

Poor quality and lack of sleep can also cause headaches, dizziness, problems with the gastrointestinal tract, frequent infectious diseases, decreased performance and concentration, and weight gain. 35 (40.2%) students often experience sadness, apathy and emotional burnout. To prevent the occurrence of such problems, we recommend implementing activities to teach sleep hygiene, increase awareness of the importance of healthy sleep, and implement insomnia and sleep quality screening programs for students.

As a result of the analysis of the chronotype test, it turned out that the performance of most students increases during the daytime, namely between 12 and 16 hours. Biological rhythms play a vital role in the lives of students, therefore, knowledge of the chronotype and adherence to the regime, physical and mental activity taking into account individual characteristics and the development of internal biorhythms can have a positive effect.

Conclusion. The study determined the high incidence of sleep disorders among students of Stavropol State Medical University. The identified problems can significantly affect the quality of life, health and education of young people. Analyzing the types and causes of sleep disorders in students, and then taking appropriate measures to prevent and eliminate these problems will help maintain not only high academic performance, but also the physical and mental health of medical students. Also, during the study, the chronotype that prevailed among medical students of Stavropol State Medical University was determined. Knowing your own chronotype is of great importance for every student, since thanks to it, you can properly plan your day, as well as distribute responsible work in such a way as to perform it productively.

References

1. Vodyakhina A.Ya., Alramadan B.A., Morozov E.A. Study of sleep disorders among 1st and 4th year students of Belgorod State National Research University. *Young scientist*. 2021;46:28-30. (In Russ.)
2. Golenkov A.V., Ivanova I.L., Kuklina K.V., Petunova E.A. Epidemiology of sleep disorders in medical students. *Bulletin of Chuvash University*. 2010;3:98-102. (In Russ.)
3. [Datieva F.S., Belyaeva V.A., Takoeva E.A., Nartikoeva M.I. Evaluation of the Munich Chronotype Questionnaire in medical students. *Modern issues of biomedicine*. 2021;2:71-80. (In Russ.) https://doi.org/10.51871/2588-0500_2021_05_02_5
4. Ionova, A. S., Popov M. V. Hygienic study of the prevalence of sleep disorders among medical students. *Youth innovation newsletter*. 2022;11:50-53. (In Russ.)
5. Kolesnik N. T., Bessudnova A. A. Relationship between chronotypes and human performance. *Current problems in the theory and practice of psychological, pedagogical and linguodidactic research: materials of the international scientific and practical conference*. 2023;2:479-483. (In Russ.)
6. Ryabkova A.S., Lyshov V.F., Shchetinkina N.A. Sleep disturbances, daytime sleepiness and symptoms of sleep apnea in college students. *Youth innovation newsletter*. 2015;4:319-320. (In Russ.)
7. [Saidova M.G., Ganieva M.T., Khalimova F.T., Karomatov I.D. Chronic fatigue, sleep disorders and their role in the educational process among medical students. *Biology and Integrative Medicine*. 2023;6:89-118. (In Russ.) <https://doi.org/10.24412/ci-34438-2023-6-89-118>
8. Chernykh N.Yu., Skrebneva A.V., Melikhova E.P., Vasilyeva M.V. Prevalence of sleep disorders among medical students. *Russian Bulletin of Hygiene*. 2021;3:23-27. (In Russ.) <https://doi.org/10.24075/rbh.2021.018>

9. Alsaggaf MA, Wali S.O, Merdad R.A, Merdad L.A. Sleep quantity, quality, and insomnia symptoms of medical students during clinical years. Relationship with stress and academic performance. *Saudi Med J.* 2016;37:173-182. <https://doi.org/10.15537/smj.2016.2.14288>

10. Perotta B, Arantes-Costa FM, Enns SC, Figueiro-Filho EA, Paro H, Santos IS, Lorenzi-Filho G, Martins MA, Tempiski PZ. Sleepiness, sleep deprivation, quality of life, mental symptoms and perception of academic environment in medical students. *BMC Med Educ.* 2021 Feb 17;21(1):111. <https://doi.org/10.1186/s12909-021-02544-8>

考试期间学生心理情绪状态的评估

**ASSESSMENT OF THE PSYCHOEMOTIONAL STATE OF
STUDENTS DURING THE EXAMINATION SESSION**

Khidriev Khamzat Magometovich

Student

Stavropol State Medical University

Mirzoyan Anastas Mirzoevich

Student

Stavropol State Medical University

Kusogonov Alkhayat Tagirovich

Student

Stavropol State Medical University

Raevskaya Anastasia Igorevna

Assistant

Stavropol State Medical University

抽象的。 研究学生的心理情绪状态水平是现代教育体系亟待解决的问题之一。 当前,由于学业负担增加,持续暴露在压力因素下,学生的心理水平有恶化的趋势,例如教育课程中信息量大,需要在短时间内掌握并直接学习,准备考试。为了避免学生神经系统资源的耗尽,有必要制定适当适应压力因素的建议。

关键词: 抑郁、焦虑、幸福感、活动、情绪、心理情绪状态、学生。

Abstract. Studying the level of psycho-emotional state of students is one of the pressing problems of the modern education system. Currently, there is a tendency towards a deterioration in the psychological level of students due to increasing academic loads, continuous exposure to stress factors, such as large amounts of information in the educational program, the need to master it in a short period and, directly, preparation for the examination session. In order to avoid depletion of the resources of the nervous system of students, it is necessary to create recommendations for adequate adaptation to stress factors.

Keywords: depression, anxiety, well-being, activity, mood, psycho-emotional state, students.

The health status of students is a pressing problem of modern education. During the examination period, many vital systems (cardiovascular, nervous, endocrine, etc.) of the body undergo a number of changes due to stress, anxiety and depression. Any inadequate stimulus (internal or external) that causes a protective biological reaction is called stress. Prolonged exposure to emotional stress causes chronic fatigue, which negatively affects human health. Often, pathophysiological complications arise as a result of stress, and medical students exposed to it have a higher likelihood of such disorders as apathy and anxiety. A number of studies indicate that stress is a decisive factor in the development of depression. Depression is a mental disorder manifested by depression, melancholy and low mood [15]. Anxiety is episodic manifestations of worry, apprehension, and disturbance of peace. Most people with anxiety describe it as a feeling of nervousness and worry [7,9,13]. As of 2019, the number of people with anxiety disorders in the world was estimated at 301 million people [8, 9]. The problem of anxiety and depressive disorders among medical students is quite relevant [1]. The main factors of student stress are a large amount of material studied, final colloquiums after each cycle, interaction with patients in clinical disciplines, and others [2,6].

The prevalence of mental disorders among students of medical universities, according to various authors, varies from 2.2% to 29.0%, depression - from 6.0% to 66.0%, anxiety - from 7.7% to 65.5% [10]. Thus, the above determines the relevance of this work, the purpose of which was to study the psycho-emotional state among students during the examination period, as well as to substantiate the possibilities of increasing the adaptability and stress resistance of future doctors at the stage of their training at the university.

Purpose: to study the psycho-emotional state of students and substantiate the possibilities of increasing the adaptability and stress resistance of future doctors at different stages of their training at a medical university.

Material and research methods. The study base was the Stavropol State Medical University (StSMU) and the North Caucasus Federal University (NCFU). The study involved 160 students (80 men and 80 women) in their 4th year at St. State Medical University and North Caucasus Federal University. The age category of respondents is from 20 to 23 years. The assessment of the level of psycho-emotional state took place in 2 stages. At stage 1 - a month before the session and at stage 2 - during the winter examination session. Exclusion criteria were the presence of bad habits, use of medications, somatic or mental pathologies, and pregnancy.

To solve the problems, the following research methods were used: theoretical analysis of information sources, testing, measurement of blood pressure (BP) and heart rate (HR), Hospital Anxiety and Depression Scale (HADS), the "state of

health-activity-mood” (SAM). For statistical processing of scale data, Student’s t test was used.

Results. From the results of psychological tests (Figure 1-4) aimed at assessing the psycho-emotional state, it follows that not only during the session period, but throughout the entire academic year, medical students are exposed to significantly greater stress factors than students of other universities. Examinations play a special role in the negative impact on the psycho-emotional state of students.

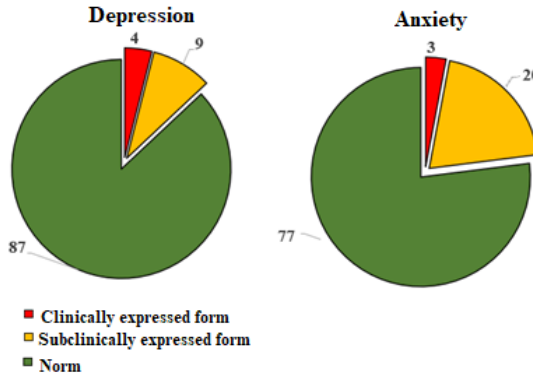


Figure 1. Results of testing students on the HADS scale before the session

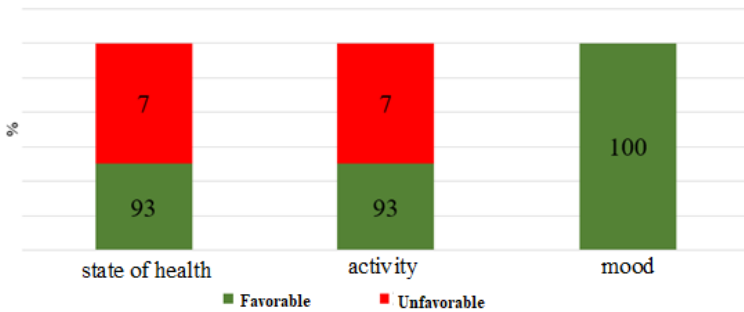


Figure 2. Results of testing students using the SAM questionnaire before the session

The results of testing for all indicators of the psycho-emotional state at the first stage among students of lower universities by score levels were satisfactory (anxiety - 5.5 points, depression, self-sensitivity - 4.8 points, activity - 4.4 points, mood -6 points, compared with those that were obtained at the second stage anxiety - 8 points, depression - 8.3 points, well-being - 4.0 points, activity - 3.8 points,

mood - 4.4 points (Fig. 1-4 It was found that that against the background of stress, students developed somatic disorders: 102 (64%) students began to experience headaches, 78 (49%) students noted the appearance of tachycardia and chest pain, 59 (37%) noted an increase in systolic and diastolic blood pressure There was a need to seek psychological help during the session among 64 (40%) students.

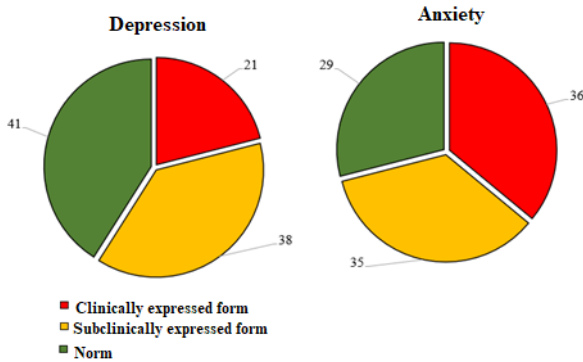


Figure 3. Results of students testing on the HADS scale during the session

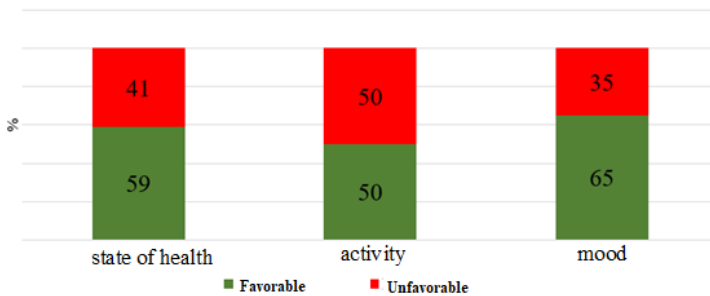


Figure 4. Results of testing students using the SAM questionnaire during the session

Discussion. Students with a high level of negative influence on the psycho-emotional state in all respects exhibit the following clinical symptoms: sudden changes in mood; during “downturns” they often experience a lack of energy, feel the need to stay in bed or the need for additional sleep, and experience a lack of motivation to study (this affects a decrease in academic performance), often or constantly feel sadness, melancholy, or are in a state of depression, apathy, and their performance is impaired. Typically these “downs” last for several days,

sometimes several weeks. In addition, they may experience periods of “normal” mood (between mood swings) during which mood and energy levels feel “normal” but performance is impaired. During “ups” they can take on a lot of tasks at the same time, which they do not have time to complete at the same time, they become very talkative, sociable, their behavior seems strange or irritates others, they sleep less, are more able to take risks, and take on several tasks at the same time.

Strong psycho-emotional overexcitation (negative emotions) causes, first of all, activation of higher autonomic centers, including the ergotropic nuclei of the hypothalamus (mainly the posterior nuclei), and, in general, activation of the sympathetic nervous system. This increases the functionality of the cardiovascular and respiratory systems, and skeletal muscles. At the same time, there is an increase in the activity of the trophotropic nuclei of the hypothalamus, which increases the activity of the parasympathetic system and thereby provides high possibilities for restoration processes aimed at maintaining homeostasis in the body. Activation of the sympathoadrenal system (SAS), as the main stress-releasing system, in response to the occurrence of psycho-emotional stress promotes an increase in the level of catecholamines (adrenaline, norepinephrine, dopamine), which regulate blood pressure and heart rate, and interaction with adrenergic receptors [4]. The SAS also stimulates the release of renin, which leads to increased resistance, sodium and water retention, and increased blood pressure. Proof of this was the results of measurements of blood pressure and heart rate in the examined students during preparation for the session, the average values of which were 135/90 mm. Hg and 92 beats/min, respectively. Increased activity of the sympathetic nervous system leads to an increased risk of developing cardiovascular pathologies due to narrowing of the coronary vessels and reflex increased cardiac activity [4,12].

Thus, the stress experienced by medical students may be caused by the educational process associated with obtaining a medical specialty, studying various disciplines, and being in the academic system for a long time. In addition, most medical students do their internships in teaching hospitals, with direct contact with patients. Medical students are more likely to face excessive stress, anxiety, depression and anxiety due to factors such as longer stays in university and hospitals, more rigorous academic syllabus, strain in clinical practice as well as pre-exam period.

Conclusion. The examination session is a strong stress factor for students, which is manifested in the deterioration of their psycho-emotional state, which, in turn, affects the effectiveness of preparation for exams and academic performance. The results of the study indicate the need to create programs for socio-psychological support for students, focused on helping in overcoming emotional problems that arise at various stages of education. Students are advised to maintain a healthy lifestyle, not resort to bad habits, and observe sleep-wake biorhythms. In order to

avoid depletion of the resources of the nervous system of students, it is necessary to create recommendations for adequate adaptation to stress factors, not only for themselves, but also for teachers: professional communications of teachers should convey exclusively positive emotions, shaping the psychological health of students.

References

1. *Abasova G.B., Dikhanbaeva G.A., Abdikhadirova A. The problem of anxiety and depressive disorders among students of a higher educational medical institution. Bulletin of the Kazakh National Medical University. 2012;4:1–3. (In Russ.)*
2. *Bobrshcheva-Pushkina N.D., Kuznetsova L.Yu., Popova O.L. Examination stress in medical students: prevalence, causes and prevention. Hygiene and sanitation. 2018;5 (In Russ.)*
3. *Gorodetskaya I.V., Solodovnikova O.I. Assessment of the level of educational stress among VSMU students. VSMU Bulletin. 2016;2:118-128. (In Russ.)*
4. *Zotova O.M., Zotov V.V. Information overload as a stress factor for university students. Kursk scientific and practical bulletin “Man and his health.” 2015;(4):108-115. (In Russ.)*
5. *Imamgalieva L.A. Sociological analysis of the influence of stress on students’ learning behavior. Bulletin of Tambov University. Series: Social Sciences. 2017;2(10). (In Russ.)*
6. *Matyushkina E.Ya. Learning stress in students in different forms of education. Counseling psychology and psychotherapy. 2016;24(2):47–63. (In Russ.) doi: 10.17759/cpp.2016240204*
7. *Bouras N, Holt G. Psychiatric and Behavioral Disorders in Intellectual and Developmental Disabilities (2nd ed.). Cambridge University Press. 2007. [(In Russ.)]*
8. *Byers AL, Yaffe K. Depression and risk of developing dementia. Nat Rev Neurol. 2011;7(6):323-31. doi: 10.1038/nrneurol.2011.60*
9. *Chand SP, Marwaha R. Anxiety. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing. 2024.*
10. *GBD Results Tool. B: Global Health Data Exchange [веб-сайт]. Seattle: Institute for Health Metrics and Evaluation. 2019*
11. *Hope V, Henderson M. Medical student depression, anxiety and distress outside North America: a systematic review. Med Educ. 2014;48(10):963-79. doi: 10.1111/medu.12512*
12. *Mao Y, Zhang N, Liu J, Zhu B, He R, Wang X. A systematic review of depression and anxiety in medical students in China. BMC Med Educ. 2019;19(1):327. doi: 10.1186/s12909-019-1744-2*

13. Miceli M, Castelfranchi C (2014-11-27). *Expectancy and emotion*. Oxford: Oxford University Press.

14. Moutinho IL, Maddalena NC, Roland RK, Lucchetti AL, Tibiriçá SH, Ezequiel OD, Lucchetti G. *Depression, stress and anxiety in medical students: A cross-sectional comparison between students from different semesters*. *Rev Assoc Med Bras* (1992). 2017;63(1):21-28. doi: 10.1590/1806-9282.63.01.21

15. Zeng W, Chen R, Wang X, Zhang Q, Deng W. *Prevalence of mental health problems among medical students in China: A meta-analysis*. *Medicine* (Baltimore). 2019;98(18):e15337. doi: 10.1097/MD.00000000000015337

哈萨克斯坦交通基础设施数字化的主要方向
**THE MAIN DIRECTIONS OF DIGITALIZATION OF
KAZAKHSTAN'S TRANSPORT INFRASTRUCTURE**

Tazhigulova Gulmira Olzhabayevna

*Doctor of Pedagogical Sciences, Full Professor
Karaganda State University, Republic of Kazakhstan*

Tazhigulov Almas Amantaevich

Candidate of Technical Sciences, Professor

Kosybayev Zhanat Zkryevich

Candidate of Technical Sciences, Professor

Kizdarbekova Makpal Zhyrenbayevna

*Master of Technical Sciences, Senior Lecturer
Karaganda Buketov University, Republic of Kazakhstan*

Seitov Ruslan Mukhtarovich

*Senior Lecturer
Karaganda Buketov University, Republic of Kazakhstan*

抽象的。 本文讨论了哈萨克斯坦运输活动数字化的问题。 作者提供了描述国家政策和交通基础设施数字化框架内数字化转型条件的数据。 分析了通过数字技术改善和协调交通运输业发展的可能性。

关键词: 交通运输业信息化、交通运输服务、交通运输、交通运输、交通物流系统。

Abstract. *The article discusses the issues of digitalization of transport activities in Kazakhstan. The authors present data characterizing the conditions of digital transformation within the framework of state policy and the digitalization of transport infrastructure. The possibilities of improving and coordinating the development of the transport industry through digital technologies are analyzed.*

Keywords: *informatization of the transport industry, transport services, transport, transportation, transport and logistics system.*

Today, digital technologies are being integrated into all sectors of the economy, including the transport industry. This trend is observed everywhere. Digitalization of the transport industry is a continuous process of introducing modern dig-

ital technologies and innovations to optimize the operation of the transport system. With the development of information technology and communication networks, transport is becoming more intelligent and efficient.

Most developed countries prioritize the direction of digital transformation within the framework of public policy, which is manifested in the development of various strategically important government programs.

Thus, the purpose of the State Program “Digital Kazakhstan” [1] is to increase the rate of economic growth, improve the quality of life of the population through the introduction of digital technologies, as well as create conditions for the transition of the economy to a new level. The Digital Kazakhstan program identifies key development vectors to achieve this goal:

Digitalization makes it possible to improve the management of transport infrastructure, ensure faster and safer delivery of goods and passengers, reduce costs and improve the quality of service. Digitalization of transport infrastructure is the process of introducing modern digital technologies into the field of transport in order to increase efficiency and safety. With the development of information technology, the Internet of Things and artificial intelligence, the opportunities for improving transport infrastructure are becoming wider [2].

Achieving this goal implies moving along two development vectors:

“Digitalization of the existing economy” - providing a pragmatic start consisting of specific projects in the real sector, launching projects on digitalization and technological re-equipment of existing sectors of the economy, government agencies and the development of digital infrastructure.

“Creating the digital industry of the future” - ensuring long-term sustainability, launching the digital transformation of the country by increasing the level of human capital development, building institutions for innovative development and, in general, the progressive development of the digital ecosystem.

The program defines 17 main tasks to achieve the goal, one of which is: “digitalization of transport and logistics” and “smart cities”. The program also defines 5 areas of implementation:

“Digitalization of economic sectors” is the direction of transformation of traditional sectors of the economy of the Republic of Kazakhstan using breakthrough technologies and opportunities that will increase labor productivity and lead to an increase in capitalization.

The “transition to a digital state” is the direction of transforming the functions of the state as an infrastructure for providing services to the public and business, anticipating its needs.

“Implementation of the digital Silk Road” is a direction for the development of high-speed and secure infrastructure for data transmission, storage and processing.

“Human capital development” is a direction of transformation, covering the creation of a so-called creative society to ensure the transition to new realities - the knowledge economy.

“Creation of an innovative ecosystem” is the direction of creating conditions for the development of technological entrepreneurship and innovation with stable horizontal links between business, the scientific sphere and the state. The state will act as a catalyst for the ecosystem, capable of generating, adapting and introducing innovations into production.

One of the key areas of digitalization of transport infrastructure is the introduction of smart traffic management systems and intelligent vehicles. This includes the use of sensors, artificial intelligence and data analytics to optimize traffic flow and prevent accidents.

Another important aspect of the digitalization of transport infrastructure is the development of mobile applications and online services that simplify the process of ordering transport, buying tickets and tracking cargo. Thanks to digital technologies, people get access to more convenient and faster ways to move and communicate with transport companies.

A well-organized transport and logistics infrastructure is a trigger for the development of the economy by reducing transport costs for the delivery of goods from the manufacturer (seller) to the consumer.

To get the maximum effect from the development of the infrastructure of communication networks, it is necessary to simultaneously develop the transport connectivity of the territory both through the development of all types of transport communication and reducing its cost, and through the development of the infrastructure for the shipment and delivery of goods.

It should be noted that currently our country has a highly developed network of railways, but at the same time an insufficiently developed network of highways and expensive air transportation. Multimodal transcontinental cargo transportation from Europe to Asia is developing, but there is also great growth potential here. There is a small volume of sea and river transportation, which also has undiscovered growth potential.

Analysis of the global experience of digitalization of the economy:

In the United States, the first standards for an intelligent transport system were developed in the mid-90s of the last century. In the period from 2002 to 2012, the National Intelligent Transportation System program was implemented in the United States.

In Japan, the creation of an intelligent transport system began in the 70s of the last century with scientific research, which later were designed as a socially oriented program to improve national welfare.

In 2007, China adopted the “Strategy for the Development of China’s Intelligent Transport System”. The corresponding tasks for the development and im-

plementation of intelligent transport system services are reflected in the five-year plans for the development of the Chinese economy.

To ensure further growth of the transport and logistics infrastructure, the introduction of an intelligent system is required, which will affect:

- increasing transit potential through vehicle management;
- ensuring transport safety through the rapid processing of information and the development of optimal management solutions.

The experience of foreign countries demonstrates that an increase in cargo traffic can be achieved, including by optimizing paper document management, using the international standard “E-freight”, in the process of air cargo transportation, as well as the development of multimodal transportation.

The problems of the industry lie in several dimensions and relate to the internal and external contours:

- low control of transit and import cargo;
- the lack of the ability to monitor, analyze and predict all types of transportation for decision-making;
- underdeveloped logistics infrastructure.

The above-mentioned problems lead to both the non-use of transit potential and the creation of barriers to the development of domestic production.

In order to transit data and participate in the global market for the development of digital services, the construction and placement of data centers will be carried out. Multilateral partnership with telecom operators of neighboring countries will be developed with the creation of a modern, productive and scalable transport infrastructure capable of providing telecommunications traffic in the directions of Russia, China and Central Asia [3].

Digitalization of transport infrastructure has great potential to improve the lives of citizens, reduce harmful environmental impacts and increase the competitiveness of the economy. Therefore, the introduction of digital technologies into the transport industry is a necessary step for its modern development and improvement [4].

Digitalization of the transport infrastructure makes it smarter and more adaptable to changing conditions. Cities can implement traffic management systems that, based on data on the movement of cars and pedestrians, optimize flows and reduce travel time. Communication technologies between vehicles and infrastructure can improve safety and reduce the number of accidents.

Digitalization also contributes to the development of public transport and multimodality – the ability to use several modes of transport within a single trip. Passengers get access to information about timetables, routes and public transport services through mobile applications and online platforms.

Digitalization of transport infrastructure improves the conditions for environmentally sustainable mobility. The introduction of electric vehicles, car sharing

and the development of e-commerce contribute to reducing environmental pollution.

In general, digitalization of transport infrastructure is a key component of the future of smart cities and modern transport systems. It optimizes resources, increases passenger comfort and reduces the negative impact of transport on the environment. Such a wide spread of digitalization processes is associated with the rapid growth of digital technologies and their active implementation into life. In order to maintain a competitive advantage both on the world stage and within the state, many countries approve government programs providing for “digital” projects. The obvious advantages of which are:

- bridging the gap between countries, regions within the country;
- expanding the spatial boundaries of the economy;
- increasing the mobility of both business and citizens’ lives;
- increasing the degree of “openness” of the economy, etc.

At the moment, the issue of digital transformation of the entire transport and logistics infrastructure is one of the key issues on the agenda of the Eurasian Economic Commission [5]. In relation to the transport complex, it is possible to use “Industry 4.0” technologies, which include: automation of business processes, the Internet of Things, signal processing technologies, etc. The introduction of such technologies undoubtedly contributes to the economic growth of a particular region, as well as strengthening the competitive advantage of the state.

The introduction of technologies of “smart roads”, “smart transport”, and other various innovations in transport inevitably contributes to improving the efficiency of the entire transport infrastructure. So, the positive effects include: reducing traffic congestion, eliminating traffic jams; improving vehicle safety; increasing the mobility of the population, etc.

The introduction of elements of an intelligent transport system is also part of the process of digitalization of transport infrastructure. The components of an intelligent transport system are: automated measuring devices (vehicle weighing, etc.), an automatic toll collection system, recognition of climatic conditions, video monitoring, an automatic detection system for traffic violations, etc.

Intelligent systems, including technologies using artificial intelligence, are able to increase the volume of auto cargo transportation both within the region and within the framework of international communication; increase traffic flow; improve the quality and safety of transport infrastructure, strengthen control over compliance with traffic rules, road safety; reduce the death rate as a result of road accidents, etc. [6].

Digitalization of the transport and logistics system is the process of introducing modern digital technologies and innovations to optimize the management and control of the movement of goods and transport.

This process includes the use of various digital tools such as cargo tracking systems, sensors for monitoring the condition of vehicles, software for managing logistics processes and many others.

Digitalization makes it possible to improve the efficiency and transparency of the transport and logistics system, reduce costs and delivery time, and improve the quality of customer service.

In general, through the integration of digital technologies and the transportation process, transportation companies can manage their resources more efficiently, optimize routes, improve demand forecasting and improve overall system performance.

References

1. *The state program “Digital Kazakhstan”*. December 12, 2017. Access mode: <https://adilet.zan.kz/rus/docs/P1700000827>
2. Tazhigulova G., Kizdarbekova M.Zh., Kamzabekov I.M., Smagulov A. *State regulation of transport activities in the Republic of Kazakhstan // Forum. Series: Humanities and Economics*. 2022. No. 1 (27). P. 3-7.
3. *The concept of digital transformation, development of the information and communication technologies and cybersecurity industry for 2023-2029*. March 28, 2023. Access mode: <https://adilet.zan.kz/rus/docs/P2300000269>
4. Tazhigulova G., Torobekov B.T., Kizdarbekova M.Z., Beysembekov M., Baigozhina P. *The main directions of digitalization of the transportation sector in Kazakhstan // Proceedings of the International Conference “Scientific research of the SCO countries: synergy and integration”. Part 2 - Reports in English (December 8, 2021. Beijing, PRC)*. – P. 105 - 110. DOI:10.34660/INF.2021.78.61.037
5. Ayupova Z.K. Kusainov D.U. Rakhimova G.D. *On the development of the digital economy in the Republic of Kazakhstan // Greater Eurasia: development, security, cooperation*. – 2021. – № 4-1. Access mode: <https://cyberleninka.ru/article/n/o-razvitiit-sifrovoy-ekonomiki-v-respublike-kazakhstan> .
6. Vechkinzova E.A. *Modern trends and prospects of development of the transport and logistics complex of Kazakhstan // Economics, Entrepreneurship and Law*. – 2020. – Volume 10. – No. 12. – pp. 3297-3308. – DOI: 10.18334/epp.10.12.111519.

新建和改建铁路规划剖面计算机辅助设计通用模型和方法
**GENERAL MODEL AND METHOD OF COMPUTER-AIDED
DESIGN OF THE PLAN AND PROFILE OF NEW AND
RECONSTRUCTED RAILWAYS**

Bogdanov Andrey Ivanovich

*Candidate of Technical Sciences, Associate Professor
Far East State University of means of Communication,
Khabarovsk, Russia*

抽象的。本文描述了新建和改建铁路规划和剖面计算机辅助设计的一般模型和方法。新建和改建铁路的规划和剖面的一般模型由分段线性函数表示。新建和改建铁路平面轮廓计算机辅助设计的通用方法是基于多因素分析综合、层次多层次系统理论和复杂系统分解原理。后者可以消除由于历史前后的存在而设计计划和剖面的困难。

关键词：近似、计算机辅助设计、规划、纵向剖面、新建和改建铁路、分段线性函数、效率准则、复杂系统分解、多元分析、分层多级系统理论。

Abstract. *The article describes the general model and method of computer-aided design of the plan and profile of both new and reconstructed railways. The general model of the plan and profile of new and reconstructed railways is represented by piecewise linear functions. The general method of computer-aided design of the plan and profile of new and reconstructed railways is based on the synthesis of multifactor analysis, the theory of hierarchical multi-level systems and the principle of decomposition of complex systems. The latter makes it possible to eliminate the difficulties of designing a plan and profile due to the presence of pre- and post-history.*

Keywords: *approximation, computer-aided design, plan, longitudinal profile, new and reconstructed railways, piecewise linear functions, efficiency criterion, decomposition of complex systems, multivariate analysis, theories of hierarchical multilevel systems.*

Automation of the design of new and reconstructed railways has been carried out in Russia since the early 50s of the last century. The first work in this direction was aimed at creating dialogue (interactive) systems in which design decisions according to the plan and profile are developed by an engineer, and the calcula-

tion of technical and economic indicators is carried out by a computer. The main disadvantage of such systems was a significant amount of subjectivity in design decisions, depending on the knowledge and experience of the engineer.

Since the early 70s of the last century, further work on automated design of the plan and profile of new and reconstructed railways was aimed at the use of mathematical programming methods. The greatest results were achieved at TsNIIS (now VNIITS) in the application of nonlinear programming methods - the gradient projection method [1, 2]. The main disadvantage of the latter was the specification of the initial approximation designed by the engineer, which limited its widespread use in design institutes.

At the present stage, in the practice of computer-aided design, interactive systems with a highly developed interface are also used, both for calculations and for the preparation of graphic documentation (Robur Topomatic, CREDO, etc.).

The article describes the general model and method for automated design of the plan and profile of new and reconstructed railways, developed by the author on the basis of piecewise linear functions and theories of multicriteria problems and hierarchical multi-level systems [3, 4].

The plan and profile of the axis of the new and reconstructed railways are represented by a family of straight and circular curves of the second, and in plan, of the third order. For a general idea when designing a plan for new and reconstructed railways in the early stages, you can limit yourself to presenting the plan only with straight and circular curves (second-order curves) and not taking into account transition curves (third-order curves), but ensure the possibility of their arrangement by designing straight lines and circular curves of sufficient length.

The starting lines for designing a plan for a new and reconstructed railway are, respectively, the angular diagram of the main line and the angular diagram of the existing plan (1).

$$\begin{aligned} \alpha(K) &= K/R - \text{for circular curves} \\ \alpha(K) &= 0 - \text{for straight lines} \end{aligned} \quad (1)$$

Logically, the starting lines for designing the profile of the new and reconstructed railways are, respectively, the profile of the ground according to the plan of the new railway and the profile of the existing rail head (ERH) of the reconstructed railway.

The mathematical model of piecewise broken lines are piecewise linear functions, defined, for example, by the set of coordinates of their vertices [4].

The general model of the plan and profile of new and reconstructed railways is represented by the coordinates of the vertices of broken lines:

- model of the original piecewise broken line
- $$C = \{Sc(i), Zc(i)\}, \quad i \in 1, N$$
- design piecewise broken line model

$$P = \{Sp(j), Zp(j)\}, \quad j \in 1, M$$

Restrictions are imposed by SP [5] both directly on the coordinates of the design lines (applicates - the total angles of rotation in the plan and marks in the profile), and on their derivatives:

a) limitation on the curvature (slope) of the elements of the design line

$$(Zp(j+1) - Zp(j)) / (Sp(j+1) - Sp(j)) \leq \rho_{max}, \rho_{min} (i_{max}, i_{min})$$

b) limitation on the length of design line elements

$$L(j) = S_p(j+1) - S_p(j) \geq 0,5 * I_n(j) + 0,5 * I_n(j+1) + l_{min} - \text{in respect of}$$

$$L(j) = S_p(j+1) - S_p(j) \geq T(j) + T(j+1) - \text{in profile}$$

where $S_p(j), S_p(j+1)$ - picketing j and $j+1$ design line fractures;

$I_n(j), I_n(j+1), T(j), T(j+1)$ - lengths of transitions or tangents of vertical curves, at j and $j+1$ points (boundaries) of the j -th element of the plan or profile;

l_{min} - the minimum length of a direct insertion or a circular curve between the ends of the transitions or tangents of the vertical curves of the j -th element of the plan or profile.

c) limitation on applicates of the design line

• in respect of

At $\rho > \rho_{max}$ (fig. 1) size of applicates $\alpha_p(j)$ at the j -point from the condition of the rational position of the element of the design line (plan) with the value of curvature with $\rho_p = \rho_{max}$ will be equal to

$$\alpha_p(j) = (2\omega_e - \rho_p K^2(j)) / 2K(j) \tag{2}$$

where $\rho_p, K(j)$ - respectively, the curvature and length of the j - plan element;

ω_e - area of the angular diagram within - j element of the existing plan.

Equality (2), corresponding to the rational position of the project plan element within the j -element of the existing plan according to the criterion $min \sum \Delta i = 0$, causes breaks along the boundaries of the element equal to (3)

$$\Delta \alpha(j) = \alpha_p(j) - \alpha_c(j) \tag{3}$$

and which can be considered as “working marks” of the design plan for the reconstructed railway.

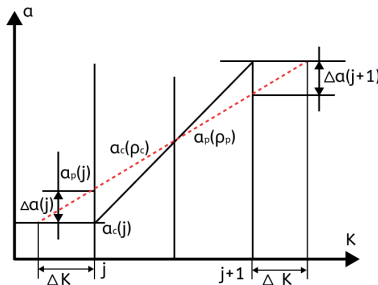


Figure 1. Limitations on “working marks” along the boundaries of plan elements

Depending on $\Delta\alpha(j)$, the shift at the j -point of the existing plan will be equal to (4).

$$\Delta(j) = \Delta\alpha(j)^2 / 2\rho_p \quad (4)$$

Hence, the restrictions on the “working marks” of the design plan for the reconstructed railway are determined as follows (5).

$$\Delta\alpha(j) \geq \sqrt{(2\Delta(j)\rho_p)} \quad (5)$$

where $\Delta(j)$ – shift constraint at the j -point of the existing plan (original line).

Restrictions on “working marks” can be ignored when designing a plan for a new railway

- in profile

When designing the longitudinal profile of new and reconstructed railways, restrictions on working elevations at any point are specified explicitly. Hence, the elevation of the design line $Z_{p(j)}$ must satisfy the inequality (6)

$$Z_p(j) \leq Z_c(j) \pm Z_{orp}(j) \quad (6)$$

where $Z_p(j)$, $Z_c(j)$ – respectively, applicates of the design and original lines at the j -point;

$Z_{orp}(j)$ – limitation on working marks at the j -point.

d) The SP limitation on the difference in slopes of adjacent elements of the longitudinal profile of new and reconstructed railways, which is the angle of rotation in the vertical plane, is analogous to the limitation on the length of the element, since the tangent of the vertical curve depends on it (the difference in slopes).

e) limitation on the distance between fractures (boundaries) of plan and profile elements (7)

$$S(j, k) \geq T_b(j) + l_n(k) \quad (7)$$

where $S(j, k)$ – the distance between the j -break of the profile and the k -break of the plan of the operating railways;

$T_b(j)$ – tangent of the vertical curve at the j -fracture of the profile;

$l_n(k)$ – length of the transition curve at the k -turn of the plan, i.e. for a k -circular curve.

The numerous requirements and restrictions described above imposed by the joint venture [5] on the plan and profile of new and reconstructed railways, when expressed quantitatively, act as criteria, the main of which are the restrictions on the maximum curvature and slope, the minimum length of a direct insertion between adjacent curves, the difference in slopes of adjacent longitudinal profile elements and many others.

Solving multicriteria problems in order to obtain an optimal solution is, in the general case, impossible. Therefore, the general method for automated design of the plan and longitudinal profile of new and reconstructed railways is developed based on the Pareto principle, according to which, first, a conditionally optimal solution is designed according to one or more main criteria, after which adjustments are made according to all other criteria.

One of the main criteria is the criterion of rationality of the design element of the plan (profile) to the original (8).

$$\Theta = \int_0^L [Z_p(l) - Z_c(l)] dl \rightarrow \min \quad (8)$$

where $Z_c(l), Z_p(l)$ – applicates of the original and project piecewise linear functions;

L – length of the designed section.

Another main criterion is the criterion for the curvature (slope) of the elements of the plan and profile of new and reconstructed railways (9)

$$(Z_p(j+1) - Z_p(j)) / (Sp(j+1) - Sp(j)) \leq \rho_{\max}, \rho_{\min} (i_{\max}, i_{\min}) \quad (9)$$

The method of computer-aided design of the plan and longitudinal profile of new and reconstructed new railways includes the following steps:

I. Recognition of the boundaries of plan elements and profiles of new and reconstructed railways based on the analysis of the original lines (recognition of fractures).

II. Enlargement of short elements of the plan and profile of new and reconstructed railways (generalization of elements).

III. Calculation of the position of plan elements and profiles of new and reconstructed railways according to a variety of main criteria within the designated boundaries with the formation of gaps (decomposition).

IV. Conjugation of discontinuous plan elements and profiles of new and reconstructed railways in order to eliminate gaps between elements.

V. Adjustment of the associated plan and profile of new and reconstructed railways according to many other criteria.

The theoretical foundations of each stage of the general method of computer-aided design of the plan and profile of new and reconstructed railways are outlined below.

Recognition of the boundaries of design plan elements and profiles of new and reconstructed railways

Recognition of the boundaries of design plan elements and the profile of new and reconstructed railways is carried out on the basis of an analysis of the original lines. Signs of the boundaries of plan and profile elements are the points of sign change (left/right for the plan and descent/ascent for the profile) and the values of the element parameters: curvature (for the plan) and slopes (for the profile) within areas with the parameters of the elements of the same sign.

The criterion for recognizing the boundaries of plan and profile elements (fractures) based on a change in the sign of curvature or slope, respectively, is the min or max of the original piecewise broken lines (10)

$$\begin{aligned} Z(i-1) \leq Z(i) \geq Z(i+1) &\rightarrow \max \\ Z(i-1) \geq Z(i) \leq Z(i+1) &\rightarrow \min \end{aligned} \quad (10)$$

Figure 2 shows an example of recognizing the boundaries of elements (fractures) based on a change in the sign of curvature or slope of the elements, respectively, of the plan or profile. The numbers of the design line points, which are min and max, are written to the vector $MPL(m)$.

$MPL(8) = \{1, 2, 4, 10, 15, 16, 19, 20\}$ - vector MPL of numbers of points of original lines, which are the boundaries of plan and profile elements.

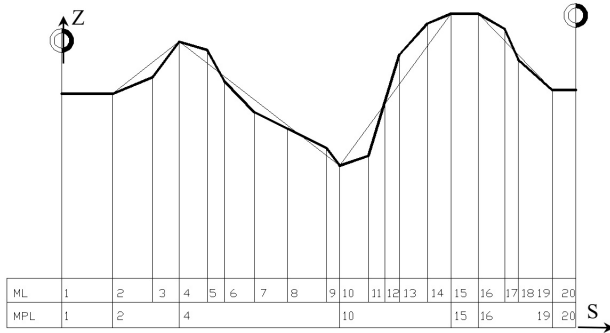


Figure 2.

Recognition of the boundaries of elements (breaks) of the design plan and the profile of new and reconstructed railways by the amount of curvature and slope is carried out on the basis of the use of a general method for studying any phenomena, for example, natural ones [6], the essence of which is to divide the phenomenon into global and local components, “BACKGROUND” and “RESIDUE”, respectively.

In Fig. Figure 3 shows a section of the original line between - “min” and - “max” with the parameters of elements of the same sign (curvature or slope), the average value of which is less than the limit and will correspond to the “BACKGROUND” and is equal to (11)

$$i_{cp} = [Z_c(j+1) - Z_c(j)] / [S_c(j+1) - S_c(j)] \tag{11}$$

where: $Z_c(j), Z_c(j+1), S_c(j), S_c(j+1)$, respectively, the ordinates and chainage of adjacent “min” and “max” of the original line.

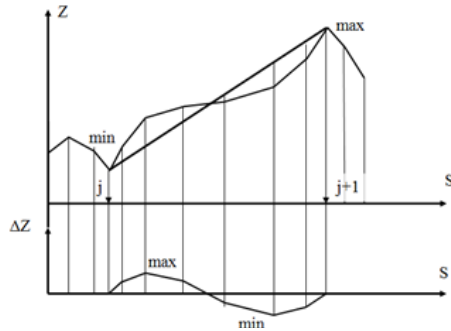


Figure 3. Localization of fractures by the amount of curvature (slope) of the elements

The “RESIDUE” ordinates are defined as the difference between $Z_c(i)$ and the value of “BACKGROUND”

$$\Delta Z(i) = Z_c(i) - [Z_c(j) + i_{cp} * (S_c(i) - S_c(j))], i = MPL(m), MPL(m+1) \quad (12)$$

where: $\Delta Z(i)$ – ordinate “RESIDUE” at i-point; $Z_c(i)$ - ordinate of the original line at the i-point; $S_c(i)$ - i-point chainage; i - point number that takes values $MPL(m), MPL(m+1)$ (см. рис. 2).

The “min” and “max” points of the “remainder” graph of the original lines are the boundaries of the plan and profile elements, respectively, according to the amount of curvature (radius) or slope of the elements.

Thus, as a result of the analysis of the initial lines according to the direction of the turning angles and the magnitude of the curvature, according to the sign and magnitude of the slopes, the boundaries of the elements of the plan and profile of new and reconstructed railways will be assigned. For plan and profile elements with similar parameter values, it is necessary to check the possibility of their enlargement (generalization).

2. Generalization of baselines for computer-aided design plan or profile of new and reconstructed railways

Generalization is carried out in order to fulfill the requirement of the joint venture to ensure the maximum possible lengths of elements. The criterion for generalization is to ensure at each point normalized deviations (shifts) of the generalized element from the original one.

Generalization is performed using the “tube” method developed by the author [7]. Let, on the set of elements of the original line $Z_c(S)$, in the section between j - «min» and $j+1$ - «max», the curvature (slope) between which is less than $\rho_{max}(i_{max})$, restrictions “from above” and “from below” are defined from the condition of ensuring normalized deviations at each point. The “above” constraint is the

upper bound, the “bottom” constraint is the lower bound and are denoted, respectively, $Z^{\text{sup}}(S)$ and $Z^{\text{inf}}(S)$ (fig. 4).

Charts $Z^{\text{sup}}(S)$ and $Z^{\text{inf}}(S)$ form a “tube” of restrictions, which represents an infinite set of positions of a generalized element of the design line, the analysis of which is carried out by dividing it into 4 subsets:

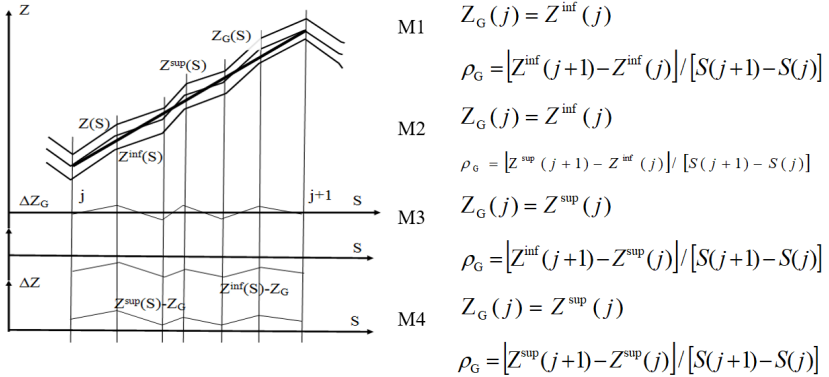


Figure 4. Generalization of baselines

Let’s calculate the difference between the function graphs $Z^{\text{sup}}(S)$, $Z^{\text{inf}}(S)$ and generalized element, we get two arrays of numbers $\delta_m^{\text{sup}}(i)$ $\delta_m^{\text{inf}}(i)$, determined by the formula (13).

$$\begin{aligned} \delta_m^{\text{sup}}(i) &= Z^{\text{sup}}(i) - (Z_G(j) + i_G (S(i) - S(j))) \\ \delta_m^{\text{inf}}(i) &= Z^{\text{inf}}(i) - (Z_G(j) + i_G (S(i) - S(j))) \end{aligned} \tag{13}$$

where $i \in j, j+1$ – internal point number;

m – number of a subset of positions of the generalized element, $m = 1, 4$.

Then, if for any point $i \in j, j+1$ inequality holds

$$\delta_m^{\text{sup}}(i) * \delta_m^{\text{inf}}(i) \geq 0 \tag{14}$$

then the section of the design line between $j, j+1$ points is generalized by one element.

If for arrays $\delta_m^{\text{sup}}(i), \delta_m^{\text{inf}}(i)$ there is at least one point i at which

$$\delta_m^{\text{sup}}(i) * \delta_m^{\text{inf}}(i) < 0 \tag{15}$$

then the generalized element goes beyond the limits of the “tube” of restrictions.

But, for subsets M1 and M4 it is possible to vary the initial marks $Z_G(S)$ at constant ρ_G , and for subsets M2 and M3 - on the contrary, with values ρ_G at constant $Z_G(S)$.

By varying the marked parameters, the generalized element of the design line between $j, j+1$ points can be “returned” to the “tube” of restrictions.

If generalization of the original set of elements between j -“min” and $j+1$ -“max” is impossible, the “tube” method will give the original boundaries of these elements.

3. Calculation of elements of a discontinuous plan or profile, new and reconstructed railways

The calculation of elements of a discontinuous plan or profile of new and reconstructed railways is carried out on the basis of the principle of decomposition of complex systems within the boundaries of elements assigned at the stages of recognition and generalization, and regardless of the position of adjacent elements on the left and right, which allows one to overcome one of the main difficulties in designing a plan and profile of new or reconstructed railways: presence of pre- and post-history.

Decomposition of complex systems involves determining the rational position of a plan or profile element within the designated boundaries according to a variety of main criteria, which includes a criterion for the amount of curvature (slope) of the element (K1) and a criterion for the rationality of design elements to the original ones (K2), i.e.

$$K1. \rho(j) \leq \rho_{npod} \quad K2. \int_{l_1}^{l_2} [Z_p(l) - Z_c(l)] dl \rightarrow \min$$

As $\int_{l_1}^{l_2} Z_p(l) dl = \int_{l_1}^{l_2} Z_c(l) dl$ equal to the areas of the corresponding trapezoids, applicate $Z_p(l_1)$ is equal

$$Z_p(l_1) = (\omega_c - \frac{\rho l^2}{2}) / l$$

where: ω_c - area of the trapezoid of the approximated element; ρ, l – respectively, the curvature and length of the approximating element.

In general, the rational position of plan elements or profiles of new and reconstructed railways in sections with a maximum value of curvature (slope) can be found by an iterative method based on the following two properties:

1. When $Z_p(j) = Z_c(j)$, the profile volume of excavation work has a maximum value.

2. Function $Q_{npod}(Z_p(k, j))$ has one extremum, which is reached at $Q_{nac} = Q_{bmem}$ [7].

Figure 5 shows an example of searching for a rational position, for example, an element of the plan of a new railway with curvature according to the angular diagram of the main course (L.N.R.).

We accept the initial position of the design line element corresponding to the -point, the value of the efficiency criterion $Q_{npod}(n), n=1$ in which it has the maximum value.

The curvature of the i - plan element will be equal to

$$\rho_i = (\alpha_{i+1}^S - \alpha_i^S) / (K_{i+1} - K_i)$$

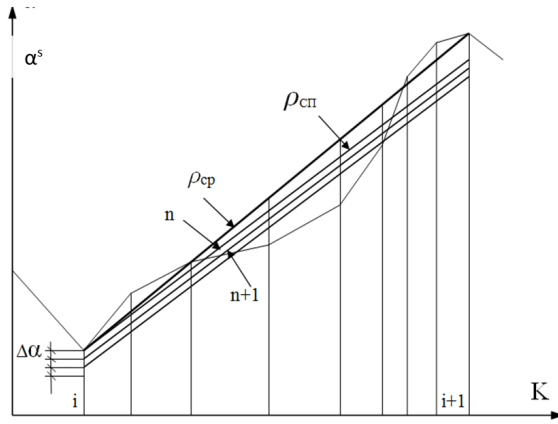


Figure 5.

We accept the value ρ_i corresponding to the standard value of the radius of the curve established by the SP from the condition

$$\rho_i = \rho_m^{CII} \Rightarrow |\rho_i| - \rho_m^{CII} < |\rho_i| - \rho_{m+1}^{CII} \quad (16)$$

With a step $\Delta\alpha$ we change the value $\alpha^s(j)$ and thereby $Q_{\text{проф}}$, which will tend to the min point. We continue the procedure until the condition is met

$$Q_{\text{проф}}(n+1) > Q_{\text{проф}}(n) \quad (17)$$

where: $Q_{\text{проф}}(n+1)$, $Q_{\text{проф}}(n)$ – accordingly, the volume of excavation work at $n+1$ and n – iterations.

Position of the design element on n – iteration will correspond to the minimum value of the efficiency criterion.

Carrying out similar calculations for each element, we obtain a discontinuous plan (profile), the discontinuities of which indicate the presence of a pre- and post-history.

4. 4. Mating elements of a discontinuous plan or profile

The pairing of elements of a discontinuous plan or profile of a new and reconstructed railway is carried out by solving a system of two linear equations with two unknowns. The equations of the system are the direction vectors of the l -th element of the conjugate plan (profile) and the j -th element of the discontinuous plan (profile).

$$A_1S + B_1Z + C_1 = 0 \quad (18)$$

$$A_2S + B_2Z + C_2 = 0$$

where: A_1, B_1, C_1 - coefficients of the general equation of the straight line passing through the last element of the conjugate line; A_2, B_2, C_2 - the same, passing

through the next element of the breaking line; S, Z - respectively, chainage and applicate of the point of intersection (conjugation) of elements.

The coefficients of the general equations of straight lines are determined through the chainage and applicates of fractures (boundaries) of mating elements according to the formulas

$$A_2 = \frac{1}{S(j+1) - S(j)} \quad B_2 = \frac{1}{Z(j+1) - Z(j)} \quad C_2 = \frac{S(j)}{S(j+1) - S(j)} - \frac{Z(j)}{Z(j+1) - Z(j)}$$

The coefficients of A_1, B_1, C_1 the last element of the conjugate line are equal to the coefficients of A_2, B_2, C_2 $j-1$ – the element of the breaking line.

The solution to the system of linear equations (8) can be found using one of the well-known methods, for example, the Gauss method.

$$S(i) = \frac{\Delta S}{\Delta} \quad Z(i) = \frac{\Delta Z}{\Delta} \quad (19)$$

where: $\Delta S, \Delta Z$ - determinants of the system that are partial in S and Z ; Δ is the general determinant of the system (8)

$$\Delta S = \begin{vmatrix} C_1 & B_1 \\ C_2 & B_2 \end{vmatrix} \quad \Delta Z = \begin{vmatrix} A_1 & C_1 \\ A_2 & C_2 \end{vmatrix} \quad \Delta = \begin{vmatrix} A_1 & B_1 \\ A_2 & B_2 \end{vmatrix} \quad (20)$$

Solution of the system of linear equations (18), i.e. the intersection point must be within the mating elements

$$S_p(i) \leq S_p(i+1) \leq S_p(j+1) \quad (21)$$

Afterwards, it is necessary to adjust the elements of the conjugate line according to many other criteria.

5. Adjustment of elements of the associated plan or profile

The theoretical basis for adjusting the elements of a conjugate design line is presented in two aspects.

The first aspect is related to the adjustment of the elements of the conjugate design line in order to return the solution to the point “min” of the objective function, which deviated from it due to the conjugation of the elements of the discontinuous line; it consists in calculating the new position of each element of the conjugate line within the new boundaries from the condition $Q_{\text{нрорф}} \rightarrow \min$ or $\sum_1^N \Delta_i \rightarrow \min$ and the constant value of curvature element.

As a result, a new discontinuous design line will be obtained, the magnitude of the discontinuities along which will be significantly smaller than in the initial calculation.

Next, you need to again pair the elements of the broken line and clarify the boundaries of the elements of the conjugate line. It is obvious that at each such step the magnitude of the gaps and deviations of the boundaries of the elements will tend to 0.

As a result of adjusting the elements of the conjugate design line, the minimum value of the goal function $Q_{\text{нпоф}} \rightarrow \min \left(\sum_1^N \Delta_i \rightarrow \min \right)$ - will be ensured - i.e. the solution is returned to the point “min”.

The second aspect is associated with the adjustment of the elements of the conjugate line, adjusted according to the “min” of the objective function, according to a variety of other criteria that meet the norms and requirements of the joint venture, and non-violation of the criteria of the main set for the amount of curvature (slope) of the elements of the plan or profile, both new and reconstructed railways.

The physical meaning of adjusting the elements of the conjugate line according to a variety of other criteria is to return a solution that is rational according to a set of main criteria to the admissible region that meets all criteria, with a minimal increase in the objective function. Adjustment for a variety of other criteria is carried out in several stages and consists of identifying elements, boundary or internal points of these elements that do not meet any criterion from the remaining set of criteria. By changing the curvature or length (boundaries) of these elements at any stage of correction, it is necessary to ensure the fulfillment of the violated criterion and the preservation of all criteria achieved at the previous stages of correction and the criterion $\rho \leq \rho_{\max} (i \leq i_{\max})$ from the set of main criteria.

The limited scope of the article did not allow us to present the results of automated design of the plan and profile of sections of new and reconstructed railways.

Based on the general method of designing the plan and profile of new and reconstructed railways, pilot versions of computer-aided design programs were developed, which were used in course and diploma design and to justify the main design decisions of real railway transport facilities.

References

1. Struchenkov V.I. *Methods for optimizing routes in CAD for linear structures.* - M.: SOLON-Press, 2014, - 272 pp.: ill.
2. Struchenkov V.I. *Mathematical foundations of road route optimization on a computer.* - On Sat. scientific proceedings of VNIITS “Issues of designing railways using computers”, issue 74, M., 1974. pp. 84-91.
3. Bogdanov A.I. *Mathematical model of the longitudinal profile of the route of new railways // Design of the development of a regional railway network: collection of articles. scientific tr. / ed. V.S. Schwarzfeld. – Khabarovsk: Publishing house of FESTU, 2018. – Issue. 6. – 185 p. : ill.*
4. Bogdanov A.I. *Computer-aided design of reconstruction of the plan of operating railways: Transport of the Asia-Pacific region, - scientific journal ed. Yu.A. Davydova - Khabarovsk: Publishing house of FESTU, 2016. – p. 39-44.*

5. SP 119.13330.2012 “1520 mm gauge railways. Updated edition of SNIIP 32-01-95”. - M.: Ministry of Regional Development of Russia, 2012.

6. Berlyant A.M. *The image of space: map and information*. - M., Mysl, 1986 - 240 p.

7. Polosin Yu.K. *Methods for optimal design of railway routes*. - L., 1965, – 171 p.

DOI 10.34660/INF.2024.66.88.176

监控收缩领域的国家和国际标准

**MONITORING OF NATIONAL AND INTERNATIONAL
STANDARDS IN THE FIELD OF CONSTRICTIONS**

Uzhakhov Karkhan Mochkievich

*Candidate of Technical Sciences, Associate Professor
Ingush State University*

Ulbieva Irina Salakhovna

*Candidate of Technical Sciences, Associate Professor,
Head of Department
Ingush State University*

抽象的。为了促进建筑业的发展，需要监控俄罗斯国家标准和国际标准。监测建筑行业的国家和国际标准可确保遵守监管要求、更新标准、改进技术流程并增强公众对建筑行业的信心。

关键词：监测、标准、测试方法、建筑材料。

Abstract. *To promote the development of the construction industry, it is necessary to monitor Russian national standards and international standards.*

Monitoring national and international standards in the construction industry ensures compliance with regulatory requirements, updating standards, improving technological processes and increasing public confidence in the construction industry.

Keywords: *monitoring, standard, test methods, building materials.*

Comparison between GOSTs and international standards in the field of determining the construction properties of natural stone materials is an important task for scientists and builders. Understanding the differences between these standards allows for harmonization and improvement of the quality of materials and designs, and facilitates the international exchange of experience and technology.

These studies are carried out in various scientific institutes, universities and laboratories throughout Russia, such as the Institute of Structural Mechanics and Aerodynamics named after M.T. Kalashnikov, Scientific Research Moscow State University of Civil Engineering, St. Petersburg State University of Architecture and Civil Engineering and at the Ingush State University at the Department of Construction Disciplines.

Research in this area is carried out by V.D. Staroverov at the St. Petersburg State University of Architecture and Civil Engineering, (4), and K.M. Uzhakhov at the Ingush State University (5).

When comparing GOSTs and international standards in the field of construction properties of natural stone materials, scientists and builders pay attention to differences in test methodology, determination of material characteristics and other technical parameters. They also take into account the context of the materials' use, safety and environmental sustainability requirements.

Differences in test methodology, material characterization and other technical parameters play an important role in the evaluation and comparison of building materials. Here are some of the key aspects that scientists and builders pay attention to:

Differences in test methods used in GOSTs and international standards to determine the frost resistance of natural stone materials may include the following aspects:

Test methods: Different standards may prescribe different test methods for assessing the frost resistance of stone materials. For example, GOST may determine frost resistance using the freeze-thaw cycle method, while an international standard (eg ASTM) uses alternative methods such as low-temperature strength testing methods.

Test Conditions: Different standards specify different test conditions, such as ambient temperature and humidity, test duration, and number of freeze-thaw cycles. These differences may affect test results and interpretation of data.

Evaluation of results: The standards provide different criteria for evaluating the results of frost resistance tests. For example, one standard may determine frost resistance based on changes in the mass or volume of a sample, while another standard evaluates changes in the mechanical properties of a material after testing.

Measurement methods: Standards may also differ in the methods for measuring parameters characterizing the frost resistance of a material, such as compressive strength, bending strength or other mechanical properties. This affects the accuracy and comparability of results between different standards.

It is important to note that differences in test methods may be due to both technical characteristics of materials and operating conditions, as well as differences in approaches to standardization between different countries and regions. To ensure comparability of test results, it is important to carefully analyze the requirements of each standard and, if necessary, conduct additional comparative studies.

For example, the basic requirements for frost resistance of natural stone are formulated in domestic standards (GOST 9479-2011, GOST 30629-2011) and foreign standards (EN 12371), etc.

GOST 9479-2011 Interstate standard "Rock blocks for the production of facing, architectural, construction, memorial and other products. Technical condi-

tions” (1) and GOST 30629-2011) “Materials and facing products from rocks. Test methods” (2) consider testing methods for natural stone materials.

Standards GOST 9479-2011 “Building materials and products for them. Test methods for frost resistance” and GOST 30629-2011 “Facing slabs and slabs for cladding walls and floors” do not contain specific recommendations regarding the number of cycles of alternating freezing and thawing to assess the frost resistance of natural stone materials.

These standards typically specify test methods as well as requirements for test results (for example, the rate of change in mass, strength, and other material characteristics). However, the specific number of freeze-thaw cycles is usually not specified directly in the standards, since it may depend on a number of factors, including the climatic conditions of the region, the type of material, its chemical composition, and many others.

Instead, the number of freeze-thaw cycles may be determined based on industry or region-specific recommendations or practices, as well as scientific research and experience. Typically, engineers and manufacturers use test results and recommendations from organizations or institutes specializing in building materials research to decide the number of freeze-thaw cycles needed to evaluate the frost resistance of a particular material.

If a sample of a natural stone material, such as Alkun Stone, can withstand more than 45 freeze-thaw cycles with less than 25% strength loss, this is usually a good indicator of its frost resistance and suitability for use as a cladding material on a building façade.

International standards specify a specific number of cycles.

Yes, some international standards may indeed specify specific values for the number of cycles of alternating freezing and thawing when testing the frost resistance of materials. For example, ASTM C666/C666M “Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing”(3), which is used to determine the frost resistance of concrete, requires a minimum of 300 freeze-thaw cycles.

Such specific guidelines on the number of cycles can help standardize the testing process and ensure comparability of results between different laboratories and countries. However, it is important to understand that these values may vary depending on the specific standard and the material to which it applies.

It turns out that international standards put forward more stringent requirements.

Yes, in some cases international standards may be more stringent than national standards. This may be due to the desire to improve quality, safety and standardization on an international scale. For example, in the case of frost resistance of natural stone materials, international standards provide for a higher number of freeze-thaw cycles or more stringent quality assessment criteria.

This is especially important for building materials such as cladding boards used on building facades, where durability and environmental resistance are important. Therefore, international standards set more stringent requirements to ensure high quality and safety standards are met.

However, it is important to note that international standards do not in all cases impose more stringent requirements. Sometimes they can be similar or even less strict, especially if we are talking about regional features or the specific requirements of individual countries. In any case, when choosing a standard for a particular project, it is important to take into account its requirements and comply with them, thus ensuring the quality and reliability of the materials used.

When choosing a standard for testing the frost resistance of natural stone materials such as limestone, it is important to pay attention to the specific requirements set out in the selected standard and adapt them to the specific operating conditions and project requirements.

Thus, how should practitioners act and what should they primarily focus on?

Practitioners in the field of construction and the use of building materials must consider a number of factors when selecting standards and assessing the conformity of materials to requirements. Here are some basic principles to guide them:

Analysis of Specific Project Requirements: Practitioners should carefully consider project requirements, including climatic conditions, environmental characteristics, building type, and other factors that may influence the selection of materials and standards.

Comparison of national and international standards: They must analyze both national and international standards to determine which best meets the project requirements and provides the required level of quality and safety.

Consideration of experience and best practices: Practitioners can draw on experience and best practices in the industry based on research, practical experience and recommendations from professional organizations.

Risk Assessment: It is important to evaluate the risks associated with the selection of specific materials and standards, including potential negative consequences for the safety, durability and cost of the project.

Collaboration with experts: Practitioners can consult with experts in the field of construction and standardization to obtain professional assessment and advice on the selection of materials and appropriate standards.

Legal Compliance: It is important to consider the laws and regulations governing construction and materials used in your particular country or region.

Essentially, practitioners must take into account all of the above factors and make decisions that best suit the specific conditions and requirements of the project.

All responsibility falls on practitioners in choosing methods and criteria for assessing the suitability of building materials.

Yes, construction practitioners do bear significant responsibility for the selection of methods and criteria for assessing the suitability of building materials. Their decisions can significantly affect the quality, safety and durability of the final construction project. This is why it is important that they demonstrate high professionalism and follow best practices:

Expertise and Knowledge: Practitioners must have in-depth knowledge of construction, materials science, standardization and technical regulation. This helps them make informed decisions when choosing methods and criteria for evaluating building materials.

Project Requirements Analysis: They must carefully study the project requirements, including functional, aesthetic, climatic and economic aspects, to determine the most appropriate evaluation methods and criteria.

Risk Assessment: Practitioners should evaluate the potential risks associated with the selection of specific assessment methods and criteria. This helps to avoid problems and unwanted consequences in the future.

Professional Judgment: Occasionally requires making difficult decisions under conditions of uncertainty. Practitioners must exercise professional judgment and make decisions based on available information and experience.

Collaboration and consultation: It is important to share experiences and consult with colleagues, experts and specialists in the field to gain additional knowledge and advice when making decisions.

Compliance with standards and legislation: Practitioners should consider relevant standards and legal requirements when selecting assessment methods and criteria. This helps ensure construction results comply with regulations and safety standards.

Ultimately, the responsibility for choosing methods and criteria for evaluating building materials lies with practitioners, their professionalism and careful approach to the decision-making process.

The term “practitioners” usually refers to specialists and professionals working in the field of construction and architecture who are involved in various stages of design, construction and operation of construction projects. This category includes:

Civil Engineers: They are responsible for the design, construction and quality control of construction projects, as well as the selection of materials and technologies for their implementation.

Architects: They develop the design of buildings and structures, taking into account functional, aesthetic and environmental requirements.

Building contractors: They are responsible for constructing buildings according to design and specifications, as well as organizing production and managing construction processes.

Building Inspectors and Quality Controllers: They monitor compliance with building codes and quality standards, and conduct inspections and tests of building materials.

Standardization and certification specialists: They develop and apply quality and safety standards in construction, and also carry out certification of building materials.

Construction Consultants and Experts: They provide advice and expertise on issues related to the selection of materials, technologies and construction methods.

In general, practitioners in the construction industry represent a wide range of specialists whose activities are aimed at ensuring the quality, safety and efficiency of construction projects.

Monitoring national and international standards in the construction industry is highly relevant for several reasons:

- The construction industry affects people's lives and safety, so strict standards are necessary to guarantee high quality construction and structural safety.

- Standards help optimize construction processes, resulting in improved productivity and reduced costs.

- Many companies conduct their business internationally, so it is important that standards are harmonized between different countries to avoid trade barriers and obstacles.

- The standards stimulate innovation and sustainable development in the construction industry by encouraging the adoption of new technologies and practices that promote environmental sustainability and energy efficiency.

- Monitoring standards help prevent corruption and unfair practices in the construction industry by ensuring transparency and fairness in processes.

In general, monitoring standards in the construction industry is not only relevant, but is also an integral part of ensuring its development and safety.

References

1. *GOST 9479-2011 Interstate standard "Rock blocks for the production of facing, architectural, construction, memorial and other products. Technical specifications"*

2. *GOST 30629-2011) "Rock facing materials and products. Test methods"*

3. *ASTM C666/C666M-03 Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing.*

4. *Staroverov V.D., Dmitriev A.L., Kuvshinov E.A. - "Problems of technical regulation in the field of building materials" / Bulletin of Civil Engineers. 2022. No. 1 (90).*

5. *Uzhakhov K.M., Kotlyar A.V. - "Raw materials base of the Republic of Ingushetia for the production of clinker bricks" - / in the collection of proceedings of the conference Current issues of modern construction of industrial regions of Russia, Novokuznetsk, October 04–06, 2022.*

用于评估路面纹理和摩擦力的阈值
**THRESHOLD VALUES FOR EVALUATING TEXTURE AND
FRICTION OF ROAD SURFACES**

Malikov Muhammad Ahmad ogli

PhD student

Tashkent State Transport University, Tashkent, Uzbekistan

抽象的。目前，道路路面表面纹理和摩擦质量的测量和评价采用多种方法和设备。因此，每种方法所包含的设备的标准和评级范围是不同的。本文讨论了道路路面纹理和摩擦力的当代监管限值。

关键词：路面状况、宏观纹理、交通安全、估计平均纹理深度、平均轮廓深度、滑移数摩擦系数。

Abstract. *Road pavement surface texture and friction quality are currently measured and evaluated by using several methods and equipments. Therefore, the criteria and rating scale for the devices included in each method are different. This article discusses contemporary regulatory limit values for texture and friction of road pavement surfaces.*

Keywords: *Pavement condition, macrottexture, traffic safety, estimated average texture depth, mean profile depth, skid number friction coefficient.*

An analysis of the accident rate on the roads shows that almost always a traffic accident is preceded by longitudinal or transverse sliding of the car's wheels on the road surface. The question of whether or not there will be an accident is ultimately decided in the area of contact of the car wheel with the road surface [1]. In this regard, the problem of ensuring, regulating and monitoring the friction qualities of road surfaces is given special attention throughout the world. In recent years, the situation on highways has changed dramatically - traffic intensity and the speed capabilities of modern vehicles have increased, multi-lane roads with extremely high speeds in the left lanes have appeared, the density of traffic flows has increased, and axle loads have increased. Therefore, attention is now being paid to ensuring the friction coefficient, which is an important factor for ensuring traffic safety. The speed of the vehicle, the condition of the tire treads, pavement texture, tire pressure and temperature have a significant impact on the friction coefficient. Currently, maintaining this indicator at the standard value is impor-

tant to ensure traffic safety in adverse weather (rainy, snowy, scorching hot days) conditions.

For the past sixty years, the measuring of pavement texture and friction has been significant. In terms of measuring principles and techniques, as well as the processing and reporting of measurement data, a wide variety of equipment has been invented and used to measure these qualities, and there can be considerable variations between them. One of the current issues is the accurate analysis of the correlation between the data measured by these methods and devices.

The following threshold values are used to evaluate the texture of the road surface.

The asperities of the road surface are the presence of small irregularities on the surface of the pavement that do not affect the deformation of the tire and provide an increase in the coefficient of friction to the tire. The asperities of the pavement are determined by the height and shape of the micro profile elements of the road surface, the distance between the tops of the protrusions, the sharpness of the protrusions of the particles of the stone material. The performance of surface texture is described by comparing measurement results to standard levels established by different regulations.

Currently, there is no developed methodology that would allow the characteristics of pavement texture to accurately and quickly determine the values of friction coefficients. This is primarily due to the lack of reliable and accurate instruments and algorithms that would allow not only to obtain a micro profile of the pavement surface under study, but also to express the listed texture parameters in quantitative form and perform the necessary calculations of the friction coefficient, a parameter that directly affects traffic safety. Nowadays, even with the advanced technology, the microtexture of the road surface is still not measured [2].

The macrotexture of road surfaces is measured by using road profilers and “Sand patch” test method.

The “Sand patch” method is the simplest and most widely used method for determining the macrotexture of a road surface. The sequence of measuring and assessing texture using the “Sand patch” method is given in regulatory documents [3-4]. The limit of the value determined by the “Sand patch” method is from 0.2 to 8 mm.

The estimated average texture depth and assessment limit on road sections on asphalt concrete and cement concrete pavements are presented in table 1 [5].

Table 1

Friction coefficient	Mean texture depth. mm	
	Asphalt concrete	Cement concrete
0.28-0.30	1	0.5
0.35	1.8	1

For safe driving on sections of roads with large slopes, the estimated average texture depth must be at least the following values on the table 2 [6].

Table 2

Slope, %	40	50	60	70	80
Mean texture depth, mm	3.5	4	4.5	5	5

The simplest image of macrotexture is obtained using a road profiler. The road profiler measures the 100mm base length of a precise pavement segment and provides 2D profile data to calculate the mean profile depth (MPD) [7]. The profilometric method is used to evaluate texture in the range of 0–5 mm. In COST 354 this “MPD” indicator is categorized in five grades according to measured values, from very good to very bad, as can be seen in Table 3 [8].

Table 3

MPD technical parameter grade	Limit values
Very good	1.06-1.25
Good	0.87-1.06
Satisfactory	0.68-0.87
Unsatisfactory	0.49-0.68
Very bad	0.30-0.49

The following threshold values are used to evaluate the friction coefficient of the road surface.

In order for drivers to manage and move their cars in both the longitudinal and lateral directions safely, pavement friction is essential to keeping them on the road. It is an essential element of highway geometric design as it dictates whether the minimum stopping sight distance, minimum horizontal radius, minimum radius of crest vertical curves, and maximum super-elevation in horizontal curves are all appropriate. Typically, a driver has more control over their car the more friction there is at the contact between the tire and pavement [9].

The adequate texture condition of the pavement must provide the required amount of friction between the wheel and the surface, which is characterized by the friction coefficient. The friction coefficient φ is the ratio of the maximum possible value of the friction force between the tires of a vehicle and the road surface F on a given section of the road to the weight of this vehicle P [10]. The limit of value of φ determined by the “Locked wheel” test method is from 0 to 1. Zero value means there is no coefficient of friction and driving on the road is unsafe, and 1 value means the maximum coefficient of friction at which driving is safe.

$$\varphi = \frac{F}{P} \tag{1}$$

Where: F - friction force; P - vertical load.

At the initial stage of road operation, the coefficient of friction (φ) along the entire length of the highway when measured at a speed of $V = 60$ km/h on wet surfaces should be $\varphi > 0.45$, and in sections with difficult traffic conditions (transition-high-speed lanes, intersection ramps at different levels, areas of separation and merging of flows) - $\varphi > 0.5$. However, during the maintenance time of roads coefficient of friction must be $\varphi > 0.4$ [11]. Friction value depends mainly on the type and condition of the road surface, so the approximate value of the coefficient for a specific case can be determined from Table 1 [10].

Table 4

Type of road surface	Pavement condition	Friction coefficient (φ)
Asphalt, concrete	Dry	0.7-0.8
	Wet	0.5-0.6
	Dirty	0.25-0.45
Cobblestone, paving stones	Dry	0.6-0.7
	Wet	0.4-0.5
Soil road	Dry	0.5-0.6
	Wet	0.2-0.4
	Dirty	0.15-0.3
Sand	Wet	0.4-0.5
	Dry	0.2-0.3
Asphalt, concrete	Icy	0.09-0.1
Compacted snow	Icy	0.12-0.15

Driving conditions during adverse weather conditions are much more difficult than with dry, clean pavement surfaces. The differences are determined by a number of factors, the main of which are: a decrease in the friction qualities of the pavement, a change in the interaction of the car with the road, a deterioration in the texture of the pavement under the influence of precipitation, ice, fog, dirt, high air humidity and other factors. To objectively assess the condition of roads, it is necessary in each case to measure the coefficient of friction at a standardized speed of 60 km/h. Tabular values of the friction coefficient can only be used for estimation calculations. Table 5 shows the friction coefficient values at a driving speed of 20 km/h for tires with normal tread [10].

Table 5

Pavement	Pavement condition											
	Reference (dry)		Wet (clean)		Wet (dirty)		Loose snow		Compacted snow		Icy surface	
Cement concrete	0,80-0,85	0,002	0,65-0,70	0,0035	0,40-0,45	0,0025	0,15-0,35	0,001-0,004	0,20-0,50	0,0025	0,08-0,15	0,002

Asphalt concrete with rough texture processing	0,80-0,85	0,0035	0,60-0,65	0,0035	0,45-0,55	0,0035	0,15-0,35	0,001-0,004	0,20-0,50	0,0025	0,10-0,20	0,002
Hot asphalt concrete without rough texture processing	0,80-0,85	0,002	0,50-0,60	0,0035	0,35-0,40	0,0025	0,15-0,35	0,001-0,004	0,20-0,50	0,0025	0,08-0,15	0,002

As the speed of movement increases, φ decreases. The friction coefficient at other speeds can be calculated using equation 2.

$$\varphi_V = \varphi_{20} - \beta_\varphi(V - 20) \tag{2}$$

Where: β_φ , is the coefficient of change in friction qualities from speed (taken depending on the type and condition of the pavement in Table 5)

The following threshold values are used to evaluate the “Skid Number” of the road surface

Skid resistance is the force developed when a tire that is prevented from rotating slides along the pavement surface. Skid resistance is frequently assessed using a friction factor or skid number. The majority of dry pavements have a pretty good friction resistance; the issue is with wet pavements. Wet pavements have twice as many accidents as dry pavements. The “Skid Numbers” in Table 6 are normative; the greater the SN, the better [12].

$$SN = \mu * 100 \tag{3}$$

Table 6

Skid Number value	Comments
Less than 30	Take measures to correct
≥ 30	Acceptable for low volume roads
31 - 34	Monitor pavement frequently
≥ 35	Acceptable for heavily traveled roads

The British Pendulum Tester (BPT) is an instrument commonly used over the world to assess the skid resistance of road surfaces. The instrument has a rigid swinging arm, the end of which contacts the road surface with a spring-loaded rubber slider. The contact distance of the rubber slider with the test surface is set between 123 mm and 127 mm [12]. This contact results in a reduction of the upward swing’s energy. British Pendulum Numbers (BPN) are a unit of measurement used to represent the amount of this upward swing. The scale ranges from 0 to 140, as can be seen in Table 7 [13].

Table 7

Category	Types of roadway	Minimum PTV suggested
A	Difficult sites such as: - roundabouts; - bends with radius less than 150 m on unrestricted roads; - gradients, 1 in 20 or steeper, of lengths greater than 100 m; - approaches to traffic lights on unrestricted roads.	65
B	Motorways, trunk and class 1 roads and heavily trafficked roads in urban areas (carrying more than 2000 vehicles per day)	55
C	All other sites	45

The correlation methods developed to harmonize skid resistance measurement data are the result of extensive research conducted in both developed and developing countries. In the table 8 for exploring the significance of road safety, several countries have issued regulations that recommend threshold values for texture and friction obtained using various methods and devices [14].

Table 8

Types of roads	Evaluation criteria		
	Satisfactory (safe)	Investigatory (site investigation)	Critical (immediate action required)
Expressway (SCRIM coefficient)	$SC \geq 0.35$	$SC = 0.3 - 0.35$	$SC \leq 0.3$
Urban roads (DFT)	$SN \geq 0.35$	$SN = 0.25 - 0.35$	$SN \leq 0.25$
Rural roads (BPN)	$SN \geq 40$	$SN = 30 - 40$	$SN \leq 30$

The Permanent International Association for Road Congresses (PIARC), established the IFI through a comprehensive testing program for the purpose of comparing and harmonizing surface texture and skid resistance data. Using this index, skid resistance data obtained from several instruments can be harmonized to a single calibrated index [15].

Conclusion

Threshold values for each method and device for assessing texture and friction quality are summarized.

The reference and changing values of road surface texture and friction quality in snowy, icy and rainy weather conditions were analyzed.

As a result of the analysis, it is possible to select evaluation and measuring devices and set threshold values depending on the category of roads.

References

1. Abdunazarov, J., Azizov, K., & Shukurov, I. (2020). *Method of analysis of the reasons and consequences of traffic accidents in Uzbekistan cities. International Journal of Safety and Security Engineering*, 10(4), 483-490.
2. Kuznetsov Y. V. (2022). *Friction qualities of car tires and road pavements.*
3. Standard (GOST) 33078-2014. *Automobile roads of general use. Method for determining the friction coefficient of wheel vehicle with road pavement.*
4. Standard RK1279-2013 *National Standard of the Republic of Kazakhstan.*
5. *Norms and rules of urban planning 3.06.03-2021.* <https://mc.uz/gradostroitelnye-normy/>
6. Nemchinov M. V. (1985). *Friction qualities of road pavements and vehicle safety. Transport.*
7. ASTM E 1845-96, 1996, "Standard Test Method for Calculating Pavement Macrottexture Mean Profile Depth," *Annual Book of ASTM Standards, Vol. 04.03, ASTM International, West Conshohocken, PA.*
8. Pranjić, I., Deluka-Tibljaš, A., Cuculić, M., & Šurdonja, S. (2020). *Influence of pavement surface macrottexture on pavement skid resistance. Transportation research procedia*, 45, 747-754.
9. Hall, J. W., Smith, K. L., Titus-Glover, L., Wambold, J. C., Yager, T. J., & Rado, Z. (2009). *Guide for pavement friction: national cooperative highway research program (244 p.). Transportation Research Board of the National Academies.*
10. Evtjukov, S. A., Evtjukov, S. S. (2013). *Parameters affecting the friction qualities of road pavements. Bulletin of Tuva State University. Technical and physical and mathematical sciences*, (3), 75-82.
11. *Rules for diagnostics and assessment of the condition of automobile roads. I.Q.N. 05-2011.*
12. Dravitzki, V. K., Wood, C. W. B., Ball, G. F. A., & Patrick, J. E. (1997). *Assessing road surface friction with the British pendulum tester, in New Zealand. Transfund New Zealand Research Report*, (73).
13. *Road Research Laboratory. (1969). Instructions for Using the Portable Skid-resistant Tester. HM Stationery Office.*
14. Kumar, A., Tang, T., Gupta, A., & Anupam, K. (2023). *A state-of-the-art review of measurement and modelling of skid resistance: The perspective of developing nation. Case Studies in Construction Materials*, e02126.
15. ASTM E1960-07(2015) *Standard Practice for Calculating International Friction Index of a Pavement Surface*

天然石材物理力学性能的研究

**THE STUDY OF THE PHYSICAL AND MECHANICAL
PROPERTIES OF NATURAL STONE MATERIALS**

Nalgiev Rashid Taysamovich

Student

Scientific supervisor - Ulbieva Irina Salakhovna

Candidate of Technical Sciences, Associate Professor,

Head of Department

Ingush State University

Research of natural resources of the Republic of Ingushetia for the development of the building materials industry.

In accordance with the resolution of the government of the Republic of Ingushetia dated April 17, 2002, No. 138, the targeted program “Geological study of subsoil and reproduction of the mineral resource base of the Republic of Ingushetia for the solid minerals industry for 2002-2003” was approved, which considered the characteristics of the Republic’s raw material base, namely: the location and area of the deposit, as well as the characteristics of the rock formations and the necessary costs for the development of the deposit.

The government of the Republic of Ingushetia dated March 23, 2011 No. 98 approved the target program “Geological study of subsoil, reproduction of the mineral resource base of the Republic of Ingushetia and rational use of subsoil plots for 2012-2016.”[1] The main objectives of the program were:

A) Development and ensuring the rational use of the mineral resource base of the Republic of Ingushetia to meet the needs of the construction industry, agriculture, and industry for non-metallic materials;

B) Preparation of objects for licensing as part of the formation of a list of subsoil areas proposed for provision for use;

C) Identification and assessment of deposits of common minerals close to consumption centers;

D) Implementation of economic monitoring of the use of mineral resources;

E) Reproduction of groundwater reserves, ensuring protection from pollution and depletion during the exploitation of aquifers;

F) Development of economically sound recommendations for the rational use of mineral reserves;

G) Study of the quality of drinking groundwater in the main operational aquifers with an assessment of their protection to ensure the calculation of reserves.

2. Study of the possibility of using Alkun stone in the construction of facilities on the territory of the Republic of Ingushetia.

In accordance with the target program “Geological study of the subsoil and reproduction of the mineral resource base of the Republic of Ingushetia in the solid minerals industry for 2002-2003.” Alkunsky limestones are well processed and have a rich range of colors from light gray to pink. Due to low weather resistance, the products can only be used for interior cladding. Based on their abrasion resistance, they can be used for flooring, stairs, and landings with low traffic flow. Limestones are also suitable for the production of lime. [2]

However, already in accordance with the target program “Geological study of subsoil, reproduction of the mineral resource base of the Republic of Ingushetia and rational use of subsoil plots for 2012-2016” it was established that limestones are well processed and come in a wide range of colors: from light gray to pink. Based on the level of abrasion, they can be used for flooring, stairs and landings with low human traffic. From the limestones of the deposit it is possible to produce slabs, sawn facing tiles, floor tiles, strips, skirting boards, facing steps and risers. Crushed limestone is suitable as filler in finishing concrete grades 100-200 for external wall panels. Limestones are also suitable for producing lime.[1]

3. Physico-mechanical characteristics of the “Alkun stone”.

The Alkun limestone deposit is composed of Upper Cretaceous limestones; the useful stratum is divided into 5 members according to the degree of fracturing, textural and structural features and color. The first member is an interlayering of dense coarse-layered limestones of various colors (pink, pale pink, gray and light gray) with thin (0.5-5 cm) interlayers of marls. Thickness - 12.5-17.5 m. The second is interlayering of coarse-layered limestones 0.1-0.44 m thick, pink, pale pink and white with thin layers (0.5-3 cm) of layered marls. The thickness of the member is 33.5-40.5 m. The third is an interlayering of dense coarse-layered pink limestones 0.2 m thick with zones of intensely fractured limestones and thin layers (0.5-3 cm) of layered marls. Thickness - 14.0-15.5 m. The fourth member is a frequent interlayering of medium-platy limestones of pink, pale pink and white colors. Power 27-31.5. The fifth is a rare interlayering of monolithic layers of colored limestone with intensely fractured limestone and thin layers (0.5-3 cm) of layered marls, Thickness 19.5-24.0 m. The total thickness of the useful thickness is on average 125 m. The length of the explored part of the deposit is 600 m. The rocks dip north, angle 25-40°. Limestones are fractured. Packs II, III, IV and V are of practical interest.

Overburden - deluvial deposits. Thickness 0.3-19.0 m, average – 6.6 m.

Limestones are well mined and come in a wide range of colors: from light gray to pink. Based on the level of abrasion, they can be used for laying floors, stairs and landings with low human traffic. From the limestones of the deposit it is possible to produce slabs, sawn facing tiles, floor tiles, strips, skirting boards, facing steps and risers. Mining and hydrogeological conditions are favorable for open-pit exploration.

The estimated area of the site is 8 hectares. [1]

3.1. Determination of frost resistance of “Alkun limestone”.

To determine the degree of effectiveness of using Alkun limestone as an external facing stone, it is necessary to test the limestone for frost resistance.

3.1.1. Method for determining frost resistance.

Tests of the first three samples of Alkun stone for frost resistance were carried out in accordance with GOST 4001-2013 “Wall stones from rocks” [3], according to which frost resistance is determined by the number of cycles of alternating freezing (4 hours) and thawing (2 hours) of five samples of the correct shape .

However, in accordance with GOST 30629-2011 “Rock facing materials and products” [10], which in turn is referred to by GOST 4001-2013, the frost resistance of facing stone is determined as follows: after 15; 25; 35; 50 and every subsequent 50 cycles of alternating freezing (4 hours) and thawing (2 hours), five water-saturated samples are subjected to a compression test. The next 6 samples were tested in accordance with GOST 30629-2011.

3.1.2. Comparison of Russian and International standards for determining frost resistance.

Comparison of Russian and international standards for determining frost resistance may include differences in methodology, evaluation criteria and material requirements. Here are a few key aspects that may be considered:

Test methods:

Russian standards may be based on specific test methods developed within the framework of domestic industry and climatic conditions.

Yes, it is true. Russian standards often take into account the peculiarities of the domestic industry and climatic conditions, which is reflected in the frost resistance testing methods. For example, when assessing the frost resistance of building materials and structures in Russia, test methods can be used that are adapted to the cold winters and harsh climatic conditions characteristic of most of the country.

These methods may include:

Freeze and defrost tests to evaluate the resistance of materials to temperature cycling.

Low temperature strength tests to determine whether materials retain their structural integrity in freezing temperatures.

Moisture penetration and water absorption tests to evaluate the ability of materials to withstand moisture during freezing and thawing.

Methods for assessing appearance and surface defects after exposure to low temperatures.

These methods can be developed taking into account the experience and requirements of domestic engineers, taking into account the specifics of local climatic conditions and typical materials used in construction and production in Russia. They are aimed at ensuring the quality and durability of materials and structures in low temperature conditions, which is an important aspect in design and construction in Russian regions with cold climates.

International standards such as ASTM (American Society for Testing and Materials) or ISO (International Standardization Organization) may offer alternative methods that are internationally accepted and may be more universal.

Yes, international standards such as ASTM and ISO do offer alternative frost resistance testing methods that are widely accepted by the international community and may be universal in their application. It is important to note that these standards are developed with the participation of representatives of various countries and industries, which ensures their widespread acceptance in global practice.

Test methods proposed by ASTM and ISO for evaluating the frost resistance of materials and structures are often based on internationally accepted scientific and engineering principles and methodologies. This may include standardized procedures for creating freezing and thawing conditions, methods for measuring the physical properties of materials at low temperatures, and criteria for assessing the resistance of materials to frost.

The advantages of international standards include their universality and acceptance in the global market. This allows companies and organizations to work with the same standards in different countries, facilitating international trade and collaboration. In addition, international standards can integrate best practices and innovations from different countries and industries, which contribute to the development of quality and efficient frost resistance testing methods.

Temperature conditions:

Different standards may specify different temperature conditions for frost resistance testing depending on regional climatic conditions.

International standards can take into account a wider range of climate conditions than regional standards.

Criteria for evaluation:

Different standards may set different criteria for successfully passing frost resistance tests, such as changes in mass, material strength, appearance, etc.

Some international standards may also include more stringent criteria to ensure compliance with the requirements of different markets.

Application specifics:

Russian standards may take into account specific requirements and characteristics of materials used in construction or production, which may differ from international standards.

International standards may be more universal and intended to be applicable to different countries and industries.

It is important to note that comparison of these standards requires detailed analysis of specific documents and may depend on specific applications and customer requirements.

Russian standards and international standards for frost resistance of natural stone materials that are used as facing materials usually determine the number of freezing and thawing cycles that the material must withstand without destruction or significant changes in its physical characteristics. However, the exact number of cycles may vary depending on the specific standard and type of material.

For example, in the Russian standards GOST 28859-90 and GOST 30633-99, which regulate testing methods for frost resistance of stone materials, the number of freezing and thawing cycles can be established, for example, 25 or 50 cycles. This may vary depending on specific customer requirements or regional conditions.

International standards such as ASTM C666/C666M and ISO 10545-12 may also have specific requirements for the number of freeze and defrost cycles. For example, ASTM C666/C666M recommends a minimum of 300 cycles to evaluate the frost resistance of concrete, and ISO 10545-12 also specifies a certain number of cycles for testing ceramic tiles.

It is important to refer to the specific standard applicable in your region or country to obtain accurate information regarding the freeze and thaw cycle requirements for natural stone veneer materials. This will help ensure that your material meets frost resistance requirements and ensures its longevity and quality.

3.2 Results of testing samples of “Alkun stone” for frost resistance. Conclusions.

Samples of Alkun limestone from units No. 4 and 5 were tested for frost resistance. It was possible to cut cubes of the correct shape and size only with an angle grinder; other methods of processing the stone either destroyed it or were not as effective as an angle grinder. One of the problems associated with taking samples from the rock was the fracturing of the limestone, and at the same time the difficulty of cutting.

The first sample was tested for frost resistance in accordance with GOST 4001-2013 “Wall stones made of natural stone” [9]. Sample No. 1, with dimensions of 5x5x5 and a weight of 578g, underwent 150 cycles of alternate freezing and thawing from September 15, 2023, to November 20, 2023. Throughout the

testing period, the weight and dimensions of the sample remained unchanged, and salts (MgCO₃) appeared on the surface.

After 150 cycles, sample No. 1 was tested for strength and showed 85 MPa.

Samples No. 2 and 3 with dimensions 6x6x5, weight 715 g, were also tested for frost resistance in accordance with GOST 4001-2013 “Wall stones from rocks” [3]. Samples No. 2 with dimensions 6x6x5 and weight 790g, and No. 3 with dimensions 5x4x5 and weight 384g., withstood 75 cycles for the period starting from December 7, 2024. until 5.02.2024 During the entire testing period, the weight and dimensions of the sample did not change; salts (MgCO₃) appeared on the surface.

After 75 cycles, samples No. 2 and 3 were tested for strength and showed: Sample No. 2 82 MPa. and sample No. 3 88 MPa.

Samples No. 4,5,6,7,8,9 were tested for frost resistance in accordance with GOST 30629-2011 “Rock facing materials and products” [4]. Frost resistance of facing stone is determined as follows: after 15; 25; 35; 50 and every subsequent 50 cycles of alternating freezing (4 hours) and thawing (2 hours), five water-saturated samples are subjected to a compression test. In the period from 02.29.2024 until 04/20/2024 samples went through 25 cycles and were tested for strength three times.

Table.1
Characteristics of samples.

	Size	Weight	Initial strength(MPa)	Ultimate Strength(MPa)
Sample No. 4	5x5x8	626g.	96	91
Sample No. 5	4x6x10	800g.	89	93
Sample No. 6	6x6x7	936	93	85
Sample No. 7	5x6x6	508g.	94.2	95
Sample No. 8	3x3x5	194g.	86	90
Sample No. 9	4x4x5	279g.	94.2	90

Despite the fact that the tested samples only slightly lose weight, the strength of the samples decreases, however, for use as facing bricks, all properties are retained.

Conclusions.

When analyzing GOST standards related to testing natural stone materials for frost resistance, there are several approaches to these tests. In addition, GOST standards must take into account the specific climatic conditions of the construction region, so it is impossible to establish a single number of frost resistance cycles for materials for the entire country. Each region has its own characteristics and climatic conditions, so it is necessary to develop test standards that take into account all these factors.

It is also important to note that the results of tests for frost resistance of stone materials can vary greatly depending on the specific type of stone, its structure and composition. Therefore, it is necessary to take into account all these factors when conducting tests and analyzing their results.

In addition, when testing for frost resistance, it is also necessary to take into account the operating conditions of the materials, such as exposure to moisture, salts, chemicals, etc. This can also significantly affect the resistance of materials to frost. For example, if the structures are located on the coast or directly in the water.

Thus, when analyzing GOSTs and developing standards for testing the frost resistance of stone materials, it is necessary to take into account all of the above factors, as well as take into account the specifics of a particular region and operating conditions of the materials.

References

1. *Republican program. "Geological study of subsoil, reproduction of the mineral resource base of the Republic of Ingushetia and rational use of subsoil areas for 2012-2016." from 03/23/2011*
2. *Republican program. "Geological study of the subsoil and reproduction of the mineral resource base of the Republic of Ingushetia in the solid minerals industry for 2002-2003." dated 04/17/2002*
3. *State standard. GOST 4001-2013 "Wall stones from rocks" dated 01/01/2015*
4. *State standard. GOST 30629-2011 "Rock facing materials and products" dated 10/01/2012*

DOI 10.34660/INF.2024.26.29.179

以注入能量从 U-70 加速器中晶体提取质子束
**CRYSTAL EXTRACTION OF A PROTON BEAM FROM THE U-70
ACCELERATOR AT INJECTION ENERGY**

Chesnokov Yuri Andreevich

*Doctor of Physical and Mathematical Sciences, Chief Researcher
Institute for High Energy Physics named by A.A. Logunov of National
Research Centre «Kurchatov Institute», Protvino, Russia*

Reshetnikov Sergey Fedorovich

*Postgraduate, Research engineer
Institute for High Energy Physics named by A.A. Logunov of National
Research Centre «Kurchatov Institute», Protvino, Russia*

Savin Danil Alexandrovich

*Postgraduate, Research engineer
Institute for High Energy Physics named by A.A. Logunov of National
Research Centre «Kurchatov Institute», Protvino, Russia*

注解。 弯曲晶体中带电粒子束的偏转现象已得到充分研究，并成功应用于加速器，用于提取和准直 10 GeV 及更高能量的粒子。 然而，偏转和提取能量低于 1 GeV 的粒子的任务对于获得用于医学和生物应用的超稳定低发射光束具有很大的实际意义。 在这项工作中，我们提出了一种新的晶体技术，可以在低于 1 GeV 的能量下有效工作。

关键词：加速器、光束提取、弯曲晶体沟道。

Annotation. *The phenomenon of deflection of a beam of charged particles in a curved crystal has been well studied and successfully applied to accelerators for the extraction and collimation of particles at energies of 10 GeV and higher. However, the task of deflection and extraction particles with energies below 1 GeV is of great practical interest for obtaining ultra-stable low-emittance beams for medical and biological applications. In this work, we propose a new crystal technique that can work effectively for energies below 1 GeV.*

Keywords: *accelerators, extraction of beam, bent crystal channeling.*

The phenomenon of deflection of a beam of charged particles in a curved crystal has been well studied and successfully applied to accelerators for the extraction and collimation of particles at energies of 10 GeV and higher (see, for example,

[1,2,3]). However, the task of deflection and extraction particles with energies below 1 GeV is of great practical interest, for example, for obtaining ultra-stable low-emittance beams for medical and biological applications. In this case, there is a serious problem in creating deflection devices for low energies, which is associated with the small size of curved crystalline samples. The efficiency of particle deflection is determined by the ratio of the critical channeling angle θ_c to the divergence of the beam j and decreases exponentially with the crystal length L :

$$\text{Eff} \sim (\theta_c / j) \times \exp (-L / L_d),$$

where the characteristic parameter L_d , called the dechanneling length, is relatively small for low energy. For example, for $E = 500$ MeV, we have $\theta_c = 0.24$ mrad and $L_d = 0.4$ mm. With a conventional curved crystal (approximately 1 mm long), only a 10% deflection efficiency was achieved for particles with an energy of 0.5 GeV [4] on the external beam. Even greater problems arise in the task of extraction the circulating beam from the accelerator ring, since here, in addition, significant transverse dimensions of the crystal exceeding its length are required. In this case, the bending angle of the crystal should be greater than 1 mrad, so that the deflected beam is well separated from the circulating one. Curved crystals of a quasi-mosaic type [5] or thin flat crystals [6,7] may be a potentially suitable means in this case, but in both these cases it is necessary to increase the deflection angle of the particles several times. In this work, we propose a new crystal technique that can work effectively over a wide range of energies and is especially promising for energies below 1 GeV.

The method is based on the use of an array of short curved crystals (Fig. 1) of submillimeter length (special thin silicon plates, about 100 microns thick, were used to produce such strips). In this case, the bending of the array occurs in the same way as the bending of a single well-studied silicon strip [8].

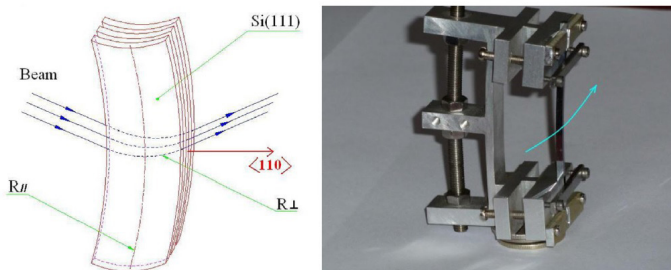


Figure 1. An array of curved silicon strips for beam deflection due to channeling (scheme and photo).

In the experiment, an array of crystals (see Fig.1) was introduced into the halo of the circulating beam of the U-70 accelerator, as shown in Fig.2. The bending angle of the crystals is sufficient to separate the circulating and deflected beams in space. The effect of beam deflection due to channeling was measured by a secondary emission detector located at the entry end face of the absorber in the vacuum chamber of the accelerator near the circulating beam. The measurements were carried out on protons at an injection energy of 1.3 GeV (kinetic energy).

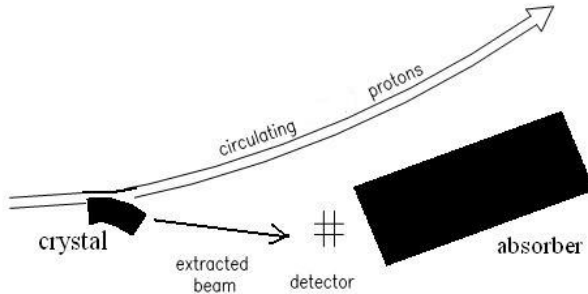


Figure 2. Diagram of the experiment on the extraction and collimation of a beam by crystals.

Fig. 3 illustrates the positive effect of using crystals when they are used as the primary element of the system touching the beam (the beam was brought to the crystal using a slowly increasing bump magnet). The beam profile is shown 23 meters behind the crystal at the entrance to the absorber. The red line indicates the casting of the crystal beam as a result of channeling, the blue curve represents scattered particles.

Deep casting of particles (red curve) improves the collimation of the beam, or can be used to extract circulating particles from the accelerator. The number of particles in the channeled peak was 20% of the number of protons induced on the crystal. A large loss of efficiency is explained by the suboptimality of beam guidance with a bump. At low energy, due to the large beam size, about 50 mm, the guidance angle drifts, which should be eliminated when the beam is guided by high-frequency noise (this work is planned in the future).

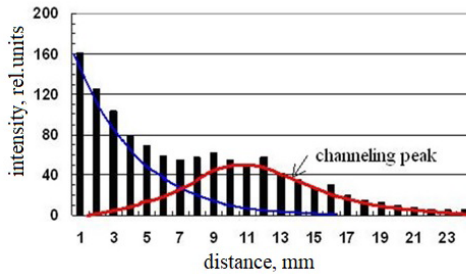


Figure 3. The profile of the deflected beam on the absorber (the circulating beam is on the left).

The work was supported by the Russian Science Foundation, grant 23-22-00001.

References

1. V.M. Biryukov, Yu.A. Chesnokov, and V.I. Kotov, *Crystal Channeling and Its Application at High-Energy Accelerators* (Springer: Berlin, 1997).
2. W. Scandale, D. Still, A. Carnera et al., *Phys. Rev. Lett.* 98, 154801 (2007)
3. N.V. Mokhov, G. Annala, A. Apyan et al. *FERMILAB-CONF-09-173-APC*, Apr 2009. 4pp. Presented at Particle Accelerator Conference (PAC 09), Vancouver, BC, Canada, 4-8 May 2009.
4. S. Bellucci, S. Balasubramanian, A. Grilli et al., *Nucl.Instrum.Meth.B252:3-6,2006*.
5. Yu.M.Ivanov, A.A.Petrinin, V.V.Skorobogatov, *JETP Letters* 81 (2005) 99
6. A.Taratin, E.Tsyganov, M.Bavizhev et al, preprint SSCL-545, 1991.
7. S.Strokov, T.Takahashi, I.Endo et al, *Nucl.Instrum.Meth.B252:16-19,2006*.
8. A.G.Afonin, V.T.Baranov, V.M.Biryukov et al, *Phys. Rev. Lett.* 87, 094802 (2001)

DOI 10.34660/INF.2024.32.10.180

UDC 691.32:666.97

无机复合材料的结构形成对生物组分的依赖性
**DEPENDENCE OF STRUCTURAL FORMATIONS OF INORGANIC
COMPOSITES ON BIOCOMPONENTS**

Tolstoy Alexandr Dmitrievich

Doctor of Technical Sciences, Professor

Yaremchuk Maksim Vitalevich

Postgraduate

Solovyov Sergey Victorovich

Postgraduate

*Belgorod State Technological University named after V.G. Shukhova,
Belgorod, Russia*

注解。在材料科学知识领域，要证实结构形成过程的机理和主要阶段，紧迫的任务是控制结构形成过程，正如实践所表明的那样，以确保材料在特定条件下运行的可靠指标。同时，有必要使用高能活性物质在微观水平上优化引入的生物成分的结构。

关键词：结构形式依赖性原理、生物成分、生物改性剂、技术材料科学。

Annotation. *In the materials science field of knowledge to substantiate the mechanism and main stages of the structure formation process, an urgent task is to control the structure formation processes, as practice has shown, to ensure reliable indicators of the operation of materials in specific conditions. At the same time, it is necessary to optimize the structure of incoming biocomponents at the micro level using energetically active substances.*

Keywords: *principle of dependence of structural formations, biocomponents, biomodifiers, technological materials science.*

According to the U.S. Green Building Council (USGBC), to create environmentally friendly materials, the following conditions must be met:

– maximum use of biosource materials in production; replacement of natural raw materials with waste from various industries allows preserving nature’s reserves;

– the use of environmentally friendly technologies that do not contain harmful substances to human health;

- replacement of scarce biomaterials and their analogues, which are widespread in the world;
- achieving minimal energy costs for creating the necessary components and their maintenance.

Thus, under conditions, the creation and use of multicomponent compositions for new materials is a promising direction.

In accordance with the principles of interdisciplinarity, as a result of the interaction of structural components, as well as the manifestation of special intrastructural effects, the technical properties of a composite can be significantly enhanced compared to individual components. In this regard, the conditions for the formation of the structure of biocomponents and the role of technological techniques in this process were previously theoretically studied. The nature of the influence of structure on the quality of materials, as well as compositions and manufacturing technology using technogenic components of various biological, chemical and mineralogical compositions[1].

A great interest in this regard is the synergetics apparatus, which considers any irreversible processes in the dynamics of their development and the new states of the system that arise as a result. In our time, a new direction is gaining momentum - the biomineralization of living bacteria. This is the process of creating new materials (biominerals) using living organisms during the hardening of existing tissues, hence such tissues are called mineralized tissues. This is an extremely common phenomenon - all six taxonomic elements contain organisms capable of forming minerals, and more than 60 different minerals have been identified in organisms. Examples include silicates in algae and diatoms, carbonates in invertebrates, and calcium phosphates and carbonates in vertebrates. These minerals often form structural elements such as marine shells and mammalian bones. Organisms have been producing mineralized skeletons for the past 550 million years. Calcium carbonates and phosphates are usually crystalline, but silicon-based organisms (sponges, diatoms) are always non-crystalline minerals. Other examples include copper, iron, and gold deposits involving bacteria. Biologically formed minerals often find special applications, such as magnetic sensors in magnetotactic bacteria (Fe_3O_4), gravity measurement devices (CaCO_3 , CaSO_4 , BaSO_4), and iron storage and mobilization ($\text{Fe}_2\text{O}_3\text{H}_2\text{O}$ in the ferritin protein) [2].

At present, no unified approach to the methodology for creating multicomponent biocompositions has been developed. Some researchers approach the problem from the side of technological mechanics; there are approaches along the lines of the rheological properties of the system, optimization of the microgranulometric composition, the relationship between the optimal structure and extreme properties of the components (the law of “swing” by I.A. Rybiev [3]). Mainly theoretical principles and principles of designing fine-grained hardening systems for multicomponent materials (Table 1).

Table 1
Comparative indicators of biomimetic powder composition

Index	Meaning	
	biomimetic powder composite	ordinary fine grain composite
Average density, kg/m ³	2150-2150	2200-2500
Compressive strength, MPa	35.0-55.0	10-50
Water holding capacity, %	85-90	78-80
Structural quality factor, K.K.K.	0.4-0.5	0.2-0.3
Waterproof grade, W	4-5	2-4
Abrasion, g/cm ²	0.5-0.6	0.7-0.8
Thermal conductivity coefficient, W/(m·K)	1.1-1.2	1.2-1.3

Therefore, theoretical approaches to the design and creation mineralization carbonate composite from a biotechnological process are not entirely applicable to multicomponent ones either in composition or in operational loads, although the methodology for selecting the composition, taking into account the energy indicators of the components, can be taken as a basis [4].

It was recorded that positive results were achieved by the multi-component composition - the number of components was 5-7. The quantity and quality of the material has a decisive influence on its properties. Promising additives in relation to high-strength and high-quality biocomplex additives introduced into the mixture in the form of aqueous solutions, powders and emulsions. Most additives are water soluble and are administered as a pre-mixed solution. The optimal dosage of the additive depends on the type, composition and manufacturing technology of the composite.

For this purpose, the type of mixture component was determined to ensure optimal properties of the material while optimizing the structure of the artificial stone. The group of dispersed multicomponent powders of technogenic and biological origin was also expanded. As a result, these substances contain a mixture of dispersed compound ready-made crystallization centers. We also used waste crushed to a specific surface area $S_{sp} = 1500 \text{ m}^2/\text{kg}$. The composition was obtained by modifying it with a complex additive consisting of bio broth and a finely ground mineral component. The content of the complex additive was 2.5-3.4%. The share of mineral consumption was up to 15%. The freshly prepared mixture has increased fluidity and rheological activity, which makes it possible to cover the surface of structures of different sizes. Results were obtained in the study of compositions and properties composite increased strength, modification of the structure with multicomponent organic-mineral modifiers, which contain reactive fine substances of various natures.

An important aspect of research on this topic is the purification and improvement of the environment, which undoubtedly gives additional relevance to the study of biotechnologies with man-made products (without the use of cements). Thus, improving the composition and technology makes it possible to obtain new data on the structure of products and methods for its optimization, and makes it possible to improve a number of design and technological indicators. The use of such technologies will improve the environmental situation [5].

Over the past decade, it has become possible to radically change the methodology for the design and production of composites with predetermined properties by optimizing the structure at the macro and micro levels. Large reserves for energy saving in the construction industry lie in more complete use of the energy of geological formations using raw materials with high internal energy, i.e. a significant expansion of the raw material base for production, primarily binders. It seems possible to expand modifiers using new starting materials.

Briefly touch upon the field of activity in the materials science field of knowledge on the basis of the mechanism and the main stages of the process of structure formation from the standpoint of the synergistic interaction of components, their understanding as open adaptive systems. Synergetics can explain and make it easier to understand the mechanism of structure-forming processes in the material world, in particular those occurring during the hardening of multi-component systems that represent biological and mineral resources (Figure 1).

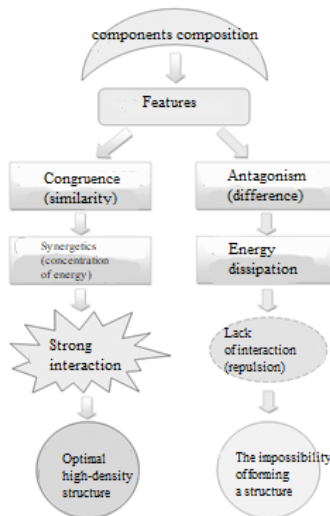


Figure 1. Coordination scheme with highly effective compositions

From a synergistic point of view in at the first stage of the technological chain, an open non-equilibrium system of a mixture of ingredients is created, in which spontaneous processes of bio and chemical interaction take place.

As a result of the work carried out, we received new data on the study and development of compositions and technology. As a result of the work carried out, we received new research and development data compositions and application technologies Main synergistic properties the task is to find mixtures by materials science definitions ingredients in material structure while maintaining high quality.

References

1. Tolstoy A.D., Krymova A.I. *Application of synergetic principles of self-organization in the theory of hardening of building composites // Bulletin of BSTU named after. V.G. Shukhova. – Belgorod, 2018, No. 9, p. 24-29*
2. Zhu T., Dietrich M. *Precipitation of carbonates as a result of the activity of microorganisms in the natural environment and their potential in biotechnology // Review: Bioengerina and Biotechnology, 2016, No. 4, p. doi: 10.3389/fbioe.2016.00004.*
3. Rybyev, I.A. *Discovery of the alignment law and its relationship with the law of congruence in construction materials science / I.A. Rybyev // Construction materials. – 1999. – No. 12. – P. 30-31.*
4. Batrakov, V. G. *Modified concrete. Theory and practice / V. G. Batrakov. – M.: Technoproekt, 1998. – 768 p.*
5. Tolstoy A.D. *Cement-free building material based on a polymer-carbonate composition // “New technologies for recycling production and consumption waste”: Materials of reports. Intl. scientific-technical conf. – Minsk, BSTU, 2004, p. 383-385.*

科学出版物

上合组织国家的科学研究：协同和一体化

国际科学大会的材料

2024年5月22日。中国北京

编辑A. A. Siliverstova

校正A. I. 尼古拉耶夫

2024年5月22日。中国北京

USL。沸点：98.7。订单253。流通500份。

在编辑和出版中心印制

无限出版社

