SCIENCE AND EDUCATION IN KARAKALPAKSTAN

ҚОРАҚАЛПОҒИСТОНДА ФАН ВА ТАЪЛИМ

ҚАРАҚАЛПАҚСТАНДА ИЛИМ ҲӘМ ТӘЛИМ

НАУКА И ОБРАЗОВАНИЕ В КАРАКАЛПАКСТАНЕ

3-сон
Нукус
2021 й
ISSN 2181-9203

Science and Education in Karakalpakstan *ISSN 2181-9203*

№3 (18) 2021

Editorial office address:
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Karakalpakstan, Uzbekistan
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O‘zbekiston Respublikasi Вазирлар Махкамаси хузуридаги OAK Tartib-qoida komissiyasi qarori 24.05.2017 y., №5/2.
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NATURAL SCIENCES

ON SOME PROPERTIES OF THE SPECTRUM OF ELEMENTS OF BANACH-KANTOROVICH ALGEBRAS OVER A RING OF MEASURABLE FUNCTIONS

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***Summary**: In this paper, some properties of the spectrum of elements of the Banach-Kantorovich algebra over a ring of measurable functions are considered.*

***Key words:** Banach-Kantorovich algebra, a ring of measurable functions, spectrum*

The structural theory of C^*-modules begins with the papers of I. Kaplansky [3], who used these objects for an algebraic approach to the theory of C^*-algebras. Consideration of C^*-algebras, AW^*-algebras and W^*-algebras as modules over their centers allows to use methods of Boolean–valued analysis to describe various properties of these classes of $*$-algebras (see, for example, G. Takeuti [6], A.G. Kusraev [4] and A. G. Kusraev, S. S. Kutateladae [5]. C^*-modules are useful examples of Banach–Kantorovich modules, the theory of which is actively developing (see for example [2, 4]). The theory of continuous and measurable Banach bundles [5] has become an important tool in the study of such Banach–Kantorovich modules, along with Boolean valued analysis. In particular, this made it possible to represent a C^*-module over a ring of measurable functions as a measurable bundle of classical C^*-algebras [1], which makes it possible to obtain the properties of C^*-modules by "gluing" the corresponding properties of C^*-algebras over the field $\mathbb{C}$.

Using this approach, it is possible to implement a study of the spectrum of the Banach-Kantorovich algebra. In this paper, we review the results with the spectrum of elements of the Banach-Kantorovich algebra. It is shown that every Banach–Kantorovich algebra over a ring of measurable functions can be represented as a measurable bundle of Banach algebras with a vector-valued lifting, and with this representation it is possible to show the non-emptiness and cyclic compactness of the spectrum of elements of Banach-Kantorovich algebras over a ring of measurable functions. The terminology and notation of the theory of Banach-Cantorovich spaces from [4], and the theory of measurable bundles from [2] are used.

Let (Ω, Σ, μ) be a measure space having the direct sum property and let $L^0 = L^0(\Omega, \Sigma, \mu)$ be an algebra of all complex measurable functions on Ω (functions equal almost everywhere are identified).

Let $\mathcal{L}^\infty(\Omega)$ be a set of all bounded complex-valued measurable functions on Ω and let

$$L^\infty(\Omega) = \{f \in L^0 : \exists \lambda \in \mathbb{R},\ \lambda > 0,\ |f| \le \lambda \mathbf{1}\},$$

where $\mathbf{1}$ is the unit in L^0. Note that the Boolean algebra ∇ of all idempotents in L^0, coincides with the set of all classes of functions of the form χ_A, where $A \in \Sigma$.

A mapping $\rho: L^\infty(\Omega) \to \mathcal{L}^\infty(\Omega)$ is said to be a lifting of $L^\infty(\Omega)$, if for all $\alpha, \beta \in \mathbb{C}$ and $f, g \in L^\infty(\Omega)$ the following are true:

- $\rho(f) \in f$ and $dom(\rho(f)) = \Omega$;
- if $f \le g$, then $\rho(f) \le \rho(g)$ everywhere on Ω;

• $\rho(\alpha f+\beta g)=\alpha\rho(f)+\beta\rho(g),\rho(fg)=\rho(f)\rho(g),\rho(f\vee g)=\rho(f)\vee\rho(g),\rho(f\wedge g)=\rho(f)\wedge\rho(g);$

• $\rho(0)=0$ and $\rho(\mathbf{1})=\mathbf{1}$ everywhere on Ω.

It is well-known (see [4, Theorem 1.4.8]) that if (Ω,Σ,μ) is a measure space having the direct sum property, then $L^\infty(\Omega)$ admits a lifting.

Consider a linear space X over the field of complex numbers $\mathbb{C}$. A mapping $\|\cdot\|:X\to L^0$ is called a L^0-valued norm on X, if for every $x,y\in X,\ \lambda\in\mathbb{C}$ the following relations hold:

1. $\|x\|\geq 0,\quad \|x\|=0\Leftrightarrow x=0;$ 2. $\|\lambda x\|=|\lambda|\,\|x\|;$
3. $\|x+y\|\leq\|x\|+\|y\|.$

The pair $(X,\ \|\cdot\|)$ is called a lattice-normed space over L^0.

A lattice-normed space X is called d-decomposable, if for any $x\in X$ with $\|x\|=\lambda_1+\lambda_2,\ 0\leq\lambda_1,\lambda_2\in L^0,\ \lambda_1\lambda_2=0$ there exist $x_1,x_2\in X$ such that $x=x_1+x_2$ and $\|x_1\|=\lambda_1,\|x_2\|=\lambda_2$. A net $\{x_\alpha\}_{\alpha\in A}$ in X is called (bo)-converging to $x\in X$, if the net $\{\|x_\alpha-x\|\}_{\alpha\in A}$ is (o)-converges to zero in L^0 (note that the (o)-convergence in L^0 coincides with convergence almost everywhere). A (bo)-complete d-decomposable lattice-normed space over L^0 is called a Banach–Kantorovich space over L^0 (see [4]). It is known that every Banach–Kantorovich space X over L^0 is a module over L^0 and $\|\lambda u\|=|\lambda|\,\|u\|$ for all $\lambda\in L^0,u\in X$ (see [4]).

Let $\mathcal{A}$ be an arbitrary algebra over the field $\mathbb{C}$ and $\mathcal{A}$ is a module over L^0, with $(\lambda u)v=\lambda(uv)=u(\lambda v)$ for all $\lambda\in L^0,\ u,v\in\mathcal{A}$. Consider on $\mathcal{A}$ some L^0-valued norm $\|\cdot\|$, endowing $\mathcal{A}$ with the structure of Banach–Kantorovich space, in particular, $\|\lambda u\|=|\lambda|\,\|u\|$ for all $\lambda\in L^0,u\in\mathcal{A}$.

An algebra $\mathcal{A}$ is called a Banach–Kantorovich algebra over L^0, if $\|uv\|\leq\|u\|\|v\|$ for all $u,v\in\mathcal{A}$. If $\mathcal{A}$ is a Banach–Kantorovich algebra over L^0 with a unit e such that $\|e\|=1$, where $\mathbf{1}$ is the unit in L^0, then $\mathcal{A}$ is called a unital Banach–Kantorovich algebra.

Let us recall a definition of measurable Banach bundle.

Let $\mathcal{X}$ be a mapping that matches to each point $\omega\in\Omega$ a Banach algebra $\left(\mathcal{A}(\omega),\|\cdot\|_{\mathcal{A}(\omega)}\right)$, where $\mathcal{A}(\omega)\neq\{0\}$ for all $\omega\in\Omega$. A function u is called a section of $\mathcal{X}$, if it is defined on Ω almost everywhere and takes a value $u(\omega)\in\mathcal{A}(\omega)$ for $\omega\in dom(u)$, where $dom(u)$ is the domain of u.

Let L be some set of sections.

A pair $(\mathcal{X},L)$ is called measurable Banach bundle, if

1. $\lambda_1c_1+\lambda_2c_2\in L$ for all $\lambda_1,\lambda_2\in\mathbb{C}$ and $c_1,c_2\in L$, where $\lambda_1c_1+\lambda_2c_2:\omega\in dom(c_1)\cap dom(c_2)\mapsto\lambda_1c_1(\omega)+\lambda_2c_2(\omega)$;
2. the function $\|c\|:\omega\in dom(c)\mapsto\|c(\omega)\|_{\mathcal{A}(\omega)}$ is measurable for all $c\in L$;
3. the set $\{c(\omega):c\in L,\omega\in dom(c)\}$ is dense in $\mathcal{A}(\omega)$ for all $\omega\in\Omega$;
4. If $u,v\in L$, then $uv\in L$, where $uv:\omega\in dom(u)\cap dom(v)\mapsto u(\omega)v(\omega)$.

Instead of $(\mathcal{X},L)$ we will simply write $\mathcal{X}$. A section s is called simple, if there exists $c_i\in L,\ A_i\in\Sigma,\ i=1,\dots,n,$ such that $s(\omega)=\sum_{i=1}^n\chi_{A_i}(\omega)c_i(\omega)$.

A section u called measurable, if there exists a sequence $\{s_n\}_{n\in\mathbb{N}}$ of simple sections such that $\|s_n(\omega)-u(\omega)\|_{\mathcal{A}(\omega)}\to 0$ for almost all $\omega\in\Omega$.

Let $\mathcal{M}(\Omega,\mathcal{X})$ be a set of all measurable sections. Denote by $L^0(\Omega,\mathcal{X})$ the factorization of $\mathcal{M}(\Omega,\mathcal{X})$ with respect to equality almost everywhere. By $\hat{u}$ denote the class from $L^0(\Omega,\mathcal{X})$ containing section $u\in\mathcal{M}(\Omega,\mathcal{X})$. A function $\omega\mapsto\| u(\omega)\|_{\mathcal{A}(\omega)}$ is measurable for all $u\in\mathcal{M}(\Omega,\mathcal{X})$. An equivalence class containing the function $\| u(\omega)\|_{\mathcal{A}(\omega)}$ denoted by $\|\hat{u}\|$. For $\hat{u},\hat{v}\in L^0(\Omega,\mathcal{X})$ set $\hat{u}\hat{v}=\widehat{u(\omega)v(\omega)}$. According to [2, Theorem 4.1.14], $L^0(\Omega,\mathcal{X})$ is a Banach–Kantorovich space over L^0. Since $\mathcal{A}(\omega)$ is a Banach algebra for all $\omega\in\Omega$, it follows that

$$\begin{aligned}\|\hat{u}\hat{v}\|&=\|\widehat{u(\omega)v(\omega)}\|_{\mathcal{A}(\omega)}\le\|u(\omega)\|_{\mathcal{A}(\omega)}\|\widehat{v(\omega)}\|_{\mathcal{A}(\omega)}\\&=\|\widehat{u(\omega)}\|_{\mathcal{A}(\omega)}\|\widehat{v(\omega)}\|_{\mathcal{A}(\omega)}=\|\hat{u}\|\|\hat{v}\|.\end{aligned}$$

Therefore $(L^0(\Omega,\mathcal{X}),\|\cdot\|)$ is a Banach – Kantorovich algebra over L^0.

So, we have the following result.

Proposition 1. *If $\mathcal{X}$ is a measurable bundle of Banach algebras, then $L^0(\Omega,\mathcal{X})$ is a Banach–Kantorovich algebra over L^0.*

Now, we consider some properties of the spectrum of elements of Banach–Kantorovich algebra. First, we shall show some show that any Banach–Kantorovich algebra $\mathcal{A}$ over L^0 is represented as a measurable bundle of Banach algebras.

Let

$$\mathcal{L}^\infty(\Omega,\mathcal{X})=\{u\in\mathcal{M}(\Omega,\mathcal{X}):\|u(\omega)\|_{\mathcal{A}(\omega)}\in\mathcal{L}^\infty(\Omega)\}$$

and

$$L^\infty(\Omega,\mathcal{X})=\{\hat{u}\in L^0(\Omega,\mathcal{X}):\|\hat{u}\|\in L^\infty(\Omega)\}.$$

Consider an arbitrary lifting $\rho:L^\infty(\Omega)\to\mathcal{L}^\infty(\Omega)$.

A mapping $l_{\mathcal{X}}:L^\infty(\Omega,\mathcal{X})\to\mathcal{L}^\infty(\Omega,\mathcal{X})$ is called a vector valued lifting (associated with lifting ρ), if for all $\hat{u},\hat{v}\in L^\infty(\Omega,\mathcal{X})$ and $\lambda\in L^\infty(\Omega)$ the following properties are true:

1) $l_{\mathcal{X}}(\hat{u})\in\hat{u}, dom(l_{\mathcal{X}}(\hat{u}))=\Omega$;
2) $\|l_{\mathcal{X}}(\hat{u})(\omega)\|_{\mathcal{A}(\omega)}=\rho(\|\hat{u}\|)(\omega)$;
3) $l_{\mathcal{X}}(\hat{u}+\hat{v})=l_{\mathcal{X}}(\hat{u})+l_{\mathcal{X}}(\hat{v})$;
4) $l_{\mathcal{X}}(\lambda\hat{u})=\rho(\lambda)l_{\mathcal{X}}(\hat{u})$;
5) $l_{\mathcal{X}}(\hat{u}\hat{v})=l_{\mathcal{X}}(\hat{u})l_{\mathcal{X}}(\hat{v})$;
6) the set $\{l_{\mathcal{X}}(\hat{u})(\omega):\hat{u}\in L^\infty(\Omega,\mathcal{X})\}$ is dense in $\mathcal{A}(\omega)$ for all $\omega\in\Omega$.

Let $\mathcal{X}$ and $\mathcal{Y}$ are measurable bundles of Banach algebras over Ω. The map $H:\omega\to H_\omega$, where $H_\omega:X(\omega)\to Y(\omega)$ is an injective homomorphism of Banach algebras, we call the embedding of $\mathcal{X}$ in $\mathcal{Y}$, if $\{H_\omega(u(\omega)):u\in\mathcal{M}(\Omega,\mathcal{X})\}\subset\mathcal{M}(\Omega,\mathcal{Y})$. In the case when $\{H_\omega(u(\omega)):u\in\mathcal{M}(\Omega,\mathcal{X})\}=\mathcal{M}(\Omega,\mathcal{Y})$ the embedding H, is called an isomorphism from $\mathcal{X}$ to $\mathcal{Y}$ (in this situation, the bundles $\mathcal{X}$ and $\mathcal{Y}$ will be called isomorphic).

Proposition 2. *For every Banach–Kantorovich algebra* $\mathcal{A}$ *over* L^0 *there exists a unique, up to isomorphism, measurable bundle of Banach algebras* $(\mathcal{X}, L)$ *with a vector-valued lifting* $l_{\mathcal{X}}$ *such that* $\mathcal{A}$ *is isometrically isomorphic to* $L^0(\Omega, \mathcal{X})$, *and* $\{l_{\mathcal{X}}(x)(\omega): x \in L^\infty(\Omega, \mathcal{X})\} = X(\omega)$ *for all* $\omega \in \Omega$. *Moreover, if* $\mathcal{A}$ *is a unital algebra, then* $X(\omega)$ *is also unital algebra for all* $\omega \in \Omega$.

A subset K of Banach–Kantorovich space X over L^0 is called a *cyclic*, if $\sum_{i\in I} \pi_i x_i \in K$ for each net $\{x_i\}_{i\in I}$ from K and any partition of the unit $\{\pi_i\}_{i\in I}$ in ∇. A linear mapping $T: X \to X$ is called a mix-preserving, if

$$T(\sum_{i\in I} \pi_i x_i) = \sum_{i\in I} \pi_i T(x_i)$$

for each $\{x_i\}_{i\in I} \subset X$ and any partition of the unit $\{\pi_i\}_{i\in I}$ in ∇.

For the elements $a, b \in L^0$ we shall write $a < b$, if $a \leq b$ and $\pi a \neq \pi b$ for all non zero $\pi \in \nabla$. As usual, by $Inv(\mathcal{A})$ we denote the set of all invertible elements of the algebra $\mathcal{A}$.

Proposition 3. *Let* $\mathcal{A}$ *be a unital Banach–Kantorovich algebra over* L^0. *Then the following statements hold:*

• *if* $x \in \mathcal{A}, \| x \| < \mathbf{1}$, *then the element* $e - x$ *is invertible and*

$$\|(e-x)^{-1} - e\| \leq \| x \| (\mathbf{1} - \| x \|)^{-1};$$

• *if* $x \in Inv(\mathcal{A}), h \in \mathcal{A}$ *and* $2 \| h \| < \|x^{-1}\|^{-1}$, *then* $x + h \in Inv(\mathcal{A})$ *and*

$$\|(x+h)^{-1} - x^{-1}\| \leq 2\|x^{-1}\|^2 \| h \|;$$

• *the mapping* $x \in Inv(\mathcal{A}) \to x^{-1}$ *is continuous and preserves mixing.*

Denote by $sp(x)$ $(x \in \mathcal{A})$ the set of all $\lambda \in L^0$ such that the element $\lambda e - x$ is not invertible in $\mathcal{A}$.

Proposition 4. *For every* $x \in \mathcal{A}$ *the set* $sp(x)$ *is nonempty.*

Let ∇ be the Boolean algebra of all idempotents in L^0. If $\mathcal{A}$ is a unital Banach–Kantorovich algebra over L^0, then the subalgebra $\pi\mathcal{A} = \{\pi x: x \in \mathcal{A}\}$, where $\pi \in \nabla, \pi \neq 0$ can be considered as a unital algebra with unit πe. By $spm(x)$ we denote the set of all $\lambda \in sp(x)$ such that for every $\pi \in \nabla, \pi \neq 0$, the element $\pi(\lambda e - x) \notin Inv(\pi\mathcal{A})$.

The next result is a version of *Gelfand's spectrum theorem* for elements of Banach–Kantorovich algebras over L^0.

Theorem 1. *For every* $x \in \mathcal{A}$ *the set* $spm(x)$ *is nonempty,* (o)*-closed, cyclic and bounded subset of* L^0.

Let (Ω, Σ, μ) be a measure space having the direct sum property and E is a subalgebra in L^0. Then the set $E(\Omega, \mathcal{X}) = \{x \in L^0(\Omega, \mathcal{X}): ||x|| \in E\}$ endowed with the operations induced from $L^0(\Omega, \mathcal{X})$ is a Banach–Kantorovich algebra over E.

Suppose that E is a solid subalgebra in L^0, that is, if $f \in E, g \in L^0, |g| \leq |f|$ implies that $g \in E$. Let $x \in E(\Omega, \mathcal{X})$ be an arbitrary element. Considering x as an element of $L^0(\Omega, \mathcal{X})$, we see that

$$spm(x) \subset \{\lambda \in L^0 : |\lambda| \leq ||x||\}.$$

Since E is solid, it follows that $spm(x) \subset E$. So, Theorem 1 implies the following result.

Theorem 2. *For every $x \in E(\Omega, \mathcal{X})$ the set $spm(x)$ is nonempty, (o)-closed, cyclic and bounded subset of E.*

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Rezyume: *Ushbu maqolada, Banach-Kantorovich algebrasi elementlarining o'lchov funktsiyalari halqasidagi ba'zi spektrlarining xususiyatlari ko'rib chiqilgan.*

Резюме: *В статье рассматриваются некоторые свойства спектра элементов алгебры Банаха – Канторовича над кольцом измеримых функций.*

Kalit so'zlar*: Banach-Kantorovich algebra, o'lchanadigan funktsiyalar halqasi, spektr.*

Ключевые слова: *алгебра Банаха-Канторовича, кольцо измеримых функций, спектр.*

INTERACTION OF MANGANESE WITH O, S, Se AND Te IMPURITIES

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Summary: *It has been shown experimentally that the electrical parameters, namely, specific resistivity, mobility and charge carriers concentration are changed after leggier of Mn preliminarily with O, S, Se and Te samples. There the charge carrier's concentration changing may be deal with the appearance of interaction of Mn with VI group elements in the Si lattice.*

Keywords*: Si, interaction, Mn, Gibbs energy, complexation.*

Introduction

It follows from known previously results on investigation of impurity interaction of Mn with the VI group elements that for the each elements pair is character the temperature definite value on which we deal with the most intensive complexation.

Table 1.

The values of the most intensive complexation temperature and Gibbs energy for corresponding compounds.

№	Binary complexes	T_{eff},˚C	ΔG^0_{298} kJ/mol	*k*
1	MnO	1300	-363.3	-0.279
2	MnS	1100	-220	-0.2
3	MnSe	820	-163	-0.2
4	MnTe	650	-128	-0.2

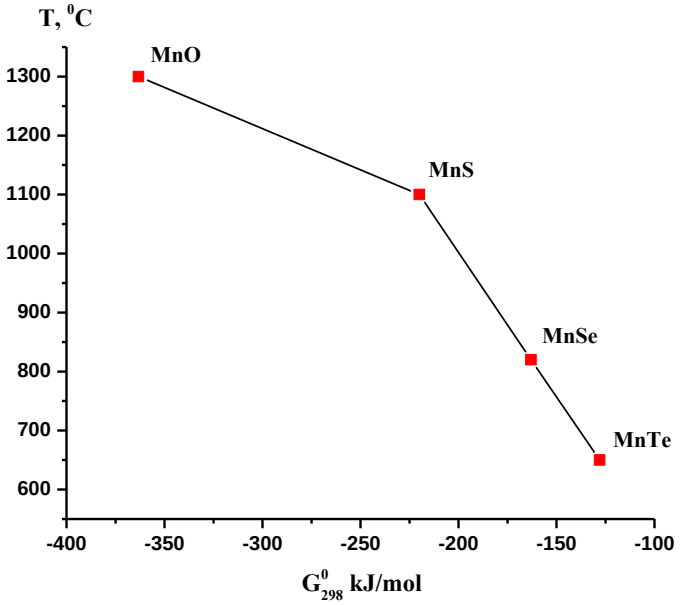

Figure 1. The temperature dependence of complexation on the Gibbs energy.

In Table 1 the values of the most intensive complexation temperature for the corresponding compounds are presented.

After analyzing data presented in this table we can conclude that there is presence the definite correlation between the most effective complexation temperature, T_{eff}, and Gibbs thermodynamic energy, ΔG^0_{298}, for corresponding chemical compounds (see, Figure 1).

$$\frac{\Delta G^0_{298} < MnO >}{T_{effMnO}} = \frac{\Delta G^0_{298} < MnS >}{T_{effMnS}} = \frac{\Delta G^0_{298} < MnSe >}{T_{effMnSe}} = \frac{\Delta G^0_{298} < MnTe >}{T_{effMnTe}} = k \qquad (1)$$

There the constancy of parameter k=-(2÷3) 10^{-1} kJ/mol K as the complexation coefficient can be identified.

The aim of the present paper is to show affecting of VI group elements interaction with Mn to the Si electrical parameters.

Investigations method

As the initial material we used the p-type Si mono crystal with specific resistance ρ=5 Ω· cm · (N_B=5·10^{15} sm^{-3}) concentrated with oxygen N_{O2}=7·10^{17} cm^{-3}. The samples as the parallelepiped with sizes 8×4×0,4 mm^{-3} are cut out, after that with M-14 micro powders in conditions provide obtaining the thickness and flatness of samples with ±10 micrometer precision are polished. Etching of the samples damaged layer in HF:HNO_3 (1:3) solution is carried out. For the diffuse we used the horizontal SUOL-0,4 type tube furnace. The diffuse annealing temperature one measured with Platinum–Platinum-rhodium. The diffuse of all impurities from the gas phase (the air residual pressure in the quart's ampoules was less than 10^{-4} mm Hg Art) is carried out. For investigations we prepared the p-type samples party with ρ=5 Ω· cm leggiered with B. The diffuse for O, S, Se and Te elements on temperature 1250 ˚C during 10 hours is carried out [3].

Table 2.

The electric parameters of samples leggier on 1250 ˚C during 10 hours.

Samples	Conductivity type	ρ, Ω·cm	μ, cm^2/ V·s	n, cm^{-3}	*x*, mkm
Si<B,O>	p	5.9	221	4.8·10^{15}	123
Si<B,S>	n	5.8	920	1.2·10^{15}	1221
Si<B,Se>	n	1.7	1385	2.6·10^{15}	818
Si<B,Te>	n	5.6·10^{-2}	686	1.6·10^{17}	12

After leggier we cut profiles with specific resistivity and charge carriers mobility distribution for all Si <B, S>, Si <B, Se>, Si <B, Te> samples on ones depth by room temperature and calculated the impurities concentration, which in Table 2 are presented.

Here the values for parameters ρ and μ (calculated by van-der Pau method) and p-n transition depth of (*x*)-samples Si <B, O>, Si <B, S>, Si<B, Se>, Si<B, Te> are given.

The analysis of distribution of N_S, N_{Se} and N_{Te} profile curve showed that it with erfc-function having surface concentrations N_S=5·10^{16} sm^{-3}, N_{Se}=1·10^{17} cm^{-3}, N_{Te}=5·10^{17} cm^{-3} and diffuse coefficients D_S=5·10^{-8} cm^2/c, D_{Se}=7·10^{-9} cm^2/c, D_{Te}=6·10^{-12} cm^2/c can be described.

Using the known data [4] we can present the representations for diffuse coefficients:

for S [5],

$$\left[D_S = 0.92 \exp\frac{-2.2}{kT}\right]\frac{cm^2}{c} \qquad (2)$$

for Se [6],

$$\left[D_{Se} = 0.3 \exp\frac{-2.6}{kT}\right]\frac{cm^2}{c} \qquad (3)$$

for Te [7],

$$\left[D_{Te} = 0.5 \exp\frac{-3.34}{kT}\right]\frac{cm^2}{c}. \qquad (4)$$

Their calculated ourselves values are in good agreement with the experimental data with accuracy less than ±20 %.

Here for calculation of the oxygen concentration in Si we used the dependence proposed in Ref. [8]:

$$\left[D_O = 0.13\exp\frac{-2.52}{kT}\right]\frac{cm^2}{c} \qquad (5)$$

The Mn diffuse from the gas phase to corresponding samples with VI group elements impurities we carried out during 30 minutes.

Presence of interaction between impurities by comparing electro physical parameters and p-n-transition depth in samples with Mn and without one is controlled.

Experimental results and discussion

The diffuse of Mn to Si <B, O> samples by T=1300 ˚C is carried out. The electro physical parameters of Si <B, Mn>, Si <B, O>, Si <B, Mn, O> samples in Table 3 has been presented.

Change, that is decrease of charge carriers concentration after leggier with Mn equals to 0,11% which differs essentially from the concentration value of Mn electro active atoms by diffuse temperature. Thus, the concentration of B with Mn does not happening. In line 1 of Table 3 we can see also the compensation case between Si <B, Mn> sample. There charge carriers concentration changing with appearance after leggier of the interaction between Mn and oxygen in the Si lattice can be explained.

Table 3.

Electro physical parameters of Si <B, Mn>, Si <B, O>, Si <B, Mn, O> samples

Samples	Conductivity type	ρ, Ω·cm	μ, $cm^2/V\cdot s$	n, cm^{-3}
Si<B, Mn>	n	$(1.2\div1.5)\cdot10^3$	1100	$4.5\cdot10^{12}$
Si<B,O>	p	5.9	221	$4.8\cdot10^{15}$
Si<B, Mn, O>	p	5÷7	260÷270	$(3.5\div3.8)\cdot10^{15}$
Δx, %	-	0,5 %	24,5 %	0,11%

Here the Mn diffuse to Si <B, S> samples by T=1100 ˚C is carried out. The electro physical parameters of Si <B, S>, Si <B, Mn>, Si <B, MnS> samples are presented in Table 4.

Table 4.

Electro physical parameters of Si <B, S>, Si <B, Mn>, Si <B, MnS> samples

samples	Conductivity type	ρ, Ω·cm	μ, $cm^2/V\cdot s$	n, cm^{-3}
Si<B, Mn>	n	$4.7\cdot10^2$	1000	$1.3\cdot10^{13}$
Si<B, S>	n	5.75	920	$1.2\cdot10^{15}$
Si<B, MnS>	p	6÷7	257	$3.4\cdot10^{15}$
Δx, %	-	4 %	25,7%	0,4%

Change (decrease) of the charge carriers concentration after leggier with Mn equals to 0,4 % which differs essentially from concentration values for Mn electro active atoms on the diffuse temperature. Thus, the compensation B with Mn does not happening. The compensation case we can see in line 1 of Table with Si <B, Mn> samples parameters. Such change of charge carriers concentration after leggier can be explained with appearance of the interaction between Mn and S in the Si lattice [9-10].

To Si <B, Se> samples the Mn diffuse we carried out on T=1160 ˚C. Then Si <B, Se> samples are annealed by T=820˚C during one hour.

Table 5.

The values of electro physical parameters of Si <B, Se>, Si<B, Mn Se> samples after additional annealing

Samples	Conductivity type (by thermozond)	ρ, Ω·cm	μ, $cm^2/V \cdot s$	n, cm^{-3}
Si<B, Mn>	n	88	1117	$6.3 \cdot 10^{13}$
Si<B, Se>	n	2	1240	$2.5 \cdot 10^{15}$
Si<B, MnSe>	p	4÷7	227	$3.7 \cdot 10^{15}$
Δx, %	-	8 %	20%	1.7%

Here change (decrease) of charge carriers concentration after leggier equals to 1,7 %, which differs essentially from the concentration values of Mn electro active atoms on the diffuse temperature. It follows the B compensation with Mn does not happening. The compensation case for Si <B, Mn> samples parameters is seen from line 1 of the Table. Such change of charge carriers concentration after leggier can be explained with appearance of the interaction between Mn and S in the Si lattice, too.

The Mn diffuse to Si <B, Te> samples is carried out on T=1160 ˚C. After that Si <B, Te> samples are annealed by T=650˚C during 1 hour.

Table 6.

The values of electro physical parameters of Si <B, Te>, Si<B, Mn Te> samples after additional annealing

Samples	Conductivity type (by thermozond)	ρ, Ω·cm	μ, $cm^2/V \cdot s$	n, cm^{-3}
Si<B, Mn>	n	$4.2 \cdot 10^{-2}$	102	$1.4 \cdot 10^{18}$
Si<B, Te>	n	$5.6 \cdot 10^{-2}$	686	$1.6 \cdot 10^{17}$
Si<B, MnTe>	p	3÷6	242	$4.3 \cdot 10^{15}$
Δx, %	-	0.7%	42%	0.3%

In this case change (decrease) of charge carriers concentration after leggier equals to 0,3 % which differs essentially from Mn electro active atoms concentration on the diffuse temperature. Thus, the B compensation with Mn does not happening. The compensation case for Si <B, Mn> samples parameters we can see from line 1 of the Table. This situation, that is change of charge carriers concentration after leggier can be explained with appearance of the interaction between Mn and Te in the Si lattice, too.

The presence of such definite correlation between of the most effective complexation temperature and the Gibbs energy for corresponding compounds testifies clearly on the chemical nature of O, S, Se and Te with Mn. In other words, in the interaction process of VI group elements with Mn impurity in the Si lattice we deal with presence of electro neutral chemical compound complexes between the centers of substitution of VI group elements and ones Mn introducing.

Conclusion

The definite correlation between the most effective temperature and Gibbs thermodynamic energy for corresponding individual compounds for each observed O, S, Se and Te complexes has been revealed. We showed that after leggier the electric parameters, namely specific resistivity, mobility and charge carriers concentration are changed. In our opinion, change of charge carriers concentration after leggier can be explained with presence interaction of Mn between VI group

elements in the Si lattice. It has been shown that the observed neutralization of impurities in the interaction process deals with happening electro neutral, chemical compound complexes between substituting centers of VI group elements and Mn.

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Rezyume: *eksperimental ravishda ko'rsatilishicha, elektr parametrlari, ya'ni o'ziga xos qarshilik, harakatchanlik va zaryad tashuvchilar kontsentratsiyasi Mn leggeridan keyin oldindan O, S, Se va Te namunalari bilan o'zgaradi. Bu erda zaryad tashuvchining kontsentratsiyasining o'zgarishi Si panjarasida Mn ning VI guruh elementlari bilan o'zaro ta'siri paydo bo'lishi bilan bog'liq bo'lishi mumkin.*

Резюме: *Экспериментально показано, что электрические параметры, а именно удельное сопротивление, подвижность и концентрация носителей заряда, изменяются после легирования Mn предварительно с образцами O, S, Se и Te. Здесь изменение концентрации носителей заряда может быть связано с появлением взаимодействия Mn с элементами VI группы в решетке Si.*

Kalit so'zlar: *Si, o'zaro ta'sir, Mn, Gibbs energiyasi, kompleks.*

Ключевые слова: *Si, взаимодействие, Mn, энергия Гиббса, комплексообразование.*

UDC 597.0/5

PARASITES FAUNA FISHES OF LAKE SUDOCHYE OF THE SOUTHERN ARAL SEA

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Summary. *The article contains a list of detected species and parasites, indicating the hosts, localization, location of detection, the degree of their infection, shows the change in the parasite fauna of fish under the influence of anthropogenic factors, indicates the pathogenic forms of parasites and their significance in changing the epizootic state of the lake, recommends ways to prevent their spread to other reservoirs.*

Key words: *fauna, parasites, epizootic, zooplankton, phytoplankton, lake, pathogen, invazion.*

Introduction. The reduction in the flow of the Amudarya and Syrdarya led to a catastrophic drop in the level of the Aral Sea, which contributed to the degradation of the aquatic ecosystems of the Southern Aral Sea. This negatively affected the state of the hydro fauna. The fish in the polluted reservoirs of the Amudarya delta are in a depressed state. All these circumstances require further improvement of their condition and the development of artificial fish farming. In this respect, Lake Sudochie is promising. It is located on the left bank of the Amudarya river in the northwestern part of its delta. The lake has undergone many changes. In 1968 it dried up a second time, and a year later it joined the Ajibaibay of the sea. The Main Left-bank Collector, the Ustyurt Collector and the Karauzyak canal flow into it.

The hydrology, hydrochemistry, and hydrobiology of Lake Sudochye have been studied by many researchers (Nikolsky and Pankratova, 1934; Akatova, 1950; Daribayev, 1969).the last hydrobiological research was conducted by S. Kazakhbayev in 1988. According to him, the area of the lake was about 15.7 thousand hectares, the depth of 1.2-1.7 m, the water is slightly alkaline (pH 7.8-8.2), has a favorable gas regime, dissolved oxygen ranged from 7.5 to 12.2 mg/l (1970), mineralization ranged from 2.5 to 5.5% [1,123; 2, 47; 3].

In the 1980 years the composition of zooplankton consisted of 17 species, of which 3 species are copepods [5, 65; 6,56; 8,36].

Zoo benthos is represented by chironomids (15 species), dragonflies (8 species), bedbugs, beetles, brooks, butterflies, lateral fin, misery, mayflies, spiders, woodlice, flies. From phytoplankton, diatoms, mine-green and green algae are found. From forage invertebrates, copepods, chironomids, lateral fin, and some species of mollusks participate in the development cycle of individual species of fish helminthes. On the territory of the lake there are near-water birds(coots, ducks, gulls, herons)-the final owners of many helminthes.

The lake is home to more than 15 species of fish, including 12 commercial (3 imported). In the composition of the catch in 1989, the snakehead predominated In subsequent years, the number of snakeheads increased to 57%, which indicates an increase in its number.

In increasing fish productivity in water bodies, the fight against fish diseases is also important. To do this, it is necessary to carefully study the parasites of fish, aquatic invertebrates and near-water birds. On the basis of which measures to combat them will be developed. Below are the results of our own research.

Material and methodology. The material for the work was the collection of fish parasites carried out in 2017 (July-August), 2018 (May) and 2019 (May-June) in Lake Sudochye. The temperature in the lake ranged from 22.1-25.60 C.

Complete parasitological study was subjected to 128 specimens of fishes belonging to 3 species (Aral roach-16, silver carp-18, 57 carp, snakehead-22).

In addition, to determine the infection rate of the fish as separate species of parasites, incomplete analysis, tested more than 300 specimens of fish. All investigated 428 copies fish.

Parasitological dissection of fish, fixation and treatment of parasites were carried out according to the generally accepted method (Dogel, 1933; Bykhovskaya-Pavlovskaya, 1985), taking into account improvements (Shigin, 1968,1976; Donets and Shulman, 1973); Khotenovsky, 1974; Gusev, 1983, etc.

When assessing the invasive fish, the indicators of the extensiveness of the EI invasion (the percentage of infected individuals in the total number of fish studied), the intensity of the AI invasion (the minimum maximum and average number of parasites of one species per fish individual), the abundance index-IO (the number of parasites per fish studied) were used. The names of these indicators are abbreviated in the text [3, 545].

The materials were processed in the laboratory of the Faculty of Biology of the Berdakh State University.

Taxonomy of parasites. In the studied fish, 31 species of parasites were found (Table 1), belonging to 8 classes: coccidia-1, myxosporidia-4, circularis-2, monogeneia-9, cestodes-4, trematodes-6 nematodes-3, crustaceans-2.

The total infection rate of the studied fish was 96.1%, including protozoa-34.8%, polyps-57.4%, cestodes-5.4%, trematodes-51.2%, nematodes-48.0, crustaceans-4.6%.

We studied 15 pike specimens, which were found to have 4 types of parasites: monogenea-T. monenteren (B-13.3%, AI-1-26), trematodes-T.

Aral's plotva. (Rutilisaralensis Berg). In Lake Sudochye, roach was one of the leading fish in the catch. In the best years of the Aral Sea, it was produced up to 75 thousand tons, which was about 20% of the total catch (Fortunatov et al., 1950). After the fall of the sea level in the reservoirs of the Amudarya delta, roach is extremely rare.

16 instance were examined. the total infection of roach was 100%. It has 4 species of parasites registered, including 3 species that have a complex development cycle and 4 species that have direct development. The first group is represented by diplostomatid species D. cpathaceum(EI-50.0%, II-1-13,IO – 2.1 exp),T. Clavata (EI-50%, II-7-52, IO-9.8 exp), nematode C. microcphalum (EI -18.7%. AI -1-2 copies). The second group includes the monogeneae D. Crucifer (EI-87.5%, AI-5-178, IO - 37.7 exp), D. Nanus (EI - 18.7%,AI-2-8 exp.P. homoion (EI-6.8% AI-1 exp). and the crustacean E. sieboldi (EI-6,8, II-1 exp). The first three species of gill flukes are specific parasites of roach, of which the first is most common. Roach did not have cestodes, which is probably due to the peculiarities of its diet, i.e., the small number of their intermediate (invertebrates) and final (birds) during our studies) the owners.

Previously, 54 species of parasites were recorded in the Aral Sea roach (Osmanov, 1971; Osmanov, Arstanov, Ubaydullaev, Yusupov, 1976).

Silver carp (Carassis auratus qibelio Bloch), of Far Eastern origin, was brought here from the Savinsky fish farm near Moscow. It is widely distributed in the reservoirs of the Amudarya delta. By way of life-this is a typical species. Crucian carp has no industrial value (which we have checked in the amount of 18 copies) [7, 53; 9, 31;10, 98; 12, 25; 13, 43; 14, 36].

In the lake, the total infection of the studied fish was 100%. Representatives of monogenes (73.2%), tremoteds (44.4%) and nematodes (33.3%) showed high invasion. In carp, we found 6 types of parasites belonging to 4 classes (monogeneae-2, trematodes-2, nematodes-1 and crustaceans-1). It often has monogeneia-G. medius (EI-50.0% AI-2.805, IO-25.4), nematode-C. microcephalum trematode-D. spathaceum- (EI-27.7%), monogeneia-D. anchoratus (EI-22.2%), crustacean - E. sieboldi (EI-22.2%), P. radiatum (EI-16.6%). In all cases, the AI was from 1 to 4 copies.

According to our data (Yusupov 1992), the parasite fauna of carp in the Amudarya delta includes 5 species of parasites.

Carp (Cyprinus carpio Linne) is one of the leading commercial fish species in this lake. In the fifties, its catches in the south of the Aral Sea reached more than 70 thousand tons. In recent

years, due to changes in the river flow of the Amudarya river and the fall in the level of the Aral Sea, the habitat conditions of the carp have deteriorated sharply. This reduced its population and changed some of its biological parameters.

During the period of this study, about 2,500 c. carp were caught in the lake. We examined 57 copies. carp, the total infection of which was 100%. We found 17 species of parasites (Table 1)

Parasitofauna of carp in Lake Sudochie

Types of parasites	of infection%	The intensity of the invasion minimal.imaximal. number of parasites	abundance index
1	2	3	4
Erimeria carpelli	64,9	0,2-1,1	0,9
Myxidium pteifferi	1,7	one. spores	-
Myxobolus dispar	1,7	Cyst	-
Tricbodinella subtilis	35,1	0,1-1,4	0,9
Dactylogyrus anchoratus	26,3	1-6	3,6
D. vastator	3,5	1 and 4	2,5
D. Extensus	86,0	2-248	69,5
Cyrodactylus mudius	21,0	1-84	6,2
Eudiplo oon nipponicum	10,5	2-8	4,6
Bothrio ephalus opsariichydis	3,7	1 and 2	1,5
Diplostomum spathaseum	57,9	1-3	6,2
Tylodelphys Clavata	17,5	3-16	1,8
Posthodiplostomum cuticola	8,8	1-2	2
Contracaecum spiculigerum	7,0	1-21	1,2
C microcephalum	38,6	1 and 3	2,7
Ergasilus sieboldi	3,5	2-12	2
Lernaea elegans	5,3		2,6

11 species (64.7%) of carp parasites are characterized by direct development, the rest - with a change of hosts. A high percentage of infection was given by himG. medius. Of the widespread forms, metacercariae-D. spathaceum and nematode-C. microcephaim were more common.

Previously, 40 species of parasites were observed in carp in the reservoirs of the Southern Aral Sea region [9, 31;12,25]..

Snakehead (Channa arqus Warpachowski Bred). The birthplace of this predatory fish is the Amur river basin. in 1961, it was brought to the Kalgan-Chirchik fish farm (Syrdarya river) of the Republic of Uzbekistan, from which it accidentally penetrated into the Aral Sea basin, where it is now found everywhere. The snakehead is relatively numerous in the reservoirs of the Amudarya delta. In the Lake Sudochie in the catches of 1988, he took the first place. The 22 snakehead specimens we tested were 100% infected. Snakehead was highly infested with flukes (54.54%) and nematodes (72.7%). We have registered 10 species of parasites (Table 3), of which more than half (7 species) develop with the participation of intermediate hosts, which is associated with its nutrition. Among them, the trematode C. microcephalum and the nematode D. spathaceum showed high invasion. the larvae of the latter were also found in roach, carp and carp. Apparently, the snakehead is infected by them when eating the young of these fish.

Table 2

Snakehead parasitofauna in Lake Sudochie

Types of parasites	of infection%	The intensity of the invasion minimal.imaximal. number of parasites	abundance index
1	2	3	4
Myxidium pfeifferi	9,1	one. spores	
Myxobolus muelleri	4,5	cysts	
Trichodina mutabilis	9,1	single units	
proteocephalus cernuae	4,5	18	
Gryporhunchus pussillum	13,6	1-5	2
Diplostomum spathaceum	54,5	1-109	9,33
Tylodelphys clavata	18,2	1-2	
Contracaecum spiculigerum	22,7	1-3	
C. microcephalum	72,7	1-16	6,76
Raphidascarus acus	4,5	2	

The list of parasites found by us shows that in the new ecological conditions of the Southern Aral Sea region, the snakehead lost one third of parasites according to our previous studies (Yusupov and Urazbayev, 1993), 27 parasite species were indicated for it.

Diseases of fish. Describing the epizootic state of the lake, it should be noted that there are quite dangerous parasites for fish, such as E. carpelli, D. exten us, D. Vastator, G. medius. B. opsarichthidus, D. spathaceum, T. clavatum, P. Cuticola, R. acus, E. sieboldi and others, which, if disturbed in the hydrological and hydrochemical regime, can lead to epizootics. According to S. O. Osmanov (1957), a large herd of bream died in this lake from the disease Raphidascaridosis. Its causative agent, R. acus, is also noted in this study.

Of the infectious diseases, rubella was observed in 40-60% of the studied carp. More often there was an ulcer form of the disease, rarely-dropsy. Ulcers of various shapes and sizes (from 2 to 8 cm in diameter) were localized in various areas of the body surface of fish with a length of 23-52 cm.

All pathogenic forms of parasites recorded in Lake Sudochye, with the exception of coccidia specific to carp (E. carpelli) myxobolus (M. pfeifferi) and gill flukes are widely specific and parasitic in representatives of various genera and even families of fish.

Conclusions

Therefore, when introducing new fish species in Lake Sudochie, it is necessary to take into account the possibility of the transition of these parasites to aliens. It should also be borne in mind that when transporting fish from this lake, these parasites can be introduced into other reservoirs and settle on the aborigines. When creating a fish farm on the basis of this lake, the presence of potentially dangerous parasites should be taken into account.

It should be noted that the parasitological situation of the reservoir is changing rapidly. Therefore, in any case, regular parasitical control is necessary.

The way to control and prevent epizootics among fish could be to improve the flow of water, enrich the natural food supply. Sick fish should be removed from the reservoir in a timely manner.

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Резюме. *Мақолада антропоген омиллар таъсири остида балиқ паразитлари фаунасининг ўзгариши акс эттирилади, паразитларнинг патоген шаклларини ва кўлнинг эпизоотик ҳолатини ўзгартиришдаги аҳамиятини кўрсатади, бошқа сув ҳавзаларига тарқалишининг олдини олиш йўллари тавсия қилинди.*

Резюме. *В статье приведен список обнаруженных видов и паразитов с указанием хозяев, локализации, места обнаружения, степени их зараженности, показано изменение паразит фауны рыб под влиянием антропогенных факторов, указаны патогенные формы паразитов и их значение в изменении эпизоотического состояния озера, рекомендованы пути предупреждения распространения их в другие водоемы.*

Калт сўзлар: *фауна, паразитлар, эпизоотик, зоопланктон, фитопланктон, кўл, патоген, инвазион.*

Ключевые слова: *фауна, паразиты, эпизоотия, зоопланктон, фитопланктон, озер, патоген, инвазии.*

THREE DIMENSIONAL DOUBLE LEIBNIZ ALGEBRAS

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***Summary**: In this paper we investigated three dimensional double Leibniz and three dimensional derivation double Leibniz algebras.*

***Key words**: Lie algebra, Leibniz algebra, classical R-matrix, derivation, double Lie algebras, double Leibniz algebras*

1. Introduction. Nowadays, the study of Lie algebras is a very popular and intensively developing area of mathematics. It should be noted that there are many papers devoted to the study of Lie algebras, (see, [2-5]). In the last decade, D.Burde's numerous papers have considered double Lie algebras, almost inner derivations of Lie algebras, degeneration of nilpotent Lie algebras and others [2, 3, 4]. In work [2], the following issue was considered:

Let $\mathfrak{g}$ be a Lie algebra. For which derivations D of $\mathfrak{g}$ does the skew-symmetric bilinear map

$$[x,y]_D = D([x,y])$$

satisfy the Jacobi identity?

In other words, for which derivations D defines $[x,y]_D$ another Lie algebra, denoted by $\mathfrak{g}_D$? If $[x,y]_D$ is a Lie bracket, then the linear map D is also an example of a *classical R-matrix* for $\mathfrak{g}$, i.e. a linear transformations $R:\mathfrak{g}\to\mathfrak{g}$ such that

$$[x,y]_R = [R(x),y]+[x,R(y)]$$

defines a Lie bracket [6].

Motivated by the work [2], we studied the double Leibniz algebras. Namely, three-dimensional double Leibniz algebras and the derivation double Leibniz algebras are described.

2. Preliminaries.

Definition 2.1. An algebra $\mathfrak{g}$ over field F is called a *Lie algebra* if its multiplication satisfies the identities:

1) $[x,x]=0$,
2) $[x,[y,z]]+[y,[z,x]]+[z,[x,y]]=0$,

for all x,y,z in $\mathfrak{g}$.

The product $[x,y]$ is called the bracket of x and y. Identity 2) is called the Jacobi identity.

Definition 2.2. An algebra $\mathfrak{L}$ over a field F is called a *Leibniz algebra* if for any $x,y,z\in\mathfrak{L}$, the Leibniz identity

$$[x,[y,z]]=[[x,y],z]-[[x,z],y]$$

is satisfied, where $[-,-]$ is the multiplication in $\mathfrak{L}$.

Let $\mathfrak{L}$ be a finite-dimensional Leibniz algebra. For Leibniz algebra $\mathfrak{L}$ we consider the following central and derived series:

$$\mathfrak{L}^1=\mathfrak{L},\ \mathfrak{L}^i=[\mathfrak{L}^{i-1},\mathfrak{L}],\ i\geq 1,$$
$$\mathfrak{L}^{[1]}=\mathfrak{L},\ \mathfrak{L}^{[k]}=[\mathfrak{L}^{[k-1]},\mathfrak{L}^{[k-1]}],\ k\geq 1.$$

A Leibniz algebra $\mathfrak{L}$ is *nilpotent (solvable)* if there exists $m\geq 1$ such that $\mathfrak{L}^m=0$ ($\mathfrak{L}^{[m]}=0$).

Classical *R*-matrices and double Lie algebras have been defined in [6] as follows.

Definition 2.1. Let V be a vector space over a field K, and $L = (V, [\,,\,])$ be a Leibniz bracket on V. A linear transformation $R: L \to L$ is called a *classical R-matrix*, if

$$[x, y]_R = [R(x), y] + [x, R(y)],$$

satisfies the Leibniz identity. In this case, the pair (L, R) is called a *double Leibniz algebra*.

Three-dimensional Lie algebras were described in [5], and three-dimensional solvable non-Leibniz algebras were classified in [1]. Combining these works, we present the following theorem which gives us the multiplication table of all three-dimensional Leibniz algebras.

Theorem 2.2. *Any three-dimensional Leibniz algebra* L *is isomorphic to one of the following pairwise non-isomorphic algebras*:

$L_1(\alpha)$, $\alpha \neq 0, \alpha \in \mathbb{C}$	$[e_1, e_3] = \alpha e_1, [e_2, e_3] = e_1 + e_2, [e_3, e_3] = e_1$	Solvable Leibniz algebra
L_2	$[e_3, e_3] = e_1, [e_2, e_3] = e_1 + e_2$	Solvable Leibniz algebra
L_3	$[e_1, e_2] = e_3, [e_1, e_3] = -2e_3, [e_2, e_1] = -e_3, [e_2, e_3] = 2e_3,$ $[e_3, e_1] = 2e_3, [e_3, e_2] = -2e_3$	Simple Lie algebra
$L_4(\alpha)$	$[e_1, e_3] = \alpha e_1, [e_2, e_3] = -e_2, [e_3, e_2] = e_2, [e_3, e_3] = e_1$	Solvable Leibniz algebra
L_5	$[e_1, e_3] = e_1, [e_2, e_3] = e_1, [e_3, e_3] = e_1$	Solvable Leibniz algebra
L_6	$[e_1, e_3] = e_2, [e_3, e_3] = e_1$	Nilpotent Leibniz algebra
L_7	$[e_1, e_2] = e_1, [e_1, e_3] = e_1, [e_3, e_2] = e_1, [e_3, e_3] = e_1$	Solvable Leibniz algebra
L_8	$[e_1, e_1] = e_2, [e_2, e_1] = e_2$	Solvable Leibniz algebra
$L_9(\alpha)$, $\alpha \neq 0, 1$; $\alpha \leftrightarrow \alpha^{-1}$	$[e_1, e_2] = e_2, [e_1, e_3] = \alpha e_3, [e_2, e_1] = -e_2, [e_3, e_1] = -\alpha e_3$	Solvable Lie algebra
L_{10}	$[e_1, e_2] = e_2, [e_2, e_1] = -e_2$	Solvable Lie algebra
L_{11}	$[e_1, e_2] = e_2, [e_1, e_3] = e_2 + e_3, [e_2, e_1] = -e_2, [e_3, e_1] = -e_2 - e_3$	Solvable Lie algebra
$L_{12}(\alpha)$ $\alpha \in \mathbb{C}$	$[e_2, e_2] = e_1, [e_2, e_3] = e_1, [e_3, e_3] = \alpha e_1$	Nilpotent Leibniz algebra
L_{13}	$[e_2, e_2] = e_1, [e_2, e_3] = e_1, [e_3, e_2] = e_1$	Associativ

		e, commutative, nilpotent Leibniz algebra
L_{14}	$[e_1,e_3]=e_1,[e_2,e_3]=e_2,[e_3,e_3]=e_1$	Solvable Lie algebra
L_{15}	$[e_1,e_1]=e_2$	Associative, commutative, nilpotent Leibniz algebra
L_{16}	$[e_1,e_2]=e_2,[e_1,e_3]=e_3,[e_2,e_1]=-e_2,[e_3,e_1]=-e_3$	Solvable Lie algebra
L_{17}	$[e_1,e_2]=e_3,[e_2,e_1]=-e_3$	Nilpotent Leibniz algebra
L_{18}	-	Abelian

3. Main results. In this section we will consider three-dimensional double Leibniz algebras and three-dimensional derivation double Leibniz algebras.

Proposition 3.1. *Let* $\mathcal{L}$ *be a Leibniz algebra and* $D\in Der(\mathcal{L})$ *be a derivation. Then* $[x,y]_D=D[x,y]=[D(x),y]+[x,D(y)]$ *satisfies the Leibniz identity if and only if*

$$D\big([D(x),[y,z]]-[[x,y],D(z)]+[[x,z],D(y)]\big)=0 \tag{3.1}$$

for all $x,y,z\in\mathcal{L}$.

Proof. We have $[x,[y,z]_D]_D=[D(x),[y,z]_D]+[x,D([y,z]_D)]=$
$=[D(x),[D(y),z]+[y,D(z)]]+[x,D([D(y),z]+[y,D(z)])]=$
$=[D(x),[D(y),z]]+[D(x),[y,D(z)]]+[x,D([D(y),z])]+[x,D([y,D(z)])]=$
$=[[D(x),D(y)],z]-[[D(x),z],D(y)]+[[D(x),y],D(z)]-[[D(x),D(z)],y]+$
$+[x,[D^2(y),z]]+[x,[D(y),D(z)]]+[x,[D(y),D(z)]]+[x,[y,D^2(z)]]=$
$=[[D(x),D(y)],z]-[[D(x),z],D(y)]+[[D(x),y],D(z)]-[[D(x),D(z)],y]+$
$+[[x,D^2(y)],z]-[[x,z],D^2(y)]+2[[x,D(y)],D(z)]-$
$-2[[x,D(z)],D(y)]+[[x,y],D^2(z)]-[[x,D^2(z),y]]$

Further

$$[[x,y]_D,z]_D=[D([D(x),y]+[x,D(y)]),z]+[[D(x),y]+[x,D(y)],D(z)]=$$
$$=[[D^2(x),y],z]+[[D(x),D(y)],z]+[[D(x),D(y)],z]+[[x,D^2(y)],z]+$$
$$+[[D(x),y],D(z)]+[[x,D(y)],D(z)]$$

and

$$[[x,z]_D,y]_D=[D([D(x),z]+[x,D(z)]),y]+[[D(x),z]+[x,D(z)],D(y)]=$$

$$=[[D^2(x),z],y]+[[D(x),D(z)],y]+[[D(x),D(z)],y]+[[x,D^2(z)],y]+$$
$$+[[D(x),z],D(y)]+[[x,D(z)],D(y)].$$

From these equalities we obtain the following relation

$$D(-[D(y),[x,z]]+[D(z),[x,y]]+[D(x),[y,z]])=0.$$

The proposition is proved.

Remark 3.2. *If the anti-commutativity identity holds in equality* (3.1), *then we have the following equality*

$$D\big([D(x),[y,z]]+[D(y),[z,x]]+[D(z),[x,y]]\big)=0,$$

which was obtained in [2, *Proposition* 2.4].

Definition 3.3. Let L be Leibniz algebra and $D\in Der(L)$ be a derivation, such that $[x,y]_D=D([x,y])$ defined another Leibniz bracket L_D. Then the pair (L,D) is called *derivation double Leibniz* algebra.

Now we will consider three dimensional double Leibniz algebras.

The following theorems are the main results of this work.

Theorem 3.4. *Any three-dimensional double Leibniz algebra (*L *, R) is isomorphic to one of the following pairwise non-isomorphic algebras*:

$L_{R,1}$: $[e_1,e_3]=e_1+e_2$, $[e_2,e_3]=e_1+e_2$,

$L_{R,2}$: $[e_1,e_3]=3e_2$, $[e_2,e_3]=e_2$, $[e_3,e_3]=2e_1+e_2$,

$L_{R,3}$: $[e_1,e_2]=2e_2+e_3$, $[e_2,e_1]=-2e_2-e_3$, $[e_1,e_3]=2e_2+e_3$, $[e_3,e_1]=-2e_2-e_3$,

$L_{R,4}$: $[e_1,e_3]=e_1$, $[e_2,e_3]=e_1+e_2$, $[e_3,e_3]=e_1+e_2$,

the omitted products are equal to zero.

Proof. To describe three-dimensional double Leibniz algebras, we need to choose the classical R-matrix. By the definition of classical R-matrices, multiplication $[x,y]_R=[R(x),y]+[x,R(y)]$ must satisfy the Leibniz identity. We considered all the algebras from Theorem 2.2 and choose new algebras that are not isomorphic to the algebras indicated in the theorem.

Consider the algebra L_2: $[e_2,e_3]=e_1+e_2$, $[e_3,e_3]=e_1$.

Let the classical R-matrix have the following form, which is not a derivation of the given algebra:

$$R=\begin{pmatrix}0&1&1\\1&1&0\\0&0&0\end{pmatrix}.$$

Then we have the following:

$$[e_1,e_3]_R=[R(e_1),e_3]+[e_1,R(e_3)]=[e_2,e_3]+[e_1,e_1+e_2]=e_1+e_2,$$
$$[e_2,e_3]_R=[R(e_2),e_3]+[e_2,R(e_3)]=[e_1+e_2,e_3]+[e_2,e_1]=e_1+e_2,$$
$$[e_i,e_j]=0,\ \ (i,j)\neq\{(1,3),(2,3)\}.$$

All products satisfy the Leibniz identity. We will denote that if we choose another classical R-matrix, then we get an isomorphic algebra to $L_{R,1}$.

Consider the algebra L_6: $[e_1,e_3]=e_2$, $[e_3,e_3]=e_1$. Let the classical R-matrix have the following form, which is not a derivation of the given algebra:

$$R=\begin{pmatrix}2 & 1 & 1\\ 1 & 3 & 1\\ 0 & 0 & 1\end{pmatrix}.$$

Then we get

$$[e_1,e_3]_R=3e_2,\ [e_2,e_3]_R=e_2,\ [e_3,e_3]_R=2e_1+e_2,\ [e_i,e_j]=0,\ (i,j)\neq\{(1,3),(2,3),(3,3)\}.$$

The resulting multiplications satisfy the Leibniz identity. We denote this algebra by $L_{R,2}$. If we choose another classical R-matrix, then we get an isomorphic algebra to $L_{R,2}$.

Now consider the algebra L_{11}: $[e_1,e_2]=e_2$, $[e_1,e_3]=e_2+e_3$, $[e_2,e_1]=-e_2$, $[e_3,e_1]=-e_2-e_3$. We choose a non-derivation R-matrix as follows:

$$R=\begin{pmatrix}0 & 0 & 0\\ 1 & 1 & 1\\ 1 & 1 & 1\end{pmatrix}.$$

Then we obtain

$$[e_1,e_2]_R=3e_2+e_3,\ [e_2,e_1]_R=-3e_2-e_3,\ [e_1,e_3]_R=3e_2+2e_3,\ [e_3,e_1]_R=-3e_2-2e_3,$$
$$[e_i,e_j]=0,\ (i,j)\neq\{(1,1),(2,2),(2,3),(3,2),(3,3)\}.$$

Here, all multiplications also satisfy the Leibniz identity and we denote this algebra by $L_{R,3}$. If we choose another classical R-matrix, then we get an isomorphic algebra to $L_{R,3}$.

Consider the algebra L_{14}: $[e_1,e_3]=e_1$, $[e_2,e_3]=e_2$, $[e_3,e_3]=e_1$.

We choose the classical R-matrix of the next form, which is not a derivation of the given algebra:

$$R=\begin{pmatrix}1 & 1 & 1\\ 0 & 1 & 1\\ 0 & 0 & 0\end{pmatrix}.$$

Then we have

$$[e_1,e_3]_R=e_1,\ [e_2,e_3]_R=e_1+e_2,\ [e_3,e_3]_R=e_1+e_2,$$
$$[e_i,e_j]=0,\ (i,j)\neq\{(1,1),(1,2),(2,1),(2,2),(2,3),(3,1),(3,2),(3,3)\}.$$

The resulting multiplications satisfy the Leibniz identity. We denote this algebra by $L_{R,4}$. If we choose another classical R-matrix, then we get an isomorphic algebra to $L_{R,4}$. The theorem is proved.

Theorem 3.5. *Any three-dimensional derivation double Leibniz algebra (L,D) is isomorphic to one of the following pairwise non-isomorphic algebras*:

$L_{D,1}$: $[e_2,e_3]_D=e_1+e_2$,

$L_{D,2}$: $[e_1,e_3]_D=e_1+e_2$, $[e_2,e_3]_D=e_1+e_2$, $[e_3,e_3]_D=e_1+e_2$,

$L_{D,3}$: $[e_1,e_2]_D=e_2+e_3$, $[e_1,e_3]_D=e_2+e_3$, $[e_2,e_1]_D=-e_2-e_3$, $[e_3,e_1]_D=-e_2-e_3$,

the omitted of products are equal to zero.

Proof. To describe the derivation double Leibniz algebras, the following steps are provided.

1-step: finding the derivations of the algebras from Theorem 2.2;

2-step: determining multiplication $[x,y]_D=D([x,y])$;

3-step: checking the Leibniz identity.

We will study all the algebras from Theorem 2.2, from which we will choose a new algebra that is not isomorphic to the algebras mentioned by the theorem. Consider the algebra L_2: $[e_2,e_3]=e_1+e_2$, $[e_3,e_3]=e_1$. Derivation of this algebra has the form

$$D=\begin{pmatrix}0 & a & b\\ 0 & a & 0\\ 0 & 0 & 0\end{pmatrix}.$$

Put $a=b=1$. Then we have

$$[e_2,e_3]_D=[D(e_2),e_3]+[e_2,D(e_3)]=e_1+e_2,\ [e_i,e_j]=0,\ (i,j)\neq(2,3).$$

The resulting multiplication satisfies the Leibniz identity and this algebra, which denoted by $L_{D,1}$, is not isomorphic to the algebras in Theorem 2.2.

Now consider the algebra L_{14}: $[e_2,e_3]=e_1+e_2$, $[e_3,e_3]=e_1$ in Theorem 2.2. Derivation of this algebra has the form

$$D=\begin{pmatrix}a & b & a\\ c & d & c\\ 0 & 0 & 0\end{pmatrix}.$$

Put $a=b=c=d=1$. Then we get

$$[e_1,e_3]_D=e_1+e_2,\ [e_2,e_3]_D=e_1+e_2,\ [e_3,e_3]_D=e_1+e_2,$$
$$[e_i,e_j]=0,\ (i,j)\neq\{(1,3),(2,3),(3,3)\}.$$

The resulting multiplication satisfies the Leibniz identity and this algebra, which denoted by $L_{D,2}$, is not isomorphic to the algebras in Theorem 2.2.

Consider the algebra L_{16}: $[e_1,e_2]=-[e_2,e_1]=e_2$, $[e_1,e_3]=-[e_3,e_1]=e_3$ in Theorem 2.2. Derivation of this algebra has the form

$$D=\begin{pmatrix}0 & 0 & 0\\ a & b & c\\ d & e & f\end{pmatrix}.$$

Putting $a=b=c=d=e=f=1$ we obtain

$$[e_1,e_2]_D=e_2+e_3,\ [e_2,e_1]_D=-e_2-e_3,\ [e_1,e_3]_D=e_2+e_3,\ [e_3,e_1]_D=-e_2-e_3,$$
$$[e_i,e_j]=0,\ (i,j)\neq\{(1,2),(1,3),(2,1),(3,1)\}.$$

The resulting multiplication satisfies the Leibniz identity and this algebra, which denoted by $L_{D,3}$, is not isomorphic to the algebras in Theorem 2.2. The theorem is proved.

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Rezyume. *Mazkur maqolada uch o'chamli qo'sh Leybnis algebrasi va uch o'chamli differensiallasning qo'sh Leybnis algebrasi o'rganilgan.*

Резюме: *В этом статье изучены трехмерные двойные алгебр Лейбница и трехмерные двойные алгебр Лейбница дифференцировании*.

Kalit so'zlar: *Li algebrasi, Leybnis algebrasi, klassik R-matrisasi, differensiallash, qo'sh Li algebrasi, qo'sh Leybnis algebrasi*.

Ключевые слова. *Алгебра Ли, алгебра Лейбница, классические R-матрицы, двойные алгебра Ли, двойные алгебра Лейбница*.

UDC 519.24

CRAMER-RAO TYPE INEQUALITY FOR A RANDOM RIGHT CENSORING MODEL WITH COMPETING RISKS

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Summary. *In competing risks model of incomplete data we present useful representations of Fisher information function in applications and establish Cramer-Rao lower bound for variance of unbiased estimator.*

Key words. *Fisher information, Cramer-Rao inequality, competing risks model, Proportional hazards model.*

1. Introduction.

The Cramer-Rao information inequality makes it possible to estimate the quality of statistical estimates of unknown parameters. The estimation efficiency property is measured by the proximity of the standard deviation of the estimate to the lower boundary of Cramer-Rao. The variances of effective estimates are inversely proportional to the Fisher information function.

If the results of observations make up a complete sample, then the corresponding results represent the basis of classical mathematical statistics. In the case of incomplete censored observations, information inequalities of the Cramer-Rao and Bhattacharya types were first established in [1]. Later, these results were generalized to the case of the Bayesian approach, as well as for random volume samples in [3-5]. The aim of this work is to investigate the properties of Fisher information and to establish the Cramer-Rao type inequality for observations, which forming a competing risk model (CRM).

2. Model description

For a fixed natural number k, let $\left\{X_j^{(1)}, X_j^{(2)}, ..., X_j^{(k)},\ j \geq 1\right\}$ be a sequence of independent and identically distributed independent random variables (r.v.) with corresponding marginal distribution functions (d.f.) $\left\{F^{(1)}, F^{(2)}, ..., F^{(k)}\right\}$, which depend on the same unknown scalar parameter $\theta \in \Theta \subseteq R^1$. Let $f^{(i)}(t;\theta) = \dfrac{\partial F^{(i)}(t;\theta)}{\partial \theta}$ and $\lambda^{(i)}(t;\theta) = \dfrac{f^{(i)}(t;\theta)}{1 - F^{(i)}(t;\theta)}$ – density functions and failure rates corresponding to the d.f. $F^{(i)}$, $i = \overline{1,k}$. Vectors $\left\{X_j, \delta_j^{(1)}, ..., \delta_j^{(k)},\ j \geq 1\right\}$ are observed in the CRM. Pairs $\left\{\left(X_j, \delta_j^{(i)}\right),\ j \geq 1\right\}$, $i = \overline{1,k}$ are also of interest, where $X_j = \min\left(X_j^{(i)}, 1 \leq i \leq k\right)$ and $\delta_j^{(i)} = I\left(X_j = X_j^{(i)}\right)$ are indicators of events indicated in brackets.

Let $H(t;\theta) = P_\theta\left(X_j \leq t\right)$ – d.f.r.v. X_j and $H^{(i)}(t;\theta) = P_\theta\left(X_j \leq t, \delta_j^{(i)} = 1\right)$ – subdistributions corresponding to pairs $\left\{\left(X_j, \delta_j^{(i)}\right), i = \overline{1,k}\right\}$. Then, it is obvious that,

$H^{(1)}(t;\theta)+\ldots+H^{(k)}(t;\theta)=H(t;\theta)$ for all $(t;\theta)\in R^1\times\Theta$ and $p^{(i)}(\theta)=\lim\limits_{t\to+\infty}H^{(i)}(t;\theta)$.

Due to the independence of the r.v. $\left\{X_j^{(1)},X_j^{(2)},...,X_j^{(k)}\right\}$ we have that $H(t;\theta)=1-\prod\limits_{i=1}^{k}\left[1-F^{(i)}(t;\theta)\right]$, and there exists densities $h(t;\theta)=\dfrac{\partial H(t;\theta)}{\partial t}=h^{(1)}(t;\theta)+\ldots+h^{(k)}(t;\theta)$, where

$$h^{(i)}(t;\theta)=f^{(i)}(t;\theta)\cdot\prod_{\substack{l=1\\l\neq i}}^{k}\left[1-F^{(l)}(t;\theta)\right]$$

and

$$H^{(i)}(t;\theta)=\int_{-\infty}^{t}h^{(i)}(u;\theta)du=\int_{-\infty}^{t}\prod_{\substack{l=1\\l\neq i}}^{k}\left[1-F^{(l)}(u;\theta)\right]dF^{(i)}(u;\theta).$$

The integral functions of the failure rate corresponding to the distributions H and $H^{(i)}$ are denoted as

$$\Lambda(t;\theta)=\int_{-\infty}^{t}\frac{dH(u;\theta)}{1-H(u;\theta)}=\sum_{i=1}^{k}\Lambda^{(i)}(t;\theta),$$

$$\Lambda^{(i)}(t;\theta)=\int_{-\infty}^{t}\frac{dH^{(i)}(t;\theta)}{1-H(t;\theta)}=\int_{-\infty}^{t}\frac{dF^{(i)}(t;\theta)}{1-F^{(i)}(t;\theta)}=\int_{-\infty}^{t}\lambda^{(i)}(u;\theta)du.$$

Let $\lambda(t;\theta)=\lambda^{(1)}(t;\theta)+\ldots+\lambda^{(k)}(t;\theta)$ be a the intensity density of the r.v. X.

Denote by $m^{(i)}(t;\theta)=P_\theta\left(\delta_j^{(i)}=1/X_j=t\right)=E_\theta\left[\delta_j^{(i)}/X_j=t\right]$ the regression of the indicators $\delta_j^{(i)}$ respectively to r.v. X_j.

Then the inverse representations are also hold:

$$H^{(i)}(t;\theta)=\int_{-\infty}^{t}m^{(i)}(u;\theta)dH(u;\theta),$$

(1)

$$\Lambda^{(i)}(t;\theta)=\int_{-\infty}^{t}m^{(i)}(u;\theta)d\Lambda(u;\theta),$$

where $m^{(1)}(t;\theta)+\ldots+m^{(k)}(t;\theta)=1$ for all $(t;\theta)\in R^1\times\Theta$.

Therefore, $\lambda^{(i)}(t;\theta)=m^{(i)}(t;\theta)\cdot\lambda(t;\theta),\ i=\overline{1,k}$.

Let $I_{\left(X,\delta^{(1)},\ldots,\delta^{(k)}\right)}(\theta)$, $I_X(\theta)$, $I^{(i)}_{\left(X,\delta^{(i)}\right)}(\theta)$ and $I^{(i)}_{\left(\delta^{(i)}/X\right)}(\theta)$ are Fisher's information functions, respectively, of a vector $\left\{X,\delta^{(1)},...,\delta^{(k)}\right\}$, r.v. X, pair $\left(X,\delta^{(i)}\right)$, and a r.v. $\delta^{(i)}$ for a given X.

To find expressions for these functions, we consider some regularity conditions for subdensities $h^{(i)}$:

(C1) The set $N^{(i)} = \left\{t \in R^1 : h^{(i)}\left(t;\theta\right) > 0\right\}$ does not depend on the parameter θ and $\bigcap_{i=1}^{k} N^{(i)} \neq \varnothing$;

(C2) There are the following finite derivatives

$$\frac{\partial^m h^{(i)}\left(t;\theta\right)}{\partial\theta^m},\ m=1,2;\ i=1,...,k;\ \left(t;\theta\right)\in R^1\times\Theta;$$

(C3) $\int_{-\infty}^{\infty}\left|\frac{\partial^m h^{(i)}\left(t;\theta\right)}{\partial\theta^m}\right|dt<\infty,\ m=1,2;\ i=1,...,k;\ \theta\in\Theta;$

(C4) For all $\theta\in\Theta$: $I^{(i)}_{\left(X,\delta^{(i)}\right)}\left(\theta\right)\in\left(0;+\infty\right),\ i=1,...,k;$

If we denote by $\kappa\left(t,y^{(1)},...,y^{(k)};\theta\right)$ the density of the vector $\left\{X,\delta^{(1)},...,\delta^{(k)}\right\}$ respectively measure $\nu\left(t,y^{(1)},...,y^{(k)}\right)$, then

$$\kappa\left(t,y^{(1)},...,y^{(k)};\theta\right)=\prod_{i=1}^{k}\left[h^{(i)}\left(t;\theta\right)\right]^{y^{(i)}}=$$

$$=\prod_{i=1}^{k}\left\{f^{(i)}\left(t;\theta\right)\prod_{\substack{l=1\\ l\neq i}}^{k}\left(1-F^{(l)}\left(t;\theta\right)\right)\right\}^{y^{(i)}},\quad \left(t;\theta\right)\in R^1\times\Theta,$$

where $d\nu\left(t,y^{(1)},...,y^{(k)}\right)=dt\times\Delta_{y^{(1)}}\times...\times\Delta_{y^{(k)}}$ and $\Delta_{y^{(i)}}$ – a counting measure centered at the point $y^{(i)}\in\left\{0;1\right\},\ i=1,..,k$.

3. Main results

The following theorem gives two results on the representation of Fisher information $I_{\left(X,\delta^{(1)},...,\delta^{(k)}\right)}\left(\theta\right)$ by $I_X\left(\theta\right)$, $I^{(i)}_{\left(X,\delta^{(i)}\right)}\left(\theta\right)$ and $I^{(i)}_{\left(\delta^{(i)}/X\right)}\left(\theta\right)$.

Theorem 3.1. Under the conditions (C1)-(C4), representations for $I_{\left(X,\delta^{(1)},...,\delta^{(k)}\right)}\left(\theta\right)$ are hold for all $\theta\in\Theta$:

(I) $I_{\left(X,\delta^{(1)},...,\delta^{(k)}\right)}\left(\theta\right)=\sum_{i=1}^{k}I^{(i)}_{\left(X,\delta^{(i)}\right)}\left(\theta\right);$

(II) $I_{\left(X,\delta^{(1)},...,\delta^{(k)}\right)}\left(\theta\right)=I_X\left(\theta\right)+\sum_{i=1}^{k}I^{(i)}_{\left(\delta^{(i)}/X\right)}\left(\theta\right),$

where

$$I^{(i)}_{\left(X,\delta^{(i)}\right)}(\theta)=\int\limits_{-\infty}^{\infty}\left(\frac{\partial log\lambda^{(i)}(t;\theta)}{\partial\theta}\right)^2 dH^{(i)}(t;\theta),$$

$$I_X(\theta)=\int\limits_{-\infty}^{\infty}\left(\frac{\partial log\lambda(t;\theta)}{\partial\theta}\right)^2 dH(t;\theta),$$

and

$$I^{(i)}_{\left(\delta^{(i)}/X\right)}(\theta)=\int\limits_{-\infty}^{\infty}\left(\frac{\partial \log m^{(i)}(t;\theta)}{\partial\theta}\right)^2\cdot m^{(i)}(t;\theta)dH(t;\theta).$$

Remark. It should be noted that representation (I) generalizes the Fisher information expression formula in terms of the failure density functions $\lambda^{(i)}, i=\overline{1,k}$, established in [2], in the random right censorship model (for $k=1$). It is proved by another, more classical method compared to [2].

The formula (II) allows us to represent the Fisher information in the form of a sum of information of a r.v. X and a conditionally r.v. $\delta^{(i)}$ for a given r.v. X. In particular, in the proportional intensity model (PIM), characterized by the independence of the r.v. X and the vector $\left(\delta^{(1)},...,\delta^{(k)}\right)$, it is equal to the following

$$I_{\left(X,\delta^{(1)},...,\delta^{(k)}\right)}(\theta)=I_X(\theta)+\sum_{i=1}^{k}\left(\frac{d\log C^{(i)}(\theta)}{d\theta}\right)^2 C^{(i)}(\theta)dH(t;\theta),$$

where $C^{(i)}(\theta)=m^{(i)}(t;\theta)$ for all $t\in R, i=\overline{1,k}.$

Now we formulate an analogue of the Cramer-Rao inequality for the variance of the unbiased estimate $\varphi\left(X,\delta^{(1)},...,\delta^{(k)}\right)$ of the function $\varphi(\theta)$ by one observation $\left(X,\delta^{(1)},...,\delta^{(k)}\right)$. In this regard, we also formulate a regularity condition for estimating φ and the parameter $\varphi(\theta)$:

(C5) The function $\varphi(\theta)$ is continuous differentiable, $\varphi'(\theta)\neq 0$ and for all $\theta\in\Theta$:

$$\int\limits_{R^1\times\{0,1\}^k}\varphi\left(t,y^{(1)},...,y^{(k)}\right)\frac{\partial}{\partial\theta}\kappa\left(t;y^{(1)},...,y^{(k)};\theta\right)d\nu\left(t;y^{(1)},...,y^{(k)}\right)=\varphi'(\theta).$$

Theorem 3.2. Suppose the conditions (C1)-(C5) hold and $D_\theta\varphi\in(0,+\infty)$. Then the following are hold for all $\theta\in\Theta$

$$D_\theta\varphi\left(X,\delta^{(1)},...,\delta^{(k)}\right)\geq\frac{\left(\varphi'(\theta)\right)^2}{I_{\left(X,\delta^{(1)},...,\delta^{(k)}\right)}(\theta)}. \qquad (2)$$

Let the estimate of φ be functionally independent of the vector $\left(\delta^{(1)},...,\delta^{(k)}\right)$ and

$$f^{(i)}(t;\theta)=\exp\left\{-T^{(i)}(t)g(\theta)+g_0(\theta)+v^{(i)}(t)\right\}, \qquad (3)$$

where $g(\theta)$ is strictly monotonic, continuously differentiable, $g'(\theta) \neq 0$ and $g(\theta)\frac{dT^{(i)}(t)}{dt} > 0, i = 1,...,k$ for all $(t;\theta) \in R^1 \times \Theta$. Then in order for equality to take place in (2), it is necessary and sufficient that the r.v. X and the vector $\left(\delta^{(1)},...,\delta^{(k)}\right)$ are independent, and in (3) $g_0(\theta) + v^{(i)}(t) = \log\left(T^{(i)}(t)g(\theta)\right)$ is fulfilled.

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Rezyume *To'la bo'lmagan tanlanmalarning raqobatli risklar modelida Fisher informatsiyasi funksiyasi ushun amaliyotda foydali bo'lgan ifodalar hamda siljimagan baho dispersiyasi uchun Kramer-Rao quyi chegarasi o'rnatilgan.*

Резюме. *В модели конкурирующих рисков неполных данных мы представляем полезные представления информационной функции Фишера в приложениях и устанавливаем нижнюю границу Крамера-Рао для дисперсии несмещенной оценки.*

Kalit so'zlar. *Fisher informatsiyasi, Kramer-Rao tengsizligi, raqobatli risklar modeli, proportsional intensivliklar modeli.*

Ключевые слова. *Информация Фишера, неравенство Крамера-Рао, модель конкурирующих рисков, модель пропорциональных интенсивностей.*

UDK 517.929.4

ON SOME NEW DISCRETE INEQUALITIES

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Summary. *This article discusses difference dynamic systems (DDS). We want to get information about the existence and stability of solutions to difference dynamical systems. The effective method for such researching is the method of evaluating functions that depend on the known parameters included in the right side of the DDS. Moreover, it is possible to investigate DDS, in which the right-hand sides are not necessarily analytical. In this article, we explore a new analogue of Gronwall's result for DDS. In this paper we have obtained some new discrete inequalities that will allow us to judge the stability of the DDS.*

Key words: *difference dynamical systems, discrete inequalities, estimates, Gronwall inequality.*

1. Introduction. In this article are given the applications of discrete inequalities of the Bellman or Bihari type to the learning of the stability of linear and nonlinear differential equations [1]. In [2] can be found numerous applications to the theory of existence and uniqueness of differential equations, as well as [3], [4]; in [5] is indicated applications to priori estimates for the classes of solutions of partial differential equations. Over the past few years, several authors have established some Gronwall-type integral inequalities with one or two independent real variables [6], [7].

Residual and summarized residual difference inequalities are widely used as a research tool in the qualitative theory of discrete systems. These inequalities were used to study some general properties of difference dynamical systems, in particular, Lyapunov stability.

In a qualitative study of DDS, in many cases, the DDS solution is estimated by functions that depend on the known parameters included in the right-hand sides of the DDS. For this, it is necessary to use a ready-made discrete inequality of the Bellman, Bihari or Gronwall type. But not for all DDS one can find the corresponding ready discrete inequality.

The following discrete analogue of Bellman's inequality is closely related to the above DDSs.

Let $\omega(n)$ - monotonically non-decreasing, and also $x(n)$, $f(n)$ - non-negative functions for $\forall n / n \in N_0 = \{n_0, n_0+1, \ldots\}$.

If the inequality works [8]

$$x(n) \le \omega(n) + \sum_{s=0}^{n-1} f(s) \cdot x(s), \ \forall n/n \in N_0,$$

The inequality will be

$$x(n) \le \omega(n) \cdot \prod_{s=0}^{n-1} [1 + f(s)], \ \forall n/n \in N_0.$$

In this paper we have obtained some new discrete inequalities that will allow us to judge the stability of the DDS. In this article, we explore a new analogue of Gronwall's result for DDS.

2 Obtaining new discrete inequalities.

Theorem 1. Let $U_n, \varphi(n), f(n)$ - non-negative functions. If $a > 0$, $p > 1$ inequality holds

$$U_n \le a + \sum_{j=0}^{n-1} \varphi(j) U_j + \sum_{j=0}^{n-1} f(j) U_j^{\,p} \qquad (1)$$

then

$$U_n \le \prod_{j=0}^{n-1}(1+\varphi(j))^{-1}\left\{a^{1-p}+(1-p)\sum_{j=0}^{n-1} f(j)\left(\prod_{j=0}^{n}(1+\varphi(j))^{-1}\right)^{q}\right\}^{\frac{1}{p}}. \quad (2)$$

Proof: Note

$$\prod_{j=0}^{n}(1+\varphi(j))^{-1}-\prod_{j=0}^{n-1}(1+\varphi(j))^{-1}=-\varphi(n)\prod_{j=0}^{n}(1+\varphi(j))^{-1} \quad (3)$$

$$\prod_{j=0}^{n}(1+\varphi(j))^{-1}=1.$$

We put $z_0 = a$, then

$$z_n = a+\sum_{j=0}^{n-1}\varphi(j)U_j+\sum_{j=0}^{n-1} f(j){U_j}^{p}, \quad n\ge 0. \quad (4)$$

It's obvious that $U_n \le z_n$ at $n \ge 0$.

From the fact that

$$z_{n+1}-z_n=\varphi(n)U_n+f(n){U_n}^{p}$$

$$z_{n+1}-z_n-\varphi(n)z_n \le f(n){z_n}^{p}. \quad (5)$$

Multiplying both sides of the inequality (5) by $\prod_{j=0}^{n}(1+\varphi(j))^{-1}$ and given (3) transform it. Let us get an estimate

$$z_{n+1}\prod_{j=0}^{n}(1+\varphi(j))^{-1}-z_n\prod_{j=0}^{n-1}(1+\varphi(j))^{-1}\le f(n)\prod_{j=0}^{n}(1+\varphi(j))^{-1}{z_n}^{p}. \quad (6)$$

Next, let $q=1-p$. We transform the left side of the inequality (6) to

$$\frac{\left(z_{n+1}\prod_{j=0}^{n}(1+\varphi(j))^{-1}\right)^{p}-\left(z_n\prod_{j=0}^{n-1}(1+\varphi(j))^{-1}\right)^{q}}{D}= \quad (7)$$

$$=q\left(z_n\prod_{j=0}^{n}(1+\varphi(j))^{-1}-z_n\prod_{j=0}^{n-1}(1+\varphi(j))^{-1}\right)$$

where D - is some value between

$$z_{n+1}\prod_{j=0}^{n}(1+\varphi(j))^{-1} \text{ and } z_n\prod_{j=0}^{n-1}(1+\varphi(j))^{-1}.$$

From the fact that z_n - non-decreasing, and

$$\prod_{j=0}^{n-1}(1+\varphi(j))^{-1}$$

- non-increasing, follows

$$D > z_n\prod_{j=0}^{n-1}(1+\varphi(j))^{-1}\ge z_n\prod_{j=0}^{n}(1+\varphi(j))^{-1},$$

if

$$z_n\prod_{j=0}^{n-1}(1+\varphi(j))^{-1}<z_{n+1}\prod_{j=0}^{n}(1+\varphi(j))^{-1},$$

and

$$D > z_{n+1}\prod_{j=0}^{n}(1+\varphi(j))^{-1}\ge z_n\prod_{j=0}^{n}(1+\varphi(j))^{-1},$$

if

$$z_{n+1}\prod_{j=0}^{n}(1+\varphi(j))^{-1} < z_n\prod_{j=0}^{n-1}(1+\varphi(j))^{-1}.$$

From (5) and (7) we get

$$\left(z_n\prod_{j=0}^{n}(1+\varphi(j))^{-1}\right)^p - \left(z_n\prod_{j=0}^{n-1}(1+\varphi(j))^{-1}\right)^q \le qf(n)\left(\prod_{j=0}^{n}(1+\varphi(j))^{-1}\right)^q \qquad (8)$$

at $q<0,(p>1)$.

Considering that $z_0 = a$, and summing up (8) by n from 0 to $n-1$ find

$$\left(z_n\prod_{j=0}^{n}(1+\varphi(j))^{-1}\right)^p \le a^q + q\sum_{j=0}^{n-1} f(j)\left(\prod_{j=0}^{n}(1+\varphi(j))^{-1}\right)^q, \qquad (9)$$

at $q<0,(p>1)$.

From the estimate (9) we obtain

$$z_n\prod_{j=0}^{n-1}(1+\varphi(j))^{-1} \le \left\{a^q + q\sum_{i=0}^{n-1} f(i)\left(\prod_{j=0}^{n}(1+\varphi(j))^{-1}\right)^q\right\}^{\frac{1}{p}}, \qquad (10)$$

at $q<0,(p>1)$.

Considering that $U_n \le z_n$ and $\prod_{j=0}^{n-1}(1+\varphi(j))^{-1} > 0$

from inequality (10) we find the estimate (2). The theorem is proved.

Theorem 2. Let the function $f(n)$- continuous positive and non-decreasing by N_{n_0}, and $b_j \ge 0,\quad a \in R,\quad j = 0,1,2,\ldots$.If at $a_j \in R$. $j = 0,1,2,\ldots$ the inequality holds

$$U_n \le a + \sum_{j=0}^{n-1} b_j f(U_j), \text{ при } n \ge 0 \qquad (11)$$

then

$$U_n \le G^{-1}\left[G(a) + \sum_{j=0}^{n-1} b_j\right] \qquad (12)$$

at $n \in N_{n_0}$, when

$$G(r) = \int_{r_0}^{r} \frac{dy}{f(y)}, r \ge r_0.$$

If $G(\infty) \ne \infty$, then $\sum_{j=1}^{n-1} b_j < G(\infty),\ n = 0,1,\ldots$

Proof: We define the sequence $\{x_i\}$ recursive formula

$$x_0 = a,$$
$$x_{j+1} = x_j + b_j f(x_j),\quad j = 0,1,2,\ldots \qquad (13)$$

it's obvious that x_j - satisfies the equation

$$x_j = a + \sum_{j=0}^{n-1} b_j f(x_j). \qquad (14)$$

Of (11), (13) and (14) we get $U_j \le x_j$ at $j \ge 0$ moreover $x_j > 0$. Hence by the property of the function f find

$$G(x_{j+1})-G(x_j)=\int_{x_j}^{x_{j+1}}\frac{dy}{f(y)}\le\frac{x_{j+1}-x_j}{f(x_j)}=b_j, \qquad (15)$$

at $j=0,1,2,\ldots$

Summing up both sides of the inequality (15) by j from 0 before $n-1$ we get

$$G(x_{j+1})\le G(a)+\sum_{j=1}^{n-1}b_j$$

from here

$$U_n\le x_n\le G^{-1}\left[G(a)+\sum_{j=1}^{n-1}b_j\right].$$

The theorem is proved.

Hence let $f(U_n)=U^m\ (m>1)$. Then from the inequality

$$U_n\le a+\sum_{j=0}^{n-1}b_j{U_j}^m,\ 0\le U_0\le a \qquad (16)$$

and the fact that

$$\int y^{-m}dy=\frac{y^{-m+1}}{-m+1}=\frac{1}{1-m}y^{1-m},\ \frac{1}{1-m}y^{1-m}\le\frac{1}{1-m}a^{1-m}+\sum_{j=0}^{n-1}b_j,$$

$$y^{1-m}\le a^{1-m}+(1-m)\sum_{j=0}^{n-1}b_j,\ y^{1-m}\le a^{-(m-1)}\left(1+(1-m)a^{m-1}\sum_{j=0}^{n-1}b_j\right),$$

$$y\le a\left(1-(m-1)a^{m-1}\sum_{j=0}^{n-1}b_j\right)^{-\frac{1}{m-1}}$$

the estimate

$$U_n\le a\left(1-(m-1)a^{m-1}\sum_{j=0}^{n-1}b_j\right)^{-\frac{1}{m-1}}. \qquad (17)$$

Conclusion. In this researching was obtained a new discrete inequality, which is used to estimate the solution of nonlinear DDS using the fundamental solutions of the linear approximation. In the proposed work, some new discrete inequalities were obtained, which will make it possible to judge the stability of the DDS. In conclusion, we note that the summarized residual inequality will allow us to investigate the stability and boundedness, the asymptotic behavior of solutions of difference dynamical systems. The results of the researching have practical importance for the verification of scenarios for computer modeling and control of physical processes.

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Rezyume: *Differentsial dinamik tizimlarni (DDT) sifatli o'rganishda ko'p hollarda DDT echimi DDT ning o'ng tomonlariga kiritilgan ma'lum parametrlarga bog'liq funktsiyalar bilan baholanadi. Bu Bellman va Bihari turidagi tayyor diskret tengsizlikni talab qiladi. Ammo barcha DDT lariga mos keladigan diskret tengsizlikni topa olmaydi. Tavsiya etilgan ishda DDT barqarorligini baholashga imkon beradigan ba'zi yangi diskret tengsizliklarga erishildi.*

Резюме: *При качественном исследовании разностных динамических систем (РДС) во многих случаях решение РДС оценивается функциями, зависящими от известных параметров, входящие в правые части РДС. Для этого необходимо готовое дискретное неравенство типа Беллмана и Бихари. Но не для всех РДС можно найти соответствующее дискретное неравенство. В предлагаемой работе были получены некоторые новые дискретные неравенства, которые позволят судить об устойчивости РДС.*

Kalit so'zlar: *Ayirmali dinamik tizimlar, diskret tengsizliklar, barqarorlik, Gronwall tengsizligi.*

Ключевые слова: *Разностные динамические системы, дискретные неравенства, устойчивость, неравенство Гронуолла.*

THE MAIN PESTS AND CONTROL METHODS DURING THE GERMINATION OF RICE

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Summary. *The results of scientific research on the types of pests that damage the rice plant grown in the conditions of Karakalpakstan, the bioecology of their development, the dynamics and the scientific aspects of the control measures depending on the degree of damage are presented.*

Keywords: *Rice, variety, vegetation, pests, plant, crops, germination, seed, degree of damage.*

Introduction. Among the agricultural crops grown in the conditions of Karakalpakstan, rice is considered to be slightly different in terms of the developmental biology and the agro-technical methods used. This is due to the fact that as soon as the rice seeds fall into the soil, the water is flooded, or in the following years, the seeds are sown after the field is filled with water after pre-sowing treatment. The pre-harvest agro-technical means have the characteristic features that can be carried out in a water-filled field. As well as, the vegetation period in the region is a bit short, rareripe varieties "Sanam", "Gulistan", "Nukus-2", "Nukus-70" are grown and high yields are obtained.

As a result, it is clear that this plant has pests that are adapted to this biotope condition, and the expected yield will not be possible without control measures.

The scientific research has shown that this is due to the fact that the level of damage caused by weeds, diseases and pests is slightly higher than the harmful factors that lead to harms in the growth of plants in rice fields, a sharp decline in yields and pollution. (Shamuratov, 1993; Hamraev etc., 1999; Toreniyazov, 2014).

Special scientific research is being carried out to solve this problem, taking into account the high negative impact of pests which live on the vegetative, generative bodies of plants, as well as the main type of harmful biotic factors in the cultivation of rice.

Methods used. It was carried out using the methods of agrotechnical methods used for the cultivation of rice varieties in the conditions of Karakalpakstan B. Kidirbaev (1992), identification of species of pests in the biotope B.P.Adashkeevich (1983), bioecology, dynamics Sh.T.Xudjaev etc. (2004), ehe degree of damage V.I. Tanskiy (1988), application of experiments B.D. Dospekhov (1986).

Results. Special observations of Karakalpak agrobiocenosis rice fields show that in recent years, the sowing period of rareripe varieties of rice in the region which has to be sown in May has been higher than in the fields sown in the third decade of June.The harvest season is in late September and October, and even after the first frost, the quality of the harvested crops is slightly higher.

Depending on the agro-technical methods used in rice fields and the specific differences in the biocenosis, it became known that any insects, including pest species, can be collected and form a biologically related biochain.

As a result of the observations made in this regard, it was determined that despite the fact that the vegetation period of the rice plant completely happens in water, the pests mentioned in Table 1 appear.

When rice seeds are sown in water, the shield-shaped scorpion and its slightly morphobioecologically similar leptesteria scorpion damage it. In addition to the damage caused by the larvae to the rice seedlings that appear in the soil, the roots of the young seedlings are cut off and the seedlings float to the surface of the water because the adult pests move quickly in this place. It is known that in such fields there is a risk of a sharp decline in the original number of rice and that the pest is likely to cause such characteristic damage.

Rice water weevil eats the stems and root coverings of the rice from seedling germination to ripening, and the larvae penetrate the roots and stems and live inside. As a result, damaged plants grow, lag behind in development and productivity decreases.

The larvae of ice leaf miner penetrate the bark of rice leaves and feed on the parenchyma. Damaged stems stop growing, photosynthesis in the leaves stops and turns yellow, the process of development does not take place.

The larvae of rice mosquitoes enter and gnaw from the backs of the upper and lower leaves, leaving both the upper epidermis and the roots. At the same time, it eats away at the seedlings and stems that germinate from the seeds, leaving them behind in development and completely destroying the plant if the number increases.

Table 1.

Types of pests that occur in the fields of plants and cause damage to plant phases Nukus, Kegeyli, Shimbay districts 2019-2021 years

Types of pests		The degree of damage	Plant phases
Karakalpak term	Latin term		
Shield-shaped scorpion	*Apus cancriformis Schaff.*	+++	Damages when seedlings germinate
Leptesteria scorpion	*Leptestheria danalacensisa*	+++	Germination of seedlings
Rice water weevil	*Hydronomus sinuaticollis Faust.*	+	Eats the stems and the root coverings
Ice leaf miner	*Hiderllia griseola*	+	Penetrate the bark of leaves and the parenchyma
Rice mosquito	*Cricotopus silvestris.*	++	The upper and lower leaves
Ephydra macellaria	*Ephydra macellaria Egg.*	+	Cut the roots
Rice grasshopper	*Oxya fusovittata.*	++	Leave, seed covering, stem
Note: -not identified, +little, ++ average, +++ at a high level			

Coastal worms gnaw at the roots that form in both the seed and the seed, resulting in the growth of the stalk from the seed and the thinning of the stalks in the stalks, causing great damage to the crop.

Ephydra macellaria larvae gnaw the roots as soon as seeds germinate, as a result, stems do not grow from the germinated seeds and the seedlings in the fields decline, causing great damage to the crop.

In addition to feeding on rice plant, rice grasshopper gnaw leaves, seed husks, and stems, rice panicles remain white if seeds are damaged during the panicle release phase of rice.

In order to prevent damage to rice seedlings and reduce the number of pests, the fields were identified and treated with chemicals on the third day after sowing. To do this, the water level in the field was lowered to a depth of 5-10 cm, and the determined amount of chemicals was spread equally over the field.

In order to determine the biological usefulness of the chemical used, entomological wells were made from a special net, in which 50 larvae and adult phases of shield-shaped scorpion were mixed into the soil and laid at the bottom of the water in the fields. Wells of this kind were placed in a field treated with preparations. The biological benefits of the method were calculated depending on the pest perish level in the ponds in the days following the treatment.

As a result, when the chemical Nurell-D is 10% em.k was applied on 0.5-1.0 liters per hectare, it was taken into account that the biological efficiency was 91.3-94.7% on the fifth day, and 98.0-99.0% of the pests perished on the tenth day. It was found that such a high level of biological usefulness was determined when applied at a rate of 0.5-1.0 liters per hectare of 10% Dalate em.k, 0.5-1.0 liters of Agrofos-D 55% em.k.

In the fields where the chemicals were used, the turbidity of the water 3-5 days after sowing indicates that the method has completely destroyed the pests moving in the soil.

Conclusion. It was found that rareripe varieties grown in agro-climatic conditions of Karakalpakstan have high yields and high quality, despite the fact that the sowing period begins in May and lasts until the end of June. There is a possibility that harvest is saved through performing crop rotation against pests that occur and damage from the phase of sowing rice and germination until the end of vegetation period and using chemicals in fields where there is an increase in the number of pests.

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UDC 541.49: 546.733

SYNTHESIS, CRYSTALLINE AND MOLECULAR STRUCTURE OF THIOCARBAMIDE COMPLEXES OF COBALT (III) 2-HYDROXIMINO-3-PHENYL PROPIONATE

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Summary: *The crystal structure was determined by X-ray diffraction analysis. [Co(HL)L·2Py]·Thio, where* HL^- *=* C_6H_5*-*CH_2*-C(NOH)-COOH; Py=*C_5H_5N*; Thio=*$CS(NH_2)_2$*. Crystals are monoclinic, space groups* $P2_{1/c}$*; unit cell parameters: a = 14.972 (3), b = 16.596 (9), c = 12.168 (2) Å, β = 98.71 (3)°. The coordination polyhedron of the Co (III) atom is a somewhat distorted elongated tetragonal bipyramid. The two ligands occupy equatorial positions and are coordinated chelated through the carboxyl oxygen atom and the nitrogen atom of the oxime group. The ligands are in the cis position and form a short hydrogen bond with each other. The axial positions are occupied by pyridine molecules. The thiocarbamide molecule is not coordinated and forms hydrogen bonds with unbonded oxygen atoms of carboxyl groups.*

Key words: *coordination compounds, 2-hydroxyminocarboxylates, thiocarbamide, cobalt (III), crystal structure, hydrogen bonds.*

Introduction.

The study of coordination compounds of cobalt (III) with oxime-containing ligands attracts the attention of researchers in connection with the possibility of modeling some biochemical processes, their use in template organic synthesis, as catalysts in chemical processes or as protective groups in the synthesis of some amino acids [1-3]. In coordination chemistry, much attention is paid to structural analogs of natural compounds. 2-Hydroxyimino-3-phenylpropionic acid in its structure can be considered as analogs of 2-amino acids and differ from the latter by the presence of an oxime group instead of an amino group. Such a similarity in structure with common bioligands, the presence of several donor centers, the possibility of stepwise elimination of protons from the acid molecule makes it possible to clarify a number of theoretical and practical issues in their study.

We have previously studied the coordination compounds of cobalt (III) 2-hydroxyminocarboxylate with some neutral nitrogen-containing ligands [4-5], which organic ligands are coordinated to the cobalt atom in the equatorial plane in the *cis*-position, and the nitrogen atoms of neutral molecules have a *trans*-arrangement.

In continuation of the above-mentioned works, this article presents the results of the synthesis and X-ray structural study of the mixed-ligand complex of cobalt (III) with pyridine, 2-hydroxyimino-3-phenylpropionic acid, and thiocarbamide.

Experimental part.

The starting compounds were [Co(HL)L·2Py] obtained by the method [4], analytical grade thiourea (Thio) (GOST 6344-73) and analytical grade methanol.

The analysis of the isolated compounds for carbon, hydrogen, and nitrogen was carried out on an automatic elemental analyzer (Carlo Erba), the analysis for the cobalt content was determined complexometrically [6].

Determination of S was performed by the titrimetric method after combustion of the substance in a Schoniger flask [7]. The experimental material was obtained in an ENRAF-NONIUS CAD-4 diffractometer (MoKα radiation, graphite monochromator, λ = 0.71073 Å). The unit cell parameters are determined from 25 reflections with θ between 15 and 18 °, space group - $P2_{1/C}$. The intensity of 5791 reflections was measured in the hkl region from (17, 19, 14) and within $0 \langle \theta \langle 25$ °, using the ω-2θ scanning method and analysis of all reflection profiles [8-9]. In the calculations,

5254 “unique” reflections were used, of which 2880 with I 〉 2σ (I) were taken into account when solving the structure.

Lorentzian and polarization corrections were used in the calculations. The structure was solved by the Patterson method using DIRDIF programs [10]. The structure was refined by the least squares method in the isotropic approximation to an R factor of 0.077 using SHELX 76 [11]. Hydrogen atoms were localized from difference Fourier synthesis.

The positional and anisotropic thermal parameters of non-hydrogen atoms were refined using SHELX 93 [12]. Hydrogen atoms were refined isotropically. The final R-factor value is 0.038, for 2880 reflexes used and 456 variables. The values of atomic factors were taken from International Tables for X-ray Crystallography [13]. All calculations were made by MicroVAX-3400 at the Scientific Computer Center of the University of Oviedo (Spain). The coordinates of the basic atoms in the structure are shown in Table 1.

The complex compound [Co (HL) L · 2Py] · Thio was synthesized according to the following procedure: to a suspension of 1 mmol (0.5725 g) [Co(HL)L·2Py] in 30 ml of methanol was added a solution of 10 mmol (0.5725 g) thiourea in the same solvent. The resulting solution was boiled for 5 hours under reflux. Upon slow evaporation of the resulting solution in a vacuum desiccator, dark red crystals were obtained, which were filtered off, washed with methanol, and dried. (Yield ~ 90%). The compound is soluble in methanol, water. Found,%: C 53.51; H 4.28; N 13.01. For $C_{29}H_{29}CoN_6O_6S$ (Mr = 648) calculated,%: C 53.70; H 4.48; N 12.96.

Results and its discussion

The presence of thiourea and two pyridine molecules in the complex, as well as the fact that the anion was 2-hydroxyimino-3-phenylpropionic acid, not previously studied by X-ray structural analysis, prompted us to perform X-ray structural studies of the compound [Co(HL)L·2Py]·Thio. The crystallographically independent part of the structure and the numbering of atoms in the complex are shown in Fig. 14). Selected bond lengths and bond angles are summarized in table. 2. The compound has a molecular structure. The cobalt coordination polyhedron is a somewhat distorted elongated tetragonal bipyramid.

Table 1. Coordinates of atoms in the structure [Co(HL)L·2Py]·Thio

Atom	X	Y	Z	B(A^2)
Co	0,2615(1)	0,0344(1)	0,2247(1)	31(1)
O_1	0,1514(2)	0,0643(1)	0,0191(2)	42(1)
N_1	0,1531(2)	0,0499(1)	0,1274(2)	34(1)
C(2)	0,0799(2)	0,0527(2)	0,1720(3)	36(1)
C(3)	0,0995(2)	0,0354(2)	0,2941(3)	36(1)
O(3)	0,0393(2)	0,0367(2)	0,3524(2)	51(1)
O(4)	0,1830(1)	0,0183(1)	0,3323(2)	39(1)
C(5)	-0,0099(2)	0,0786(2)	0,1138(3)	44(1)
C(6)	-0,0152(2)	0,1693(2)	0,1087(3)	40(1)
C(7)	-0,0432(3)	0,2128(2)	0,1929(4)	57(1)
C(8)	-0,0457(3)	0,2959(3)	0,1907(5)	86(2)
C(9)	-0,0192(4)	0,3360(3)	0,1025(6)	89(2)
C(10)	0,0089(4)	0,2941(3)	0,0171(5)	83(2)
C(11)	0,0103(3)	0,2109(3)	0,0201(4)	61(1)
N(12)	0,2595(2)	-0,0808(2)	0,1911(3)	38(1)
C(13)	0,2821(2)	-0,1337(2)	0,2751(4)	50(1)
C(14)	0,2308(2)	-0,1911(2)	0,0661(4)	57(1)
C(15)	0,2536(3)	-0,2446(2)	01517(4)	60(1)
C(16)	0,2809(3)	-0,2157(2)	0,2562(4)	63(1)
C(17)	0,2350(2)	-0,1094(2)	0,0901(3)	45(1)
N (1A)	0,3435(2)	0,0550(2)	0,1257(2)	33(1)

O (1A)	0,3166(2)	0,0728(1)	0,0183(2)	43(1)
C (2A)	0,4279(2)	0,0585(2)	0,1678(3)	33(1)
C(3A)	0,4426(2)	0,0344(2)	0,2879(3)	39(1)
O(3A)	0,5186(2)	0,0304(2)	0,3410(2)	51(1)
O(4A)	0,3687(1)	0,0199(1)	0,3285(2)	36(1)
C(5A)	0,5017(2)	0,0858(2)	0,1069(3)	44(1)
C(6A)	0,5028(2)	0,1760(2)	0,0892(3)	37(1)
C(7A)	0,4728(3)	0,2303(2)	0,1618(3)	48(1)
C(8A)	0,4752(3)	0,3123(2)	0,1429(4)	54(1)
C(9A)	0,5084(3)	0,3421(2)	0,0522(4)	55(1)
C(11A)	0,5371(2)	0,2071(2)	-0,0010(3)	48(1)
N (12A)	0,2621(2)	0,1505(2)	0,2591(2)	33(1)
C(13A)	0,2333(3)	0,2067(2)	0,1832(3)	44(1)
C(14A)	0,2348(3)	0,2878(2)	0,2071(4)	57(1)
C(15A)	0,2685(3)	0,3127(2)	0,3123(4)	58(1)
C(16A)	0,2981(3)	0,2559(2)	0,3907(4)	53(1)
C(17A)	0,2935(2)	0,1756(2)	0,3618(3)	42(1)
S	0,7532(1)	0,0453(1)	0,2248(1)	54(1)
C(18)	0,7751(2)	0,0226(2)	0,3605(3)	40(1)
N(19)	0,7102(2)	0,0139(2)	0,4228(3)	61(1)

As in the previously described structures, the main geometrical distortions of the polyhedron are introduced due to the rigid chelate node N = C - C - O. It should be noted that the Co-anion bonds are somewhat longer (–0.01 Å) in comparison with the corresponding pyridinate complex [4]. Despite these indicated bond lengths Co-N and Co-O are in good agreement with those in other octahedral complexes of cobalt(III) [14,15].

In the coordination polyhedron, one of the vertices of the bipyramid is slightly more elongated (Table 2). This is due to the specific arrangement of the phenyl groups of the ligands (Fig. 1), which are in the immediate vicinity of the pyridine molecule, thus "forcing" it to "move away" somewhat from the cobalt ion. Co-N_{py} bonds are practically perpendicular to the equatorial plane (angle N12-Co-N12A = 179.36 °). The coordinated oxygen and nitrogen atoms of the anions are practically in the same plane, while for the cobalt atom, there is a slight departure from the rms plane O4A, O4, N1A, N1 (Table 3).

The coordination of acid ions is carried out according to the type described for analogous complexes of cobalt (III) [4]. Both anions are in the cis-position and form a short hydrogen bond O1A… H-O1. The distance between the indicated oxygen atoms is 2.479 Å. The lengths of the valence bonds and the angles between them are almost identical with those for [Co(HA)A·2Py] (where, H_2A-2-hydroxyminopropionic acid). The bond lengths in aromatic groups are 1.37-1.38 Å on average. Somewhat unexpected are the N-C bond lengths in pyridine molecules. These bonds in the "screened" molecule (molecule A) are practically equal, while in the other molecule their difference is greater than 0.03 Å.

A characteristic feature of this complex particle is the cis-arrangement (with respect to the equatorial plane) of the benzyl groups of the acidoligands. Their phenyl rings are practically parallel (the dihedral angle is 4.1 °) and form angles of 46.8 ° and 42.8 ° with the neighboring pyridine molecule. This arrangement leads to a significant turn of the heterocyclic base from the imaginary plane passing through the N12A-Co-N12 bond and the bisector of the N1A-Co-N1 angle (Table 2). Two pyridine molecules form a dihedral angle of 5.4 ° with each other. Information on other dihedral angles in the molecule is given in Table 3.

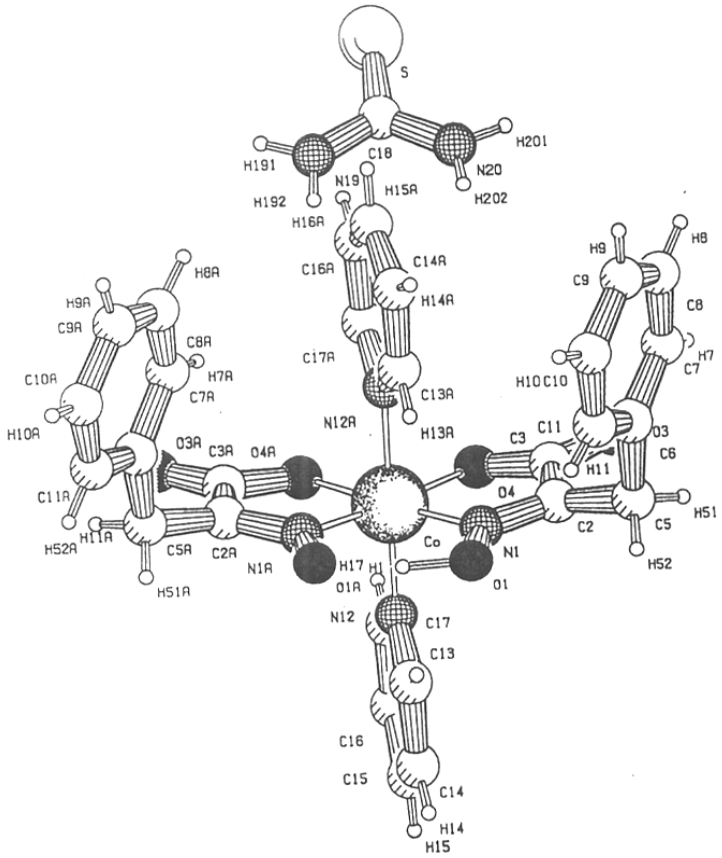

Figure 1. Molecular structure of the [Co(HL)L·2Py]·Thio complex

Table 2. Some bond lengths (Å) and bond angles (°) in the compound [Co(HB)B·2Py]·Thio

Atom 1	Atom 2	Distance	Injection	ω(city)	Injection	ω(city)
Co	N(1)	1,875(3)	N(1)CoN(1A)	99,09(12)	N(1)CoO(4A)	177,51(12)
Co	O(4)	1,906(2)	N(1A)CoO(4A)	83,16(11)	N(1A)CoO(4)	83,59(11)
Co	N(12)	1,954(3)	N(1A)CoO(4)	176,06(11)	O(4A)CoO(4)	94,11(10)
O(1)	N(1)	1,336(3)	N(1)CoN(12)	91,03(11)	N(1A)CoN(12)	91,99(11)
O(1)	H(1)	1,08	O(4A)CoN(12)	89,96(11)	O(4)CoN(12)	90,84(11)
N(1)	C(2)	1,294(4)	N(1)CoN(12A)	88,65(10)	N(1A)CoN(12A)	88,61(11)
C(2)	C(5)	1,485(4)	O(4A)CoN(12A)	90,34(10)	O(4)CoN(12A)	88,57(10)
C(2)	C(3)	1,498(5)	N(12)CoN(12A)	179,36(11)	N(1)O(1)H(1)	101,0(2)
C(3)	O(3)	1,229(4)	C(2)N(1)O(1)	121,0(3)	C(2)N(1)Co	116,6(2)
C(3)	O(4)	1,298(4)	O(1)N(1)Co	122,2(2)	N(1)C(2)C(5)	125,1(3)
N(12)	C(17)	1,317(4)	N(1)C(2)C(3)	111,0(3)	C(5)C(2)C(3)	123,7(3)
N(12)	C(13)	1,351(4)	O(3)C(3)O(4)	123,3(3)	O(3)C(3)C(2)	121,3(3)
C(18)	N(20)	1,323(4)	O(4)C(3)C(2)	115,5(3)	C(3)O(4)Co	112,6(2)
C(18)	N(19)	1,327(4)	C(2)C(5)C(6)	110,3(3)	C(17)N(12)C(13)	118,2(3)
Co	N(1A)	1,877(3)	C(17)N(12)Co	122,8(3)	C(13)N(12)Co	119,0(3)
Co	O(4A)	1,902(2)	C(2A)N(1A)O(1A)	120,6(3)	C(2A)N(1A)Co	116,7(2)
Co	N(12A)	1,971(3)	O(1A)N(1A)Co	122,4(2)	N(1A)O(1A)H(1)	100(2)
N(1A)	O(1A)	1,341(3)	N(1A)C(2A)C(5A)	124,8(3)	N(1A)C(2A)C(3A)	111,4(3)
N(1A)	C(2A)	1,291(4)	C(5A)C(2A)C(3A)	123,8(3)	O(3A)C(3A)O(4A)	124,5(3)

C(2A)	C(5A)	1,490(4)	O(3A)C(3A)C(2A)	121,1(3)	O(4A)C(3A)C(2A)	114,4(3)
C(2A)	C(3A)	1,498(5)	C(3A)O(4A)Co	113,9(2)	C(2A)C(5A)C(6A)	113,4(3)
C(3A)	O(3A)	1,223(4)	C(17A)N(12A)C(13A)	117,5(3)	C(17A)N(12A)Co	119,6(2)
C(3A)	O(4A)	1,301(4)	C(13A)N(12A)Co	122,9(2)	N(20)C(18)N(19)	115,7(4)
N(12A)	C(17A)	1,333(4)	N(20)C(18)S	121,9(3)	N(19)C(18)S	122,4(3)
N(12A)	C(13A)	1,337(4)				
S	C(18)	1,678(4)				

From the data presented in it, the angle between the planes of the chelate rings, equal to 15.1 °, deserves attention, which is also, apparently, due to the cis-arrangement of benzyl groups in the molecule. The corresponding angle in the [Co (HA) A · 2Py] complex is only 1.5 °.

Table 3. Some planes of atoms and the distance (Å) of atoms from this plane in the structure [Co(HB)B·2Py]·Thio

Root mean square plane in structure	The exit of atoms from the plane
(1) O(4A), O(4), N(1A), N(1)	Co-0.0322, O(1)-0.0720, N(1)-0.0151, C(2)-0.1682, C(3)-0.2107, O(3)-0.4032, O(4)-0.0154, C(5)-0.4539, N(1A)-0.0151, O(1A)-0.0220, C(2A)-0.1635, C(3A)-0.0918, O(3A)-0.1503, O(4A)-0.0155, C(5A)-0.4235
(2) O(4A), C(3A), C(2A), N(1A), O(1A)	N(1A)-0.0068, O(1A)-0.0035, C(2A)-0.0206, C(3A)-0.0214, O(4A)-0.0111
(3) O(4), C(3), C(2), N(1), O(1)	O(1)-0.0017, N(1)-0.0037, C(2)-0.0110, C(3)-0.0115, O(3)-0.0292, O(4)-0.0016
(4) Py(A)	The average deviation of atoms from the plane is 0.0046
(5) Py	The average deviation of atoms from the plane is 0.0059
(6) C_6H_5(A)-	The average deviation of atoms from the plane is 0.0041
(7) C_6H_5-	The average deviation of atoms from the plane is 0.0028
Dihedral angles (°) between planes:	(1)-(2) 6.3, (1)-(3) 9.1, (2)-(3) 15.5, (1)-(4) 90.7, (2)-(4) 97.0, (4)-(3) 81.6, (1)-(5) 91.6, (2)-(5) 97.9, (3)-(5) 82.5, (4)-(5) 5.4, (6)-(1) 81.7, (6)-(2) 86.5, (6)-(3) 74.6, (6)-(4) 46.8, (7)-(1) 83.3, (7)-(2) 88.3, (7)-(3) 75.8, (7)-(5) 37.8, (7)-(6) 4.1

The thiourea molecule uncoordinated by the central atom has standard bond lengths and bond angles (Table 2). It forms hydrogen bonds with unbound oxygen atoms of carboxyl groups, while acting as a kind of bridge between two neighboring complex particles. The indicated network of hydrogen bonds is shown in Fig. 15, where the N19-O3A and N20-O3 * distances are 2.903 and 2.938 Å, respectively (* is the operation of symmetry x + 1, y, z).

Conclusions

A new cobalt (III) compound with an oxime-containing ligand, namely 2-hydroxyimino-3-phenylpropionic acid, has been synthesized. The structure of this compound was investigated both in solid state and in solution. Based on the data of NMR spectroscopy and X-ray structural analysis,

the spatial structure of the synthesized compound is proposed. The composition and structure of the synthesized coordination compound was confirmed on the basis of elemental and X-ray structural analysis, as well as NMR and IR spectroscopy.

Gratitude.

The authors are sincerely grateful to Professor Fernando Lopez Ortiz and Professor Santiago Garcia-Granda for their help in recording the NMR spectrum and performing X-ray structural studies.

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Rezyume: *Rentgen strukturaviy tahlil yordamida [Co(HL)L·2Py]·Thio ning kristall tuzilishi aniqlandi, bu erda HL^- = C_6H_5-CH_2-C(NOH)-COOH; Py=C_5H_5N; Thio=$CS(NH_2)_2$. Kristallar monoklinik, fazoviy guruhlar $P2_1/c$; elementar yacheyka parametrlari a = 14.972(3), b = 16.596(9), c = 12.168(2) Å, β = 98.71(3)°. Co (III) atomining koordinasion ko'pburchagi biroz cho'zilgan tetragonal bipiramida. Ikki ligand ekvatorial pozisiyalarni egallaydi va kislorodli karboksil atomi va oksim guruhining azot atomi orqali xelat hosil qilib koordinasiyalangan. Ligandlar cis- holatida joylashgan bo'lib bir -biri bilan qisqa vodorod bo'g'lanishini hosil qiladi. Akcial holatlarni piridin molekulalari egallaydi. Tiokarbamid molekulasi koordinasiyalanmagan va karboksil guruhlarining bog'lanmagan kislorod atomlari bilan vodorod bo'g'larini hosil qiladi.*

Резюме: *Методом рентгеноструктурного анализа определена кристаллическая структура [Co(HL)L·2Py]·Thio, где HL^- = C_6H_5-CH_2-C(NOH)-COOH; Py=C_5H_5N; Thio=$CS(NH_2)_2$. Кристаллы моноклинные, пространственные группы $P2_1/c$; параметры*

элементарной ячейки: a = 14.972(3), b = 16.596(9), c = 12.168(2) Å, β = 98.71(3)°. Координационный полиэдр атома Co(III) представляет собой несколько искаженную вытянутую тетрагональную бипирамиду. Два лиганда занимают экваториальное положения и координировано хелатно через атом кислорода карбоксильной и атом азота оксимной групп. Лиганды находится в цис- положении и образуют между собой короткий водородный связь. Аксиальные позиции занимают молекулы пиридина. Молекула тиокарбамида не координировано и образует водородные связи с несвязанными атомами кислорода карбоксильных групп.

Kalit so'zlar: *koordinatsion birikmalar, 2-gidroksiminokarboksilatlar, tiokarbamid, kobalt(III), kristall tuzilish, vodorod bog'lanishlar.*

Ключевые слова: *координационные соединения, 2-гидроксимино-карбоксилаты, тиокарбамид, кобальт(III), кристаллическая структура, водородные связи.*

MODELING THE PROBLEM OF INTERSTATE WATER USE AND THE ALGORITHM OF ITS SOLUTION

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Summary: *This article discusses the development of mathematical models for the formation of payments for water use and standards for environmental payments, as well as methods for solving the problem of interstate water use.*

Key words: *mathematical model, method, price, water resources, dual problem, environmental payments, algorithm, convergence.*

Currently, the issue of rational use of natural resources is especially acute. At the same time, the formal price for some resources, for example, water, land, has not been established.

The ecological situation in the Aral Sea region due to the drying up of the sea and the deterioration of the water composition in the basins of the Amu Darya and Syr Darya rivers has recently acquired special relevance. It should be noted that this problem is increasingly attracting the attention of the international community, environmental scientists, mathematicians, economists far beyond Central Asia. The search for ways to normalize the situation is being pursued in various directions.

The concept of rationalizing the use of natural resources is described in works [1-6]. One of the obvious reasons for this problem is the disordered use of the water resources of the Amudarya and Syrdarya rivers, as a result of which there is practically no water inflow into the residual part of the Aral Sea. And this, as you know, led to a sharp increase in the level of salinity of sea water, to reversible climate changes, which entailed the loss of many unique species of flora and fauna. Since the Amu Darya and Syr Darya are a common resource of the Central Asian countries, it is expedient, in our opinion, for the joint efforts of all states using the water of these rivers to solve the hydroecological problems of the Aral Sea region.

As a possible measure in this direction, it is advisable to coordinate the activities of the relevant regional water distribution bodies. We consider it expedient to establish a payment for water use. This raises the problem of determining scientifically based standards for payments for water resources and analysis of the environmental and economic consequences of the introduction of such payments. The solution to this problem runs into a number of difficulties. First, due to the lack of ownership of water, it is difficult to develop market relations for the purchase and sale of water resources, and hence, purely market-based pricing mechanisms. Secondly, in the specific conditions of Central Asia with a wide spread of irrigated agriculture and a constant shortage of water, its usefulness for consumers obviously significantly exceeds the material costs directly related to its supply. This means that the cost-based approach is also of little use for the formation of payments for water resources.

From a formal point of view, the price for water can be based on dual estimates of the optimal payment for water consumption. The main difficulties in this are in determining the value of such an estimate without information about the utility functions of consumers.

It is also necessary to assess how the introduction of water charges and environmental charges will contribute to rational water use in the basins of these rivers and stimulate structural changes in the economy of this region, in particular in the Republic of Karakalpakstan. The

complexity and multidimensionality of this problem requires the use of mathematical modeling methods to solve it.

It should be noted that a number of works propose algorithms for calculating prices for such "shared resources" based on the results of the theory of duality. [1,2,9,13]. In one of these works devoted to the problem of water use, it is shown, in particular, the feasibility of using the methodology developed at the International Institute for Applied Systems Analysis (IIASA) [9].

This paper proposes one of the models for the formation of charges for water use and environmental charges for water pollution, based on the concept of "shared resources" and a method for its solution [11,12].

1. Substantial and mathematical formulation of the problem of interstate water use:

Consider N countries using a common water resource.

Let us first suggest that each of them consumes part of the water, but does not change its quality. Let F - be water resources; x_i - water consumption in i-the country; $v_i(x_i)$- profit derived from the consumption of water in i-the country in the amount x_i; $\bar{x}_i$ - limit value of water consumption in the i-th country. Then, the problem of maximizing the profits of all countries from the use of water is as follows:

$$\sum_{i=1}^{N} \upsilon_i(x_i) \to \max, \tag{1}$$

$$\sum_{i=1}^{N} x_i \le F \ , \tag{2}$$

$$0 \le x_i \le \bar{x}_i , \quad i = \overline{I,N}. \tag{3}$$

It follows from the results of [10] that the solution to this problem (optimal water consumption) belongs to the core of a non-antagonistic game in which N countries will be players, and their payoff functions $\upsilon_i(x_i)$.

Objective (1) - (3) cannot be solved by any one coordinating body, since the participating countries are not interested in disclosing their utility functions $\upsilon_i(x_i)$. Therefore, the methodology proposed in this work is based on an algorithm for solving this problem, which does not require the exchange of such information. Its essence is as follows.

2. Algorithm for solving the problem of interstate water use.

The coordinating body sets a certain price for water. Countries consuming it communicate their needs to the coordinating authority at a given price. Depending on the ratio between the total demand for water and its available resources, the coordinating body adjusts the price and informs consumers of its new value, after which the procedure described above is repeated. To justify this procedure, we write down the Lagrange function for problem (1) - (3):

$$L(x,u) = \sum_{i=1}^{N} \upsilon_i(x_i) + u\left(F - \sum_{i=1}^{N} x_i \right) = \sum_{i=1}^{N} \upsilon_i(x_i) - u\sum_{i=1}^{N} x_i + uF \ . \tag{4}$$

If you know u^* - the optimal solution to the problem, dual to (1) - (3), then we can consider its equivalent setting (with concave utility functions):

$$L(x,u^*) \to \max, \tag{5}$$

$$0 \le x_i \le \bar{x}_i , \quad i = \overline{I,N} \tag{6}$$

From problem (5) - (6) we obtain, taking into account (4), N independent subproblems for each individual consumer:

$$\upsilon_i(x_i) - u^* x_i \to \max, \tag{7}$$

$$0 \le x_i \le \bar{x}_i, \quad i = \overline{I,N} \tag{8}$$

Thus, at a known water price u^*, decentralization of the solution to the problem of optimal water use (1) - (3). The same will happen for an arbitrary price u, only the solution obtained in this case will not be the optimal solution to problem (1) - (3).

In fact, the exact optimal solution to the dual problem is unknown. However, it is possible to construct an adaptive determination procedure u^*, based on the use of the current value of the imbalance between the total water consumption $\sum_{i=1}^{N} x_i$ and its available resource F, i.e. magnitudes $\sum_{i=1}^{N} x_i - F$.

The proposed procedure is as follows:

We choose an arbitrary number as u^o an initial approximation. Let us know u^s, $s = 0,1,\ldots$ - the price of water at time s. Based on it, each water consumer determines his needs x_i^s, solving the problem:

$$\upsilon_i(x_i) - u^s x_i \to \max \tag{9}$$

$$0 \le x_i \le \bar{x}_i, \quad i = \overline{I,N} \tag{10}$$

The new price for water u^{s+1} is determined by changing u^s proportionally to the difference between the total demand for water $\sum_{i=1}^{N} x_i^s$ and its supply F, taking into account the mandatory non-negativity u^{s+1}:

$$u^{s=1} = \max\left(0, u^s + \rho_s\left(\sum_{i=1}^{N} x_i^s - F\right)\right), \tag{11}$$

where ρ_s - is some step factor.

It should be noted that $\sum_{i=1}^{N} x_i^s - F$ in (11) is the generalized gradient of the objective function $\varphi(u) = \max\limits_{0 \le x_i \le \bar{x}_i} L(x,u)$, $i = \overline{I,N}$, problem dual to (1) - (3) (under the assumptions made, this function will not be differentiable for those $u = u^s$, when at least one of problems (9) - (10) has more than one optimal solution [11]).

The procedure (11) itself will be the generalized gradient descent method [7] for solving this minimization problem $\varphi(u)$ with limitation $u \ge 0$. Therefore, the choice of the step factor ρ_s can be based on the conditions usual for this method:

$$\rho_s \ge 0, \quad \rho_s \to 0 \quad npu \quad s \to \infty, \quad \sum_{s=0}^{\infty} \rho_s = \infty, \quad \sum_{s=0}^{\infty} \rho_s^2 < \infty.$$

Note that the coordinating body, given the information it has, cannot calculate the value of the function $\varphi(u)$. Therefore, to determine the optimal price u^* numerical methods using such information cannot be applied.

The last condition guarantees the convergence of the sequence $\{u^s\}$ to one of the optimal solutions u^* of the problem dual to (1) - (3). Without this condition, one can only assert the convergence $\{u^*\}$ any sequence from $\{x^s\}$.

As already noted, u^* can be interpreted as the optimal payment for water, a x_i^s - as the demand for water of the i-th country at a price u^s. Therefore, relation (11) is a difference analogue of the Walras equation, which describes the price dynamics in a competitive market and the procedure for forming the optimal (i.e. equilibrium) price.

Thus, the stated algorithm imitates the market pricing procedure for the "common resource" - water.

If in model (1) - (3) x_i - is not a scalar, but an m-dimensional nonnegative vector, then instead of problem (9) - (10) the subproblem will be considered:

$$\upsilon_i(x_i) - u^s \sum_{j=1}^{m} x_{ij} \to \max \tag{12}$$

$$x_i \in X_i, \quad i = \overline{1,N} \tag{13}$$

where $x_i = (x_{i1}, \ldots, x_{im})$, $i = \overline{1,N}$, X_i - range of valid values.

Note that in fact, in the process of water use, a part of the water is polluted and its composition deteriorates due to discharges. Therefore, it is necessary to build a model that takes these factors into account. In such a model of the objective function (1) and constraints (2) - (3), constraints will be added

$$\sum_{i=1}^{N} q_i^k(x_i) \le Q_k, \quad i = \overline{1,N}, \quad k = \overline{I,K}, \tag{14}$$

where $q_i^k(x_i)$- the relationship between the volume of water consumption and the increase in the concentration of the k-th pollutant in water, Q_k - maximum permissible concentration in water of the k-th pollutant, K - the number of pollutants taken into account. In this case, along with the water price u, a tax should be introduced w_k, which is imposed on the unit of the k-th pollutant discharged into the water. The adaptive process for water pricing and taxation of discharged pollutants will take the following form.

We choose arbitrary u^o and w_k^o, $k = \overline{I,K}$. Let's describe the construction procedure u^{s+1} and w_k^{s+1}, by well-known u^s and w_k^s, $s = 0, I \ldots$, $k = \overline{I,K}$. For this:

1) optimal structure of water use x_i^s is determined independently by each consumer from the condition of the maximum of his profit:

$$\upsilon_i(x_i) - u^s x_i - \sum_{k=1}^{K} w_k^s q_i^k(x_i) \to \max,$$

$$0 \le x_i \le \bar{x}_i, \quad i = \overline{I,N}$$

2) new price u^{s+1} on water is determined according to the condition

$$u^{s+1} = \max\left(0, u^s + \rho_s\left(\sum_{i=1}^{N} x_i^s - F\right)\right); \quad (15)$$

3) new rates w_k^{s+1} taxes for water pollution are calculated by the formula:

$$w_k^{s+1} = \max\left(0, w_k^s + \rho_s\left(\sum_{i=1}^{N} q_i^k(x_i) - Q_k\right)\right), \quad k = \overline{I,K} \quad (16)$$

The convergence conditions for this algorithm are similar to those previously considered. Additionally, convexity of functions is required $q_i^k(x_i)$ and the existence of an interior point of the set defined by constraints (14).

Note that the procedure for determining water prices and pollution charges can be organized as follows. According to the data created in the basins of the Syrdarya and Amu Darya rivers, interstate monitoring will periodically determine the volume of water use and water pollution in each of the countries. Then, the value of water prices and pollution charges will be adjusted according to procedure (15) - (16). The funds received from such payments will be used to finance interstate programs to improve the environmental situation in the region.

Naturally, the direct application of such an adaptive quasi-market procedure can take a significant amount of time to obtain a close optimal price. Therefore, it is of interest to consider the following procedure for negotiating the price of water and payment for its pollution, the model of which is the above algorithms.

Before the start of negotiations, a certain "Agency" is created, authorized to set the price and the amount of taxes. Such "Agency", in particular, can be the Interstate Commission for Water Coordination (ICWC). Member countries are considered as water consumers. The negotiations are organized as follows.

"Agency" reports the current price for water u^s and tax rates for its pollution w_k^s. After that, consumers, independently of each other, determine and report to the agency the optimal levels of water consumption x_i^s. With the participation of representatives of the "Agency" they also calculate the expected volumes $q_i^k(x_i^s)$, associated with this water pollution. "Agency" aggregates the incoming information, calculating the values

$$\sum_{i=1}^{N} x_i^s - F \quad \text{и} \quad \sum_{i=1}^{N} q_i^k(x_i) - Q_k, \quad k = \overline{I,K}.$$

After that, in the "Agency" according to the formulas (15) - (16) new values of the payment for water are calculated u^{s+1} and environmental tax rates w_k^{s+1}. Note that such negotiations are easy to organize using a network of computers connecting the Agency with consumers. At the same time, the "Agency" will initially only have information about the aggregated standards F and Q_k, function data $\upsilon_i(x)$ and $q_i^k(x_i)$ remain at the disposal of consumers. Value information x_i^s and $q_i^k(x_i^s)$ comes from consumers directly to the central processor of the network, where aggregated values are calculated $\sum_{i=1}^{N} x_i^s$ and $\sum_{i=1}^{N} q_i^k(x_i)$. This will prevent the disclosure of information that is confidential to each consumer. Compared to the previously considered pricing procedure through monitoring data, such negotiations are beneficial to consumers also because this eliminates the negative impact on their economy of high non-optimal prices set at the intermediate stages of the pricing procedure.

Thus, on the basis of these models, centralized iterative procedures for setting water use charges and environmental charges for water pollution have been proposed. Conditions for the convergence of such procedures to equilibrium prices are determined.

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Rezyume: *Ushbu maqolada davlatlararo suvdan foydalanish uchun to‘lovlarni shakllantirishning matematik modellarini va ekologik to‘lovlarning normativlarini ishlab chikish masalalari va shuningdek davlatlar -aro suvdan foydalanish masalalarini yechish usullari qaralgan.*

Резюме: *В настоящей статье рассматриваются вопросы разработки математических моделей формирования платы за водопользование и нормативов экологических платежей, а также методы решения задачи межгосударственного водопользования.*

Kalit so'zlar: *matematik model, usul, narx, suv resurslari, ikkilamchi muammo, ekologik to'lovlar, algoritm, konvergentsiya.*

Ключевые слова: *математическая модель, метод, цена, водные ресурсы, двойная задача, экологические платежи, алгоритм, сходимость*

TO ORDERING THE INCOMING AND OUTGOING PARAMETERS OF AN OBJECT

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Summary. *The issues of identifying the most important properties of an object with the help of methods of simple ranking, direct and pairwise ranking are studied. The problem of ordering the input and output parameters of an object using the method of expert assessments is investigated.*

Keywords: *of simple ranking, direct and pairwise ranking.*

There are many processes and events today that do not have quantitative characteristics to describe them, or they change rapidly. Mathematical models also use the relationships between input and output variables derived from different considerations. In cases where it is not possible to substantiate the results of experiments or tests and to evaluate the results of decisions made, the method of expert evaluation is used to study the nature of the process or event [1]. The complexity of the formation of the research object or the lack of complete information about the nature of the object requires the use of expert systems. The examination process, on the other hand, involves the identification of a hypothesis that is true on the basis of an overall assessment by each expert from among the predicted hypotheses presented (based on selected factors). As a result, the factor or indicators that significantly affect the object are regulated [2].

The purpose of this article is to study the criteria for regulating the input and output parameters of the object under study using the method of experts.

Processing of experimental or test results.

If it is not possible or appropriate to assess the performance of the objects directly, then the coloring method can be used. The coloring process indicates which of the objects being studied is important. The following methods of coloring are widely used in practice [3,4]:

simple coloring;

direct staining;

pairwise comparison, etc.

The simple staining method is based on arranging objects in ascending or descending order according to their characteristic factors, indicators and traits. In painting, the expert assigns a natural number to each object in order, that is, each object is colored based on its properties. The number of colors is equal to the number of sorted objects. If an object is being studied in N, the color of the most influential object by its nature is denoted as 1, and the color of the least influential object is denoted by N. The value of an object's color actually represents its number in an ordered row of colors. For example, if the row of colors is 1,3,5,7,7,10, the color corresponding to 5 numbers is equal to 3. In some cases, as a result of the expert giving the same color to several objects, the number of objects, which are differentiated by the number of colors, remains the same. In such cases, objects are given standardized colors. In this case, the number of standardized colors is assumed to be n. Objects with the same color are assigned an XS standardized color. The value of a standardized color is equal to the arithmetic mean of the places of objects of the same rank by color. For example, in the table below, five objects (factors) are given the colors x_i (i = 1,..., 5) according to Table 1.

Table 1. Assign colors to objects.

i	1	2	3	4	5
X_i	1	2	3	2	3

The standardized color of the second and fourth objects, which correspond to the second and third places in terms of color, is $X_S = (2 + 3) / 2 = 2,5$. The standardized color of the fourth and fifth

objects, corresponding to the fourth and fifth places in terms of color, is $X_S = (4 + 5) / 2 = 4.5$. As a result, the final view of the object is shown in Table 2 below.

Table 2. Using standardized colors, reassignment of ranks to objects.

i	1	2	3	4	5
x_i	1	2,5	4,5	2,5	4,5

The set of colors obtained by coloring n objects $X_S(n)$ is defined as follows:

$$X_S(n) = \sum_{i=1}^{n} x_i = \frac{n(n+1)}{2}$$

where x_i is the rank corresponding to the i-th object. In fact, applying this formula to Table2,we can be sure that $X_S(5)=5(5+1)/2=(1+2.5+4.5+2.5+4.5)=15$

If the staining is performed by an expert in k, then the color of each object x_{ij} $\left(i=\overline{1,n};\ j=\overline{1,k}\right)$is determined as the final color by the colors determined by all experts. The object with the smallest set of colors is given the highest (first) color, otherwise the lowest n colors are given. The rest of the objects are arranged in the order of growth of the sum of colors relative to the first object. The main advantage of the method of painting is explained by its easy implementation. The main disadvantages of this method are:

-coloring a small number of small objects, because if their number exceeds

15-20, it is difficult to color them;

-In this way, the question of how important the objects under study differ from each other in importance remains unresolved.

Direct staining method. This method is based on qualitatively describing the degree of significance of the process or factors when it is difficult to quantify them. In this way, the expert uses his own scale to color the objects in the proposed range of colors. When the number of objects is large, it is difficult to use the direct staining method.

Pair comparison method. This method of coloring is convenient when the number of objects is large. Based on this method, objects are compared in pairs to determine which is more important than each pair of objects. To do this, if the number of objects is n, the expert elements x_{ij} form a square matrix of dimension $n*n$. The elements of the matrix assume the following values:

if the i-th object is more important than the j-th object $x_{ij} = 1$;

if the j-th object is more important than the i-th object $x_{ij} = 0$.

Suppose that objects O_1, O_2, O_3, O_4 and O_5 are required to be painted by an expert. In this case, the expert can construct the following matrix:

Table 3. Pair comparison matrix.

	O_1	O_2	O_3	O_4	O_5	Total color
O_1	0	0	1	1	0	2
O_2	1	0	1	1	0	3
O_3	0	0	0	0	1	1
O_4	0	0	1	0	1	2
O_5	1	1	0	0	0	2

As you can see from the table, the most important object here is the O_2 object, the most insignificant object is the O_3 object. Taking into account the relative importance of the remaining O_1, O_3 and O_4 objects, the order of the objects can be arranged as follows:

O_2, O_5, O_1, O_4, O_3.

Assess the consistency of expert assessments.

The results of any expert are not convincing.Indeed, if the conclusions of the experts differ sharply (for example, if half of the experts are the first color for the factor x_i,and the color of the remaining experts is the last color), then the consensus criterion is used.The criterion for evaluating

the results of any expert is called the consensus criterion (or indicator).The higher the coherence of the experts,the higher the confidence in the results of the expert evaluation [4].

There is a need to quantify the degree of coherence of experts and to explain the inconsistency of expert opinions [5]. The measure of conformity is determined on the basis of statistics available to all experts. If the conclusions of the experts do not differ much, then the level of agreement of the experts can be considered good.

The purpose of assessing the consistency of an expert's opinion is to identify a group of experts who agree with each other. The high final agreement of all groups of experts can be the only final assessment. It is necessary to separate a subgroup of experts with a high degree of consensus from a group of experts with a low level of consensus, and to analyze the work of the group's experts in order to determine the reasons for differences in the views of this subgroup. If the reason for the difference of opinion of the experts is the dishonesty of some of them, then it is necessary to reorganize the expert assessment.

Each expert has his own personal assessment, but the agreement factor can be used to verify the final result of the group of experts. The concordance coefficient is used to assess the coherence of the opinions of experts. This coefficient was introduced by Maurice George Kendall, a well-known statistician in the United Kingdom [4].

Suppose that m requires an expert to evaluate n an object. In this case, the coloring matrix is measured in $m*n \parallel r_{ij} \parallel (j=1,\ldots, m;\ i = 1,\ldots, n)$. Here r_{ij} is the rank assigned to the i-th object by the j-th expert. The values of the elements of the matrix are equal to one of the natural numbers $1,\ldots, n$ set by the experts, indicating the importance of the objects.

$$r_i = \sum_{j=1}^{m} r_{ij}, \quad (i = 1, 2, \ldots, n)$$

The total color of the object's significance can be defined as the sum of the colors on each column of the matrix:

$$r_1 < r_2 < \cdots r_{n-1} < r_n.$$

The color of this collection shows the importance of the objects in the assessment of all experts. The result is a sequence of n objects arranged as follows:

Given that r_i quantities are random quantities, we determine their variance estimates. According to the requirement of the minimum standard error, the variance estimate can be determined as follows:

$$D = \frac{1}{n-1}\sum_{i=1}^{m}(r_i - \bar{r})^2, \qquad (1)$$

where $\bar{r} = \frac{1}{n}\sum_{i=1}^{n} r_i$ is determined by the formula and represents the mathematical expectation.

The coefficient of coherence is an immeasurable quantity and is defined as the variance relative to the maximum variance as follows:

$$W = \frac{D}{D_{max}}. \qquad (2)$$

determined by The maximum value of the variance estimate, depending on the number of objects and experts, is determined by the following equation:

$$D_{max} = \frac{m^2(n^3-n)}{12(n-1)} = \frac{m^2(n^2+1)}{12}. \qquad (3)$$

Using the notation $S=\sum_{i=1}^{n}(r_i - \bar{r})^2$, Equation (1) can be expressed as follows:

$$D = \frac{S}{n-1}. \qquad (4)$$

Considering equations (3) and (4), the coefficient of agreement is expressed as follows:

$$W = \frac{12\,S}{m^2(n^3-n)} \qquad (5)$$

Equivalent objects are usually given the same colors, and such colors are called linked colors. The values of the linked colors are equal to the arithmetic mean of the colors. If there are bound colors in the staining, then the maximum value of the variance decreases and the coefficient of concordance is determined by the following relationship:

$$W = \frac{12\,S}{m^2(n^3-n)-m\sum_{j=1}^{m} T_j}. \qquad (5)$$

In formula (5), the color index associated with the *j*-th rank is denoted by T_j. In turn, the value of this indicator is found in the following formula:

$$T_j = \sum_{k=1}^{H_j}(h_k^3 - h_k).$$

Here H_j - *j* is the number of groups with the same color as the color, and h_k -*j* is the number of colors with the same color in the k group.

In conclusion, it should be noted that the agreement coefficient takes values between 0 and 1. The fact that the value of the agreement coefficient is close to 0 means that the agreement is low. If the value of the coefficient is less than 0.3, it means that the opinions of the experts do not agree with each other, that is, there is no consensus. Also, the values of the coefficient of agreement between 0.3 and 0.7 and greater than 0.7 correspond to the average and high agreement, respectively. In the case of $W = 1$, the experts agree.

When arranging the parameters by the method of expert evaluation, all input and output parameters are determined. These input and output parameters must be sufficiently studied. Otherwise, their use in the model will not be effective.

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Rezyume: *Oddiy ranglash, bevosita ranglash va juftlab taqqoslash usullari yordamida ob'ektning eng muhim xususiyatlarini aniqlash masalasi o'rganilgan. Ob'ektning kiruvchi va chiquvchi parametrlarini ekspertlarning baholash usuli yordamida tartibga solish masalasi tadqiq qilingan.*

Резюме: *Изучены вопросы выявления наиболее важных свойств объекта с помошью методов простого ранжирования, непосредственного и парного ранжирования. Исследована задача упорядочивания входящих и выходящих параметров объекта с помощью метода экспертных оценок.*

Kalit so'zlar: *oddiy reyting, to'g'ridan -to'g'ri va juftlik bo'yicha.*

Ключевые слова: *простого ранжирования, прямого и попарного ранжирования.*

MICROELEMENTS CONTAINING IN ROCK OF THE ARAL REGION

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Summary: *Contents of microelements in rock of the Aral region was studied basing on the multielement instrumental neutron activation analysis (MIAA). Calculation of Clark concentration (CC) of different elements and comparison of different kinds of rock show, that soils explored in agriculture are impoverished with nutritious elements K, Sc, Cr, Mn, Co, Ni, Cu, Rb, Sr, Cs and several rare earth elements. Clay, bentonit, mixed ground, glouconit, phosphorit, chalk are proved to be effective for melioration of soil because of their contents being more than 5 times enriched with the microelements (K, P etc) than the soils expolored in agriculture.*

Key words: *Aral region, chemical composition, neutron-activation analysis, mixed ground, glouconit, region of the ecological disaster, intensity, coefficient.*

INTRODUCTION.

Lately chemization of agricultur has been done not only by mineral nutrification and pesticides but also by melioration with rocks and indusrrial waste [1,2]. However, increase in soil fertility and the related efficiency of production requires systematic control and analysis of the chemization so as not to disturb the existing balance in ecosystem. The experiment on bringing mountion rocks up 30ton/hecttar in soil shows that the eocks has variable element contents (up a few orders of value) [2,3] and under this condition the soil may be poisoned with undesirable toxic elements.

Thus, it becomes actual to analyse the total element contents of soil and the inserted meliorants (rocks and other resources available in the region) used in agroculture production. Besides, the obtained information about element contents of mountain rocks allows to solve not only geochemical problems but also to evaluate soil formation process. Choose of a mountain rockhaving soil. Lack of microelements in soil can be made up by fitting optimal doses of meliorants consisting of mineral (NPK) and local fertilizers, mountain rocks or indusrtial waste.

We proved earlier, that the soils of cotton plantiog area of Uzbekistan are exhousted with the nutrious elements (Co, Fe, Zn, Cu, Mn, Mo, Rb, Cs, K and rareer P). Besides, the soil are polluted with As, Sb, Br, U, Th, REE and the Republics [4]. Owing to pollution of the region soil with tixic elements, deficit of the nutritious in the environment, one can expect progressing of several diseases (sick ratr) in the population. Relating to the updeate agri-state of the soil of cotton planting region of Karakalpakstan, one can observe similar agrogeochemical prosecces complicated by a sharp accumulation on Na and Cl in subsurface lauers of the soil [5].

On the territory of the South Asral at different depths of many chinks and paleogenic terrigenic thicks being opened in hills of Krantau, Khoja-Kul, Beshtube, Khojeily and also in the South-East Sultanuezdag, there are mountion rocks rich in not only macro- but also in microelements. Not deeping into details of the formed agrogeochemical sutuation in The Aral area,in some cases it is necessary to carry out urgent agrogeochemical intervention for improving the stae of the soils, especially sour and ensalted. For this purpose we selected samples of rocks from Bozatau, Amu-darja, Karauzyak, Nukus regions and the Lazarev island (the midst of the Aral sea), beltau and Sultanuezdag. The samles were dried till the steady state weight, milled till powder state (0,5-1 mesh), then an averaged schedule in the thermal column (channel) of the Reactor WWR-SM with the flux of 5 10^{13} neutr/cm^{2}s. Determining elements was carried out over short-, medium- and long-living radionuclides [4]. The results of the analysis of several rocks are listed in Table 1 together with values of CC [8] and mean arithmetic quantities of several elements in soil.

Table 1.

Concentration of several chenical elements in the roks of Karakalpakstan, mg/kg.

Elements	Porlytau chalk	Kujakul caolinandy	The Laserev iziand sandy rock	Beltau bentonit	Glay	Mixed ground	Krantau glawconit	Phosphorit
Na%	0,35	0,90	0,06	1,53	1,74	1,34	1,12	0,38
Cl	2,20	1,12	-	7,7	12,9	1,16	2,2	-
K%	-	2,65	-	2,2	2,84	1,5	4,3	0,7
Sc	2,6	4,01	0,46	1,6	13,1	11,0	6,8	0,91
Cr	16,0	18,6	10,4	75	62,3	77,3	23,5	23,4
Mn	1256	30,3	49,3	488	177	657	330	2342
Fe%	0,30	0,6	0,08	2,2	2,3	1,9	2,3	0,4
Co	2,7	1,8	0,3	9,4	6,7	10,7	8,4	4,02
Cu	37,5	-	38,2	49	54	25	32,3	-
Zn	41,5	78,1	13,5	288	392	285	121	17,6
As	-	-	-	10	-	-	11,2	18,4
Rb	13,8	65	4,9	77	106	43	75	10
Sr	507	-	873	-	-	140	-	506
Sb	-	-	-	1,7	1,4	2,2	1,5	1,4
Cs	0,7	2,03	0,33	6	6	3,7	2,8	0,44
Ba	-	516	377	452	123	326	292	14,5
La	19,9	19,2	3,3	24,4	21,1	40,0	24,5	18,0
Ce	15,4	30	4,2	39	28	54	42,6	27,9
Sm	3,4	2,7	0,46	2,8	2,3	3,8	4,4	0,67
Eu	1,0	0,72	-	1,2	1,43	1,5	1,4	0,64
Tb	0,55	0,3	0,11	0,3	0,3	0,36	0,45	0,25
Yb	2,5	1,57	-	2,0	2,0	1	1,72	2,0
Lu	0,26	0,15	0,10	0,20	0,32	0,28	0,19	0,14
Hf	-	1,85	0,21	3,4	2,96	3,77	3,33	0,31
Ta	0,17	0,30	-	0,67	0,5	0,4	0,36	-
Au	-	-	-	0,01	-	-	-	-
Th	0,56	3,7	0,5	9,1	8,7	8,2	4,2	0,57
U	0,6	0,7	0,64	4,5	4,9	2,13	1,8	14,2

According to CC values, contents of chemical elements in soils varies on the scheme: Hg-Ag-Se-Br-Yb-As-Hf-Sb-Ca-Zn-Au-Mo-Cr-Ce-U-Sc-Cl-Eu-Cu-Sr-La-Na-K-Ba-Co-Mn-Rb-Lu-Sm-Fe-Ce-Ta-Ni-Tb.This descending row for the soils of Karakalpakstan characterizes in some degree the biochemical mobility of chemical elements in ecosystem and shows, that the soils of the main cotton planting regions of Karakalpakstan are impowerished (CC<1) with K, Sc Cr, Mn, Co, Fe, Ni, Cu, Rb, Sr, Cs, Ba, R (except Yb), Th and U. This statement is reliable when considering the distribution of these elements over the whole Republics. CC>1 means technogenical pollution of the cotton planted soil with Zn, Se, Br, Ag (CC=71), Sb As, Hf, Yb, Au, Hg. Such a situation is propably related not only to domination cotton plant, but also to erosion of soil, because there are traces of this process in many places. Significant accumulation of heavy metals in the soil (up to 70times of the clark) of several regions csn be explained by their proximity to gold containing ores, for examples Bel-Tau and Sultanuezdag [6].

Mean content of Na and Cl in the soils of the Republics are much less than CC, and Muynak, Kegrylin and Chimbay region they are 2.2 times more than CC. Technogenic pollution with Na and K results from airsole particles transfer from the Aral Sea aquatory. It is well known that in Karakalpakstan agricultural crop capacity is decreasing now and the process is directly

related to the change in element contents of the soils, which in turn depend directly on composition of substrate rocks [7].

Let us analyze briefly microelement composition of the rocks and the soils of cotton planted regions of Karakalpakstan. (table 2).

Porlytay chalk. Microelement contents and the concentration coefficient (relating to the earth crust clark) demonstrate its enrichment with Cl, Mn, Sr, and Yb and also (CC<1) Cu, Zn and REE. On sum CC_{mean}=1,27 the chalk is rich of microelements. A high concentration of Cl is propably due to proximity to underground water and airsole pollution of the soils.

Sandstone. We studied Kozhakul caolin sandstone (Amu-Darja region) and that of the Lazar island (the midst of the Aral Sea). The both are less rich of microelements than the chalk. The sum element contents on CC_m is 0,93 and 0,27 respectively. Caolin containing sandstone is rich in K (CC>1) and Hf, and that of the Lazarev island is rich in Sr.

Bentonit. These soil forming rocks are rich in microelements (CC_m<1) and occur in many regions of Uzbecistsn including Rarakalpakstan. Maximal CC_m=3,1 are found for Sc, Cu, Zn, Sb. Cs, Hf, U, As, Yb, Au and less (CC_m<1) for Cl. Contents of Cr, K, La and Eu is on a clark level.

Clay. It has complex element composition and enriched with K, Sc, Cu, Zn, Sb, Cs, Eu, Hf, U, Yb (CC>1). The concentration of these elements in the clay higher than both the clark of the earth crust and that of the regional background (up 2 times for several elements). The concentration of As is especially high, and thar of Na is close to the clark. Such a tendency occurs in the clays selected in North regions of Karakalpakstan. The clays contion a low concentration of Mn, Ba, Ce, Sm, Tb, La, Ta and several other elements. The value of CC_m is 1.29 not taking into account the CC_{Cl}.

Mixed ground is rich in Sc, Zn, Sb, Cs, La, Eu, Hf (CC>1). Concentrations of Th and U in it are much less than the clarks of the earth crust. The value of CC_m is 1,44 including Cl and 1,12 concentrations however it is much higher than the mean contents in the regional soil.

Table 2.

According to CC values, contents of chemical elements in soils varies on the scheme of Karakalpakstan (mg/kg).

Elements	Porlytau chalk	Kujakul caolin andy	The Laserev iziand sandy rock	Beltau bentonit	Beltau bentonit.	Mixed ground	Krantau glawconit	Phosphorit
Na%	0,44	0,36	0,03	0,61	0,70	0,54	0,45	0,15
Cl	0,13	0,007	-	0,05	0,08	0,007	0,12	-
K%	-	1,10	-	0,88	01,14	1,50	4,30	0,70
Sc	0,26	0,40	0,046	1,16	1,31	1,10	0,64	0,09
Cr	0,19	0,22	0,13	0,90	0,75	0,93	0,28	0,28
Mn	1,26	0,03	0,05	0,48	0,18	0,66	0,33	2,34
Fe%	0,07	0,13	0,02	0,47	0,49	0,41	0,50	0,22
Co	0,15	0,09	0,02	0,52	0,40	0,59	0,47	-
Cu	0,78	-	0,81	1,04	1,15	0,52	0,69	-
Zn	0,50	0,94	0,16	3,46	4,72	3,41	1,46	0,21
As	-	-	-	10,0	-	-	6,57	10,8
Rb	0,09	0,43	0,03	0,51	0,70	0,32	-	1,49
Sr	1,49	-	2,56	-	-	0,41	-	1,49
Sb	-	-	-	3,40	2,70	4,40	3,0	2,78
Cs	1,18	0,54	0,09	1,60	1,62	1,0	0,75	0,11
Ba	-	0.79	0.58	0.69	0.18	0.50	0.45	0.22
La	0,68	0,66	0,11	0,84	0,72	1,36	0,84	0,61

Ce	0,22	0,34	0,05	0,55	0,40	0,77	0,61	0,39
Sm	0,42	0,34	0,06	0,35	0,29	0,47	0,55	0,08
Eu	0.76	0.55	-	0.92	1.1	1.16	1.10	0.48
Tb	0,13	0,07	0,03	0,07	0,06	0,13	0,10	0,06
Yb	7,6	4,80	-	6,0	6,10	3,0	5,21	2,7
Lu	0,33	0,18	0,12	0,24	0,39	0,34	0,22	0,17
Hf	-	1,85	0,21	3,4	2,96	3,77	3,33	2,31
Ta	0,07	0,12	-	0,27	0,20	0,15	0,14	-
Au	-	-	-	2,61	-	-	-	-
Th	0,04	0,28	0,04	0,51	0,66	0,62	0,24	0,04
U	0,24	0,30	0,25	1,8	1,90	0,85	0,72	5,70

Krantau glowconit contains a great deal K, P, Zn, As, Sb, Eu, Yb, Hf with the of CC_m=1,65. So it can be used as a meliorant for inserting into soil, especially in the cases of scarcity varies within the limits of 2,0 – 7,7 wt.% and 80 – 180 mg/kg respectively. One can find Cl, Cu, Cs, La, Ce, U in noticeable amounys. Not taking into consideration the CC of Cl polluting the region, the CC_m=1,23 which is much higher than CC of the soil (CC_m=1,33).

Phosphorites. There is deposit of phosphorites on the territory of Karakalpakstan, which contains P2O5 up 40-45 %, the mean arphmetic value is 27wt. %. Besides P, there is a gread amount of Mn (Q=2342,0 mg/kg), As (Q=1,4mg/kg), Sr (Q=506,0 mg/kg), U (Q=14,2 mg/kg) and REE. The phos horites are very rich in microelements. Not traking into account P, the mean clark is 1,22.

Inserting meloirants improves physical-chemical properties of soils, increases water-atorage and ensures a high cation exchange in soil. But, the exploration of several natural ores or rocks together with local and mineral fertilizers for improving soil is accompanied by a number of doses and periods of inserting, also taking into account factors of distribution of several elements and mineral composition and mechanical state of meliorants.

Often after exploring soil for agriculture for a long time, when agrochemical standards are not fulfilled, there occur exhaustion of the soil with main nutritious elements, change in pair elements' ration and their associations, pollution with toxic metals, all resulting in crop's yield drop. That is why the task to recover nutritious element composition of soils becomes omportant and actual. The chalk, clay, bentonit, glowconit and phosphorit selected in Karakalpakstan are rich not only in microelements, but also in P and K. The highest value of CC=3,1 is assighned to the bentonit of Beltau and the C_m changes in the descending sequence: clay (1,29), chalk (1,27), glawconit (1,23), phosphorit (1,22) mixed ground (1,12), sandy rock (0,93 and0,27) (see Tabl.1).

As regarding to the composition of soils of Karakalpakstan, it is exhausted significantly with all the microelements (Tabl.1). The concentration clarc of CC_m=0,77. The data on As and Sb were taken off, because the soil of main cotton planting area of Karakalpakstan are polluted with these elements. Perhaps, the high concentration of Cl in all the analysed probes is due not only to Cl transfer by dust and airsole, but also to elevation of underground water level in the area.

The studied rocks, especially bentonites, glawconites and clay, because of a higher concentration of several elements in them, can be used widely for melioration of the soils of Karakalpakstan (see Tabl.2). Concentration of majority of chenical elements in rocks is higher than ther in the soils of cotton planting area. Average, after inserting 1 ton of rock in 1 hectar of soil, the plants get up 30 kg K, 10 kg P, 10 kg of other elements. So using cheap natural resources, such as the clay, the bentonit, the glawconit, the phosphorit etc, allows to improve significantly the structure of the soils of cotton planting area of Karakalpakstan, and also enriches its microelement composition 1,1-5 times.

Conclusion:

1. Basing on the instrumental neutron activation analysis, the microelement composition of the rocks of Karakalpakstan has been studied.

2. Clay, bentonit, mixed ground, glawconit, phosphorit and chik, which are rich in microelements, K and P, 5 times as compared to the soil, are effective melioranfs.

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Rezyume: *Orol bo'yi tog' jinslarining mikroelemenlik tarkibi ko'p elementli neytronlar faollashtirish tahlili asosida o'rganildi. Turli xil elementlarning Klark konsentratsiyasini hisoblab va har xil tog' jinslarining taqqoslash shuni ko'rastadiki, qishloq xo'jaligida o'rganilgan tuproqlar K, Sc, Cr, Mn, Co, Ni, Cu, Rb, Sr, Cs va bir nechta noyaob tuproq elimentlari bilan to'yinadi. Loy, bentonit, aralash tuproq, plyukonit, fosforit, bor tuproqlarning meliorativ holatini yaxshilash uchun samarali ekanligi isbotlangan, chunki ularning tarkibi qishloq xo'jaligida ishlatiladigan tuproqlarga qaraganda 5 marta ko'proq miroelementlari (K, R va boshq.) bilan boyitilgan.*

Резюме: *Содержание микроэлементов в породе Приаралья было изучено на основе многоэлементного инструментального нейтронно-активационного анализа (МИАА). Расчет концентрации Кларка (СС) различных элементов и сравнение различных видов горных пород показывают, что почвы, исследуемые в сельском хозяйстве, обеднены питательными элементами K, Sc, Cr, Mn, Co, Ni, Cu, Rb, Sr, Cs и несколькими редкоземельные элементы. Доказано, что глина, бентонит, смешанный грунт, глауконит, фосфорит, мел эффективны для мелиорации почвы, поскольку их содержание более чем в 5 раз обогащено микроэлементами (K, P и т. Д.), чем почвы, используемые в сельском хозяйстве.*

Kalit so'zlar: *Orol mintaqasi, kimyoviy tarkibi, neytron-aktivatsiyali tahlil,aralash tuproq, glokonit, ekologik ofat mintaqasi, intensivligi, koyeffitsiyent.*

Ключевые слова: *Аральский регион, химический состав, нейтронно-активационный анализ, смешанный грунт, глуконит, район экологической катастрофы, интенсивность, коэффициент.*

ANALYSIS OF THE LIGHT-VOLTAGE CHARACTERISTICS OF A SOLAR CELL WITH NANO-DIMENSIONAL HETERO TRANSITIONS

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Summary: *The optimal ratios of the parameters of a solar cell with nano-dimensional hetero transitions that provide maximum power efficiency are determined. It follows from the obtained relations that a solar cell with nano-dimensional hetero transitions can be constructed in such a way that its efficiency will always have the required high level. It is shown that such a controlled situation is possible in relation to a solar cell with nano-dimensional p-n transitions created due to the phenomenon of self-organization on a substrate made of technical silicon.*

Key words: *Equivalent circuit, light current, converter, voltage characteristic.*

Introduction. The paper analyzes the efficiency of a solar cell with nano-dimensional hetero junctions (SE with NDHJ), based on its light-voltage characteristic (VAC). A special feature of the research is that nano-dimensional hetero transitions are created on the surface of a substrate made of technical silicon. Usually, this modification of silicon is practically not used to convert solar radiation into electricity. However, in our previous works:[1-7]

- the choice of technical silicon (after additional nano-technological impact) as a substrate of a solar cell is justified in detail,
- the technology of creating hetero contact structures on its surface is considered,
- the requirements for contacting materials are defined,
- the conditions under which the efficiency of a solar cell with nano-dimensional hetero transitions will be commensurate with the efficiency of traditional solar cells based on a crystalline modification of silicon are estimated.

A solar cell with nano-dimensional hetero transitions is able to significantly improve the process of converting solar radiation into electricity, since the transformation is carried out by nanoscale hetero contact structures that are formed in accordance with the natural phenomenon of self-organization [8-10].

The creation of self-organized nano-sized semiconductor hetero contacts on the surface of a solar cell is realized most successfully if the degree of crystallinity of the contacting materials is close to each other [11].

It was shown in [12] that lead chalcogenides are close to silicon single crystals in their crystal structure and are capable of creating nano-dimensional heterocontact systems on its surface based on the phenomenon of self-organization.

The study of the structure of real homogeneous technical silicon [13] showed the presence in it in small proportions (within one percent) of uniformly distributed nano-sized crystalline areas on the surface.

By the method of molecular beam epitaxy, it is these areas of silicon crystallinity that, due to the manifestation of elastic stresses at the contact boundary of materials, are the centers of the formation of stable nano-dimensional heterocontact structures (so-called "islands" up to several hundred million in one cm^2 [8-11]). In this paper, the transformative properties of a solar cell with nano-dimensional hetero transitions are investigated based on the analysis of its light-voltage characteristic.

Light voltage characteristic. When studying the optical properties of a solar cell with nano-dimensional hetero transitions, each of them is considered as an ideal p-n transition [14-19]. They are located on the surface in a strict staggered order, the equivalent scheme of functioning of which is easy to imagine in the form of a chain of homogeneous photodiodes connected to each other in

parallel. Each of them has an independent "generator" G of the light current I_L. Such effective converters with many p-n transitions are studied in detail in [20-21].

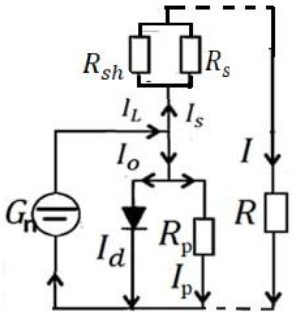

Fig.1. Equivalent scheme of a solar cell with a nanoscale hetero transition.

From the equivalent circuit diagram of the electrical circuit, it can be seen that the light current I_L of a separate photodiode branches into the I_o current that ensures its operation, and into the Is current flowing through the resistance p = $R_sR_{sh}/(R_s + R_{sh})$ external to the contact structure (with subsequent flow to the resistance of the external load R), that is, $I_L = I_s + I_o$.

Here R_s is the resistance of the single-crystal section of the nano-dimensional p-n junction, and R_{sh} is the resistance of the structureless part of the substrate and the contact of the Schottky barrier.

In turn, $I_o = I_d + U_p/R_p$, where U_p/R_p is the current of the diode through the internal parallel resistance R_p, and $I_d = I_{oo}\cdot(e^{\alpha Up} - 1)$ is the diode current. Thus, the light voltage characteristic of each single contact structure on the surface of a solar cell has the form:

$$I_s = I_L - I_d - U_p/R_p \quad (1)$$

Directly on the surface of a thin substrate with a thickness of 100 to 250 microns, n nano-sized contact structures with embedded electrostatic fields are formed at distances of about 1-2 microns from each other (see Figure 2).

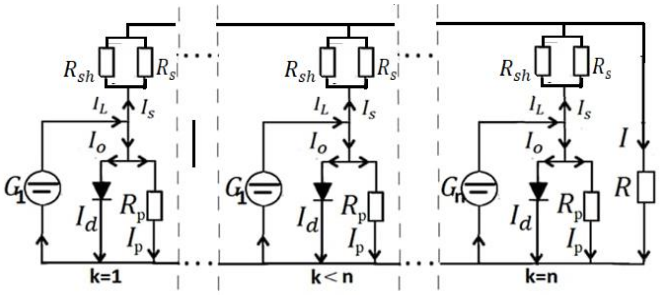

Fig.2. An equivalent scheme of n pieces of solar cells with nanoscale hetero transition.

The current I through the external load R is formed from these n independent and identical microcurrents I_s from each single contact structure, functioning due to an independent source of electromotive force ε (the function of the current generator G). Therefore, it can be represented as an algebraic sum of n independent microcurrents I_s, that is:

$$I = n\cdot I_s. \quad (2)$$

Hence, the current-voltage characteristic of a real solar cell with parallel connected n nano sized p-n transitions will be of the form:

$$I = n\cdot I_s = n\cdot(I_L - I_d - U_p/R_p) \quad (2^*)$$

To obtain relevant and reliable data circuit consisting of conductive regions, should be closed. It can be seen from (2*) that $I = n\cdot I_s$ - the current, as a function of the voltage drop on the diode U_p, decreases from the value of the short - circuit current ($I_{sc} = n\cdot I_L$) to zero when U_p changes from zero to U* - the no-load voltage. Moreover, both values of I_{sc} and U* are easily measured parameters maximum volt-ampere characteristics:

when $U_p = 0$, $I_{sc} = n\cdot I_L$ - short-circuit current is equal to the light current;

when $U_p = U^*$, $I = 0$ - the current through the resistance of the external load is zero, and $I_{sc}/n = I_L = I_d^* + U^*/R_p$.

Knowing the easily measured values U^* and $I_{sc} = n\cdot I_L$, it is possible to estimate from this equality the R_p value of the parallel resistance of the diode part of the equivalent circuit. It is equal to $R_p = U^*/(I_{sc}/n - I_d^*) = U^*/(I_L - I_d^*)$, where $I_d^* = I_{oo}\cdot(e^{\alpha U^*} - 1)$ – is the diode current at the no – load voltage U*, and I_{oo} is its amplitude value.

So, U* and I_{sc} determine the boundary of the change in the parameters of the current-voltage characteristic: the current varies from $I_{sc}=n\cdot I_L$ to zero, and the voltage from zero to U*. Accordingly, the P-power of a solar cell with n independent single nano-dimensional hetero contact

structures is determined by the product of the current current $I = n \cdot I_s$ by the current voltage U_p, that is, $P=I \cdot U_p = n \cdot I_s \cdot U_p$.

To analyze the obtained relations, it is convenient to present them in a normalized form by dividing the current U_p, I and P by the corresponding boundary values U^*, I_{sc} and P. By performing this operation, we obtain a dimensionless normalized voltage characteristic:

$$I/I_{sc} = n \cdot I_s/n \cdot I_L = I_s/I_L = (1- U_p/U_{co}) + I_d^*/I_L \cdot (U_p/U_{co} - I_d/I_d^*) \quad (3)$$

$$P/U^* \cdot I_{sc} = (U_p/U^*) \cdot (I/I_{sc}).$$

For ease of analysis, we introduce some dimensionless coefficients:

$\gamma = I_{oo}/I_L$ $\quad \alpha = e/(A \cdot k \cdot T)$ $\quad \Omega=(1+\gamma)/\gamma$ $\quad a = (e^{\tau} - \Omega)/\Omega > 0$

$\tau = \alpha \cdot U^*$ $\quad e^{\alpha \cdot U^*} = e^{\tau}$ $\quad e^{\alpha \cdot Up} = e^{\tau y}$ $\quad I_L/I_{sc} = I_{sc}/I_{sc} = 1$

$f = I/I_{sc}$ $\quad y = U_p/U^*$ $\quad \Psi = P/U^* \cdot I_{sc} = U_p\, I_s/U^* \cdot I_{sc} = y \cdot f$

With these dimensionless parameters, the dimensionless normalized current-voltage characteristic of a solar cell $I = n \cdot (I_L - I_d - U_p/R_p)$ will now be:

$$f = [\Omega \cdot (1+ay) - e^{\tau y}] \cdot [1/(\Omega - 1)], \quad (4)$$

and the power: $P= I \cdot U_p = U_p \cdot \{I_L \cdot (1- U_p/U_{co}) + I_d^* \cdot (U_p/U_{co} - I_d/I_d^*)\}$ becomes non-dimensional form looks like:

$$\Psi = P/U^* \cdot I_{sc} = y \cdot f = y \cdot [1/(\Omega - 1)] \cdot [\Omega \cdot (1+ay) - e^{y\tau}] \quad (5)$$

The physical meaning of the boundary conditions of the SC with the NDHJ. When deducing (4) and (5), a number of physically justified model requirements are adopted:

- The current through the external load is formed in many parallel connected, independent and single contact structures. Therefore, the current is defined simply as the algebraic sum of identical microcurrents from each cell of an equivalent circuit.
- The experimentally measured parameters of the current-voltage characteristic (short-circuit current, no-load voltage) are considered known and are entered as calculated parameters.
- The current through the external load in the entire voltage range is considered positive.
- The power of the entire electrical circuit of a solar cell with nano-dimensional hetero junctions at boundary parameters is zero.

The power (5), as a function of the voltage $\Psi = \Psi(y)$, increases with the growth of y (voltage) from zero to a certain maximum Ψ_m (at a certain current f_m and voltage U_m). Then it quickly decreases to zero at y=1 (or $U_p = U^*$).

The main indicators of the efficiency of a solar cell are the parameters of the maximum power: f_m, Ψ_m and y_m (or I_m, P_m and U_m). If we find the voltage of this maximum y_m , then by formulas (4) and (5) we find f_m and Ψ_m. The position of the maximum is determined from the condition that dP/dU_p is equal to zero - the first derivative of the solar cell power by the voltage U_p (or in the dimensionless form $d\Psi/dy$). From this equality, we get a transcendental equation that defines the y_m:

$$e^{ym\tau} = \Omega(1+2y_m a)/(1+ \tau \cdot y_m). \quad (6)$$

Solution (6) will allow us to determine $y_m=U_m/U^*$ and with its help, f_m, and Ψ_m (or I_m and P_m,). In an explicit and dimensionless form, the result has the form:

$P_m= I_m \cdot U_m$ $\quad U_m$ $\quad I_m= I_{sc} \cdot (1-U_m/U^*+I_{oo}/I_L \cdot (U_p/U_{co} - I_d/I_d^*))$ (7)

$\Psi_m = f_m \cdot y_m$ $\quad y_m$ $\quad f_m = [y_m\Omega/(\Omega-1)(1+\tau \cdot y_m)][\tau+a\,(\tau \cdot y_m-1)]$

Power solar cell, divided by $I_{sc} \cdot U^*$, determines its the efficiency $\eta = P/(I_{sc} \cdot U^*)$, which in dimensionless form matches the definition of the normalized power and has the form:

$$\eta = y \cdot f = P/(I_{sc} \cdot U^*) = y \cdot [1/(\Omega - 1)] \cdot [\Omega \cdot (1+ay) - e^{y\tau}]$$

At the point of maximum power, the efficiency coefficient in dimensionless form is equal to:

$$\eta_m = [y^2_m\Omega/(\Omega-1)] \cdot [(\tau+a\,(\tau \cdot y_m-1))/(1+\tau \cdot y_m)] \quad (8)$$

Analysis of the results obtained. The analysis of the obtained results shows that the value of the maximum power efficiency is significantly determined by the parameters of a solar cell with nano-dimensional hetero transitions: Ω, τ and the ratio between them.

It follows from the transcendental equation (6) that the left growing exponential part of $e^{ym\tau}$ is equal to the right, asymptotically decreasing part with respect to y_m: $\Omega(1+2y_m a)/(1+\tau \cdot y_m)$. But it

follows from (4) that in the entire range of voltage changes from 0 to U* ($y \leq 1$), the value of the normalized current f must be positive. And this is possible under the condition $e^{\tau y} > \Omega$, which is guaranteed to be fulfilled near the boundary $y \leq 1$. Note that $e^{\tau y}$ and Ω are large numbers in themselves, but they are quite close to each other. Since $\Omega > 1$ and $a = e^{\tau}/\Omega - 1$, the decrease of the right part of (6) is possible for $(1+2y_m a)/(1+\tau \cdot y_m) < 1$. Thus, the combination of the conditions: $e^{\tau y} > \Omega$, $\Omega > 1$, $(1+2y_m a)/(1+\tau \cdot y_m) < 1$ and $2 \cdot a < \tau$, allows us to obtain a relation connecting Ω, τ and y:

$$e^{\tau y} > \Omega > 2e^{\tau}/(2+\tau)$$

It follows from this inequality that the greatest efficiency of a solar cell with nano-dimensional hetero junctions is manifested when

$$\Omega = I_L/I_{oo}+1 \geq 2e^{e\,U^*/(A \cdot k \cdot T)}/(2+e\,U^*/(A \cdot k \cdot T)) = 2e^{\tau}/(2+\tau) \qquad (9)$$

and when the value of the maximum voltage U_m is close to the boundary voltage U*, that is, $U_m \leq U^*$.

It is precisely with the simultaneous fulfillment of inequalities (9) and $U_m \leq U^*$ that it is possible to achieve the maximum value of η_m - the efficiency indicator of a solar cell with nano - dimensional hetero junctions.

We list several combinations of the numbers $\Omega = 1 + I_L/I_{oo}$ and $e^{\tau} = e^{e \cdot U^*/(A \cdot k \cdot T)}$, whose substitution in will give a high efficiency of a solar cell with nano-dimensional hetero junctions. It is only necessary to observe the conditions $e^{\tau} > \Omega$ each time.

(Ω=8 and e^{τ}=10) (Ω=21 and e^{τ}=24) (Ω=51 and e^{τ}=56)

(Ω=101 and e^{τ}=111) (Ω=201 and e^{τ}=203)

Temperature variations or changes in the non-ideality coefficient of the diode A affect the value $\tau = e \cdot U^*/(A \cdot k \cdot T)$. For example, with an increase in $A \cdot k \cdot T$ or due to temperature, or a change in the A - coefficient of imperfection, the type of current-voltage characteristic changes dramatically.

Conclusions. The optimal ratios of the parameters of a solar cell with nano-dimensional hetero junctions that provide the maximum power efficiency are determined.

It follows from the obtained relations that a solar cell with nano-dimensional hetero junctions can be constructed in such a way that its efficiency will always have the required high level.

It is shown that such a controlled situation is possible in relation to a solar cell with nano-dimensional p-n transitions created due to the phenomenon of self-organization on a substrate made of technical silicon. Such solar cells can contribute to improving the efficiency of solar energy, the formation of highly efficient, cheap photovoltaic converters.

Thanks. The authors are grateful to Academician R.A. Zakhidov and professors M.N. Tursunov, K.A. Ismailov for stimulating discussion of the results obtained.

The work was carried out within the framework of two projects of the Fundamental Research Program: FA-F3-004 "Study of fundamental new physical models, mechanisms, methods" and No. BV-F3-005 "Theoretical studies of the parameters of a solar cell and the effects of nano-technological processing of its surface on improving the efficiency of solar energy".

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Rezyume: *Nano o'lchamli getero o'tishli quyosh elementining maksimal quvvatli samaradorligini ta'minlaydigan parametrlarining optimal nisbati aniqlandi.*

Olingan munosabatlardan kelib chiqadiki, nano o'lchamli getero o'tishli quyosh elementi shunday qurilishi mumkinki, uning samaradorligi doim talab qilingan yuqori darajaga ega bo'ladi.

Bunday nazorat qilinadigan holat texnik kremniydan yasalgan taglikda "o'z-o'zini tashkil qilish" orqali hosil qilingan nano o'lchamli p-n o'tishli quyosh elementida bo'lishi mumkinligi ko'rsatildi.

Резюме: *Определены оптимальные соотношения параметров солнечного элемента с нано размерными гетеро переходами обеспечивающие максимальной мощности коэффициент полезного действия.*

Из полученных соотношений следует, что солнечный элемент с нано размерными гетеро переходами можно построить таким образом, что его эффективность будет иметь всегда требуемый высокий уровень.

Показано, что такая управляемая ситуация возможна применительно к солнечному элементу с нано размерными p-n переходами, созданные в силу явления самоорганизации на подложке из технического кремния.

Kalit so'zlar: *Ekvivalent sxema, fototok, turlantirgich, volt-amper xarakteristika.*

Ключевые слова: *Эквивалентная схема, световой ток, преобразователь, вольтамперная характеристика.*

TECHNICAL SCIENCES

MULTI-COMPONENT CONCRETE WITH MICRO-SILICA AND MODIFIED HYDROPHOBIZER

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Summary: *The article represents the results of researches of concrete models using a complex of additives capable of regulating the structure formation of cement stone, while improving the physical, mechanical and operational characteristics of concrete.*

Keywords: *Cement, superplasticizer, microsilica, modifying water repellent, cement stone, modifying additives, frost resistance, additiv.*

The strength of concrete with a constant quality of raw materials depends not only on water and cement (*further*: W/C) value, but also on the composition of modifying additives. The increase in the content of the gel phase is one of the main parameters of the strength of concrete, since the cement gel is characterized by the highest strength of all the structural characteristics of the cement stone [1].

The procedure for the manufacture and testing of models of cubes with an edge of 10 cm was carried out in accordance with State Standard 10180-2012 [2]. Models without additives and with additives of modifiers were tested in parallel. Since the W/C was constant, the change in the strength properties is a consequence of the modification of the structural elements of the cement stone. The arithmetic mean of a series of models was multiplied by a scale factor. When testing the strength characteristics of modified heavy concrete, the results are shown in the table.

Table-1 – compressive strength of models of heavy concrete within 28 days

Modifier	W, MPa	R_{cp}, MPa	S_n, MPa	V, %
28 days				
Without additives	3,15	63,00	2,71	4,42
Superplasticizer (Karakalpak)	2,93	73,00	2,58	3,56
Superplasticizer (Titanium)	2,82	85,00	2,31	2,95
Superplasticizer + Micro Silica (Karakalpak)	3,27	86,00	2,73	3,33
Superplasticizer + Micro silica (Titan)	3,44	91,00	3,015	3,31
Superplasticizer + Micro Silica + Modifying Water Repellent (Karakalpak)	3,30	94,00	2,37	4,80
Superplasticizer + Micro Silica + Modifying Water Repellent (Titan)	3,47	96,00	3,11	4,25

Modification of the concrete structure increases the strength properties at all times of hardening by increasing the content of the weakly crystallized gel-like hydro silicate phase [3]. Water-reducing additives to a lesser extent increase the strength of concrete after one day of hardening, as they exhibit the properties of surfactants. The introduction of active micro silica (further: MS), together with a plasticizer and modifying water repellent (further: MWR), doubles the daily strength. That is, micro silica fume shows the properties of a hardening accelerator already at an early stage of hydration. The increase in the compressive strength of concrete continues with increasing age, and with the introduction of water-reducing additives, an increase in strength is

provided. The maximum increase in strength is provided by the joint introduction of water-reducing and pozzolanic additives, which reaches 95 MPa. The greatest increase in strength with the introduction of plasticizing additives is recorded after three days of hardening, while the use of complexes with silica fume provides the maximum increase in strength after the first day.

Indicators of the microstructure of hydrated phases and their degree of crystallization affect the porosity and water absorption of concrete. Figure-1 shows the change in water absorption of concrete without additives and with additives modifiers at different ages [3,4].

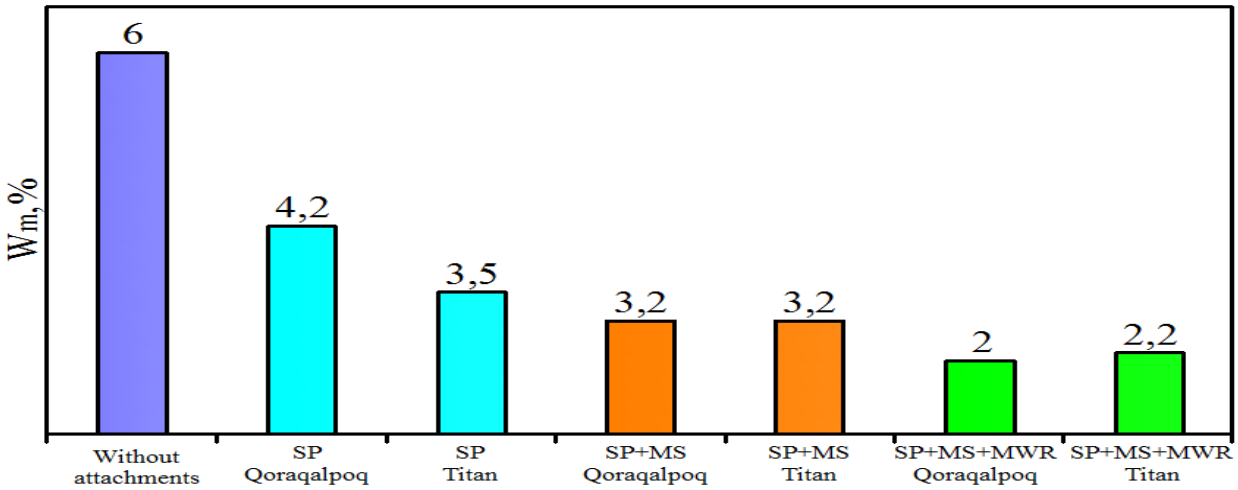


Figure 1 - Results of testing the water absorption of modified concrete within 28 days.

Water absorption characterizes the macrocapillary porosity of concrete. The use of modifying additives reduces water absorption by weight, since the modification changes the nature of the porosity, especially with the introduction of micro silica fume, which, due to the pozzolanization reaction, promotes the formation of predominantly gel porosity.

Plasticizing additives reduce the water absorption of concrete models from 6.0 to 4.2 and 3.8% with the introduction, respectively, of SP, since they contribute to the formation of gel-like hydrated phases of cement stone of increased density. It was found that long-term holding of models under normal conditions, before testing for water absorption, practically does not affect their result, due to the preservation of the microstructure of concrete. As in the strength tests, the modification of concrete with the additions of SP, MWR, MS has the best effect on reducing the amount of water absorption to 2.2%.

Testing concrete resistance to frost aggression were carried out in accordance with State Standard 10060-2012 - manufactured cube models 100 × 100 × 100 mm after 28 days of normal hardening were saturated with 5% NaCl solution and in a vessel with this solution were cyclically frozen at minus 50 ºC and thawed at 20 ºC [5]. At the same time, models of concrete with a frost resistance grade F2500 must withstand 80 freezing and thawing cycles without loss of strength and weight loss. The standard does not strictly regulate the total duration of one cycle, but it must be at least 6 hours. In the work, the duration of the freezing and thawing cycle was taken as 12 hours, which provided two cycles per day. Models of concrete with different modifiers were made in such quantity as to be periodically checked after different number of cycles corresponding to grades F2100, F2150, F2200, F2300, F2400 and F2500. A series of models with each modifier was divided into two groups, one was tested for brands by frost resistance (main models), and the second was kept in a 5% NaCl solution at (20 ± 2) ºC (control models) and tested simultaneously with the first group. Before testing, all models were pre-saturated in accordance with paragraph 4.12 of State Standard 10060-2012 for four days in 5% sodium chloride solution [6]. Frost resistance of modified concrete models is shown in the figure, and the calculation of frost resistance grades is given in the appendix.

Influence of modifying additives on frost resistance. Table - 2

	R_{cp} MPa	F 100	F 200	F 300	F 400	W%

Control	89,00	-	+	-	-	
Karakalpak+MS+MWR	92,00	-	-	-	+	
Titanium +MS+MWR	94,00	-	-	-	+	

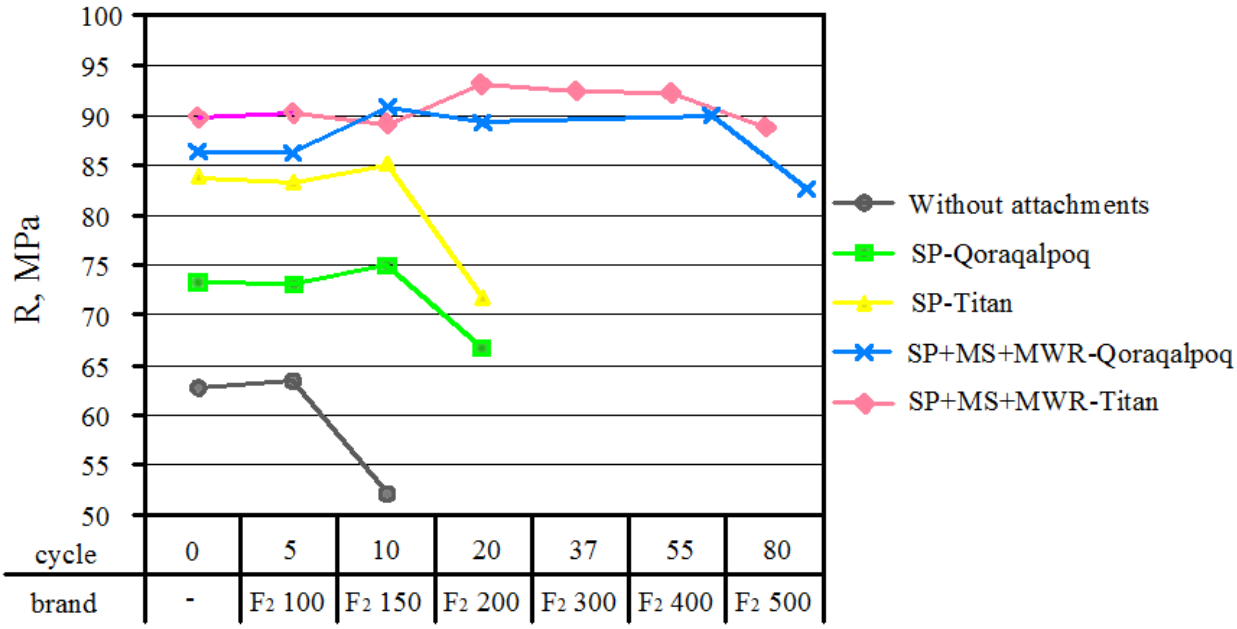


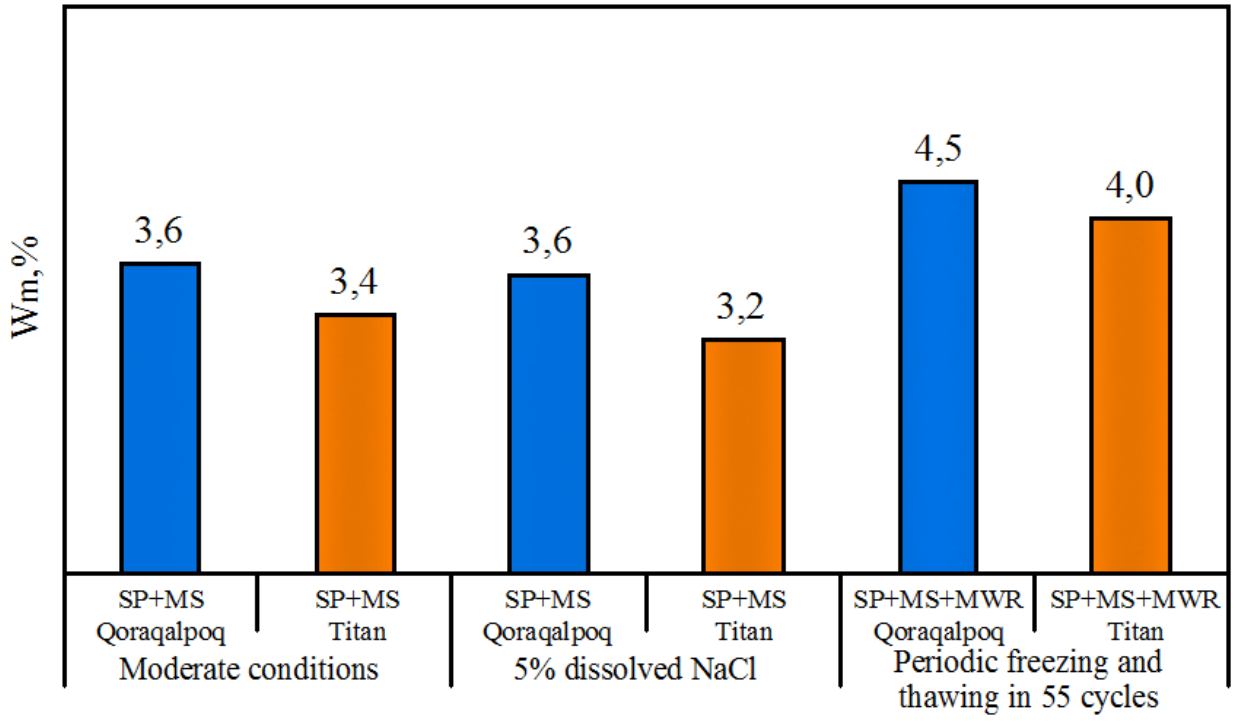
Figure 2 - The results of testing models of modified concrete for frost resistance

The control and main models were made from concrete mixtures with the same workability grade P1, with a constant water-cement ratio of 0.31.

Concrete models without modifying additives withstood the least number of freezing and thawing cycles, corresponding to the frost resistance grade F2100. Despite the previously noted modifying effect of the addition of a polycarboxylate plasticizer, the grade of concrete in terms of frost resistance F2150 when applied does not differ from the grade obtained with the introduction of superplasticizer (*further*: SP). For concrete models with SP, after testing the grade for frost resistance, damage was noted in the form of peeling of the surface. In addition, for concrete models without additives up to five cycles, and with plasticizers up to 10 freezing and thawing cycles that was observed an increase in strength. This may indicate an acceleration of the hydration process, since the initial structure of the hydrated phases of the cement stone ceased to block the grains of unreacted cement, and it means that gel porosity partially increased to micro and macrocapillary [7,8]. The most significant increase in the grade of concrete in terms of frost resistance occurs with the joint introduction of a plasticizer and micro silica, while F2400 is achieved for modifiers SP, MWR, MS. The role of the pozzolanic addition of micro silica in increasing the frost resistance of concrete is enhanced by the modifying effect of SP, due to the binding of calcium ions in the pore fluid of concrete into complex compounds [7,8,9].

Thus, the combined use of additives SP, MWR, MS is the most effective way to obtain concrete with high frost resistance, due to a decrease in the content of portlandite in cement stone and the formation of weakly crystallized hydrosilicates, which persist during long-term low-temperature frost resistance tests.

Water absorption of concrete models with modifying additives is also a characteristic of the pore space structure associated with the peculiarities of the formation of hydrate phases. The amount of moisture absorption by concrete models and the effect on it of 55 cycles of freezing and thawing according to the third method of State Standard 10060-2012 is shown in Figure-3 [10,11].



gure 3 - The amount of moisture absorption by concrete models at the same time duration

Based on the results of this experiment, it can be concluded that the type of fluid - water or sodium chloride solution, in which the models were kept for a month, did not affect the value of water absorption. After 55 freezing cycles, the water absorption of the models modified with SP, MWR, MS did not significantly increase by 25%, which is caused by a change in the initial microstructure, accompanied by an increase in the pore size. With the introduction of additives SP, MWR, MS, the structure of hydration products remains unchanged, which provided the same amount of water absorption as in the control samples.

It is advisable to evaluate the processes occurring in the structure of the cement stone of concrete when testing frost resistance by changing the value of water absorption on the same samples, weighed after a different number of cycles. The allowable weight loss according to the standard should not exceed 2% in order to assign a concrete grade for frost resistance [11].

For concrete models modified with a plasticizer and pozzolana, the saturation value according to the standard procedure for four days, before the frost resistance test, is about 0.42–0.84% (10–20 grams). Such a small amount of water absorption is a consequence of the absence of capillary pores in concrete in the presence of mainly gel porosity, in which the movement of moisture is carried out due to diffusion mechanisms.

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Rezyume: *Maqolada betonning fizik, mexanik va ekspluatatsion xususiyatlarini yaxshilab, tsement toshining tuzilishini shakllantirishga qodir bo'lgan qo'shimchalar majmuasidan foydalangan holda beton namunalarini o'rganish natijalari keltirilgan.*

Резюме: *В статья приведены результаты исследований бетонных образцов с использованием комплекса добавок способных регулировать структурообразование цементного камня, улучшая при этом физико-механические и эксплуатационые характеристика бетона.*

Kalit so'zlari: *Tsement, superplastifikator, mikrosilika, suv o'tkazmaydigan, tsement tosh, o'zgartiruvchi qo'shimchalar, sovuqqa chidamli, qo'shimchalar.*

Ключевые слова: *Цемент, суперпластификатор, микрокремнезем, модифицирующих гидрофобизатор, цементный камня, модифицирующих добавок, морозостойкость, добавка*

UDK 541.183:665.5

THE EFFECT OF DIFFERENT DETONATIONS ON GASOLINE PRODUCTION AND COMPONENTS

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Summary: *The formation of resins of gasoline mixtures of various nature containing a large number of resins has been studied. The formation of gasoline mixtures resins has been shown to be variable. The addition of oxygenates to gasoline compositions of various properties reduces their formation. Low molecular weight alcohols and amines as well as MTBE esters demonstrated a great positive synergistic effect.*

Keywords: *car gasoline, antioxidant landings, additivity, riformat, catalyst, induction period.*

Introduction. Today, the development of energy systems and adaptation to a new local, regional and secular reality, aimed at the transition to environmentally friendly fuels, is leading to a change in the economy based on the use of oil and gas and coal. The transition to a new more qualitative type of collars will require considerable investment, but precisely the modernization of these production areas will be a key factor in the development of such separate areas as economic, social and environmental.

The surge in demand for oil and gas products is causing various serious environmental problems in the world. Given this, Uzbekistan pays great attention to improving the quality of petroleum products and producing environmentally friendly petroleum products based on domestic raw materials and technologies.

Uzbekistan fuel industry is moving towards the requirements of European standards on antidetonation and environmental properties of autobenzine and diesel fuel (Euro-3, Euro-4, Euro-5) (Table 1).

Table 1

Modern requirements for the quality of gasoline

Indicators	Requirements		
	Euro-3	**Euro-4**	**Euro-5**
Amount of benzene, %	1,0	1,0	1,0
Amount of sulphur, %	0,015	0,005	0,001
Amount of aromatic hydrocarbons, %	42	35	35
Amount of Alefin Hydrocarbons, %	18	14	14
Oxygen content, %	2,3	2,7	2,7
Steam pressure, kPa	summer 70 winter 90	summer 70 winter 90	summer 70 winter 90

Using the example of gasoline on agar to obtain gasoline that meets the above requirements (Euro-3, Euro-4, Euro-5), it is necessary not only to increase its octane amount, but also to reduce the amount of sulfur, olefin and aromatic hydrocarbons (in particular benzene). It is necessary to transfer excess aromatic hydrocarbons to isoparaffins, add oxygen-containing components, antioxidants, detergents and other necessary planting to the gasoline composition[1-2].

The octane number can be increased in two ways [3-6]:

– high content of high-octane fractions in gasoline. This method is carried out through catalytic cracking, isomerization, alkylation and a number of modern hydrogenation processes.

– Use of alternative antidetonators. By this method, it is possible to increase the octane amount of gasoline using alcohols and ethers (methanol, ethanol, isoprapanol, MTBE, MTE) increasing the amount of octane.

However, these plants and amines are formed from various components (gasoline fractions of secondary processes, such as direct driving of gasoline fractions, ismoerization, reforming, catalytic cracking), the effect of gasoline of various compositions on the cell formation process has not been fully studied [7, 8].

Research methods and materials. In the course of the study, the formation of gasoline fractions in combination with alcohols, ethers and amines of various molecular weights was evaluated. The process of creating a pit in research work is determined by the GOST 32404-2013 of determining the content of gasoline and its resin components. The research installation is shown in Figure 1.

Figure 1. Resin sizing device FS-10

Hydrocarbon composition of gasoline fractions is determined by adsorption - cryoscopic method [8], and density - by picnometric method according to 3900-85 GOST.

Results obtained and analysis. At the beginning of the study, we identified the physicochemical properties of gasoline components produced at local refineries. These indicators serve as the basis for assessing physical and chemical changes after they are attached to them. The physical and chemical properties of gasoline and its fractions used in the study are given in Table 2.

Table 2

Physicochemical properties of the applied gasoline and its components

Type of gasoline	Amount of resin, mg/100cm^3	Density, g/cm^3	Quantity of hydrocarbons, % masses.	
			Aromatic hydrocarbons	Shallow hydrocarbons
Gasoline AI-80	1141,20	0,772	48,78	3,21
Reformat (P)	1457,00	0,7912	78,12	8,22
Completely Dumped Gasoline (CDG)	12,20	0,7915	2,12	0,98
Catalyst (K)	1235,10	0,7885	31,14	6,31

In order to assess the effect of oxygenates and amines on the deposition formation of gasoline and its components with different composition, they contain 10% mass of alcohols, amines and ethers of different molecular masses. included in the amount:

- alcohols: ethyl alcohol (EA), isopropyl alcohol (IPA), ethylene glycol (EG), diethylene glycol (DEG), triethylene glycol (TEG);
- ethers: methyl tert-butyl ether (MTBE);
- amines: monoethanolamine (MEA).

The results of the study suggest that the resin formation of gasoline compositions with different mixtures has a variable character. On the account of the synergistic effect on gasoline with a mixed composition, it is possible to observe a decrease in the amount of tar. In terms of the amount of Bunda smalas, multi-Smal gasoline showed a lower indicator than the addive size. When there is a sufficient amount of smelting in gasoline, excess smelting will stop the process of formation of the next smelting.

When alcohol, ether and amines are added in an amount of 10%, it is possible to see that the amount of tar falls significantly in gasoline compositions. In it, a synergistic effect is observed [9-10].

To assess the effect of oxygenates on the amount of Smales in different mixed samples, the concentration dependence of the composition of 10% oxygenates and amin stored riformat+properly drained gasoline compositions was determined. The mixture of R+PDG gasoline was chosen due to the fact that the additive differs greatly in size. When assessing the formation of a tar with the participation of oxygenates, the highest deviation from the indicators of the composition of the mixture by resins was used (Figure 2).

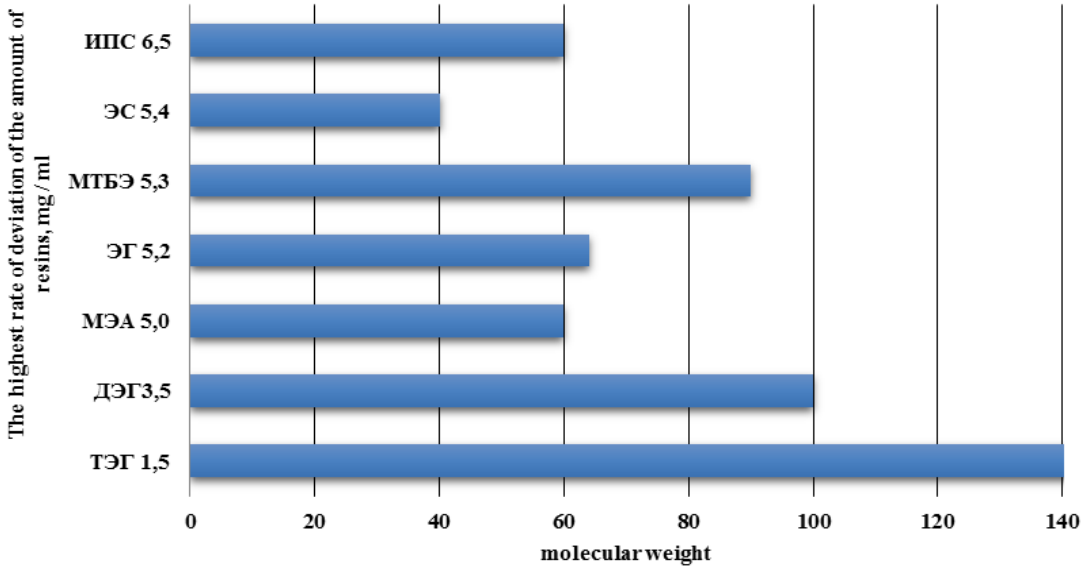
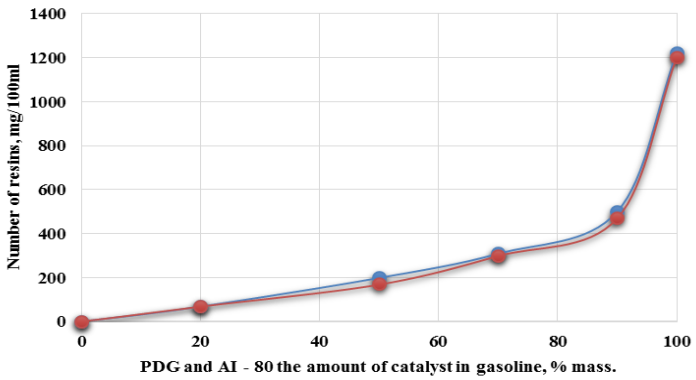


Figure 2. In the gasoline sample R + PDG 10% with oxygenate and amines, and when added, the concentration of resins depends on their molecular weight

The results of the experiment showed that with a decrease in the molecular mass of alcohols, the degree of deviation from the additive size increases, respectively, a decrease in the amount of tar. It follows that low-molecular alcohols and amines are highly inhibited by the formation of resins in gasoline with different mixtures compared to high-molecular alcohols. MTBE and MEA also show a positive synergistic effect on the composition of R+ PDG gasoline and reduce the formation of Smales (Figure 2)



3-picture. AI-80 gasoline and PDG resin forming speed

In order to confirm the effectiveness of antioxidation of low molecular weight alcohols, the kinetics of resin production for 45 days of gasoline compositions with a content of 5% ethyl alcohol were studied (Figure 3). The results of the analysis showed that the addition of ethyl alcohol to the composition of automobile gasoline reduces their yield. With a high level of resin formation in a reformate with a high content of aromatic and shallow hydrocarbons, the effect of antioxidizing ethyl alcohol, relatively less aromatic and non-oxidized hydrocarbons and resin substances had a better effect on gasoline. This can be estimated by the rate of resin creation.

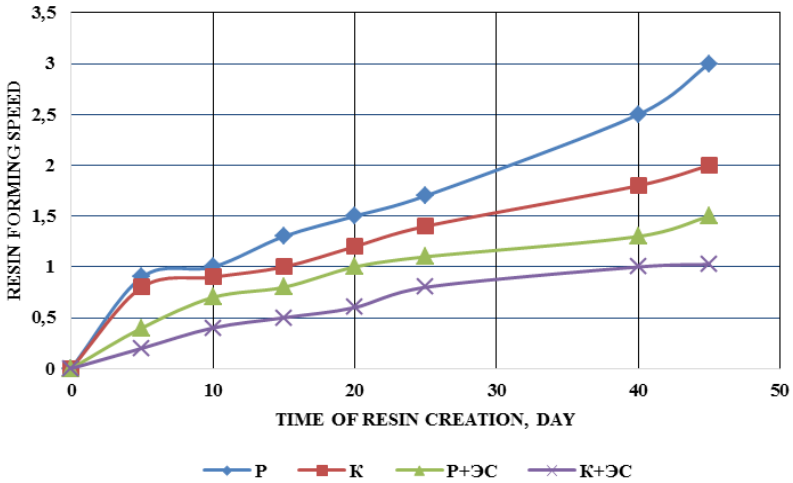


Figure 4. Kinetics of the rate of formation of gasoline compositions

We determined the rate of formation of the resin by the following formula:

$$v = \frac{F_1 - F_0}{t}$$

here: v – t storage the rate of formation of tar per day, *mg/100 sm*^{3}; F_o – concentration of Smolar at the beginning of the experiment, *mg/100 sm*^{3}; F_1 – t storage the concentration of subsequent resins per day, *mg/100 sm*^{3}.

The results of the analysis of Figure 4 show a high rate of resin formation on gasoline containing high molecular weight substances, aromatic and shallow hydrocarbons. At the same time, the rate of formation of resins for 10 days in gasoline containing and not storing ethyl alcohol is the same. As the subsequent storage time increases, the rate of resin formation will vary. In gasoline samples that do not contain ethyl alcohol, the yield level of the resin increases with increasing storage time and after 45 days the rate of its formation increases to 1.3-1.5 times.

To confirm the results, we determined the induction time of gasoline compositions containing oxygenates. The results are shown in Table 2. The results showed a large induction time involving oxygenates.

Table 2

Induction period

Type of gasoline	Induction period, min.
Reformate	22
R + 5% EA	24
Catalysate	27
K + 5% EA	30
K + 5% IPA	32

Thus, the results of the conducted theoretical and practical studies suggest that antidetonation landings lead not only to an increase in the number of Octane in gasoline and its components, but also to a decrease in the level of their resin formation. This in turn leads to the improvement of colloidal stability, ecological – operational properties of automobile gasoline.

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Резюме: *Таркибида турлича миқдордаги смолаларни сақлаган ҳар хил хоссали бензин аралашмаларининг смола ҳосил қилиши ўрганилди. Бензин аралашмаларини смола ҳосил қилиши ўзгарувчан хусусиятга эга эканлиги исботланди. Турли хоссали бензинлар таркибига оксигенатларни киритилиши, уларни смола ҳосил қилишини камайтиради. Катта мусбат синергетик эффектни паст қуйи молекуляр спиртлар ва аминлар, шу билан бирга МТБЭ типидаги мураккаб эфирлар намоён этди*

Резюме: *Изучена осмоляемость смесей бензинов различной природы с различным содержанием фактических смол. Доказано, что осмоляемость смесей бензинов носит неаддитивных характер. Введение оксигенатов в состав бензинов различной природы приводит к снижению их осмоляемости. Большой положительный синергетический эффект проявляют низкомолекулярные спирты и амины, а также сложные эфиры типа МТБЭ*

Калит сўзлар: *автомобил бензин, антиоксидловчи қўндирмалар, аддитивлик, риформат, катализат, индукцион давр.*

Ключевые слова: *автомобильный бензин, оксигенаты, аддитивность, риформат, катализат, индукционный период.*

RESEARCH AND ABILITY TO USE ALUMINA CONTAINING WASTE FOR LOW-TEMPERATURE SPINEL SYNTHESIS

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Summary: *The article posted results of studies of the chemical-mineralogical characteristics of alumina-containing wastes of the gas processing industry and the possibility of their use for the synthesis of magnesium aluminate spinel are given. It has been established that the optimal condition for the synthesis of spinel $MgAl_2O_4$ by sol gel method using an alumina containing waste is the temperature equal to 1000 ℃ and the holding time of 120 min.*

Key words: *magnesium aluminate spinel, sol-gel method, alumina containing waste, phase transformations, X-ray analysis, DTA – analysis, γ-alumina.*

Intensification of industrial processes of the Republic of Uzbekistan, the development of various areas of modern technology is associated with the development of new materials, with special physicochemical properties based on silicates and other refractory non-metallic compounds. [1, 2].

To date, there are a number of studies on the synthesis and the study of physicochemical properties, phase transformations, isomorphic substitutions, interpretation of phase diagrams of a number of polycomponent oxide compounds of alkaline earth metals, in particular magnesium. However, the solid phase reaction of the formation, the patterns of the formation of structures of solid solutions, phase transformations at high temperatures, the physico-chemical properties of magnesium aluminates are not sufficiently studied [3,4].

Therefore, they find widespread use in armored window systems, high-energy laser windows, rocket dome, electronic humidity sensors, refractories, catalytic carriers, etc. Magnesium aluminate spinel is also well known for its optical properties that make it necessary material in production transparent ceramics for use in visible [5, 6]. Spectrum, near infrared and microwave frequency ranges.

It is known that the synthesis of magnesium aluminate, i.e. Aluminumagnesian spinel is carried out by artificially. It can be obtained by melting the initial components, as well as high-temperature thermal treatment of compressed polycrystalline samples from the original magnesium and aluminum oxides [7,8].

Optimization of the methods of the synthesis of spinel and the study of the kinetics occurring at the same time, chemical reactions seems to be an urgent task. In this paper, an attempt was made to determine and compare the interaction of various precursors, leading to the formation of magnesium aluminate spinel.

For the spinel synthesis by sol-gel method was used by the technique of fine gamma alumine as the main component, which is a spent catalyst of the Shurtan gas chemical complex (SGCC). Also used magnesium oxide obtained by roasting magnesium carbonate, HNO_3, glucose ($C_6H_{12}O_6$) anhydrous and 5% solution polyacrylamide, partially hydrolyzed using NaOH, the results of chemical analysis spent catalyst of the SGCC, was shown that the content after the injection at a temperature of 900 ℃ γ-Al_2O_3 is approximately 96 wt.%.

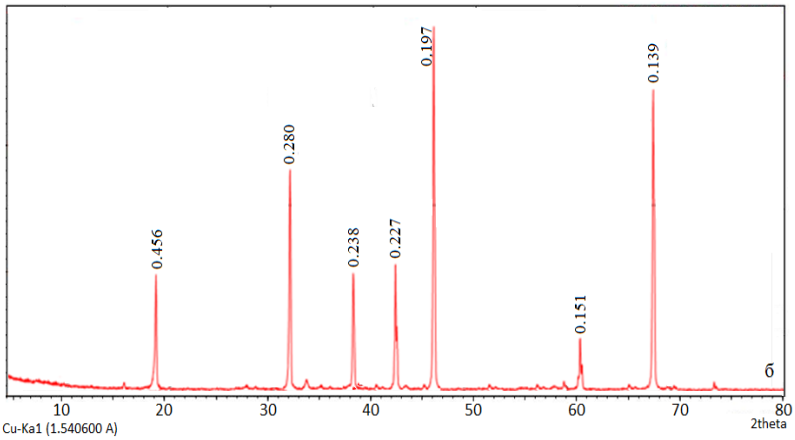

Fig.1. X-ray of alumina-containing waste heat treated at a temperature of 900 ℃

X-ray data have shown that after heat treatment of the original alumina-containing waste, there are lines of diffraction maxima with diffraction lines d = 0.455, 0.288, 0.236, 0,226, 0.197, 0.152, 0.139 nm, the gamma form of alumina γ-Al_2O_3 and d = 0.618, 0.317, 0.241, 0.185, 0.145, 0.143, 0.131 nm gibbsit mineral relatives γ-$Al(OH)_3$. At a temperature of 900 ℃, the gibbsit is completely converted to the gamma form of aluminum oxide, as a result of which a single-phase gamma alumina (γ-Al_2O_3) powder is obtained with an diffraction lines d = 0.455, 0.288, 0.236, 0.226, 0.197, 0.152, 0.139 nm. X-rays analysis (Fig. 1) shows at a temperature of 500 ℃ almost all diffraction lines corresponds to the mineral γ-Al_2O_3. However, with an increase in temperature to 900 ℃ intensity, the corresponding diffraction lines increases and traces that belong to gibbsit completely disappear.

In the process of obtaining alumopesal spinels, the sol-gel by the method of the stoichiometric amount of the spent catalyst γ-Al_2O_3, MgO and glucose was stirred in dry form and crushed to the particle size of less than 0.1 μm. The resulting mixture was dissolved in the H_2O of partially dilute nitric acid. The precursor solution was then kept on a magnetic stirrer for 60 minutes to obtain a homogeneous mixture, and the pH was maintained to 10 by adding NaOH drops. After that, the solution was continuously stirred into the magnetic stirrer for 5 hours, maintaining its temperature in the range of 50-60 ℃. After that, a 5% solution of polyacrylamide was added obtained by a homogeneous liquid and the gel precipitate was obtained. The finished product was filtered and dried at room temperature.

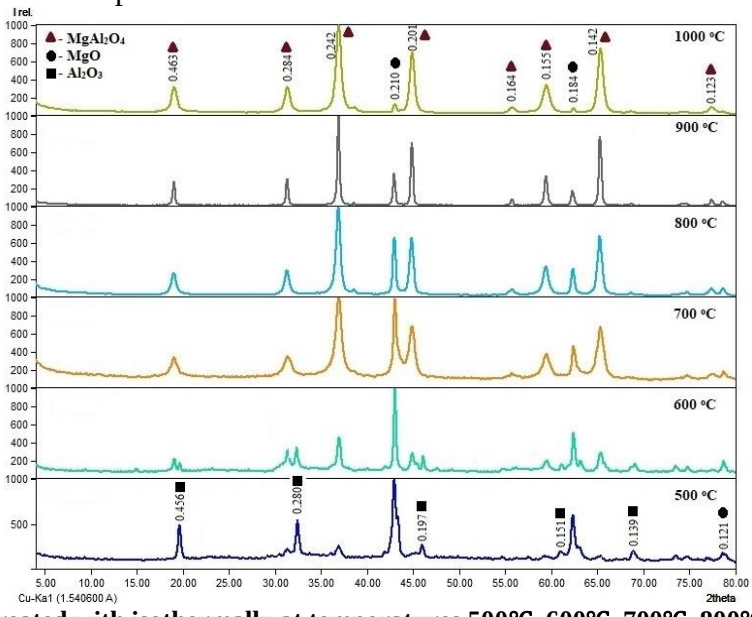

Fig. 2. X-ray patterns treated with isothermally at temperatures 500℃, 600℃, 700℃, 800℃, 900℃ and 1000℃ for 120 minutes.

The resulting samples were burned in the SNOL 5/1300 muffle furnace in the temperature range of 500-1000 ℃ (Fig.2), increasing the temperature for each individual sample per 100 °C with an exposure of 2 hours.

Results, X-ray phase analysis have shown that at a temperature of 500 ℃, the main phase is observed, which corresponds to the gamma form of aluminum oxide with the corresponding with diffraction lines d = 0.456, 0.280, 0.197, 0.151, 0.139 and magnesium oxide d = 0.210, 0.184, 0.121 also determined the beginning of the phase spinel d = 0.284, 0.242, 0.155, 0.123 (Fig. 3.4). With increasing temperature up to 1000 ℃, there is an intensive increase in reward pattern effects corresponding to the spinel phase, as well as there are minor layers of the magnesium oxide phase. This is explained by the high reactivity of the gamma aluminum oxide form compared with magnesium oxide.

Figure 3.5 shows the result of the thermogravimetric and differential - thermal analysis of the dried xerogel, obtained by the coal gel method.

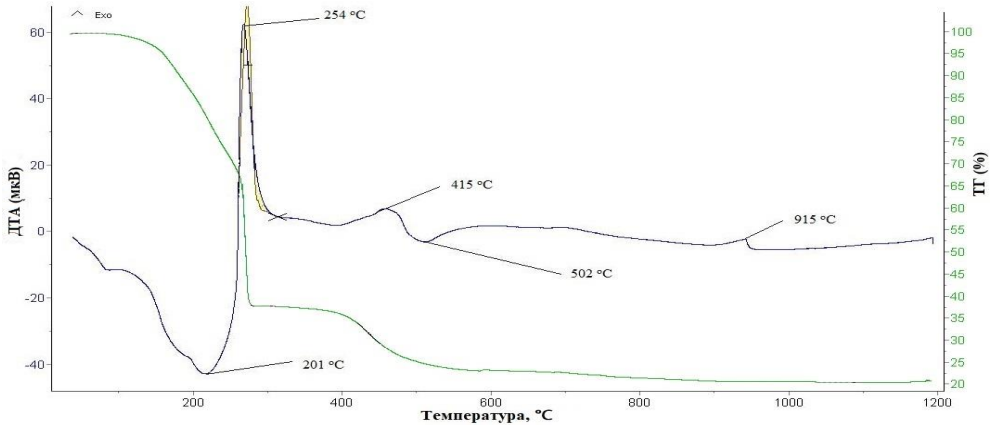

Fig.3. TG and DTG analysis of the synthesized sample of xerogel

The results of thermogravimetric and differential-thermal analysis show that the mass loss is observed in the main at a temperature of 150 - 645 °C. The results of differential thermal analysis were shown (Fig. 3.5) that two endothermic effects were detected on the sample heating curve at temperatures 201, 502 °C associated with the removal of H_2O molecules. The effect at a temperature of 201 °C is associated with the decomposition of absorbed water.

The second endothermic effect at a temperature of 502 °C accompanied by weight loss, is associated with the removal of chemical bound Water H_2O from Bemit, which is then crystallized in γ-Al_2O_3, and magnesium hydroxide with the transition to MgO, which is confirmed by the results of the radiograph (Fig. 3.4). Weight loss occurs by the $2AlOOH \rightarrow Al_2O_3 + H_2O$ and $Mg(OH)_2 \rightarrow Mg(OH)_2 \rightarrow MgO + H_2O$ removal of the H_2O molecule. Three exothermic effects at temperatures 254, 415, 915 °C are also observed. The first two exothermic effects are associated with oxidation and burnout of organic substances, and the third with the formation of spinel crystals. With a further increase in temperature up to 1200 ° C, no heat events are observed

Conclusion. Thus, as a result of the studies carried out, the conditions for the synthesis of spinel by using the sol-gel method were studied and created. Received a fine ceramic powder, consisting of the main phase of spinel ($MgAl_2O_4$), which is obtained from waste and reactive magnesium oxide grade, having a particle size of 0.5 to 1 micron.

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Rezyume: *Maqolada gazni tozalash sanoati glinozemtarkibli chiqindilarining izlanishlar natijasida olingan kimyoviy minerologik tavsiflari va ularning alyumomagnezial shpinel sintez qilishda foydalanish imkoniyatlari keltirilgan. Glinozemtarkibli chiqindilar asosida zol-gel usuli bilan alyumomagnezial shpinel sintez qilishning maqbul sharoiti 1000 ℃ haroratda 120 min haroratni ushlab turish vaqtida ekanligi asoslandi.*

Резюме: *В статье приведены результаты исследований химико-минералогических характеристик глиноземсодержащих отходов газоперерабатывающей отрасли и возможностей их использования для синтеза алюмомагниевой шпинели. Установлено, что оптимальным условием для синтеза шпинели $MgAl_2O_4$ золь-гель методом с использованием глиноземсодержащего отхода является температура 1000 ℃ и время выдержки 120 мин*

Kalit so‘zlar: *alyumomagnizial shpinel, zol-gel usuli, glinozemtarkibli chiqindi, faza almashinishi, rentgenofaviy tahlil, DTA-tahlili, γ- aluminiy oksidi.*

Ключевые слова: *алюмомагниевая шпинель, золь-гель метод, глиноземсодержащий отход, фазовые превращения, рентгенофазовый анализ, ДТА-анализ, γ-оксид алюминия.*

STUDY OF SALT EFFLORESCENCE FORMATION AND THE WAYS TO ELIMINATE IT

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Summary: *The article discusses methods and additives for eliminating salt efflorescence on the surface of ceramic building materials. To protect ceramic bricks from efflorescence, hydrophobization is proposed by the solution of washed licorice root waste.*

Keywords: *ceramics, clay, brick, efflorescence, firing, salt, barium, potassium, gypsum, water solubility*

Among the numerous problems of modern production of ceramic building materials, the formation of salt efflorescence on the surface of brickwork is one of the most relevant. The prevention of efflorescence in ceramic wall materials is an urgent task. Efflorescence contributes to the aging process and destruction of the building material. Salt eats away the outer surface, which begins to crumble, and wind and precipitation finish the job – the "weathering" occurs. The worst of all is the fact that salts crystallize not only on the surface but also in the body of the material, destroying it from the inside. The result is the formation of microcracks, and over time, serious damage to the walls of the buildings occurs. The main reason for the appearance of salt efflorescence on ceramic wall materials is the increased salinity of clay raw materials, especially in the territory of the Republic of Karakalpakstan.

Many foreign researchers studied the problem of elimination of efflorescence on the surface of clay brick. They determined that the main source of efflorescence is soluble sulfate salts of alkali and alkaline earth metals Na_2SO_4, K_2SO_4, $MgSO_4$ and $CaSO_4$. The most harmful of these salts, which spoil the appearance and cause degradation, are the readily soluble salts of sodium and magnesium sulfates. These salts in different climatic conditions can add crystallization water forming crystalline hydrates, and then give it back.

Potassium sulfate K_2SO_4 is a hygroscopic mineral; it does not affect the strength characteristics of ceramic bricks, and with complex salts such as Na_2SO_4, $MgSO_4$ and $CaSO_4$, causes a destructive effect.

Gypsum $CaSO_4$ $2H_2O$ is slightly soluble, at the normal temperature it retains crystallization water, does not cause destruction, but forms salt efflorescence which worsens the appearance of bricks.

At present, various methods are known to eliminate efflorescence. For example, it is eliminated by barium salts, which create moisture-retaining films on the surface of the stretcher and header faces of the raw brick that weaken the sensitivity of the clay itself [1].

It was established that salts that form efflorescence on fired ceramic products are NaCl, $CaSO_4$ $2H_2O$, $MgSO_4$ $7H_2O$, K_2SO_4, $NaSO_4$ $10H_2O$, $Ca(NO_3)_2$ $4H_2O$, $CaCO_3$, $MgCO_3$, Na_2CO_3 [2].

Water-soluble chloride salts NaCl, KCl, $CaCl_2$, $MgCl_2$ in clay raw materials are the main cause of efflorescence on clay brick and other building ceramic materials. The salt efflorescence occurrence mechanism is as follows. During the drying process, the salts contained in the clay diffuse in the form of an aqueous solution to the surface of the raw material and, after evaporation of moisture, is deposited on the surface. After firing, efflorescence remains on the surface and, during operation of the masonry, under moisture diffusion from the inner layers of efflorescence, they can cause its destruction.

The formation of efflorescence on the surface of ceramic products depends not only on the water-soluble salts contained in the clay but also on the nature of the porosity and the size of the crystallization area in relation to the volume of the product.

Researchers Zelmang.G., Laird.R. have found that at an equal content of soluble salts in clay, the concentration of their deposition depends on a certain coefficient equal to the ratio of the surface

area of the sample *S* to its volume *V: K* = S/V. So, at *K* = 5.5, salt efflorescence does not appear, and at *K* = 1.3-2.8, the appearance of salt efflorescence becomes probable.

Consequently, salt efflorescence is formed on thick walls, where a large amount of salt is deposited on the surface; thin walls contain much less efflorescence on the surface.

If the brick has large pores, then a significant amount of salts can be deposited inside, this reduces efflorescence on the surface. If the brick is dense and the pores are very small, even a small amount of salts, such as $MgSO_4$, can cause salt efflorescence.

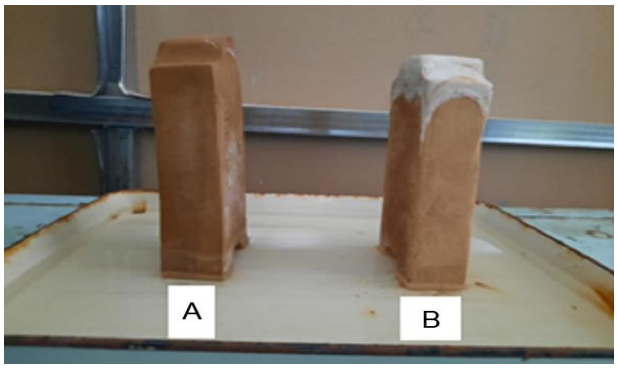

Fig. 1. Test for efflorescence formation

Fig. 2. Storage in distilled water

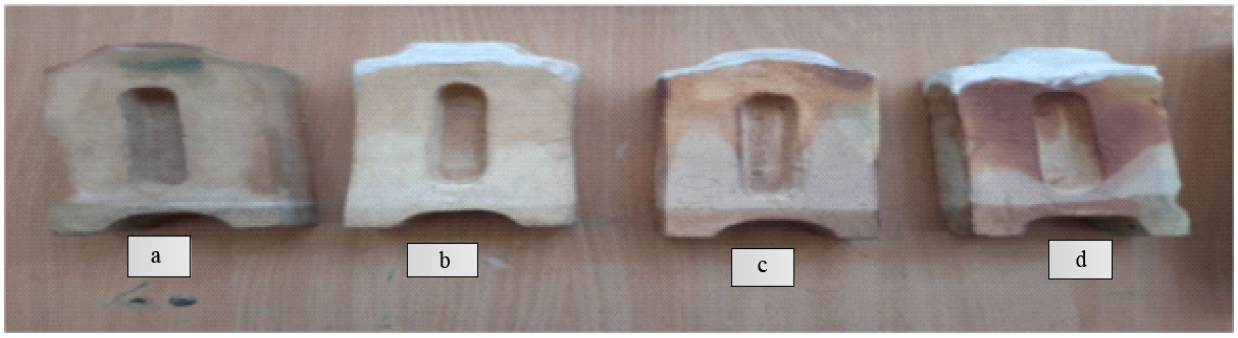

Fig. 3. a) with a solution of the washed licorice root waste 100%; b) 100% water; c) 50% solution 50% water; c) 100% water

One of the promising ways to combat efflorescence on the surface of ceramic products is to convert soluble salts into an insoluble state by introducing various additives into the clay mass. For the production of facing bricks and other ceramic products from clays containing water-soluble salts, barium compounds are effective.

Barium carbonate $BaCO_3$, less often barium oxide hydrate $Ba(OH)_2$, barium chloride $BaCl_2$ $2H_2O$, barium fluoride BaF_2, barium bicarbonate $Ba(HCO_3)_2$ are most often used as barium compounds introduced into the clay mass.

To ensure the required intensity and completeness of the chemical reaction proceeding in an aqueous medium, water-insoluble barium carbonate introduced into the clay mass must have a maximum dispersion. Particle sizes 0.2-1 microns of barium $BaCO_3$ effectively binds soluble salts contained in clay. Particle sizes 1-2 microns are less effective, and particles larger than 2 microns are unsuitable.

The research conducted by L.M. Botvin et al. at the Tashkent Research Institute of Building Materials was performed to eliminate salt efflorescence on a brick made of loess-like loam of the Kattakurgan deposit with a salt content of up to 2.15%. They experimentally found that the introduction of barium salts increases the molding moisture; BaCO3 and BaCl2 increase their water absorption. The mechanical strength of fired samples with the addition of $BaCO_3$ decreases slightly, and with $BaCl_2$ it remains within the same limits; with the introduction of BaF_2, the strength doubles.

Fig. 4. Treatment with a solution of licorice root waste

Fig. 5. External treatment with a silicon solution

In the publications mentioned above, there is no study on the elimination of salt efflorescence by the solution of licorice root waste. At the Karakalpak State University named after Berdakh experiments were conducted on the formation of salt efflorescence in ceramic bricks made from clay from the Bekbay Tugay deposit. As seen from Figure 1, salt efflorescence with local (tap) water mixed to a plastic mass of clay forms a larger amount of salts as compared to a solution of washed licorice root waste added to a plastic mass. With manual mixing, the water demand of the clay was 0.24%. After mixing with water, the clay mass was wrapped in a plastic bag and left in laboratories for 1 day. On the next day, the clay was soft and plastic, and could be easily molded. The firing was carried out in a muffle furnace at a temperature of 1050°C. The weight loss after firing (X) in percent was calculated by the following formula

$$X = \frac{m_1 - m_2}{m_1} \cdot 100\%$$

where: m_1 – is the mass before firing
m_2 – is the mass after firing

According to the test results of 10 samples, the weight loss after firing was 14%, water absorption was 28%, and the density was 1.4 g/cm^3.

After the strength test, the ceramic brick was of M100 grade. The introduction of the proposed method into the production line is not a problem; it is, enough during the process of moistening, to add the device with a solution of liquid licorice root waste.

The use of the proposed method to eliminate salt efflorescence on the surface of ceramic bricks contributes to the expansion of the use of the solution of licorice root waste to obtain high-quality ceramic products.

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Rezyume: *Maqolada keramik qurilish materiallari yuzasida sho'r hosil bo'lishini yo'q qilish usullari va qo'shimchalari muhokama qilingan. Keramik g'ishtlarni sho'rlanishdan himoya qilish uchun yuvilgan qizilmiya ildizining chiqindi yeritmasini gidrofobizatsiya qilish taklif etiladi.*

Резюме: *В статье рассматриваются способы и добавки для устранения высолов на поверхности строительных керамических материалов. Для защиты керамического кирпича от высолообразования предлагается гидрофобизация раствором отхода отмытого лакричного корня.*

Kalit so'zlar: *keramika, loy, g'isht, sho'rlanish, olov, tuz, bariy, kaliy, gips, suvda yeruvchanlik.*

Ключевые слова*: керамика, глина, кирпич, высолы, обжиг, соль, барий, калий, гипс, водорастворимость.*

DEVELOPMENT OF INSTRUMENTAL ORE DEPOSITS OF THE MURUNTAU OPEN PIT

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Summary: *The article discusses a number of issues on the opening of the near-field reserves of the Muruntau deposit, in particular the Eastern zone; the construction of an underground mine based on the existing infrastructure of the M mine is more cost-effective and less labor-intensive than the construction of a new underground mine. And also in the work is investigated the definition of the Central-double ventilation scheme with a separate supply of a fresh air stream into the underground workings is already used at the mine "M".*

Key words*: sidewall, mine, shaft, massif, side, deformation, horizon, mine, reserves, minerals sought.*

Ore reserves outside the Muruntau open pit are concentrated in 6 zones: North-East, East, North, South and West Muruntau deposits and the zone of the Mutenbai deposit.

The off-pit reserves of the Muruntau and Myutenbay deposits are supposed to be developed by the "open-underground" method, using for their opening the worked-out benches of the open pit, from which capital adits and slopes will be passed (Fig. 1). With a detailed analysis of the considered option, the issue of opening ore zones for underground mining through the laying, driving of adits and slopes from the side of the existing open pit is not possible due to the ventilation regime. Since the current limit of permissible concentration (MPC) for underground workings is: carbon monoxide 20 mg / m3; nitric oxide 2 mg / m3; quartz dust 1 mg / m3. However, the MPC of the open pit is carbon monoxide 20 mg / m3; nitric oxide 5 mg / m3; quartz dust 2 mg / m3 [1]. Due to the fact that mining operations at the Muruntau open pit are not localized, and on the basis of the above factors, the opening of near-field reserves by underground workings from the side of the open pit is inappropriate, since The MPC of a quarry can in no way be considered fresh for underground mining.

The specialists of the Muruntau mine and the Uzgeorangmetliti Institute carried out exploration work to open the Eastern zone of the Muruntau deposit. Since this zone is explored by underground workings of mine "M" at three horizons: 0.0m; + 78m; + 128m. On the horizons +78 m; +128 m capital mine workings with access to these zones are currently mothballed.

Development of the Eastern zone can be divided into three stages:
1st stage of mining at the level of horizons -75 m ÷ + 128 m;
2nd stage of mining at the level of horizons +128 m ÷ +315 m;
3rd stage of mining in the level of -400 m ÷ -75 m.

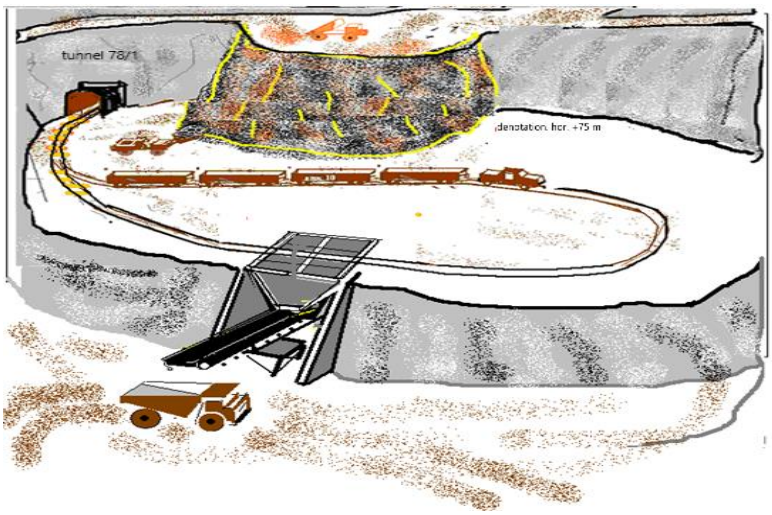

Fig. 1. Development of off-pit reserves of the Muruntau and Myutenbay deposits using the worked-out benches of the open pit for their opening

For the development of the Eastern zone in the 1st stage, we propose to use the existing infrastructure of mine "M" as a basic model of an underground mine:

1. To restore part of the workings of the +78 m horizon of mine "M": crosscut (Querschlag) 1-main, crosscut 1-1, crosscut 1, drift 219, drift XI (Fig. 2).

2. Go through drift 78/1 from the +78 m horizon of the M mine with a length of 600 running meters. with an exit to the side of the quarry at an elevation of +75m.

Drift 78/1 will subsequently lose its functional significance as “horizontal mine workings that do not have access to the surface”, therefore, it can be reoriented, for example, into adit 78/1. This development provides for the delivery of ore to the general quarry cargo flow, and back - the delivery of filling material to the mine. The overburden of a quarry can be used as a filling material.

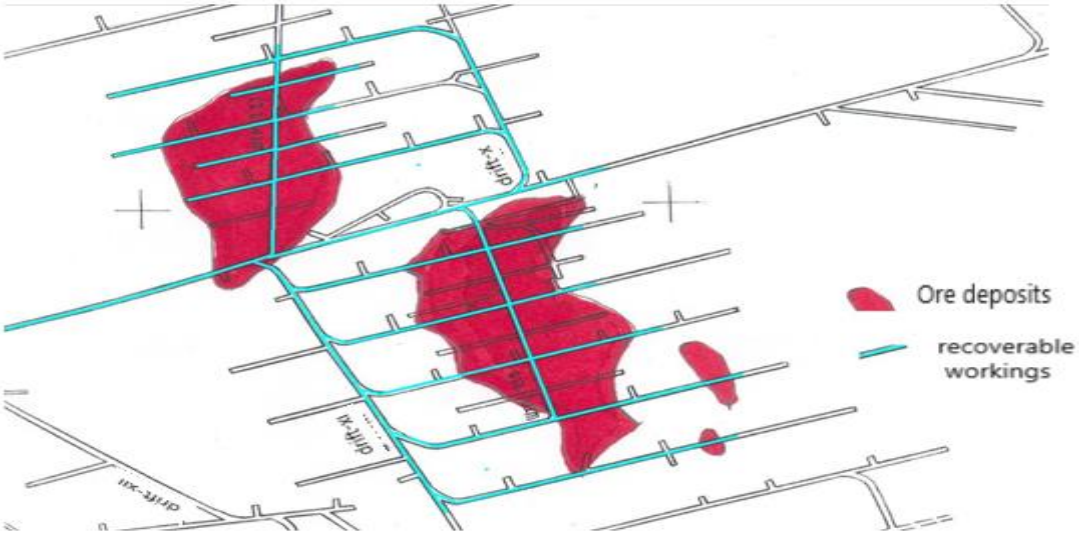

Fig. 2. The restored part of the workings of the horizon +78 m of mine "M"

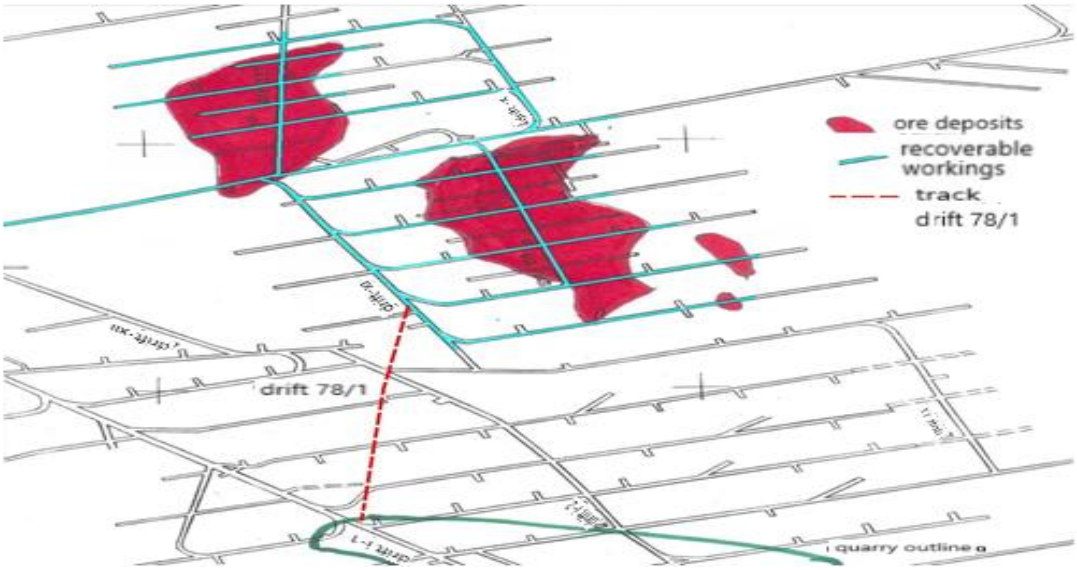

Fig. 3. Driving of roadway 78/1 from the +78 m horizon of the “M” shaft with a length of 600 running meters. with an exit to the side of the quarry at an elevation of +75 m

3. Pass the 0/78 slope from the 0.0 m horizon of the “M” shaft with access to drift 78/1 (Fig. 4).

The length of the 0/78 slope will be 450 linear meters, the slope angle is +100. Slope 0/78 will ensure the delivery of ore from the underlying horizons of the Eastern zone;

4. Apply the centrally double ventilation scheme currently in force at the Muruntau mine (Fig. 5).

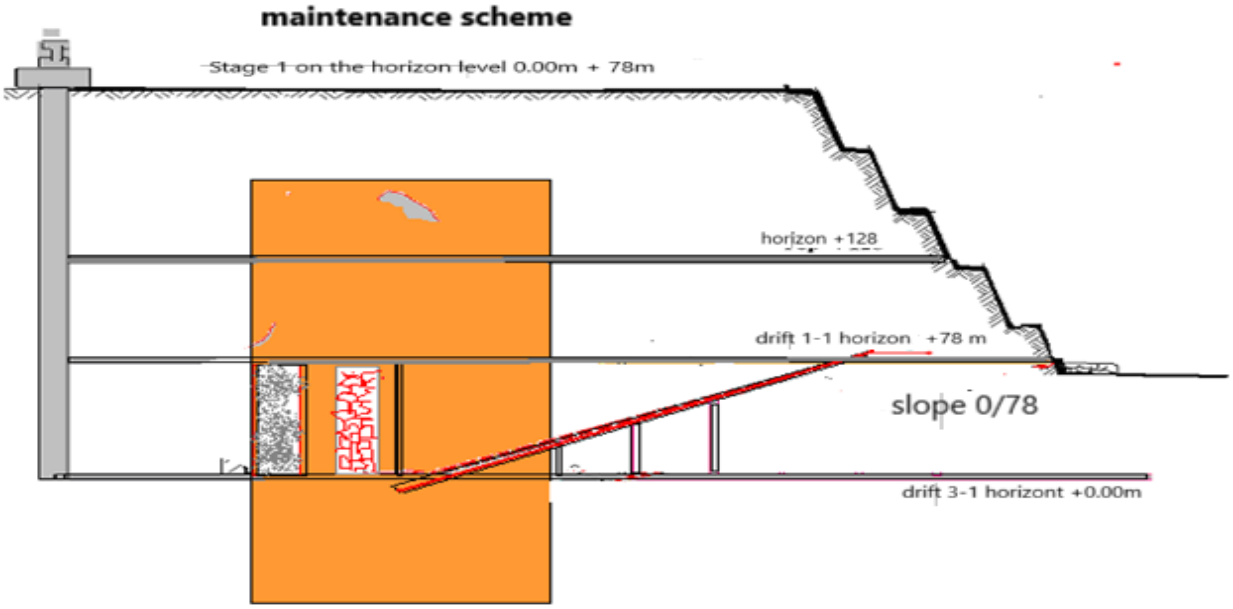

Fig. 4. Driving the slope 0/78 from the horizon 0.0 m of the "M" shaft with access to the road 78/1

The centrally double ventilation scheme with a separate supply of a fresh air stream to underground workings is already being used at the M mine. This scheme can be improved by making small changes and, if necessary, the outgoing air stream will be carried out into the open pit atmosphere. At the same time, regulate the movement of the general mine jet by reversing the main fan and the system of sluices. In case of massive explosions in an underground mine, the products of the explosion are liquefied and removed through the auxiliary shaft of the “M” mine.

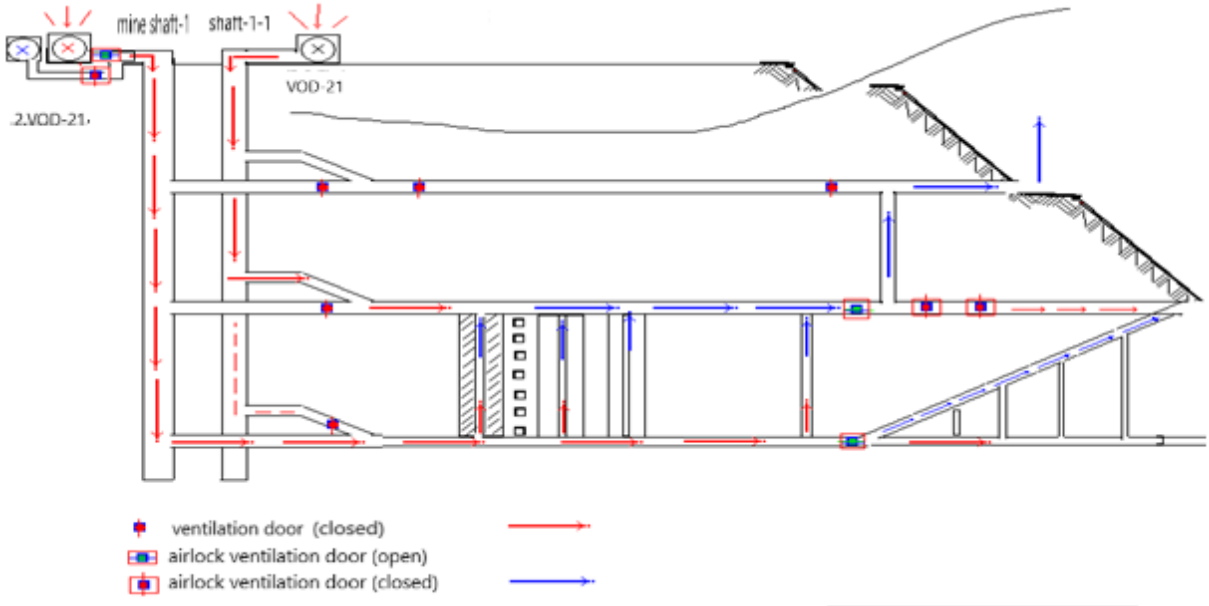

Fig. 5. Application of the centrally-doubled ventilation scheme currently in force at the Muruntau mine.

5. Transfer the Muruntau exploration mine to the exploration and production mine. At the same time, the costs of constructing an underground mine will be significantly lower compared to the construction of a new mine.

Application of the proposed autopsy option will make it possible to prepare the 1st stage of development of the Eastern zone in 1.5 years.

For the convenience of working out, the 1st stage is supposed to be divided into three stages:

Stage 1 at the level of the horizons 0.0 m ÷ +78 m;

Stage 2 at the level of horizons +78 m ÷ +128 m;

Stage 3 at the level of the horizons -75 m ÷ 0.0 m.

Thus, it is advisable to open the near-field reserves of the Muruntau deposit, in particular the Eastern zone, from the existing workings of the +78 m horizon of the "M" mine, since the construction of an underground mine based on the existing infrastructure of the M mine is more cost-effective and less labor-intensive than the construction of a new underground mine.

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Rezyume: *Bugungi kunda butun dunyoda bort orti zahiralarni qazib olishda er osti kon lahmlari o`tish va massiv barqarorligini ta'minlash muammolari o`z yechimlarini topmoqda. Bort orti zahiralarini samarali qazib olish bo`yicha ilmiy tadqiqotlar olib borish samarali ishlab chiqarish bo'yicha istiqbolli texnologik sxemalar bilan ilmiy tadqiqotlar o'tkazish va massivning keskin deformatsiyalangan holatini aniqlash zarur bo`ladi. Bu muammolarning yechimi sifatida bort orti zahiralarini qazib olishning texnologik sxemalarini ruda tanalarining joylashishini hisobga olgan holda ishlab chiqish kerak bo`ladi.*

Резюме: *В статьи рассматривается ряд вопросов по вскрытию прибортовых запасов месторождения Мурунтау, в частности Восточной зоны, целесообразно производить из существующих выработок горизонта +78 м шахты «М», т.к. сооружение подземного рудника на основе действующей инфраструктуры шахты «М» экономически эффективнее и наименее трудоемкое по сравнению со строительством нового подземного рудника. А также в работе исследуется определение Центрально-сдвоенная схема проветривания с обособленной подачей свежей струи воздуха в подземные выработки уже применяется на шахте «М».*

Kalit so`zlar*: bort orti, shaxta, stvol, massiv, bort, deformatsiya, gorizont, rudnik, zahiralar, foydali qazilma.*

Ключевые слова: *прибортовой, шахта, ствол, массив, борт, деформация, горизонт, рудник, запасы, полезное ископаемое.*

ON REGULATION OF THE STRUCTURE FORMATION OF CEMENT STONE WITH MICRO-SILICA AND A MODIFIED HYDROPHOBIZER

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Summary: *The article discusses the issues of structure formation of a cement binder with a complex of additives directed action. As a result of optimization of multicomponent concretes with a complex of additives, concretes with suspended performance characteristics were obtained.*

Keywords: *Cement, superplasticizer, microsilica, modifying water repellent, cement stone, modifying additives, frost resistance, additiv*

Since micro silica (*further*: MS) has pozzolanic properties and interacts with secondary calcium hydroxide released during the hydration of C3S, it was taken as a binder component and the water demand was assessed not by the water-cement ratio, but by the water-binder ratio.

The initial water demand of the non-additive cement paste does not change or decreases with the proportional introduction of modifier additives, which balances the multidirectional change in water demand. The optimal MS content in a dosage of 8–10% of the cement mass increases the W/W value, which is compensated by the introduction of polycarboxylate in an amount of 0.5–0.75% of the cement mass, and with a higher ACE content, the water demand decreases from V/V = 0, 25 to V/V = 0.23 [1].

The polycarboxylate superplasticizer, possessing surface-active properties, slows down the onset of setting of the cement paste, while micro silica fume does not affect this characteristic. The joint introduction of additives in optimal amounts causes a more intensive retardation of the onset of setting, in comparison with individual modifiers. The end of the setting of the cement paste, with the joint introduction of the optimal amount of additives, slows down by 25–30% of the duration of the end of the setting of the composition without additives. This indicator must be taken into account in the heat and moisture treatment (HMT) of modified concrete, since with an increase in the setting time, it is necessary to lengthen the preliminary exposure of reinforced concrete products.

Slowing down the onset of setting of the cement paste for concrete mix is a positive moment - this increases the preservation of its workability and increases the distance of transportation.

The maximum value of the compressive strength after a day of normal hardening of cube specimens with an edge of 20 mm was established with a SP content within 0.6%, MS 8%, MWR-0.05%. The increased content of modifier additives slows down the set of daily strength, despite water reduction, that is, at one day of age, the set of strength is inhibited mainly due to the presence of a surfactant additive in the composition of the models.

In three days, the set of strength is determined by water reduction - the higher the dosage of SP, the greater the compressive strength. The addition of silica fume increases the water demand of the mixture during the manufacture of models, which causes a decrease in strength when introducing a complex additive.

In 28 days of normal hardening, the pozzolanic addition of micro silica more actively contributes to an increase in strength, both due to a greater degree of hydration of alite, and due to the formation of gel-like hydro silicates, such as C – S – H (I). This effect of micro silica is especially characteristic with the optimal content of modifier additives, in which the introduction of MS to a lesser extent affects the strength of the cement stone.

The addition of micro silica interacts in the structure of the cement stone with portlandite, promoting the formation of the C – S – H (I) phase; this reaction proceeds most intensively without the addition of SP [2]. The polycarboxylate additive also reduces the content of portlandite in cement stone, due to complexation with calcium ions, but at the same time reduces W/W and slows

down the degree of cement hydration [1,2,3]. The maximum decrease in portlandite in cement stone, with the combined introduction of the optimal amount of SP and MS, MWR is because such a decrease for Ca (OH) 2 does not lead to deterioration of the protective properties of concrete in relation to steel reinforcement [4]. From literary sources it is known that until all the portlandite in the cement stone has reacted, concrete does not lose its protective properties in relation to steel reinforcement [5,6]. The data obtained on the amount of Ca (OH) 2 in the cement stone are confirmed by H. Taylor, who studied the structure of the cement stone modified with silica fume at low W/W values at different ages [8].

According to the authors, microsilica, interacting with portlandite, promotes the hydration of alite, which leads to an increase in the degree of hydration from 67% to 92%. With the introduction of a superplasticizer additive, the hydration of alite slows down to 63%, and the joint introduction of SP with active pozzolana neutralizes this effect and increases the degree of hydration to 84%. That is, this complex of additives exhibits the properties of a cement hardening accelerator.

The kinetics of an increase in the strength of a cement stone and strength at a certain age are a function of the phase composition of hydrated cement neoplasms

X-ray pictures of a cement stone modified with various additives within 28 days are shown in Figures 7-10.

Portland cement "Karakalpak" plant

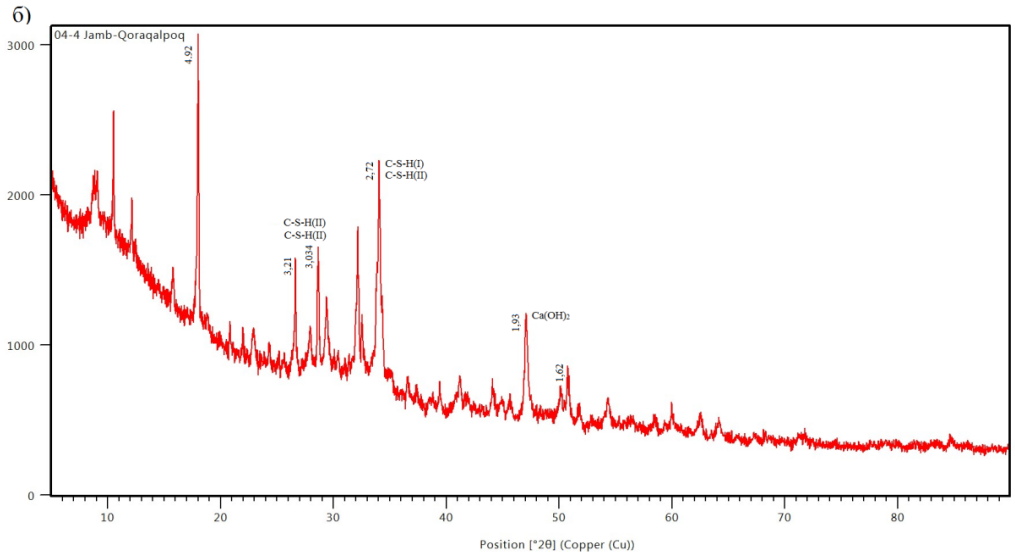


Figure. X-ray phase analysis data for cement stone without additives.

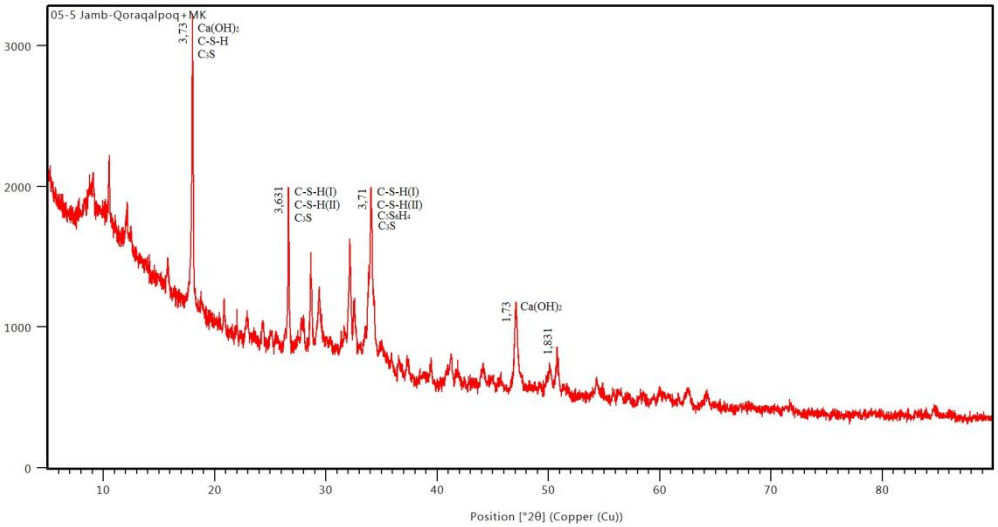


Figure. X-ray phase analysis data of cement stone + MS

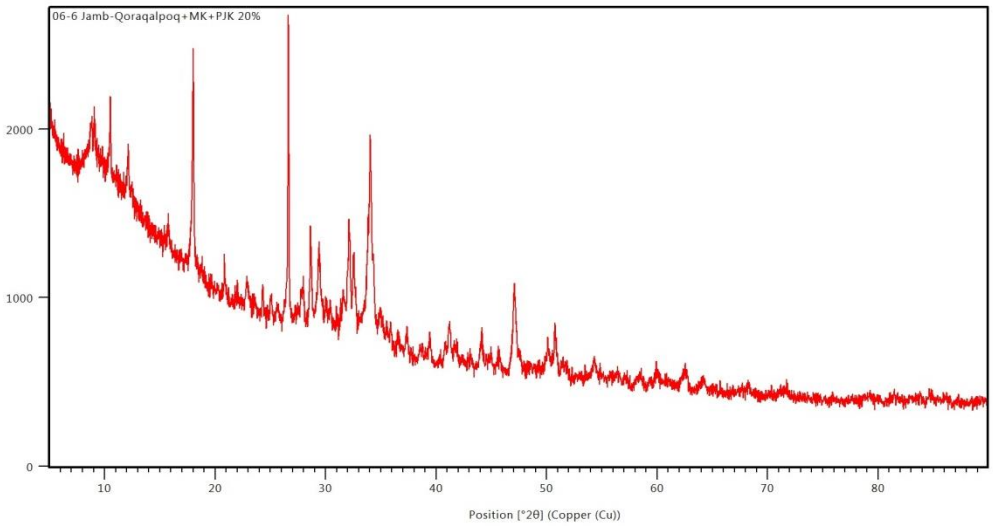


Figure. X-ray phase analysis data of cement stone + MS + MWR
Portland cement "Karakalpak" plant

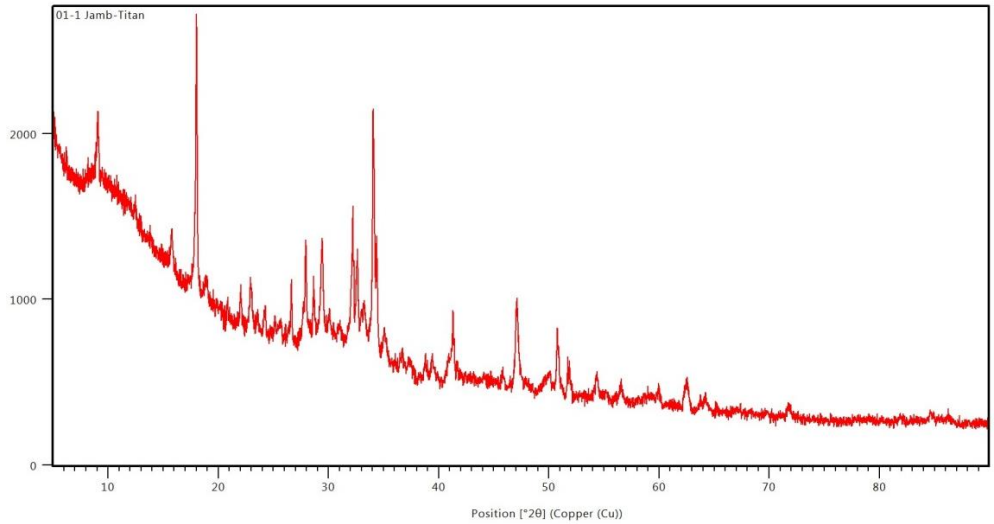


Figure. X-ray phase analysis data for cement stone without additives.

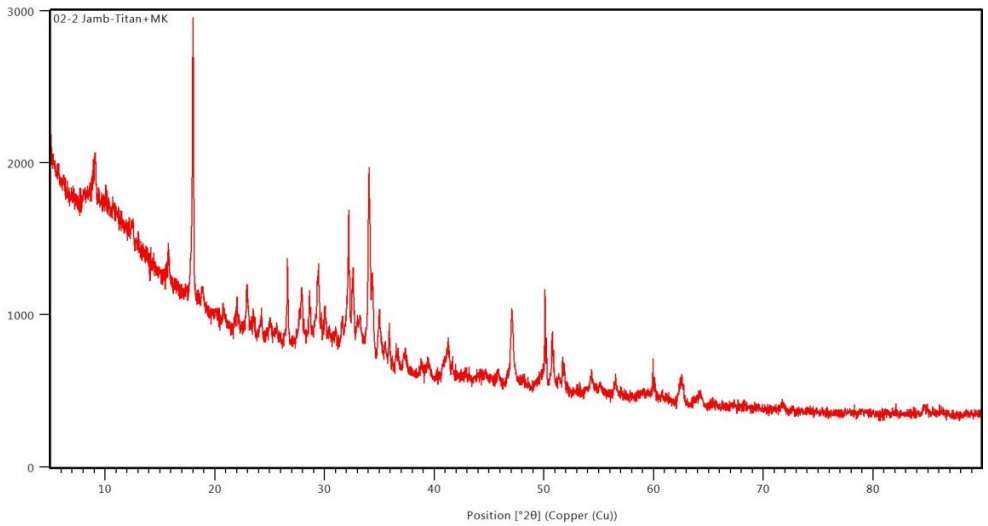


Figure. X-ray phase analysis data of cement stone + MS

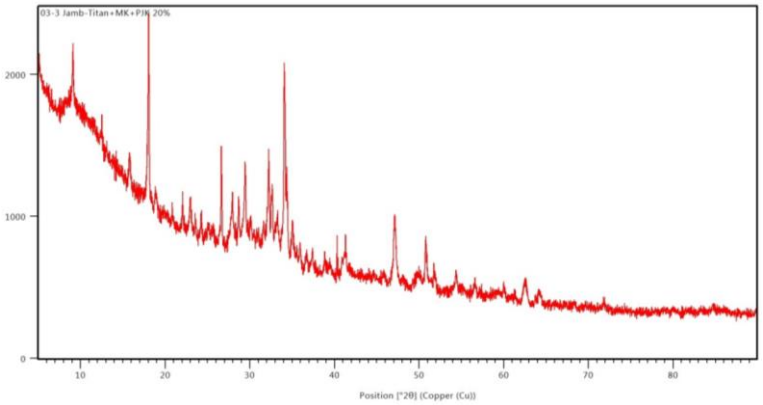


Figure. X-ray phase analysis data of cement stone + MS + MWR

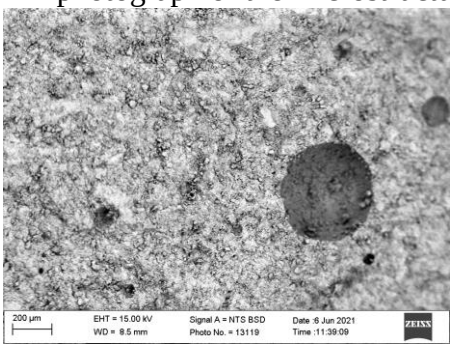
From the X-ray phase study, it follows that the introduction of the SP additive reduces the content of portlandite in the cement stone, which correlates with the results of thermal analysis. The predominant hydrosilicate phase of cement stone with SP is a highly basic, weakly crystallized phase, of the C – S – H (II) type. The rest of the hydration phases are amorphous.

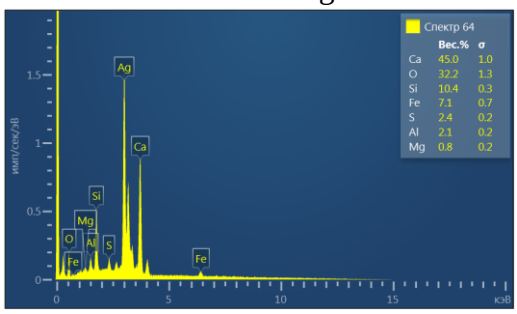
The cement stone modified by the addition of microsilica is formed mainly from low-basic hydrosilicates.

The combined introduction of a plasticizing and pozzolanic additive - 0.8–1% SP and 8–12% MS, and MWR-0.05% contribute to the formation of a small amount of Ca (OH) 2 in the cement stone, and hydrosilicates are mainly represented by C – S– H (I) phase, reflections of calcium hydroaluminates, calcium hydrosulfoaluminates and unhydrated residues of clinker minerals are also recorded. The complex additive SP, + MS + MWR promotes the formation of gel-like hydrosilicate phases of varying degrees of basicity, and the degree of their amorphization is higher than when the additives are used separately.

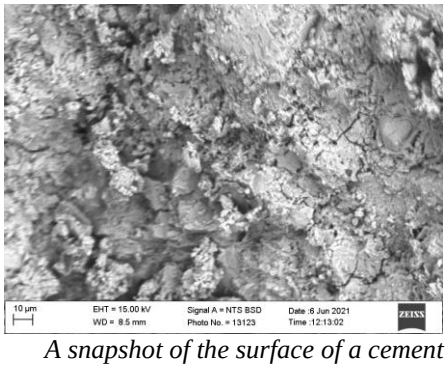
To clarify the available data, using a scanning electron microscope with an X-ray microanalyzer, studies of the structure of a cement stone with various additives were carried out.

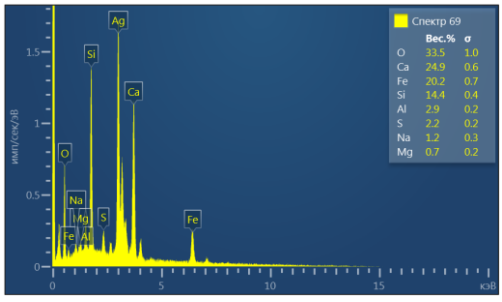
A photograph of the microstructure of a cement stone is shown in the figure.



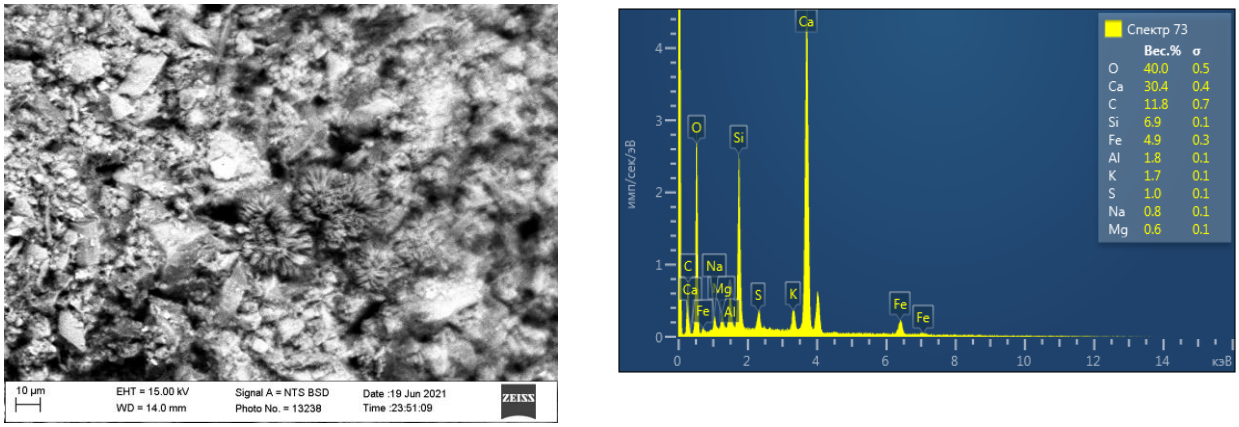


A snapshot of the surface of a cement stone chip without additives within 28 days of the Karakalpak plant

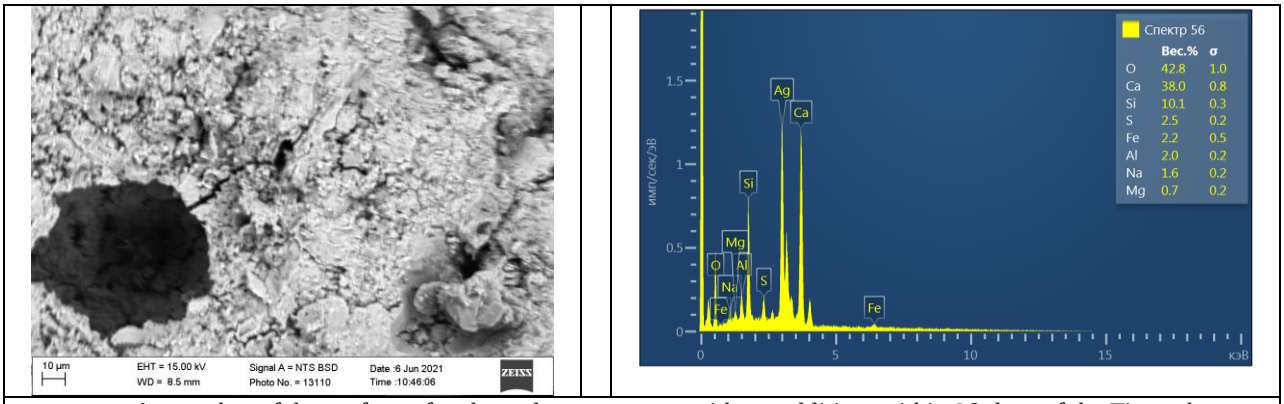




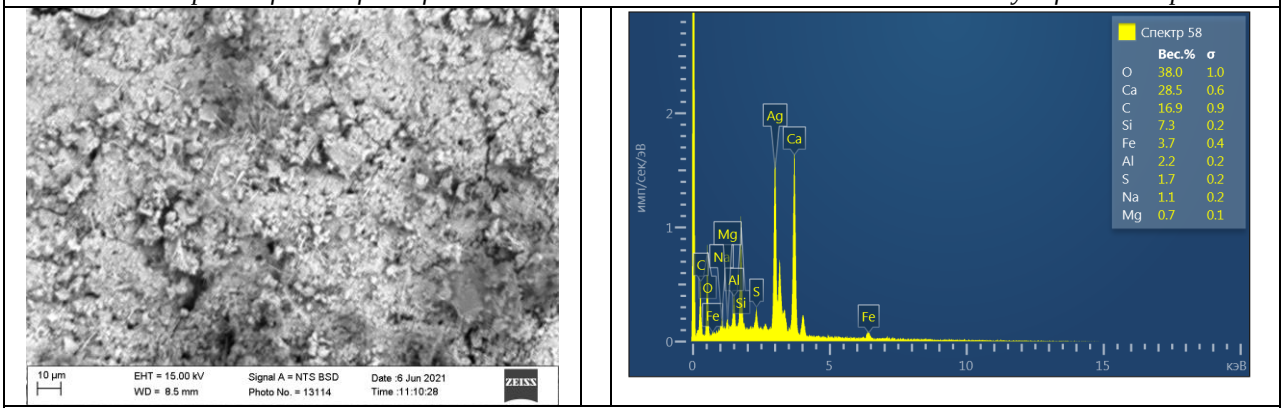
A snapshot of the surface of a cement stone chip without additives within 28 days of the Karakalpak plant



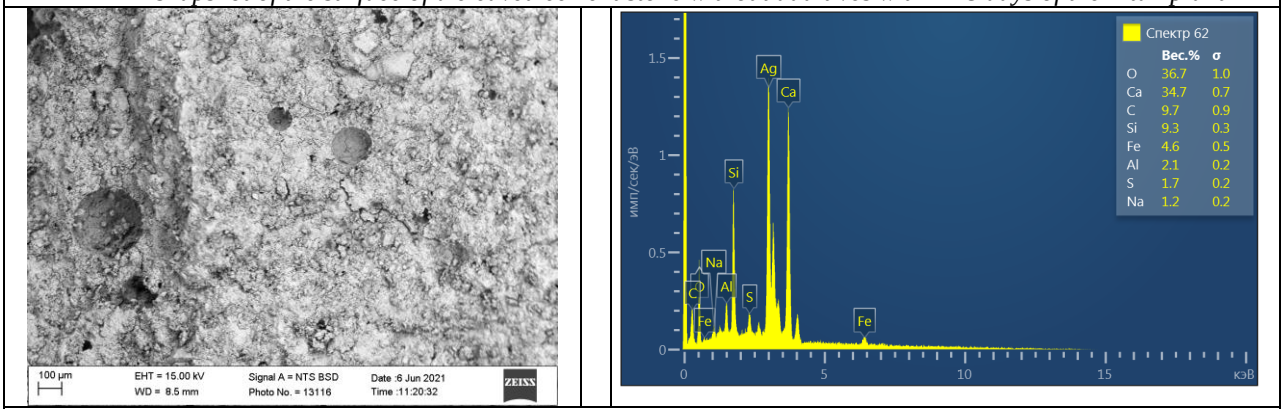
A snapshot of the surface of a cement stone chip without additives within 28 days of the Karakalpak plant



A snapshot of the surface of a cleaved cement stone without additives within 28 days of the Titan plant



A snapshot of the surface of a cleaved cement stone without additives within 28 days of the Titan plant



A snapshot of the surface of a cleaved cement stone without additives within 28 days of the Titan plant

Well-formed Ca (OH) 2 crystals are visible on the cleavage surface, which weakly crystallized masses of calcium hydrosilicates, such as C – S – H (II), which, according to X-ray

microanalyzer data, have an increased basicity - C / S≥1.5, and areas of gel-like fine crystalline masses.

Cement stone modified by the addition of MS (see Figure 12) differentiate with a dense surface with a concave-splinter fracture, the content of free calcium hydroxide is 6.5% and consists mainly of low-base hydrosilicates of calcium - C – S – H (I) phase.

The microstructure of a cement stone modified by the introduction of a polycarboxylate superplasticizer is represented by gel-like highly basic hydrosilicate phases of the C – S – H (II) type with C / S≥1.5, which is confirmed by the data of an X-ray microanalyzer.

Calcium hydroxide is distributed in the cement stone in the form of small areas, in most cases, located between the hydrosilicate components.

On the surface of a cement stone cleavage (see Figure 14), modified with additives of SP, MWR, MS, regions of a weakly crystallized gel-like C – S – H (I) phase with a C / S ratio of 1.1–1.3 are visible, and individual disseminations of hydroxide are observed calcium, with a total content of not more than 5%.

With the introduction of additives SP + MS + MWR, the structure of the cement stone is formed mainly from weakly crystallized hydrate phases of the plate form, such as C – S – H (I), which leads to an increase in its density and strength.

The specific surface of the cement stone models (see Figure 15) was tested at the age of 28 days using the Brunauer-Emmett-Teller method [9]. It was found that the additions of SP + MS + MWR contribute to an increase in the specific surface area of hydration products and, accordingly, to a greater degree of structure amorphization.

Additives modifiers, when combined into a cement stone, with an increase in dosage, reduce micro and macroporosity to 16–17%, and SP has a greater effect due to water reduction. Thus, according to the totality of all parameters, it was found that the modifying effect of each of the additives separately is not enough. The maximum effect, expressed in the directional formation of weakly crystallized low-basic calcium hydrosilicates, with a minimum amount of portlandite of about 5%, is achieved with the combined use of additives at a dosage of 1% SP, 8-12% MS, 0.05% MWR.

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Rezyume: *Maqolada harakatga yo'naltirilgan qo'shimchalar majmuasi bo'lgan tsement biriktirgichining tuzilishini shakllantirish masalalari ko'rib chiqiladi. Ko'p komponentli betonlarni qo'shimchalar majmuasi bilan optimallashtirish natijasida to'xtatilgan ishlash xususiyatlariga ega bo'lgan betonlar olindi.*

Резюме: *В статья рассмотрены вопросы структурообразования цементного вяжущею с комплексом добавок направленного действие. В результате оптимизации многокомпонентные бетона с комплексом добавок были получены бетоны с повешенными эксплуатационными характеристиками.*

Kalit so'zlari: *Tsement, superplastifikator, mikrosilika, suv o'tkazmaydigan, tsement tosh, o'zgartiruvchi qo'shimchalar, sovuqqa chidamli, qo'shimchalar.*

Ключевые слова: *Цемент, суперпластификатор, микрокремнезем, модифицирующих гидрофобизатор, цементный камня, модифицирующих добавок, морозостойкость, добавка*

UDK 665.5

THE EFFECT OF DIFFERENT FUNCTIONAL LANDINGS ON THE ECOLOGICAL PROPERTIES OF AUTOMOBILE GASOLINE

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Summary. *The growth of the automobile fleet and the associated increase in environmental pollution impose increasingly stringent requirements on the quality of gasoline produced, in particular its environmental properties. The article describes the characteristics of additives that improve the environmental and anti-detonation properties of automobile gasoline and their degree of influence in local gasoline.*

Keywords: *gasoline, environmental standard, additives, octane number, hydrocarbon composition.*

A sharp increase in the demand for oil and gas products is the cause of the emergence of various serious environmental problems in the world. Taking into account this, great attention is paid to improving the quality of petroleum products in the Republic of Uzbekistan and production of environmentally friendly petroleum products on the basis of local technologies and technologies.

The main part of the chemical poisoning of the environment comes from gases emanating from internal combustion engines. Due to the physical and mechanical processes going on in the cylinders of the engine, engines of complex composition are distinguished, containing more than 200 poisonous components. The table below shows the composition of toxic gases displacing diesel and gasoline engines.

Table 1

The composition of car toxic gases

Component	Quantity, %	
	Gasoline engine	Diesel engine
Nitrogen	74-77	76-78
Oxygen	0,3-8,0	2-18
Water deer	3,0-5,5	0,5-4,0
Carbon Dioxide	5,0-12,0	1,0-10,0
Carbon monoxide	5,0-12	0,01-0,5
Nitrogen oxides	0,0-0,8	0,0009-0,5
Nocanthserogenic hydrocarbons	0,2-3,0	0,009-0,5
Aldehydes	0,0-0,2	0,001-0,009
Saca	0,0-0,4 gr/m^3	0,01-1,1 gr/m^3
Benz (+) pyrene	10-20 up to mcg/m^3	10 up to mcg/m^3

From these above components, we obtain carbon monoxide, because they exhibit hemoglobin-like properties, they form compounds such as carboxyhemoglobin (HbCO), even under not very high partial pressure. Dissociation HbCO is 3600 times slower than oxyhemoglobin (HbO2). At the same time, the appearance of hypoxemia reduces the oxygen conductivity of tissues into the body. At the same time, the constant content of carbon monoxide in a low concentration leads to a decrease in the sensitivity of the visual organs to light and colors, changes in the brain, impaired mental reactions over a certain period of time, a change in morphological indicators of blood content, such as erythrocytosis, polyglobulia. Constant exposure to carbon monoxide causes dizziness, dizziness, rapid exhaustion, emotional instability, predisposition to the heart [1].

Together with the above, benzene containing gasoline poses various risks to human organs. When exposed to benzene at a high concentration, which has a great influence on the areas of the human brain, and when exposed to benzene at a lower concentration, the circulatory organs are the first to suffer. Exposure to benzene in the blood leads to its accumulation in the brain, disruption of

nucleic acid synthesis, infection of the main cells, violation of their chromosomal structure and a number of similar effects. There is a linear connection between the concentration of benzene in automobile gasoline and its derivatives - poisonous gases, substances released from the fuel system, and components containing benzene in gas stations. Increase of benzene content in fuel for every 1% leads to its increase in composition of toxic gases by 0.7-0.8% [2].

Proceeding from the above information, it should be said that reducing the impact of vehicles on the environment is becoming one of the pressing problems of today.

Table 2

Modern requirements for the quality of gasoline

Indicators	Requirements		
	Euro-3	**Euro-4**	**Euro-5**
Amount of benzene,%	1,0	1,0	1,0
Amount of sulphur,%	0,015	0,005	0,001
Amount of aromatic hydrocarbons,%	42	35	35
Amount of alephine hydrocarbons,%	18	14	14
Oxygen content,%	2,3	2,7	2,7
Fraction composition,%:			
Steam pressure, kPa	summer 70 winter 90	summer 70 winter 90	summer 70 winter 90

The fuel industry of Uzbekistan is moving to the requirements of European standards (Euro-3, Euro-4, Euro-5) on the anti-detonation and environmental properties of gasoline and diesel fuel (table 2) [3].

Using the example of gasoline on agar, it is necessary not only to increase its octane amount in order to obtain gasoline that meets the above requirements (Euro-3, Euro-4, Euro-5), but also to reduce the amount of sulfur, olefin and aromatic hydrocarbons (in particular benzene). In addition, it is necessary to transfer excess aromatic hydrocarbons to isoparaffins, add oxygen-containing components, antioxidants, detergents and other necessary installations to the gasoline composition.

Given the chemical view of the detonation process, the power of the latter fuel affects the primary oxidation products of hydrocarbons - hydroperex and the products of their highly active free radical decomposition. The higher the peroxide formation in this working mixture, the brighter the combustion is observed [4].

The main factor of yield and intensity of detonation is the chemical composition of the fuel, since the tendency of hydrocarbons of different groups to oxidize is different under the same conditions - fog. With insufficient peroxide of hydrocarbons contained in the agar under pre-burning oxidation conditions, there is no decomposition in it, as a result of which the mixture does not act as active substances, combustion occurs at the usual rate without detonation. Detonation stability or anti-detonation properties of hydrocarbons and fuel are determined on a special single-cylinder laboratory device. To improve environmental safety and improve the quality of gasoline, it is possible to change its hydrocarbon and chemical composition. The use of antidetonators based on tetraethyl kanase is fully fixed. Once such anti-detonators have been incorporated into petrol, much attention will be paid to testing of nitrogen aliphatic and aromatic plants and industrial production.

Aliphatically justified landings received a wide color in the United States. This was done by building new catalytic cracking devices and alkylation processes. Unleaded US gasoline is characterized by a small amount of aromatic hydrocarbons. Their detonation stability is improved by high octane isoparaffins [5].

In Western Europe and Russia, an aromatic orientation aimed at the rifling of low-octane gasoline has been widely used. The leaded product of this type consists mainly of aromatic hydrocarbons. Therefore, gasoline of this type, together with high detonation resistance, show a high standard of living and retain a smaller number of hexagonal compounds in the composition. [6-7].

In recent years, in the USA, Western Europe and Russia, the addition of oxygen-containing compounds, such as high-octane ether and alcohol, to the composition of autobenzines has begun.

In addition to the above, the following plantations are used in relatively small amounts: elemental compounds such as iron and manganese, for example $(C_5H_5)_2Fe$ dicyclopentanedienyltemir, manganese methyl cyclopetadienyltricabonyl $CH_3CH_5H_4Mn(CO)_3$, etc. Such landings have been extensively investigated and widely used abroad. Oxygenates such as lower aliphatic alcohols, methyl tert-butyl ether or a mixture thereof called feterol with tert-butanol are now widely used [7].

The main disadvantages of the above manganese and reinforced concrete wells, after their ignition, are the remains of iron oxide and manganese of the engine. these oxides cause damage to engine piston parts and injection elements. The main disadvantage of oxygen-containing plants is their consumption above. Despite the fact that azocyanated ash-free landings lag behind reinforced concrete and manganese landings in anti-detonation properties, oxygen-containing landings exceed 10-15 times. The advantage of such exercises is their polyfunctionality and high antidetonation properties, which also exhibit antioxidizing, stabilizing and anticorrosive properties. Their aromatic amine compounds are relatively effective: 1.3-5% of concentrated xylidine and extraline (7% aniline, 88% N-methylaniline and 5% xylidine) have a high well-being. Among such planting compositions, ADA plants containing 2% - N-methylaniline and 0.1% - anti-acid plants such as agidol-1 or agidol-12 are widely used. When using these landings together with MCBE, the amount of octane due to synergistic effect increases to 1 point. This indicator was obtained in relation to the special use of planting [3-5].

Throughout the world, many types of additional and landing devices have been investigated and patented, increasing the octane amount of gasoline. Among them, oxygen plants occupy a special place: MTBE, methyl tert-amyl ether (MTAE), ethyl tert-butyl ether (ETBE), diisopropyl ether (DIPE), ethyl tert-amyl ether (ETAE); alcohols: methanol, ethanol, isopropanol, etc. These additives exhibit high octane number, low volatility, low tendon and low photochemical activity. Their addition to gasoline, the complete combustion of gasoline, as well as the carbon content in gases leaving transport, can be reduced to 32.5%, and the amount of hydrocarbons - to 14.5% [3]. The physicochemical properties of these cases are shown in Table 3 [4].

Table 3

Physicochemical properties of oxygen wells

Indicator	MA	EA	IPA	TBA	VBA	MTBE	MTAE
20°C density at temperature, kg/cm^3	795	790	780	780	802	740	770
Heat, kdj / kg. Burning Bending	 22707 1104	 16945 839	 33300 666	 35590 536	 35690 562	 38220 337	 39392 326
Novice temperature, °C	6,5	12	13	11	24	28	-
Octane number Research method (R.M) Motor method (M.M)	 122 93	 121 97	 117 95	 106 94	 108 91	 115 97	 108 96
Steam pressure, kPa	35	17	13	14	9,7	61	22

We investigated the effects of isopropanol alcohol (IPA) and MTBE from the above anti-detonation plants on the octane amount of gasoline with local low octane.

Table 4

Results of detonation tests of gasoline and IPS compositions

Size of IPA in composition, %	B-1	B-2
	Octane number	
	M.M. / R.M.	M.M. / R.M.
0	70/70	71,5/80,3
5	72,7/74,1	73,5/82,4

7,5	74,3/75,6	74,4/83,7
10	77,1/75,6	75,3/84,9

Antidetonation efficiency of IPA in a ratio of 70:30% - a mixture of isooctane and n-heptanes (B-1, octane number in the motor method (M.M.) - 70, by the test method (R.M.) - 70) and control fuel (B-2, a mixture of toluene and n-heptane in a ratio of 60:40%; octane number M.M. - 71.5 and the like - 80.3) depending on the change in octane number. The results of the study are shown in the table below.

From the results of the study it follows that the use of IPA in purity does not solve the problem of bringing the octane amount of low-octane gasoline to the requirements of Eurostandard.

In this regard, in the course of our subsequent studies, we added MTBE to domestic low-octane gasoline (AI-80) and determined the degree of change in its anti-detonation properties. Samples of the new composition were taken with up to 5, 10 and 15% HCBP added. The results of the study are given in the following sequence.

From the results of the theoretical and practical study, it can be concluded that at present, by adding oxygen-containing octane plants, it is possible to obtain automobile gasoline that meets modern environmental requirements and improved anti-detonation properties.

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Rezyume: *Avtomobillar ko‘payishi va shu bilan birga atrof-muhit zaharlanishining o‘sishi ishlab chiqarilayotgan benzinlarning ekologik xossalariga qo‘yilayotgan talablarning jiddiylashishiga asos bo‘lmoqda. Maqolada avtomobil benzinlarini ekologik va antidetonatsion xossalarini yaxshilovchi qo‘ndirmalarni tasnifi va ularning mahalliy benzilarga ta’sir etish darajasi keltirilgan.*

Резюме: *Рост автомобильного парка и связанное с ним увеличение загрязнений окружающей среды предъявляют все более жесткие требования к качеству вырабатываемых бензинов, в частности их экологических свойств. В статье приведены характеристики присадок, улучшающие экологические и антидетонационные свойства автомобильных бензинов и их степень влияния в местных бензинах.*

Kalit so‘zlar: *benzin, ekologik standart, ekologiya, qo‘ndirmalar, oktan soni, uglevodorod tarkib.*

Ключевые слова: *бензин, экологический стандарт, присадки, октановое число, углеводородный состав.*

EXPERIENCE IN DESIGNING LARGE CITIES IN COMPLEX ENVIRONMENTAL CONDITIONS

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Summary: *This article describes the stages of urban planning, the problems of aesthetic improvement of the master plan spatial environment in accordance with the lifestyle of the population, methods and principles of solving the problems of material and spatial organization of leisure activities of the population.*

Keywords: *Urban planning, master plan, project, interior, shear, agglomeration, demographic factors, profile, landscape.*

Since gaining independence, Uzbekistan, in accordance with complex structural transformations, has been taking consistent steps to improve and develop the organizational structure of environmental quality management and nature management. In the context of ongoing economic reforms, the transition to market relations, the growth of population and cities, an increase in the volume of transportation, the intensification of agricultural and industrial production, solving the problems of environmental protection and related issues of rational use and reproduction of natural resources has become a major state task.

It should be noted that the effective implementation of reforms is facilitated by a good legal framework.

The system of environmental protection and nature management in Uzbekistan was formed back in the 60-80s of the last century.

The reforms carried out in Uzbekistan since the attainment of independence contribute to the successful solution of the tasks of overcoming economic difficulties on the way from a centralized planned system with administrative-command principles of management to a market economy, achieving economic and financial stability.

In the context of the transition to a market economy, it is necessary to ensure an effective combination of macroeconomic planning with environmental policy aimed at implementing the transition from the protection of individual elements of nature to the overall protection of ecosystems and ensuring sustainable development of the country.

The prospects for the country's economic development cannot be viewed in isolation from its impact on the environment. At the same time, the effectiveness of environmental protection is not always adequate to the efforts expended. Structural changes taking place in the economy of Uzbekistan have an undoubted impact on the degree of use of natural resources and on the level of environmental pollution. Therefore, during this period, the economic aspects of environmental decision-making, that is, the integration of environmental and economic policies, acquire special importance. In these conditions, the State Committee for Nature Protection of the Republic of Uzbekistan pays special attention to pursuing a policy aimed at introducing resource-saving and low-waste (clean) technologies, new types of services, entrepreneurship, etc. with a wide range of economic instruments.

The Aral Sea crisis is a formidable warning to the entire world community about how rapid and large-scale the environmental threat can become for the whole region due to unsustainable use of natural resources. Only twenty-five years ago, no one attached any serious importance to this. Although the fact that the Aral Sea began to dry up was noticed more than 100 years ago. At that time, its cliffs were exposed on the western shores, and part of the bottom was exposed on the shallow southern and eastern shores. From 1858 to 1894, Aybugir Bay completely dried up in the south. In 1989, the Aral Sea was divided into Small and Big. The Small Sea became a flowing body of water, and the Big Sea became closed. In such a short period, the fourth largest enclosed body of water in the world disappears from the face of the earth, and a population equal in number to the

whole state of Europe is at the epicenter of the crisis.

It was assumed that the possible reasons for this process were a decrease in the amount of water in the Amu Darya and Syrdarya rivers flowing into the Aral, a decrease in the amount of precipitation falling on the surface of the lake and its immediate environs, an increase in air temperature and stronger winds.

The sharp drop in the water level in the sea and its division into two parts necessitated the development of improved methods for calculating the terms of the water balance. Currently, many researchers (including foreign ones) are looking for ways to mitigate negative consequences by preserving its parts, as well as regulating water consumption in its basin.

Excessive pollution of water resources and their depletion as a result of an extensive approach to the use of natural resources has become one of the main causes of the ecological crisis in the Aral Sea zone.

The Aral Sea crisis and its consequences in terms of the scale of their impact on the environment and climate have no analogues in the world and have become the subject of close attention not only to the states of this basin, but also to the world community. As a result, prerequisites have been created for reaching a consensus between the states of the region on pricing in water use, planning the use and management of water resources, cooperation and joint use of databases for the sustainable provision of water to economic sectors in all states of the basin, effective water quality management and overall environmental health improvement. situation in the Aral Sea basin.

Foreign experience.

The national economic value of the lands of sandy deserts is much less than the value of lands in oases, which makes it possible to occupy these territories for inhabited places in an unlimited amount. However, the development of the territory of sandy deserts is associated with huge expenses for the improvement and consolidation of sands, on which it is impossible to plant trees and shrubs without adding fertile soil.

In desert conditions, water is the main factor in the emergence of populated areas and their further development. Water supply is carried out in various ways: by transport (by rail, by car, by plane, etc.), laying canals and water conduits, drilling artesian wells and wells, as well as by evaporating salt water in special installations using various types of energy (solar , atomic, etc.). Thus, in the city of Krasnovodsk, located on the eastern coast of the Caspian Sea, water is delivered by tankers from Baku; to the settlements of Darvaza and the Sulfur Plant located in Central Kara-Kum, water is delivered by plane from Ashgabat; In the city of Shevchenko (Mangyshlak peninsula), the first in our country experimental atomic seawater desalination plant, with a capacity of about 5 thousand m3 of fresh water per day, operates. The territory of the sandy desert of the Central Asian republics belongs to the non-seismic zone.

The planning structure of inhabited places in a sandy desert is primarily due to the need to create a space isolated from the desert, to preserve its coolness and shade inside.

In areas with a forward view of sand movement and an active wind regime, small villages or individual buildings have a streamlined shape that does not impede the movement of the wind-sand flow. This form was proposed and implemented by the geographers E. Ostanin and A. Znamensky in Nebit-Dag. Villages or houses with a streamlined shape are located with their long side in the direction of the prevailing wind. On the short windward side, a rounded fence is arranged, and on the leeward side, where sand usually accumulates in the vortex zone, the fence has the shape of an incoming acute angle. Villages or buildings built according to such a plan are not covered with sand, since the wind-sand stream, approaching the streamlined structure, bypasses it, without losing speed and without depositing sand.

A vivid example of this is the city of oil workers of Turkmenistan, Nebit-Dag, created in the post-war period. Northeast winds prevail here, as a result of which the sands move forward from the foothills of the mountain ranges of the Big and Small Balkhan, sweeping through the city. The

conditions for the development of plants here are extremely unfavorable, especially because of the highly saline sea sands, on top of which there are accumulations of mobile sands in the form of dunes.

The layout of Nebit-Dag is designed in such a way that the direction of the wide main streets coincides with the direction of the prevailing northeastern winds, along which wind-sand streams pass freely through the city without depositing sand. The territory of the residential areas does not have a through blowing, and the saw wind seems to bend around the inner space of residential courtyards.

This, obviously, is due to the fact that on streets parallel to the direction of the wind, the air speed increases due to the narrowing of the section of the wind flow at the entrance to the street space. As a result of this, the phenomenon of suction occurs to some extent from residential yards. The roadways and sidewalks are usually designed so that they do not contribute to the accumulation of sand drifts.

It is interesting to consider the zoning of residential buildings by number of storeys in Nebit-Dag. In the peripheral parts of the city, where the influence of unfavorable factors is the strongest, there are mainly 1-storey buildings with adjoining plots, forming a reliable screen that protects the inner parts of the city from external negative influences. The central part of the city is built up with multi-apartment 2 and 3-storey sectional buildings.

An example illustrating what has been said is the city of Karmil in the Negev desert (Israel) shown in the general plan diagram. Buildings in the districts adjacent to the public center of this city have a linear layout. Here, residential buildings of mixed number of storeys, divided into compact residential groups by narrow streets, seem to be a typical technique for the desert zones of the city, in order to reduce distances, all utilities and some industries are concentrated in groups of residential buildings.

In principle, the organization of the residential area was adopted in the development of Beersheb (Israel), where multi-storey buildings create a protective screen around the plots built up with low-rise buildings with courtyards near the apartment.

Of interest is the work of French designers for living conditions in the Sahara. So, when designing the city of Kansado (Mauritania) with a population of 35 thousand people, they had to solve complex problems - creating a favorable environment in conditions where there is no fertile soil, not a single tree. Fresh water supplies are very limited. The designers had to look for a type of dwelling that would be suitable for the conditions of a particularly arid region.

The planning structure of the residential part of the city of Kansado is solved in such a way that service establishments and pedestrian roads are located in the central part of residential areas; residential buildings are divided into residential groups by narrow pedestrian streets with shaded houses; low-rise buildings, occupying the maximum site.

Here, special attention was paid to the architectural and spatial organization of the city through the concentration of residential buildings and the combination of various volumes of houses.

In the residential development of new settlements in Iran (in oil-bearing regions), 1-storey block houses are used with apartment courtyards with an area of 20-30 m2. Additional premises (bathrooms, kitchen) for all four apartments are located in the center of the block and communicate with the living rooms only through the courtyard ... The presence of a small open courtyard allows you to be outdoors around the clock during the warm season to avoid the device of a special flight room (in the form of verandas or loggias).

The house with a compact layout is also used in the Sahara. A distinctive feature of this house from the type of houses used in Iran is the different arrangement of the courtyard. If in the first case the courtyard is located at the entrance to the apartment, replacing the front one (the traditional method of locating the courtyard in the people's dwelling of the countries of the Near and Middle East), in the second case, the courtyard is located at the back of the apartment so that you

need to pass through the living rooms. This creates certain inconveniences in the operation of the home.

The most common is a semi-detached 2-storey house with apartments on two levels and a compact plan, an example of which is a residential building in Rabat, Morocco. Each apartment here has a courtyard on the ground floor with a common room and a terrace on the second floor with bedrooms. Such a house provides favorable conditions for daytime rest (courtyard of the first floor) and night sleep (terrace on the second floor). In addition, blocking buildings into single massive volumes increases their inertial qualities and reduces the area of external surfaces exposed to thermal effects of the environment.

Domestic experience.

One of the priority areas in the development and implementation of master plans for cities, regional centers and urban settlements is urban planning ecology, aimed at assessing and improving the environment of urban settlements.

The main task of environmental protection is to improve the microclimate of the settlement, i.e. protection of air, water bodies, soil from pollution by industrial emissions and household waste; reduction of street and industrial noise; increasing the sanitary and hygienic efficiency of green spaces; development of unsuitable for building lands for green spaces.

The rationale for measures to protect and improve the environment is based on the research, calculations and monitoring of the existing sanitary services and the developers of the master plan.

When developing the section "Protection and improvement of the environment" of the master plans of urban settlements Khazarasp, Pitnyak (Druzhba) and Shavat of the Khorezm region, pre-design studies of the state of atmospheric air, water and soil cover were carried out.

A feature of the region is an extra-arid climate, characterized by large amplitudes of fluctuations in annual and daily temperatures, very hot summers, little cloudiness and humidity, negligible rainfall - the average annual rainfall fluctuates around 120mm / year. Dry air and intense solar radiation cause strong evaporation of moisture, which affects green spaces, especially along highways.

Analysis of changes in vegetation in recent years shows an increased impact of salt accumulation and deflation. These processes determine the desertification of the natural environment of the Southern Aral Sea region. When the channel dries up, tugai are intensively desertified. In desert places, salt- and dry-resistant plant species are introduced into the species composition.

The state of soils, grounds and vegetation is determined by the impact of both technological (industrial, energy, utilities, vehicles) and natural sources, and correlates with the state of atmospheric air, surface and ground waters.

The landscaping system laid down in the projects of master plans is multifunctional. It takes into account the need to preserve and replenish natural resources, create favorable microclimatic conditions, perform protective functions, and improve the aesthetic qualities of the landscape.

When developing greening projects at subsequent stages, the selection of an assortment of trees and shrubs should be carried out depending on the location of the green areas, taking into account the complex of all functional loads.

In one case, the decorative value of rocks may prevail (landscaping of planning centers, parks, boulevards), in another case, the height of trees and their viability (sanitary protection zones from industrial facilities, landscaping along highways) are important, in the third, the depth and ramification of the root system and drought resistance (planting to strengthen river banks and canals flowing in ravines).

Urban conditions have a very strong influence on the condition and longevity of trees. A high level of air and soil pollution, soil nutrient deficiency, as well as deterioration of the water and air regime of soils reduce the vital functions of trees, and reduce their natural life expectancy. Therefore, urban green spaces need special care and constant maintenance. The improvement

services should already have a program of necessary forestry activities (thinning, clarification of valuable species, sanitary felling, as well as measures to combat pests and diseases, selection of an assortment of planting material, depending on the ecological state of the environment and the sustainability of vegetation).

The development of the section "Protection and improvement of the environment" made it possible to identify a number of main factors affecting the sanitary and hygienic state of cities. The figure shows a schematic in the image of a comprehensive assessment of the state of the environment, the main components are: pollution of atmospheric air, water bodies and soil and vegetation cover; territories with uncomfortable micro-climatic conditions; areas with a high level of noise and radiation, pollution from mobile sources.

After a summary assessment of all components, the city's territories with varying degrees of environmental condition and favored for urban planning are classified.

The formation of the sanitary and hygienic qualities of the urban environment is greatly influenced by:

natural and climatic factors that determine the thermal regime of open spaces and buildings;

conditions for the rehabilitation of urban areas;

conditions for the dispersion of harmful emissions from stationary (industrial enterprises, heating and gas distribution stations, boiler houses, gas stations) and mobile sources (highways, railway and air transport).

The master plans of the cities of the Khorezm region provide for long-term and priority environmental protection measures.

Long-term measures include: the creation of a unified system of greening the city, the development of existing industrial enterprises through reconstruction and refurbishment.

Priority measures include: removal of enterprises that pollute territories (oil depots, warehouses of agricultural chemistry, etc.) outside the city limits, repair of engineering networks and communications of water supply and sewerage, repair of the drainage system, creation and strict observance of water protection zones, uninterrupted organization of removal of household waste.

Complex measures for environmental protection and rational use of natural resources.

The complex of measures for environmental protection includes:

-technological conditions for the implementation of environmental requirements (reducing the toxicity of car engines, improving the production and processing technology, achieving the optimal level of equipment of industrial, energy and municipal facilities with modern gas cleaning, dust collecting and water treatment equipment, ensuring the treatment of wastewater and contaminated surface runoff to a degree that meets the regulatory requirements for discharge into surface water bodies-canals, removal and processing by industrial methods of household and industrial waste, modernization of industry with the transition to low-waste and non-waste technologies);

- urban planning directions for the implementation of environmental requirements (elimination of environmental risk zones that pose a threat to the safety of public health, remediation and rehabilitation of areas subject to a strong technogenic load; elimination of noise discomfort zones on the territory of residential and public buildings (equipment with existing screen devices, green plantings with sustainable species composition, etc.); the formation of a safe environment in residential buildings due to the removal of enterprises and industries that pollute urban areas.

The scientific department of the OJSC "Uzshaharsozlik LITI" Institute develops methodological recommendations for stabilizing the environment of urban settlements of the Republic of Uzbekistan, which reflect the environmental sustainability of urban areas in all regions of our country; an assessment of the current state of engineering facilities and communications is given; studied the socio-economic aspects of urban planning ecology. The recommendations will

help city planners to purposefully solve the issues of improving the urban environment, the most relevant and necessary for each specific city of the republic.

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Rezyume: *Ushbu maqolada shaharsozlik bosqichlari, aholining turmush tarziga mos ravishda bosh rejaning fazoviy muhitini estetik takomillashtirish muammolari, aholining bo'sh vaqtini moddiy va fazoviy tashkil etish muammolarini hal qilish usullari va tamoyillari tasvirlangan.*

Резюме: *В статье описаны этапы градостроительства, проблемы эстетического совершенствования генерального плана пространственной среды в соответствии с образом жизни населения, методы и принципы решения проблем материально-пространственной организации досуга населения.*

Kalit so'zlar: *Shaharsozlik, bosh reja, loyiha, interyer, qirqim, aglomeratsiya, demagrafik omillar, profil, landshaft.*

Ключевые слова: *Градостроительство, генеральный план, проект, интерьер, сдвиг, агломерация, демографические факторы, профиль, ландшафт.*

CHANGES OF ELECTROPHYSICAL PROPERTIES OF ANTISTATIC WOVEN FABRIC

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Summary: *Electro-conductive textile materials and products are used presently giving solutions to the problems, related to static electricity, electromagnetic shielding and electromagnetic radiation. Thus, a study of their electro-physical characteristics, character of conductivity, possibility of forecasting of electric parameters etc. has a substantial value. This article shows the possibility of production electro-conducting textile materials with stable antistatic properties by introduction of electro-conducting yarn into the structure of fabrics. This article reviews the results of the related research, of the electrical characteristics of the fabric, of the effect of containing in their composition different amounts of electrically conductive yarns. The purpose of this work is to study the change in the electrical resistance of electrically conductive yarn (ECY) in the process of fabric formation and to determine the most rational version of the fabric for creating special antistatic suits, various capes and other products that help remove static electricity charges.*

Key words: *Electro-conductive textiles, static electricity, electro-physical characteristics, anti-static properties, woven fabric.*

1. INTRODUCTION

Textile materials are dielectrics by their electrophysical properties and accumulate static electricity in the processes of processing and operation, in other words, they are electrified. The phenomena of electrification also take place in other cases during the flow of dielectric liquids, pneumatic transportation of powdery dielectric materials, etc. We observe electrification almost always (unless special measures are taken) when we deal with materials made of synthetic polymers. This is due to the fact that in most cases synthetic polymers are hydrophobic, i.e. their equilibrium moisture content is very low and they have a sufficiently high electrical resistance of the order of 10^{13}-10^{16} ohm • cm.

According to GOST 17.1.018-79, the term “static electricity” means a set of phenomena associated with the emergence, retention and relaxation of a free electric charge on the surface and in the bulk of dielectrics and semiconductors, products on insulated, including those dispersed in a dielectric medium [1-5].

Electrification of materials often interferes with the normal course of production processes, and also creates an additional fire hazard due to sparking during discharges in the presence of combustible steam and gas-air mixtures in rooms, tanks and hangars.

The same GOST 17.1.018-79 defines the concepts of electrostatic spark-safety (ES&B) as the state of an object, in which the possibility of explosion and fire from static electricity is excluded. Electrostatic spark safety must be ensured by eliminating static electricity discharges that can become a source of ignition of flammable substances (materials, mixtures, products, products, etc.).

Often, static electricity can also accumulate on the human body if he is wearing synthetic clothing and is in a dielectric environment.

In some cases, static electrification of the human body and then the subsequent discharge from a person to the ground or grounded production equipment, as well as an electrical discharge from ungrounded equipment through the human body can cause pain and nervous sensations and cause involuntary sudden movement during - the result of which a person can get injured (falls, bruises, etc.). In addition, under the influence of an electrostatic field, a current can flow through the human body, which can lead to discomfort and various diseases.

According to the hypothesis of static electrification of bodies when two different-discharge substances come into contact, due to the nonequilibrium of atomic and molecular forces on their surface, a redistribution of electrons (in liquids and gases also ions) occurs with the formation of a double electric layer with opposite signs of electric charges. Thus, between the contacting bodies, especially during their friction, a contact potential difference arises, the value of which depends on a number of factors - the dielectric properties of materials, the value of their mutual pressure upon contact, humidity and temperature of the surfaces of these bodies, climatic conditions -viy.

The removal of static electricity from the human body is carried out by means of the device of electrically conductive floors in industrial premises, work sites and other devices, as well as the provision of conductive shoes and antistatic gowns [6-12].

There are two ways to remove static electricity from workwear:

METHOD 1 - By distributing the charge from the place of accumulation over the area of the entire suit.

With this method, overalls are made from special electrically conductive antistatic materials, often such materials are obtained by introducing metal, metallized or carbon conductive threads into their structure.

Further, to drain the charge from the suit, it is necessary to provide grounding (connecting parts of clothing, shoes into a single electrical circuit and ensuring the grounding of the floor, equipment, etc.). The rate of charge distribution significantly depends on the humidity of the environment, the higher the humidity of the air, the larger the area of the suit over which the static voltage will be distributed, the more closed circuits (cells) the antistatic thread will form, the faster the excess charge will drain. At the same time, there is an unambiguous correlation between the ability of the material to electrify and its specific surface resistance, therefore the antistatic properties are determined by the specific surface resistance in ohms (EN 1149-1 and GOST 19616-74). Typically, the lower the electrical resistance, the less electrified a given material is.

METHOD 2 - By neutralizing the static charge, when the thread does not distribute the charge, i.e. does not function as a "conductor", but itself neutralizes the charge like the action of an induction coil. With this method, the rate of drainage of the charge per unit of time is determined. According to EN 1149-3, the drainage rate does not exceed 0,04s [13-15].

In the process of fabric formation, the warp threads undergo various deformations during the shedding process, the beating of the weft thread laid in the shed to the edge of the fabric. The tension values of the warp threads are always greater than the weft.

2. RESULTS AND DISCUSSION

The purpose of this work is to study the change in the electrical resistance of electrically conductive yarn (ECY) in the process of fabric formation and to determine the most rational version of the fabric for creating special antistatic suits, various capes and other products that help remove static electricity charges.

To obtain experimental samples of antistatic fabrics, electrically conductive yarn was used, which had the following characteristics:

Composition - 60% cotton fiber, 40% electrically conductive fiber; linear density – 50x2 tex; specific breaking load – 9,0 cN/tex; breaking elongation – 14,0 %; linear electrical resistance measured at $\lambda = 0{,}03$ m - 35 kOhm/m; the number of twists is 608 twist/m.

Cotton threads with a linear density of 10x2 tex were used as warp and weft threads. The density of the fabric on the warp and on the weft was 180 ± 2 yarn/dm.

ECY was wound on a separate weaving beam and produced with a plain weave to ensure a strong contact between the warp and weft EC threads. For root warp and weft threads, any kind of weave can be applied, depending on the purpose and appearance of the fabric. The fabric was produced on the Somet Thema Super Excel machine (Italy) with a dobby “Stoubli”, which allows producing fabrics with a maximum pattern repeat of up to 6400 weft inserts.

3. EXPERIMENTAL

Six experimental samples of plain weave fabrics were produced, containing different amounts of electrically conductive yarn per 10 cm. This was achieved by the fact that electrically conductive yarn was included in the fabric structure along the warp and weft at a given distance from each other along the warp and weft [3-8].

The distances between the electrically conductive yarns were as follows:

Sample No. 1 – 0,5 cm, No. 2 – 1,0 cm, No. 3 – 1,5 cm, No. 4 – 2,0 cm, No. 5 – 2,5 cm, No. 6 - 3 cm (Fig. 1).

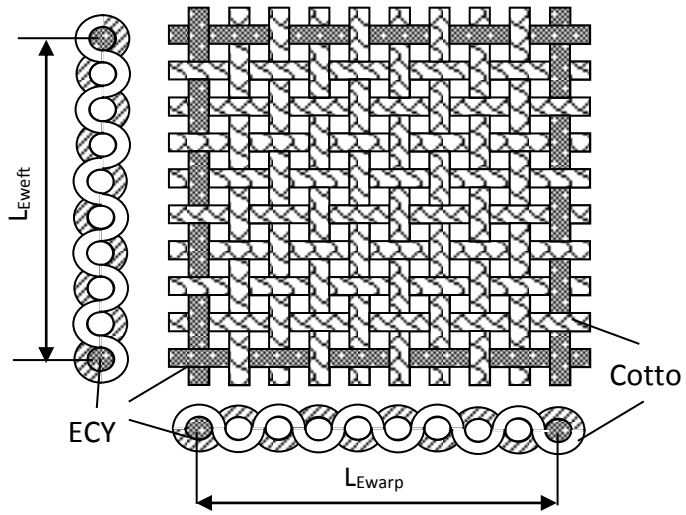

Fig. 1. Distribution of ECY in fabric

The results of studying the specific surface electrical resistance of various fabric samples are shown in Table 1.

Table 1

No of simples	Electrical resistance fabric, Rs, kOm	
	Weft	Warp
1	0,14	0,30
2	1,16	2,23
3	1,44	2,5
4	1,52	2,6
5	1,73	2,7
6	2,6	4,3

These dependences are seen more clearly in Fig. 2.

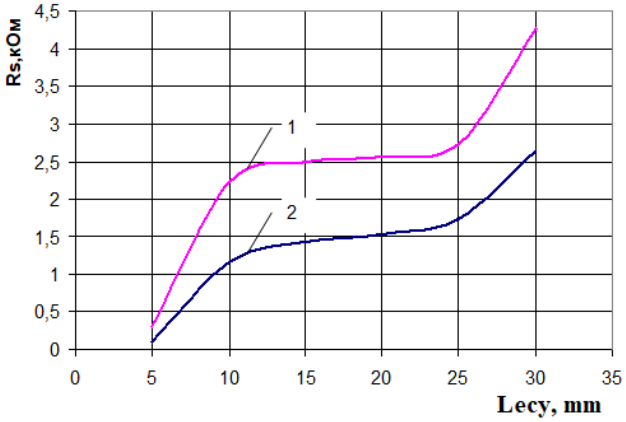

Fig. 2. Dependence of the specific surface electrical resistance of fabric from the distance between ECY. 1- warp, 2- weft.

From the presented data, it can be seen that a decrease in the distance between the electrically conductive yarn leads to a natural decrease in Rs. The specific surface electrical resistance of the samples (Rs) measured along the warp is 1,6-2,1 times higher than the Rs measured along the weft. This can apparently be explained by the fact that the warp and weft threads are subjected to different loads during weaving. In [3], the effect of static load on the linear resistance of the electrically conductive yarn (Rp) used in this work was studied. It is shown that at low loads (up to 50g) Rp-decreases, however, with an increase in load over 50g, Rp begins to grow. Apparently, this is due to a change in the conductive structure of the yarn under various loads.

In our case, in the process of weaving, the warp threads are subjected to greater dynamic loads than the weft threads, this leads to some disruption of the contacts between the electrically conductive fibers in the blended yarn and an increase in Rs.

4. CONCLUSION

As can be seen from the figure, the pattern of changes in Rs is the same in both cases, and is rather complicated.

It should be noted that the distance between the measuring electrodes was 20 cm. In [3], it is shown that at distances between the measuring electrodes less than 20 cm, the measured section of the yarn has an unstable conductive structure and the change in the electrophysical parameters of the yarn obeys complex patterns that differ from the patterns that exist for ordinary conductors. In connection with the above, it is of certain interest to study the electrophysical properties of fabric samples at distances between the measuring electrodes of more than 20 cm. We think that this will be the subject of further research.

Samples of fabric containing various amounts of electrically conductive yarn were obtained.

It was found that all investigated images have an electrical resistance of the order of 103 ohms and can be used to create antistatic products.

The dynamic loads that electrically conductive yarns in the warp and weft are subjected to affect its electrical resistance. This must be taken into account when making an electrically conductive fabric.

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Rezyume: *Hozirgi vaqtda elektr o'tkazuvchan to'qimachilik materiallari va mahsulotlari statik elektr, elektromagnit ekranlash va elektromagnit nurlanish bilan bog'liq muammolarni hal qilishda ishlatiladi. Shunday qilib, ularning elektrofizik xususiyatlarini, o'tkazuvchanlik xususiyatlarini, elektr parametrlarini prognoz qilish imkoniyatlarini va boshqalarni o'rganish katta ahamiyatga ega. Ushbu maqolada matolar tarkibiga elektro o'tkazuvchi ipni kiritish orqali barqaror antistatik xususiyatlarga ega bo'lgan elektr o'tkazuvchi to'qimachilik materiallarini ishlab chiqarish imkoniyati ko'rsatilgan. Ushbu maqolada, matoning elektr xususiyatlari, ularning tarkibida har xil miqdordagi elektr o'tkazuvchan iplar mavjudligi bilan bog'liq tadqiqotlar natijalari ko'rib chiqiladi. Bu ishning maqsadi - matoning shakllanishi jarayonida elektr o'tkazuvchan ipning elektr qarshiligining o'zgarishini o'rganish va maxsus antistatik kostyumlar, turli qopqoqlar va boshqa mahsulotlarni yaratish uchun matoning eng oqilona variantini aniqlash. statik elektr zaryadlarini olib tashlang.*

Резюме: *Электропроводящие текстильные материалы и изделия используются в настоящее время для решения проблем, связанных со статическим электричеством, электромагнитным экранированием и электромагнитным излучением. Таким образом, изучение их электрофизических характеристик, характера проводимости, возможности прогнозирования электрических параметров и т. Д. Имеет существенное значение. В статье показана возможность получения электропроводящих текстильных материалов со стабильными антистатическими свойствами путем введения электропроводящей пряжи в структуру тканей. В данной статье рассматриваются результаты соответствующих исследований электрических характеристик тканей, влияния включения в их состав разного количества электропроводящих нитей. Целью данной работы является изучение изменения электрического сопротивления электропроводящей пряжи (ЭПН) в процессе формирования ткани и определение наиболее рационального варианта ткани для создания специальных антистатических костюмов, различных накидок и других изделий, помогающих снять заряд статического электричества.*

Kalit so'zlar: *Elektr o'tkazuvchan to'qimachilik, statik elektr, elektrofizik xarakteristikalar, antistatik xususiyatlar, to'quv mato.*

Ключевые слова: *Электропроводящий текстиль, статическое электричество, электрофизические характеристики, антистатические свойства, тканый материал.*

THE KARAKALPAK YURTA IN ARCHITECTURE

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Summary: This article is about Karakalpak grasslands. There is talk about their construction work, types, as well as their comparisons with foreign countries, comparisons, construction materials used.

Keywords: Karakalpak national houses, yurta, the dark house, fire decorations, shanarak, tunduk.

It is a little history

Yurta - one of great achievements of mankind, comparable with the invention of a sail. Both allowed to cover long distances in the shortest possible time.

Yurta (in the majority of Turkic languages of yurtas, a yurta; mong. ger) - the figurative dwelling at nomads and semi-nomads. Karakalpaks called a yurta "Qara uy" - "the dark house".

The most general meaning of the all-Turkic word "yurt" is "parking" though the dispersion of values is quite broad. In one Turkic languages this word designates only the figurative dwelling or a tilt cart, and in others - a pasture, the patrimonial earth and even the Homeland. In modern Mongolian language the word a yurta (ger) is synonymous to "house".

Yurta - the main dwelling of nomads of the Central and Central Asia, and also the Southern Areas of Siberia. The structure of a yurta consists of wooden lattices and poles which become covered with felt. Felt - the dense material made of wool of sheep or camels. To receive felt from wool, wool it is necessary long and with effort to rumple and fray that it absolutely was mixed up.

According to data of archeologists, the first prototype of a yurta existed more than three thousand years ago. In the territory of present Karakalpakstan scientists found constructions identical to what the millennia used nomad tribes of Asia.

It were round or many-sided constructions with frame walls from vertical poles, with a lattice from a wattle fence, with the conic or pyramidal overlapping leaning on a frame through which there was a smoke or simply a smoke hole. In the center of a yurta the copper for cooking - a cauldron settles down. The opening for light and a smoke settles down in the top of a dome. It is natural that in cold or rainy days the top opening of a yurta has to be densely closed. Also it was closed by felt (felt - the best grade of felt which prevents hit of a wind and moisture). Folding trellised walls which are moving apart as the furs of an accordion found in the territory of Karakalpakstan became fundamental difference of a yurta from her predecessors reminding an ordinary tent.

Advantages of a yurta

The yurta blows the mind the perfection. During the millennia all components were carefully perfected, did not reach an ideal yet. Anything superfluous. The great French architect Le Corbusier admired completeness, universality, interchangeability of parts of a yurta. He considered it as one of prototypes of the concept "The house - the car for housing"[3.,30].

The yurta which appeared thousands years ago still remains actual and today. The small weight, compactness, mobility, a reliability for using on all seasons and commonality of details in combination with low cost do this dwelling high-competitive in the market of easy constructions. Also it should be noted low operational cost - installation and service do not demand from the personnel of high qualification, and compactness is a basis of low warehouse expenses at storage. Thus the cost of a yurta is 2-3 times lower in comparison with other quickly built constructions.

In the last decades the yurta becomes popular around the world. A set of firms in Europe and the USA are engaged in production and operation of yurtas, thereby popularizing this highly esthetic and romantic dwelling.

The word "yurta" got to Indo-European group of languages from Turkic group. Yurtas nomad tribes called figurative the dwelling. By the nature the yurta is universal as can adapt

practically for any weather conditions, it easily transfers a rain, snow, cold and a heat. Obviously considering it, nomads also chose a yurta for themselves as housing. The yurta has no base and therefore understands and gathers by the tent principle.

To build a grandiose construction - a yurta, efforts of two people are enough. One person of course will be hardly able to establish a yurta independently, and here the third person at installation has nothing to do. 2-3 persons within one hour can usually establish a yurta. The yurta includes the curtailed wattled wooden framework into which the doorframe is inserted. This framework is moved apart, established, then special fabric which serves subsequently as yurta "safety lock" from a rain and snow is put on it.

Inside the yurta was fitted mats over which dark, dense fabrics were hung up. Despite the small size, a yurta very capaciously. At nomad tribes in yurtas not the family could live alone. The yurta shares on two half, one half is considered man's, there the owner and his wife need to live, and another - maiden, relied there to live to daughters till a marriage. If owners had male children, they needed to live on a man's half. Division takes place in a yurta according to parts of the world, and is defined by tapes of different flowers. It quickly gathers and easily understands by forces of one family within two hours. It is easily transported on camels, horses or the car, its felt covering does not pass a rain, a wind and cold.

The round form and mobility of a yurta reflected in itself both protection against weather, and economic tenor of life of the nomad. The yurta, sensitively reacts to fluctuations of temperature, and weather changes, perfectly protects from not numerous atmospheric precipitation, rescues from heat, summer and from cold in winter. Such unique ability is very essential. After all in the territory of Karakalpakstan and in some regions of Asia air temperature in the summer +40 C, and in the winter-30 C. The yurta design consisting of a wooden lattice and porous woolen felt plays a temperature regulator role, keeping in the dwelling the constant thermal mode. In a yurta, perhaps to organize circular ventilation for what it is necessary to raise a little a felt koshma at the basis therefore air will perfectly circulate. To a yurta no natural cataclysms are terrible - its structure without special problems maintains the strongest hurricanes and earthquakes. Existence of an opening at the top of a dome creates draft and allows to use the center easily [5.,1492].

The yurta sizes optimum correspond to the scale of the person, internal planning considers interests and tastes of her inhabitants, provides the most comfortable economic and household activity in steppe conditions.

Easy collapsible construction is adapted for transportation on pack animals. Gross weight of a yurta with furniture makes about 300-400 kg, it is loading capacity only of one camel. Diameter of a usual inhabited yurta - 4,5-8 m, height in the center of 3,5-5 m. Installation or dismantle takes no more than one hour. The design of a yurta consists of nine main parts. The structure of walls is formed from the folding wooden lattices connected among themselves which determine the sizes and capacity of the dwelling. Each lattice consists of the flat laths imposed one on another by a slanting cage and fastened with tawing belts. Thanks to that these laths contract or stretch an accordion, it is possible to vary the yurta size. The roof skeleton forming the arch consists of the planed poles which are stuck above in a special circle - the center of a roof, and in the lower part lean on a lattice of walls.

Yurtas happen different

In the steppe there were yurtas from small inhabited to huge nomadic temples and yurtas palaces. Depending on geographical conditions, mainly from an amount of precipitation, also appearance of a yurta changed. The dwelling could have spherical (the Mongolian type) or a conic form (Turkic type), at the first the roof has a form of a low cone, at the second dome. Karakalpaks, Kazakhs, Kyrgyz, Uzbeks and the Bashkir had both types, at the Turkmen - Turkic type. The inside of walls is decorated with a straw mat. In the winter Karakalpaks hang up 2-3 rows of straw mats on walls, and the place between them is filled with straw. The floor is dimmed by carpets and a sheepskin.

The size of a yurta was formed from its functional purpose. So, if the ordinary inhabited yurta of the nomad consisting of 3-4 compound lattices walls had a capacity of 8-10 people, big collapsible yurtas palaces of leaders already consisted of 10-25 lattices walls and accomodated 50-100 people. The big figurative yurta of the last khan of Mongolia accomodated 500 people [2.,36].

There were special ritual yurtas - wedding and mourning. Wedding yurtas were especially beautiful, the abundance of an ornament and bright paints affected. And here in mourning yurtas a color symbol of death was not necessarily black, as at Europeans, and not only white, as at the Far East people. Over a mourning yurta lifted a red panel if the young man died, black - if it was the person of average years, white - if elderly.

Device of a yurta and its assembly

At first put around links to "kerega" and connected them among themselves a woven band, between two lattices inserted and bound a doorframe. Then any of men lifted a rim "шанарак", using a special pole with a fork on the end, it strengthened 3-4 poles, and then inserted the others, tying their lower ends to the top forks to "kerega". A trellised wall above where it was fastened to dome poles, outside pulled together the baskury - the wide woven strip reaching 30-35 cm (even to 45) width. Baskur usually had an ornament and represented one of obligatory decorative elements of an interior of a yurta. Outside, approximately on a half of height to a kerega, the koshomny cover was surrounded with hair lassos or a woven tape to which tied ropes of integumentary felts of a dome of a yurta. If the yurta was covered with long koshma, outside in two places tied up a beldea. The felt valve was attached in the last turn.

Tapes, various on width and a pattern, woven of woolen, are more often than a camel yarn, served as decoration of an interior. Woven or wattled narrow tapes went down from rims in a yurta, and in case of a strong wind them tied to the stake hammered in the middle of a yurta. From a dome tapes for a perevyazyvaniye of poles during transportations of a yurta hanged down. These tapes quite often came to an end with multi-colored brushes. During a summer heat lateral felt walls could rise by height to meter, then the wind freely blew in the room, and owners could, sipping ayran to survey vicinities. From within the yurta shares on two half as the human race was once divided. The North - female, and the South - man's.

On a man's half - is closer to a door, that is is closer to the earth, - there is a bed of owners. Here the man's weapon, a horse harness, mascots is hanged out. On female - maiden - the bride's bed - the owner's daughters. Below - to a door - a crockery case. This half guest where do not sit up. The daughter will marry, will leave a native home.

In the center of a yurta - Fire, the center. A place of honoring of Spirit of Fire - the Keeper Ochaga. From - Ana, Mai-Ana - Mother call fire Karakalpaks. Fire honoring - one of ancient religions on the earth. Fire gave to the person heat, hot food, melted iron (stirrups and arrows).

The tree - Tala which we know as a willow - turns into laths and bars. Laths are bent, connect leather klyopky a cross - on - a cross and it turns out to a kerega - folding walls of a yurta. The bend strengthens a stiffening rib, and klyopk (from tawing skin) allow to stretch and put walls. At Karakalpaks, quantity the kerega or as them still call a rope - wings, can determine the yurta size. And tell usually three, four, five or the biggest twelve kryly yurta. The circle to a kerega is closed by a doorframe - a bosaga. The Bosaga consists of four separate parts: two lateral, one pritolochny and threshold. Four beams, thanks to grooves, gather in a frame before installation of a yurta. On a frame the swing door - esik is suspended.

From bars uuk - a structural element the creating yurta dome are bent. It is accepted to measure by their quantity the yurta size at Kyrgyz. Usually say that a yurta on sixty, or we will tell hundred uuk. And the most important, central element - shanarak, or in a different way - tunduk, a circle at yurta top. A symbol of the homeland and the center which decorates flags of two countries.

Here also the openwork framework of a yurta consisting of a tunduk (shanarak), uuk, a kerega and an esika is ready.

Bushes a chiya - initial material for a grass mat. Chy is a mat with which cover to a kerega - yurta walls. At first sight, apparently, that this mat does not bear special functional loading

especially as in the Mongolian yurta it is not used at all and only sometimes put outside. During a heat it can serve as a summer wall for what turn in felt, and through the chy the breeze bringing a pleasant cool appears. But it is possible to offer also other version of an origin a chiya. It can be not casual that the plant of chiya of which the mat is made, in India is considered sacred. Do laying for a sadkhana of it, a pudzha, a prayer. From all variety possible, only four laying the Indian tradition calls capable to attract positive vibration and it is one of them.

The centuries-old tradition defines also process of transformation of sheep wool into felt, a koshma or as it is called still - kiyiz. From felt lateral coverings of a yurta - tuurduk, and the koshma covering a yurta dome - uzuk are found. Warm, woolen walls and roof of the nomadic house. The floor of a yurta is covered or the felt painted with a color traditional ornament - is scarlet-kiyiz that is translated as motley felt, or sewed from pieces of felt of different color - shirdak.

Koshma who is used traditionally for a yurta covering, happens different color, it depends on a species of animals who are bred in this region. At the Turkic people it is rams, therefore a koshma gray and white, but maybe black. More rare the koshma is done of camel wool.

Felt is environmentally friendly raw materials, holds a cool in hot day, and warmly in cool night. If in a yurta to heat, in it, as in a valenok, very warmly. In the ancient time in the middle of a yurta there was a center, and draft rose to a tunduk, due to draft and a roundish form of a yurta up. Today furnaces where the pipe is removed upward are used. Koshma protects from a wind and bad weather, though is not absolute. Even the good yurta maintains 3 days of a pouring rain, further starts flowing. It should be noted that both in the ancient time, and today, the yurta was covered not only koshmy, but also a matter and carpets.

Yurta of the average size in which the family from 5 - 7 people lives, establish together hour for two, and sort for an hour. The basis of a yurta is formed by a wooden framework which is done usually of a willow, is more rare from a fir-tree. The lower part of a framework consists of folding lattices to a kerega where rods or laths are fastened to the help of thongs from camel or veal skin. The quantity to a kerega determines the yurta size. So, in a small yurta only four lattices, in the big - eight or twelve. Kerege is tied to a door wattled belts a term which surround lattices and hold all design. A term are usually ornated by an ornament. At a rupture of these belts the yurta is scattered, as a house of cards. A door of a yurta of usually wide, but low, about 1,5 meters, and shutters swing open inside not to prevent to close a doorway a dense curtain from felt and a grass mat which is called chiya. Far back in the past the yurta had no wooden doors, and chiya carried out their function. The roof of a yurta is formed by poles uuk which one end become attached to lattices, and by another are inserted in tyundyuk - a wooden wheel with crosswise crossbeams which is a window and a flue at the same time. Tyundyuk of big yurtas support a wooden pole bagan, small yurtas hold tyundyuk a tension of ropes. Around establish to a kerega the long wattled mat from a chiya ornated by a national ornament, and the lower parts of uk cover felt koshmy dzhavak bash. The framework is covered with felt kiyiz, in the winter in two-three layers, in recent years put on a cover from tarpaulin or a canvas felt. Rich yurtas are usually covered with felt of white color, and outside decorated with felt belts with an ornament. In the summer the yurta is established directly on the earth, lay a timber floor in the winter. In the summer felts from below raise that improves aeration. In the center of a yurta the metal furnace or the center where cook food settles down. For the night remove a pipe from the furnace, and tyundyuk close felt koshmy tyundyuk a jump that helps to keep heat. To the left of an entrance - a man's half, saddles lie here, the weapon is stored. On the right - female part of a yurta where the kitchen utensils, a locker with products, a cradle beshik are placed. Opposite to a door - the sacred party of a yurta where chests with the most valuable good are located, accurate piles put carpets and bedding. Often here it is possible to see the Koran, a rug for a prayer, photos and portraits of ancestors, native. Sit in a yurta on felt carpets shyrdak or on small stools, at a low table where eat food, owners and guests. To this day, Karakalpaks sacredly observe the traditions connected with a yurta. So, a yurta it is impossible to enter with the weapon, it is impossible to step on a threshold - earlier it was considered as declaration of war, better to come into a yurta from the right foot. Having entered a yurta, it is

impossible to sit down self-willedally on the sacred party intended for especially guests of honor is it is possible to make only after the invitation of the owner. Having entered a yurta even the stranger, it is impossible to leave, without having tried his bread is it is considered an insult. Men by tradition take the left side from an entrance, the woman - right, and children are allowed to run everywhere. A yurta - not simply the house, it at the same time the temple and model of the Universe. Square interlacings of lattices symbolize communication with the native earth, slightly curved uuk - ascension of human spirit, and shanarak is a symbol of the Sun and Eternally Blue Sky - Tengri. It is considered that through shanarak there passes the mystical thread which connects together all levels of the Universe, and shamans can move on it to other worlds. The center of a yurta - the triangular center of a talg. Three of its ends symbolize indissoluble connection between generations - last, real and future. On custom, at first establish the center, over it lift shanarak and after that collect other details of a yurta. Moving, but the new place, the hostess carries surely out fire feeding ceremony, spraying the center milk. A yurta - the unique dwelling which is perfectly adapted for severe conditions of mountains and steppes of Central Asia. In the summer when on the earth the heat reigns, in a yurta it is cool, in the winter - heat and is cozy even if behind felt walls snowstorm howls.

People still in the ancient time correlated space in which they live with winds and streams of life and tried to live in harmony with the world. We try to apply traditional methods and in our life. It is very important when the tradition does not become the museum, does not become the herbarium hanging on a wall and as grain falls in a fertile field and sprouts. Today we live in a yurta and it too tradition, but we change some things in a modern key. For example, we paint the yurtas with special paint to avoid rotting of a tree. So the tradition is not refusal of the technologies existing today opportunities existing today. The tradition is continuation of that there began our ancestors. The ancient person perceived himself as a life stream. All that we speak and as we think, is acquired by our ancestors, we are continuation of this stream, and the tradition does not stop it, and helps the person to take responsibility for the movement of this stream. Then, maybe, our descendants will be able to live, leaning on that we will add to this stream.

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Rezyume: *Ushbu maqola qoraqalpoq yaylovlari haqida. Ularning qurilish ishlari, turlari, shuningdek, xorijiy davlatlar bilan solishtirmalari, taqqoslashlari, ishlatilgan qurilish materiallari haqida gapiriladi.*

Резюме: *Эта статья о каракалпакских лугах. Поговаривают об их строительных работах, типах, а также об их сравнении с зарубежными странами, сравнениях, используемых строительных материалах.*

Kalit so'zlar: *qoraqalpoq milliy uylari, yurta, qorong'i uy, olovli bezaklar, shanarak, tunduk*

Ключевые слова: *каракалпакские национальные дома, юрта, темный дом, огненные украшения, шанарак, тундук*

SOME INVESTIGATIONS OF THE PROPERTIES OF COSTUME FABRIC

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Summary: *The article is devoted to research work on the creation of an assortment of fabrics for school uniforms based on mixed yarns and the improvement of production technology. Five samples of existing fabrics were taken, their physical and mechanical properties were studied, and a comparative analysis of the test results was given.*

Key words: *fabric, warp, weft, breaking load, plain weave.*

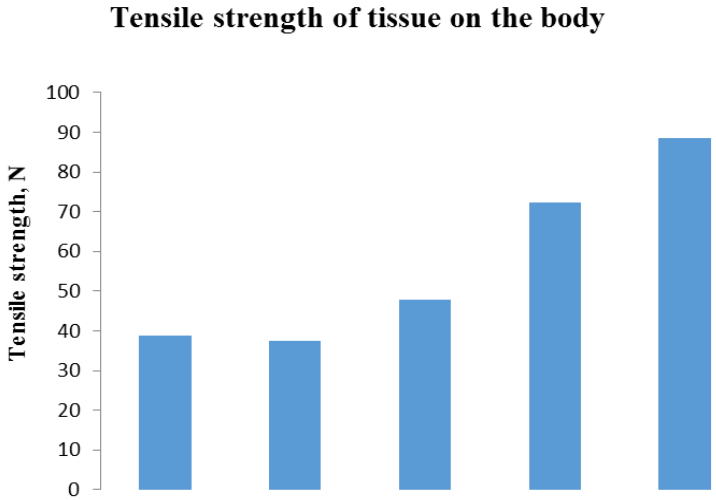
Costume fabric is a separate group of fabrics, from which all work clothes: vests, skirts, men's and women's pants and suits, jackets, etc. used in production. When choosing a suit fabric, great attention is paid to what purpose it is used for.

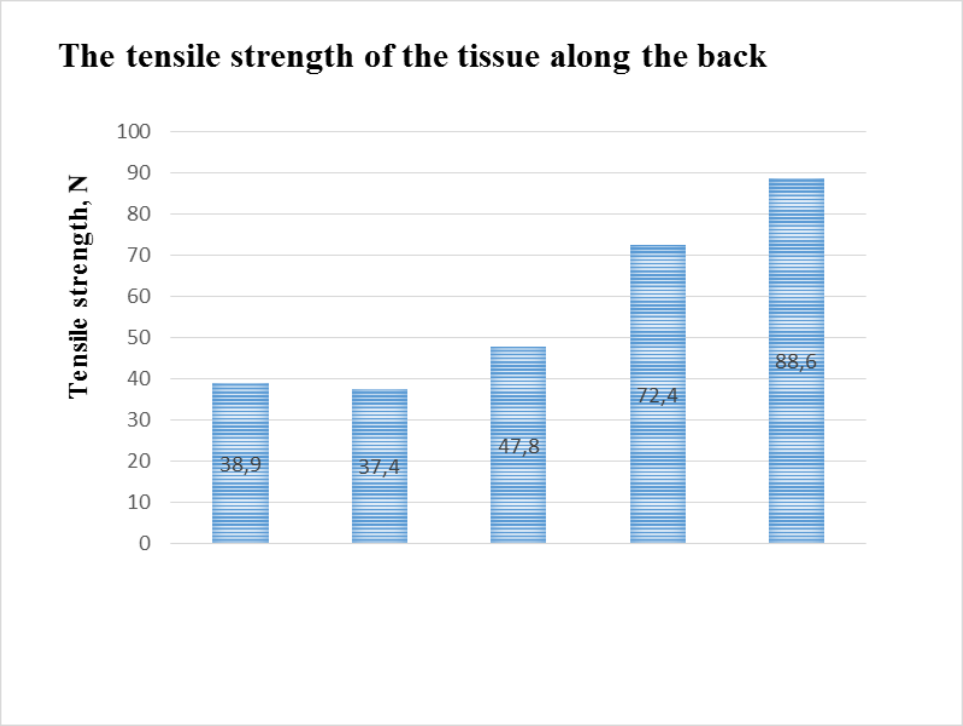
Costume fabric are mainly produced by canvas weaving. Canvas weave is the most common of the weaving weaves. In this case, the tanda and back yarns alternate, one tanda yarn and one back yarn appear on the right side of the fabric. Canvas weaving - weaving is the most common of the weaving, with about 40% of the fabric being produced in canvas weaving. The fabric woven with cloth cutting is the most durable, the fabric is rough when densely woven.

The suit should be high in terms of certain properties and the following set requirements, regardless of the composition of the fabric: non-shrinkage and resistance to deformation; aesthetic appearance; good shape retention; immobility; breaking strength; color fastness; simple storage conditions.

At the department of "TMT" of Tashkent Institute of Textile and Light Industry there was conducted research on the creation of an assortment of fabrics for school uniforms on the basis of mixed yarns and the improvement of production technology. Currently, 5 types of existing tissues are used in practice, and their physical and mechanical properties have been determined in the certification laboratory "Centexuz" of Tashkent Institute of Textile and Light Industry. Figure 1 shows a histogram of tissue rupture.

The shear forces were determined along the body (Fig. 1a) and posterior (Fig. 1b) directions of the tissue.





а) б)

Figure 1. Histogram of tissue tensile strength

Analysis of the histograms obtained showed that the tensile strength of the tissues in options 4 and 5 was higher than in options 1–3. This situation depends on the linear densities of the body and back yarns of the tissue, and the linear densities of the 4th and 5th variant tissue yarns are 9.8% greater than those of the 1st to 3rd variant tissues.

The air permeability property of the above sample tissue was also determined. Figure 2 shows histograms of the tissues under study for air permeability.

The results of the study showed that the air permeability of the 1st and 4th tissue samples was found to be higher than that of the other sample tissues.

Conclusion

Concluding from the results of the study, it is recommended to take into account the linear densities and tissue densities of their constituent body and back yarns when designing fabrics for school uniforms based on mixed yarns. It was found that the structural parameters of the tissue play an important role in determining its functional properties.

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Rezyume: *Maqola aralash iplar asosida maktab o‘kuvchilari formasi uchun mo‘ljallangan to‘qimalar assortimentini yaratish va ishlab chiqarish texnologiyasi takomillashtirish bo‘yicha ilmiy tadqiqot ishlariga bag‘ishlangan. Mavjud to‘qimalarning 5 turi olinib, ularning fizik-mexanik xususiyatlari o‘rganilib, sinov natijalaring qiyosiyy taxlili keltirilgan.*

***Резюме**: Статья посвящена научно-исследовательской работе по созданию ассортимента тканей для школьной формы на основе смесовых нитей и совершенствованию технологии производства. Были взяты пять образцов существующих тканей, изучены их физико-механические свойства и дан сравнительный анализ результатов испытаний.*

***Kalit so'zlar:** to'qima, tanda, arqoq, uzilish kuchi, polotno o'rilishi*
***Ключевые слова:** ткань, основа, уток, разрывная нагрузка, полотняное переплетение.*

UDC 016: 568.567.1

ADHESIVE INTERACTIONS OF RICE STRAW FIBERS AND GYPSUM MATRIX IN A NEW COMPOSITE MATERIAL

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Summary: *The article provides analytical data comparing the impact of two matrix additives "JK-02" and "Frem Nanogips", in a composite material based on rice straw and gypsum binder. The degree of influence of thermochemical treatment of plant fibers on the strength of the fiber-matrix adhesive bond had been studied. The adhesive interaction of two dissimilar components has been featured through the index of the ultimate strength in bending of the material.*

Key words: *adhesion, fiber-matrix, gypsum, straw, delignification.*

Scientific and technological progress in the construction industry is based on the development of new and effective building materials with a set of required properties required for various purposes. For a long time, wood, ceramics, steel, concrete and reinforced concrete were primarily used as building materials. In Uzbekistan, with the recent development of the construction industry in the last decade, there is now a wide application of composite building materials for the construction of most facilities. Composite building materials are the multiphase systems comprising two or more mono-materials with various properties. Through rational combination of starting components, and a synergetic effect that follows, new materials are formed, which retain the individual characteristics of each of the starting heterogeneous component [1].

The purpose of creating composite building materials is to improve certain properties of the starting components, for instance, their mechanical, thermophysical properties, chemical resistance, durability, as well as to decrease the cost of materials, including through the use of various wastes. Composite building materials include mortars, concrete, ceramics, mastics, adhesives, putties, paints and varnishes, fiberglass and other artificial multicomponent materials.

The idea of creating composite materials is not a novelty. Since ancient times people have been traditionally using adobe, consisting of clay as a bonding substance (matrix) and straw as a stiffening reinforcement. Furthermore, the asbestos cement, consisting of cement as a matrix and natural fibrous asbestos material serving as reinforcement has been used in construction for a long time. The properties of such composites are determined by the high strength of the reinforcing fibers, the rigidity of the matrix, and the bond strength at the matrix-fiber interface. The ratio of these parameters characterizes a whole set of mechanical properties of the material and its destruction mechanism as well.

In general, an adhesive interaction of fiber and matrix determines the properties of composites and their behavior during operation. The local stresses in the component reach maximum values at or near to the interface, wherein the destruction of the material usually occurs. The interface should ensure an efficient transfer of load from the matrix to the fibers.

The adhesive interaction at the interface should not break up under the action of thermal and shrinkage stresses induced either by the differences in temperature coefficient of linear expansion of the fiber and matrix or by the chemical shrinkage of the binder during its solidification [2] .

The adhesion strength depends on the binding energy, completeness of contact determined by the relief of the surface, the interphase surface energy, wetting, and other surface phenomena, as well as the conditions for forming the contact (e.g. pressure, temperature, etc.) [3].

Today in Uzbekistan, some enterprises have already adopted the production of gypsum fiber boards, which is a rather new composite material for the local market. Such a composite contains a recycled cellulose fiber, which is evenly distributed in the gypsum mass and serves as reinforcement. Yet, the deficiency of recycled cellulose forces local entrepreneurs to apply various manufacturing technologies and use plant-based raw materials, which greatly affects the production process, primarily the operations to ensure high adhesion of the fiber to the matrix e.g. processing of fibrous raw materials or modification of the binder. In many cases, the straw of cereal crops is used as alternative raw material due to its affordable price and availability in large quantities as required. However, similar to many organic cellulose aggregates, straw has both the inherent valuable properties and negative ones, which make it difficult to produce composites of high strength [5]. The specific properties of such an organic cellulose aggregate include an increased chemical aggressiveness, significant amounts of moisture deformation and developing swelling pressure, a high degree of anisotropy, high permeability, low adhesion to the matrix, larger elasticity at mixture compaction. All of these properties adversely affect the matrix hardening, the structure formation, the strength and durability of the composite material to moisture-induced influences.

The article contains the experimental data on adhesive interaction with the substrate surface in the new composite material. Exploring the nature of the interaction is of fundamental importance for the understanding of the adhesion mechanism of fibers, in particular, straw fibers to gypsum crystals, and also for the development of solutions to enhance the adhesion between them.

First of all, there is a need to more extensively explore the catalytic effects at the adhesive - substrate interface as well as the molecular and chemical forces in the contact zone. Since the degree of negative effect of moisture deformations of the fibrous aggregate on the strength of the gypsum fiber board is largely determined by the adhesion rates of different materials (straw and gypsum), it is thus advisable to analyze the interconnection of these factors [6].

Nanazashvili et al. studied the adhesive properties of composite materials from waste wood and plant materials based on polymer and mineral binders [2]. According to authors the adhesive properties of wood with mineral binders depend on the tree species, the chemical composition, additives, treatment conditions, specific surface area, etc. It was found that with a decrease in the specific surface area of straw aggregate to a certain limit, the strength of the composite increased. The decrease in strength when using aggregates with coarse aggregates can be partially explained by the influence of large moisture deformations, which cause stresses in the contact zones during hardening and drying. When using a fine fraction, such a decrease can be explained by a significant decrease in the thickness of the gypsum crystalline layers in the structure due to the large specific surface of the aggregate [7].

With an increase in surface roughness, the adhesion of straw with a gypsum matrix increases as well. At the same time, the increase in adhesive strength is proved to be associated with the appearance of a large number of active centers, an increase in the true contact area, and mechanical adhesion of the fiber and cavities serving as dowels and rivets of a kind [8].

The true contact area can be enlarged by removing the fat and wax layer from the straw surface and thus allowing the appearance of additional fibers and depressions. It is known, that rice straw contains from 10 to 30% of mineral components, which can be removed through the alkaline treatment. The alkali solution affects the ligno - carbohydrate complex resulting not only in the removal of the mineral component and part of the lignin, but also in the destruction of polysaccharides [9]. With regards to the abovementioned, an attempt was made to explore the regularities between improvement of raw material (straw treatment) and adhesion of the fibers to the matrix (gypsum modification). The study therefore had to achieve the following tasks:

- Ensure the maximum extraction of mineral components and lignin from the ligno - carbohydrate complex of rice straw with minimal destruction of polysaccharides;
- Ensure the formation of denser gypsum crystal lattice, which increases the bonding strength at the fiber-gypsum interface.

The experimental tests were carried out using modifiers, plasticizers, desugared straw broths, mineral modifiers, which influence the hardening of the adhesive bonding of straw with gypsum to a different degree. Furthermore, the rice straw of the last year harvest containing 58 % cellulose, 14 % lignin, 5,4 % resin, 3,2 % soluble substances, 19, 4 % mineral substances and construction gypsym were used.

Dry and chopped into 12–20 mm rice straw was cooked with an aqueous solution of sodium hydroxide under the following conditions: straw – solution ratio - 1/8; NaOH concentration - 1-6%; processing temperature - 90 ° C; the duration of the temperature rise - 15 minutes; the duration of alkaline treatment - 60-240 minutes. The resulting material was washed with distilled water to a neutral medium, sieved, ground, dried and weighed. Preliminary studies on alkaline treatment of rice straw and dependence of the product yield from the alkali concentration and duration of treatment are presented in Fig. 1.

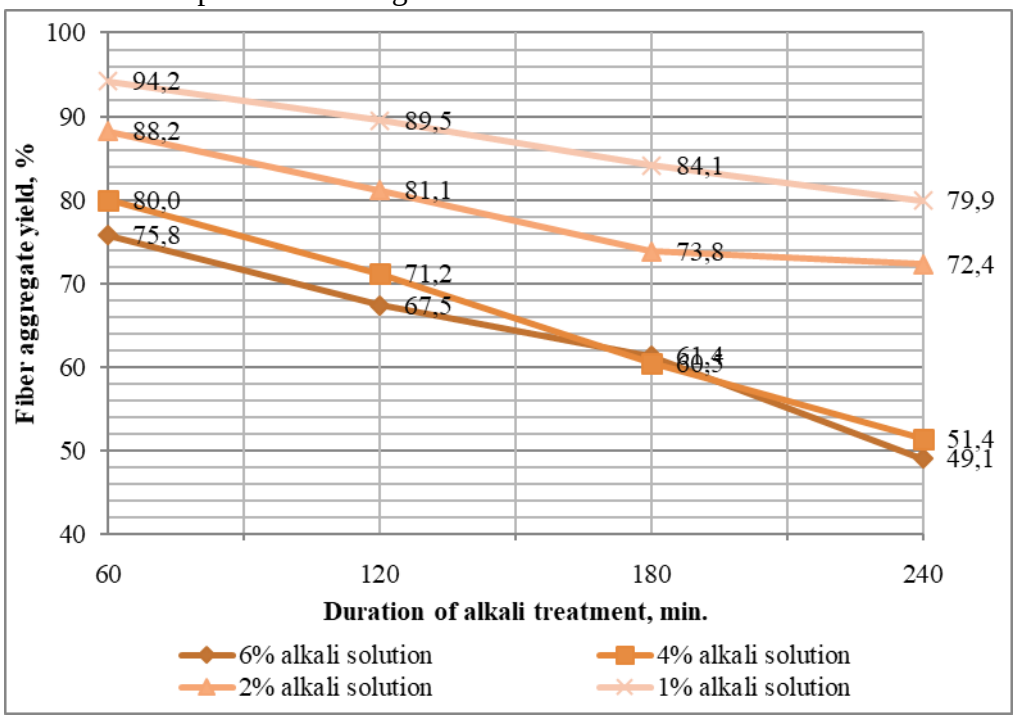

Fig. 1. The dependence of the yield of fibrous aggregate on the alkali concentration and duration of treatment

The results obtained indicate a significant decrease in the product yield at the alkali concentration of 6% and treatment duration of 240 minutes (Fig. 1), therefore the further increase of the alkali concentration and treatment duration was seen as unnecessary.

The visual inspection of the material boiled in 1-2% alkaline solution indicated that treatment even with a duration of 240 min. did not result in the required yield and quality values. The analysis of the first treatment allowed to identify a range for further studies, meaning alkali concentration - from 3 to 5%, processing time - from 60 to 240 minutes.

After a series of experiments, the optimal conditions for the alkaline treatment of rice straw were identified. Based on the optimized conditions (treatment duration - 150 min; alkali concentration – 3,5%), the material visually resembling cotton fibers with a product yield of 57.1% was obtained.

In order to study the degree of adhesion of the obtained material with a gypsum binder, the strength characteristics of specimen mixtures, which also contained various types of additives to improve the bonding strength of fiber-gypsum, since the strength of the gypsum fiber composite, in our opinion, depends on the bonding strength between adhesive and substrate.

Table 1: The effect of additives on the characteristics of the gypsum-fiber mixture

No.	Straw,%	Additive,%		W/G	Spreading, mm	Bending strength, MPa	Compressive strength, MPa
		JK-02	Nanogips				
1.	0.5	-	-	0.66	180	3.84	9.80
2.	0.5	-	0.2	0.66	250	4.69	15.4
3.	0.5	-	0.4	0.43	182	4.12	15.6
4.	0.5	-	0.7	0.33	180	4.34	16.1
5.	0.5	-	1	0.43	250	4.81	17.9
6.	0.5	-	2	0.36	260	6.84	18.6
7.	0.5	0.7	-	0.66	220	4.02	9.82
8.	0.5	1	-	0.66	236	4.02	10.6
9.	0.5	1,5	-	0.66	244	4.02	11.4
10.	0.5	2	-	0.66	258	6.03	12.6
11.	1	-	-	0.72	171	3.35	8.24
12.	1	-	0.2	0.72	245	3.68	10.8
13.	1	-	0.4	0.48	172	4.98	12.6
14.	1	-	0.7	0.36	171	4.98	16.1
15.	1	-	1	0.48	244	4.01	11.8
16.	1	-	2	0.40	249	4.82	13.5
17.	1	0.7	-	0.72	212	3.54	9.60
18.	1	1	-	0.72	218	3.98	9.80
19.	1	1,5	-	0.72	232	4.64	10.4
20.	1	2	-	0.72	238	5.40	12.6

The data analysis leads to several conclusions:

- adhesive strength depends on the gypsum paste density and its chemical activity, while the higher is the viscosity of the solution, the lesser it can penetrate into the straw pores.
- additives reduce the water demand of the mixture, which leads to the increase of the matrix density, and as a consequence, to the increased strength of dry material.

When mixing with the additives that increase the density of the gypsum matrix and the strength of gypsum-fiber interaction the rate of compressive strength of gypsum fiber composites significantly increased, and this indirectly indicates that without additives bulk and moisture deformation may lead to destructive processes occurring in the board during its hardening.

The experimental studies show the "FremNanogips" additive for gypsum mixtures (manufactured by JSC "Plant of additives and lubricants "FRAME") to be the most effective for the formation of specimens, which have the high degree of adhesion throughout storage. Increased adhesive strength of specimens is the result of the increased density of the gypsum crystal lattice, which ensures a more solid bonding with a fiber surface.

It is assumed that the adhesive interaction between straw and gypsum results from the interaction of ion calcium formed during hardening of the gypsum paste in the contact zone with the polar functional groups of straw components such as cellulose, lignin, and hemicellulose.

The experimental studies demonstrate that the adhesive strength between the straw and gypsum depends on the specific surface of the aggregate, aggregate shape coefficient, the roughness of the fibrous aggregate, chemical activity of the composite components, water/gypsum ratio, amounts of chemical additives, level of transformation processes of structural and chemical characteristics in straw in the course of its thermochemical processing.

Our studies suggest an effective method for the complex preparation of the fiber aggregate by the preliminary heat treatment in alkaline solution followed by mixing with gypsum and modifier, which in turn reduces the paste viscosity and contributes to the clogging of open pores and depressions in the aggregate and thus ensures the high degree of adhesion of the matrix and aggregate.

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Rezyume: *Maqolada sholi somoni hamda gips bog‘lovchisi asosidagi kompozitsion materialda qo‘llangan ikki matritsa modifikatorlari «JK-02» va «Frem Nanogips» larning ta’sirini taqqoslashda olingan analitik ma’lumotlar keltirilgan. Shuningdek, o‘simlik tolalariga termokimyoviy ishlov berishning tola-matritsa adgezion bog‘ining mustahkamligiga ta’siri ham o‘rganilgan. Maqolada ikki turli xil komponentlarning o‘zaro adgezion ta’siri materialning egilishdagi mustahkamligi orqali tavsiflangan.*

Резюме: *В статье приводятся аналитические данные сравнения воздействия двух модификаторов матрицы «JK-02» и «Frem Nanogips» использованных в композиционном материале на основе рисовой соломы и гипсового вяжущего. Также исследуется степень влияния термохимической обработки растительных волокон на прочность адгезионной связи волокно-матрица. В статье адгезионное взаимодействие двух разнородных компонентов характеризуется через показатель предела прочности при изгибе материала.*

Kalit so‘zlar: *adgeziya, tola-matritsa, somon, delignifikatsiya.*

Ключевые слова: *адгезия, волокно-матрица, солома, делигнификация.*

STUDY OF BASALT DEPOSITS IN THE REPUBLIC OF KARAKALPAKSTAN

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Summary: *The use of local basalts of Karakalpakstan is a new raw material base for obtaining: fire-resistant and heat-resistant materials; metal substitutes; electrical insulators of various potentials; acid-fast products; composite materials; Portland cement, etc., which can be used in various industries.*

Keywords: *Basalt, minerals, basalt rocks, composite and acid-resistant materials, minerals, hydrogeological and mining conditions of the deposit, alkalinity, natural mineral resources.*

Basalt is an igneous volcanic rock of the basic composition of the normal series of alkalinity from the basalt family and is formed during solidification of the poured out to the surface. World consumption of metal substitutes obtained from natural mineral raw materials has increased 2-3 times, and refractory, composite and acid-resistant materials - 2.5-3.8 times. At present, in the developed countries of the world, the main directions of modern science of mineral processing is the study of effective ways to develop mineral resources, their processing and implementation in practice of achieving advanced technology.

Basalt minerals in the Republic of Karakalpakstan are located in the Sheikhdzheili, Dushchebulak and Berkuttau areas in order to identify promising areas suitable for the production of continuous mineral fibers with the calculation of predicted resources according to the P1 category for setting appraisal works.

The study area is confined to the northern and northwestern parts of the Sultanuweis Mountains. The geological structure of the region includes rocks of the Paleozoic age of basalt-andesite-dacite-rhyolite composition.

The Berkuttau site with an area of 1.62 km2 is located in the center of a brachyform hat-like structure with a diameter of about 3 km, located in the zone of influence of the Berkuttau fault, composed of volcanogenic rocks of the Berkutgau Formation of basalt-andesite-dacite-rhyolite association. Subvolcanic basaltic andesites and andesites form small steeply dipping bodies 6-15 m in size, aphyric and fine-porphyry basalts form a large stock-like body of oval cross-section 150x300 m in size. Basalts and andesite-basalts are recommended for further study as raw materials for the production of basalt fibers.

The Dushchebulak site is located in the northwestern part of the Karakuduk ophiolite band, occupies an area of 11.7 square kilometers and is a linear fractured outcrop of basalt-andesite-dacite formation rocks that compose the lower part of the Karakuduk suite. Basaltoid rocks are broken by subvolcanic bodies of plagiorhyodacites and gabbroids of the Sultanuizdag complex. Basalt rocks within the area are traced for 8 km in two strips separated by terrigenous formations of the Kazansai Formation. Basaltoid rocks with a thickness of 50 m (in the northwest) to 500 m (in the southeast), green and dark green, cryptocrystalline, are recommended for further study as raw materials for the production of basalt fibers.

Sheikhdzheili plot with an area of 5.3 sq. km, composed mainly of basalts and basaltic andesites of the Sheikhdzheilin Formation. Basalts are dark gray, dark green, fine porphyry with a lepidogranoblastic structure of the groundmass, foliated, are recommended for further study as a raw material for the production of basalt fibers.

The quality of the studied basalt rocks in terms of average grades in comparison with the requirements of TU 21 GSSR 137-84 and the company Satbic (China) are shown in Table 2.

Comparison of the quality of basalt rocks of the Berkuttau, Dushebulak, Sheikhdzheili areas with the requirements of regulatory documents

Components,%	TU 21GSSR 137-84	TU Satbic (PRC)	Average values of indicators, %		
			Berkuttau	Duschebulak	Sheikhjayli
SiO_2	47,5-52,5	52,0-54,5	53,0	50,9	52,2
Al_2O_3	14,0-18,0	14,0-16,3	14,6	14,2	15,7
FeO	7,0-13,5	4,5-5,5	-	-	-
Fe_2O_3		3,5-4,5	8,6	10,1	8,9
CaO	8,0-11,0	8,0-9,0	6,7	9,0	8,0
MgO	3,5-8,5	6,5-7,5	3,9	7,9	4,8
K_2O	2,5-6,0	0,7-1,6	1,7	0,5	1,0
Na_2O			3,9	зд	2,3
TiO_2	0,2-2,0	1,3-1,6	0,7	0,9	0,9

Analysis of the table shows that the studied basalt rocks do not meet the requirements of Satbic for the Duschebulak area in terms of SiO2 content (by 1.1% less in relation to the minimum content), in all areas they do not meet the requirements for Fe2O3 content - 8.6-10.1 % with the requirement of 3.5-4.5%. At the same time, it should be noted that chemical analyzes were performed for the sum of oxides FeO + Fe2O3. If you add up the sum of oxides from Satybic company, you get 8.0-10.0% and then the rocks of the studied areas meet the requirements of the mentioned company. In addition, the basalts of the Berkuttau site contain 6.7% CaO with the required 8.0-9.0%; the content of K2O is 1.7% with the requirements of 1.3-1.6%; the raw material of the Duschebulak site contains 7.9% MgO, while the requirement is 6.5-7.5%.

It should be noted that the conclusion about the suitability of basalt rocks in the production of mineral fibers can only be obtained from the results of technological tests. However, the geological assignment does not provide for such tests at the stage of prospecting works.

The gamma activity of the rocks that make up the studied areas, according to the logging studies performed in the wells, is 0.5-14 per / hour.

The hydrogeological and mining conditions of the deposit are simple. Underground waters are not exposed by drilled wells, surface watercourses are also absent. Considering that the hydrogeological conditions of the area are generally determined by the influence of the Amu Darya River, the surface mirror of which is at an elevation of +85 m, and also considering that the lowest elevations of the quarry bottom in the studied areas are at a horizon of +240 m, their flooding with groundwater is not expected.

The source of drinking water supply is the Tuyamuyun-Nukus water pipeline, technical water supply - the surface runoff of the river. Amu Darya.

Mining conditions are favorable for the development of a mineral by quarrying all year round, with preliminary loosening of the massif by means of explosives.

The density of the exploration network for calculating the predicted resources - the distance between the sections is 400 m, between the wells in the sections - 200 m, for the calculation of C2 category reserves - the distance between the sections is 200 m, between the wells in the sections - 100 m.

The calculation of geological reserves was carried out by the method of vertical parallel sections. For these purposes, 8 geological sections were built on the Sheikhdzheili site, Dushchebulak - 24 and Berkuttau - 8 geological sections on a scale: horizontal - 1: 1000, vertical - 1: 500.

The areas on the sections were calculated using the Maplnfo software.

Block volumes between cuts are calculated using publicly available formulas. The distances between the cuts were measured with a ruler.

A confidence factor of 0.7 is applied to the calculated resources and reserves.

The results of calculating the probable resources and geological reserves of basalt rocks for the studied areas are shown in Table 3.

The results of calculating the resources and geological reserves of basalt rocks for the Berkuttau, Dushchebulak and Sheikhdzheili areas.

Site name	P1 category resources with a safety factor of 0.7 m3 / t	Category C2 reserves with a safety factor of 0.7, m3 / t
Berkuttau	10 082 729,3/29 643 224,1	1 854 090/5 451 024,6
Duschebulak	136 482 514/401 258 591,2	6 254 703/18 388 826,8
Sheikhjayli	98 597 436/289 876 461,8	-

Taking into account the foregoing, consider the movement of reserves in the Berkuttau, Dushchebulak and Sheikhdzheili areas:

Site name	Unit of measurement.	Condition of 01.01.2020	Increase (+) or decrease (-) for 2020.	Condition on 01.01.2021
Inferred resources of category P1				
Berkuttau	thousand tons	2 661,6	+26 981,6	29 643,2
Duschebulak	thousand tons		+401 258,6	401 258,6
Sheikhjayli	thousand tons		+289 876,5	289 876,5
Total for the project	thousand tons	**2 661,6**	**+718 116,7**	**720 778,3**
Category C2 reserves				
Berkuttau	thousand tons	2 085,9	+3 365,1	5 451,0
Duschebulak	thousand tons		+ 18 388,8	18 388,8
Total for the project	thousand tons	**2 085,9**	**+21 753,9**	**23 839,8**

In the conclusion of a scientific study on the use of local basalts of Karakalpakia, one can expect the economic efficiency of using these composite materials in the production of cast products, including stone pipes. Particular attention should be paid to the resistance of basalt pipes to acid, alkaline and chemical environments.

Development of production technology for obtaining stone products and, on their basis, casting stone pipes for various purposes and products for special purposes. An innovative technology for the production of cast pipelines, materials used for various industrial purposes are also developed on the basis of local basalt raw materials. The use of local basalts and the results of research and development work improves the characteristics of paper for various purposes and products for special purposes, including the foundry materials industry, reduces the cost of products, which makes it possible to produce competitive and value-saving products.

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Rezyume: *Qoraqalpog'iston mahalliy bazaltlaridan foydalanish yangi xom ashyo bazasi: olovga chidamli va issiqqa chidamli materiallar; metall o'rnini bosuvchi moddalar; har xil potentsialli elektr izolyatorlari; kislotaga chidamli mahsulotlar; kompozit materiallar; Turli sohalarda ishlatilishi mumkin bo'lgan portlend tsement va boshqalar.*

Резюме: *Использование местных базальтов Каракалпакстана является новой сырьевой базой для получения: огнеупорных и жаропрочных материалов; заменители металлов; электрические изоляторы различных потенциалов; кислотоупорные продукты; композитные материалы; Портландцемент и др., Которые можно использовать в различных отраслях промышленности.*

Kalit so'zlar: *Bazalt, minerallar, bazalt jinslari, kompozit va kislotaga chidamli materiallar, minerallar, konning gidrogeologik va qazib olish sharoitlari, ishqoriylik, tabiiy mineral resurslar.*

Ключевые слова: *базальт, полезные ископаемые, базальтовые породы, композиционные и кислотоупорные материалы, полезные ископаемые, гидрогеологические и горные условия месторождения, щелочность, природные полезные ископаемые.*

THE USAGE OF THE CRUSHED CONCRETE SCRAP AS AGGREGATE FOR SELF-COMPACTING CONCRETE

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***Summary**: The results of the study of the effectiveness of multistage crushing of concrete scrap according to the "soft" mode are presented. It has been established that the processing of concrete scrap using this technology can significantly increase the characteristics of the secondary concrete aggregate, in particular, crushing, water absorption and voidness. This is achieved by reducing the content of cement stone in secondary crushed stone. Significant volumes of dispersed material formed as a result of such processing can be used as a thin filler in self-compacting concrete technology.*

***Key words**: self-compacting concrete, concrete scrap, secondary aggregate, multistage crushing, crushing, water absorption, elastic modulus.*

In the domestic construction industry, several million tons of concrete scrap is generated annually [1]. The source of concrete scrap are: concrete and reinforced concrete structures after dismantling physically and morally obsolete buildings; scrap and process waste at precast factories and construction sites; reclamation of industrial and spontaneous dumps.

In large cities, there are technological lines for the processing of reinforced concrete structures. They make it possible to obtain so-called "secondary crushed stone" after crushing concrete scrap and removing reinforcement. However, according to existing technologies, it is impossible to produce high-quality aggregate for concrete from scrap concrete structures [2]. Due to its low characteristics, secondary crushed stone is usually used for the production of low-grade concrete and in road construction [3, 4].

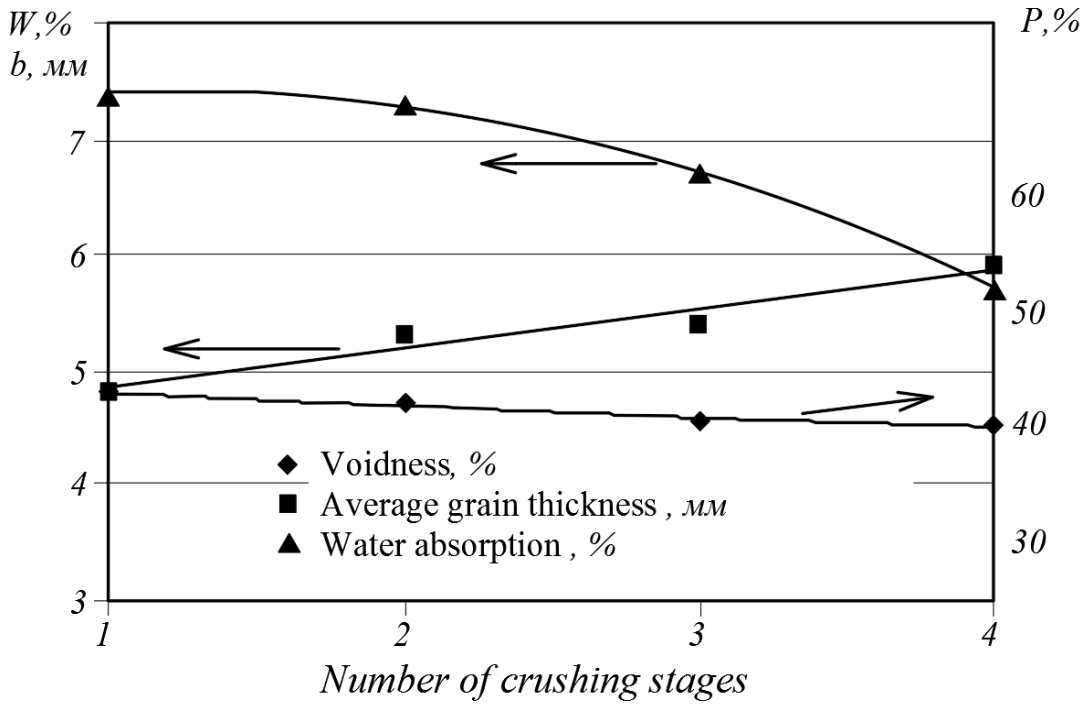
The reason for the low strength of secondary crushed stone obtained by traditional technology is the content in its composition of a significant volume of cement stone, which has a strength by an order of magnitude lower than that of coarse and fine aggregates [5, 6].

An increase in the strength and other characteristics of secondary crushed stone is possible when crushing according to modes that ensure the destruction of predominantly cement stone. To ensure such a grinding regime, special equipment is being created, for example, vibrate-scorable or cone inertial crushers [7]. An increase in the characteristics of secondary crushed stone is also possible due to various technological methods, in particular, mechanical processing in a concrete mixer, impregnation with strengthening polymer solutions [5, 6].

To improve the characteristics of the aggregate, multistage crushing of concrete scrap according to the "soft" mode in conventional jaw crushers can be used. To ensure such a mode, the crusher's discharge opening should be open to the maximum possible width, and crushing should be carried out with the maximum filling of the crusher's working space in the "blockage" mode. In this mode, the destruction of concrete scrap occurs due to the contact interaction of the crushed material with each other, in contrast to the traditional mode of crushing, in which the destruction of the material occurs as a result of the "hard" impact on it of the movable jaw of the crusher.

Grinding according to the "soft" mode ensures the destruction of predominantly fewer durable particles of cement stone and the mortar component of concrete, as well as the separation of these components of concrete from grains of coarse aggregate. In this mode, the degree of crushing of the material is reduced, so it must be subjected to two- or three-fold crushing.

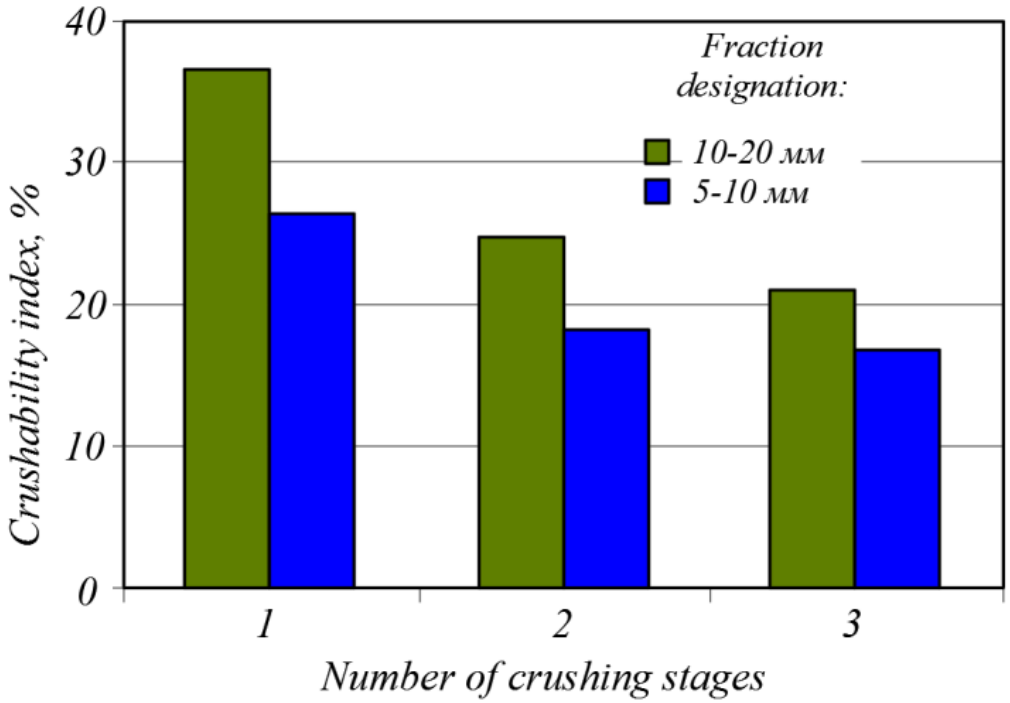
Tests of the characteristics of secondary crushed stone have shown the high efficiency of the multistage crushing method. As seen in Fig. 1, after grinding in 3-4 stages according to the "soft" mode, the characteristics of crushed stone of fraction 5-10 mm are significantly improved - water absorption (W), voidness (P) and average grain thickness (b).



Rice. 1 - Influence of crushing on the properties of secondary crushed stone fr. 5-10 mm

An increase in the characteristics of secondary crushed stone is ensured by a gradual decrease in the content of cement stone in the secondary crushed stone, which is confirmed by a decrease in water absorption and an increase in the density of secondary crushed stone. In addition, crushing in 2-3 stages makes it possible to reduce the intergranular voidness of crushed stone by improving the shape of the grains, which was characterized in the experiment by the average grain thickness b.

The results of determining the strength of crushed stone by crushing in a cylinder also show the effectiveness of multistage crushing of concrete scrap (Fig. 2).



Rice. 2 - Influence of re-crushing on the strength of various fractions of secondary crushed stone

Two- and three-stage crushing of secondary crushed stone significantly increases its strength and other characteristics, however, it leads to the formation of significant volumes of fine and fine fractions of crushing products. These fractions, as well as crushed stone after a single crushing, had low strength; therefore, their use as a fine and fine aggregate instead of natural sand leads to a decrease in the strength of concretes and mortars. To increase the strength properties of these fractions, they were subjected to grinding in a laboratory ball mill for 2 minutes during the experiment. This led to an increase in the proportion of fine and fine fractions in the aggregate, but made it possible to more than double the strength of fine-grained concrete. When determining the strength characteristics, the grain size composition of the filler before and after grinding was the same.

Multi-stage crushing improves the characteristics of the aggregate, but leads to the formation of a large volume of fine fractions, consisting mainly of particles of cement stone. The granulometric composition of the obtained coarse and fine aggregates does not allow them to be used for the production of traditional concrete without screening out fine and fine fractions. Obviously, such a technological operation will lead to the formation of a large volume of material, which also cannot be used in traditional concrete technology.

Taking into account the grain composition of the products of multistage crushing, the most promising field of application of this material is self-compacting concrete, since its technology allows the use of large volumes of fine and fine fractions formed during crushing of concrete scrap. This is due to the fact that one of the key elements of self-compacting concrete technology is the use of a thin filler [8]. In addition, in self-compacting concrete, the content of coarse aggregate and its maximum size are limited, which is another argument in favor of using the products of crushing concrete scrap in this technology. It should be noted that the use of various dispersed mineral waste as a fine filler is considered as one of the ways to reduce the cost and increase the volume of self-compacting concrete use.

Taking into account the fact that sands with a particle content of less than 0.63 mm are widespread and quite cheap, this fraction of the products of crushing concrete scrap, characterized by high porosity and low strength, is advisable to grind in mills to a fineness comparable to that of cement. This will allow sufficient volumes of thin self-compacting concrete filler to be obtained.

To assess the possibility of using the aggregate obtained by crushing concrete scrap in the technology of self-compacting concrete, two compositions were investigated. The first used crushed dolomite grade 1200 with a density of 2880 kg / m3 and its crushing screening, which was used to optimize the grain size composition of fine aggregate [9], as well as dolomite flour with S*sp* = 340 m2 / kg as a fine aggregate.

In the second composition, secondary crushed stone of 5-10 and 10-20 mm fractions was used as a coarse aggregate. Screening of concrete crushing with a fraction of 0.63-5 mm was used to optimize the granulometric composition of fine aggregate based on quartz sand. To obtain a fine aggregate, crushing screenings of less than 0.63 mm were crushed in a laboratory ball mill to a specific surface area S*sp* = 334 m2 / kg.

Sand of the MAYSKOYE field was used as a fine aggregate in both compositions. Due to the fact that the content of grains in this sand is less than 0.63 mm, more than 90%, natural sand was enriched with screenings for crushing crushed stone or concrete scrap.

The compositions of the investigated concretes, their strength are shown in the table.

As can be seen from the data given in the table, for the concrete mixture prepared using the products of crushing concrete scrap, despite the higher water consumption, the spreading is noticeably less, which indicates a high water demand of the secondary aggregate. Replacing a high-quality aggregate with concrete scrap leads to a 2-fold decrease in the strength of concrete at the age of 1 day. This is due to the higher water consumption in the composition with the secondary aggregate, which causes a longer blocking effect of the plasticizer. After 28 days, the strength of concrete on crushed scrap is also lower, but the decrease is only 8%.

Compositions of the investigated concretes and their properties

№ composition	Concrete composition	Consumption, kg/m^3	Blur, mm	Strength, MPa, after		
				1 days	28 days	TBO
1	Cement Water Sand Limestone crushed stone (FR. 10-20) Limestone crushed stone (FR. 5-10) Screening of crushed stone crushing Limestone filler Plasticizer "POLIMIX"	310 170 257 256 513 722 295 1,6	576	20,8	56,4	48,5
2	Cement Water Sand Limestone crushed stone (FR. 10-20) Limestone crushed stone (FR. 5-10) Screening of crushed stone crushing Limestone filler Plasticizer "POLIMIX"	313 190 257 257 444 696 280 1,6	530	11,1	52,6	42,2

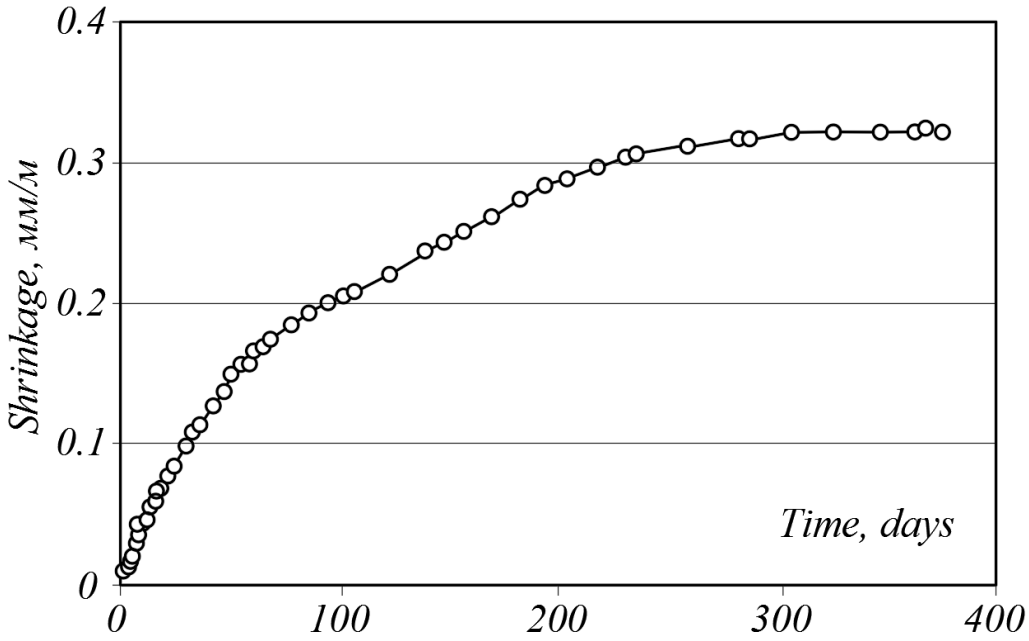
When storing samples made with the use of concrete scrap for a year in air-dry conditions, the concrete reached a strength of 73.8 MPa, and the prismatic strength was 57.5 MPa. At the same time, the modulus of elasticity was only 24.3 MPa, which is 1.6 times lower than the value specified in the normative document (ҚМҚ 2.03.01-96 Concrete and reinforced concrete structures. Basic provisions), which regulates this indicator for concrete of class B55. Such a low value of the modulus of elasticity of the investigated concrete is explained by the peculiarity of its composition and structure.

Firstly, in self-compacting concrete there is less than in ordinary concrete, the content of aggregates characterized by high values of the modulus of elasticity, and more - of low-modulus cement stone. It is noted that the modulus of elasticity of self-compacting concretes is 15% lower than that of conventional concretes [10].

Secondly, secondary aggregates contain low-modulus inclusions of the mortar component of concrete, which also reduce the modulus of elasticity of concrete made using crushing products. It has been established that the modulus of elasticity of such concretes is 7 ... 18% lower than that of concretes based on natural aggregates [11].

The reason for the decrease in the modulus of elasticity of self-compacting concrete made with the use of concrete scrap is the use of crushed cement stone as a fine filler. This feature of the investigated material should be taken into account when choosing the area of its application.

Studies of the shrinkage of self-compacting concrete based on the products of concrete scrap processing, carried out for one year, showed that this characteristic is in the range of 0.3 ... 0.34 mm / m (Fig. 3), which does not confirm the data on a significantly higher shrinkage self-compacting concretes [12].



Rice. 3 - Kinetics of shrinkage deformations of composition 2 (according to the table)

Conclusions

The studies carried out allow us to draw the following conclusions:

- concrete scrap after multistage crushing in a "soft" mode can be used as a filler for self-compacting concrete;

- replacement of high-quality aggregates for concrete scrap crushing products in self-compacting concrete leads to a decrease in strength by 8-10%. However, the properties of the resulting concrete, in particular

strength more than 50 MPa after 28 days of normal hardening, allow it to be used for the production of most structures of modern buildings and structures;

- self-compacting concrete, obtained on the basis of the products of crushing concrete scrap, has a reduced modulus of elasticity, which must be taken into account when choosing rational areas of application of this concrete.

- the proposed technology for processing concrete scrap makes it possible to obtain an inexpensive aggregate with a granulometric composition necessary for the production of a new highly efficient type of concrete - self-compacting concrete.

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Rezyume: *Beton lomini ko‘p bosqichli «yumshoq» rejim bo‘yicha maydalashning saradordigini tasdiqlovchi ilmiy tadqiqotlar natijalari keltirilgan. Aniqlanishicha ushbu uslub bo‘yicha beton lomini qayta ishlash texnologiyasi ikkilamchi to‘ldiruuvchining burdalanuvchanlik, suv yutuvchanlik va bo‘shliqdorlik kabi ko‘rsatkichlarini yaxshilaydi. Olingan betonning muhim xossalari, jumladan normal sharoitlarda 28 sutka davomida qotirilgandagi mustaxkamligi 50 MPa yetadi, bu esa zamonaviy bino va inshootlarning ko‘pchilik konstruksiyalarini ishlab chiqarishda foydalanish imkoniyatlarini beradi.*

Резюме: *Приведены результаты исследования эффективности многостадийного дробления бетонного лома по «мягкому» режиму. Установлено, что переработка бетонного лома по такой технологии позволяет значительно повысить характеристики вторичного заполнителя бетона, в частности дробимость, водопоглощение и пустотность. Это достигается за счет снижения содержания во вторичном щебне цементного камня. Образующиеся в результате такой обработки значительные объемы дисперсного материала могут применяться в качестве тонкого наполнителя в технологии самоуплотняющегося бетона.*

Kalit so‘zlar: *o‘zi zichlanuvchi beton, beton lomi, ikkilamchi to‘ldiruvchi, ko‘p bosqichli maydalash, burdalanuvchanlik, suv yutuvchanlik, bo‘shliqdorlik, elastiklik moduli.*

Ключевые слова: *самоуплотняющийся бетон, бетонный лом, вторичный заполнитель, многостадийное дробление, дробимость, водопоглощение, модуль упругости.*

ORGANIZATION OF AGRO-TECHNICAL SERVICES ON THE BASIS OF PUBLIC-PRIVATE PARTNERSHIP

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Summary. *One of the promising options in the article to meet the demand of farmers for machinery is the joint work of farmers on the joint use of machinery. One of the most promising forms of state support for agricultural producers using budget funds is the provision of the agro-industrial complex with machinery and pedigree cattle on a leasing (financial lease) basis.*

Key words: *farms and dehkan farms, public-private partnership, innovation sector, innovation strategy, public-private partnership mechanism, investment and innovation agency, state support of innovation.*

The role of high-efficiency modern machines, equipment, tools and other means of production in the continuous implementation of reproduction processes in agriculture and the intensive development of the industry is immeasurable. In order to develop the industry at a sustainable pace, it is necessary to pay serious attention to improving its technical base. [1].

At present, farms can meet their needs for the purchase of equipment in the following ways:

1. Procurement through bilateral agreements concluded directly from manufacturing plants.
2. Procurement through intermediary supply and trade enterprises.
3. Leasing.
4. Purchase of obsolete equipment of enterprises and organizations at exchange trades.

Most farmers and ranchers want to have their own machinery. The advantage of this is that they will be able to process agricultural crops in a timely manner and with the desired quality, material resources and finished products to the right place at a relatively low cost.

If we take into account the increase in the area of farms specializing in horticulture, viticulture and vegetable growing in the country, we are convinced that it is necessary to take major measures to provide them with material and technical means to create conditions for further sustainable development. The distribution of the share of land in the Republic of Karakalpakstan and the regions of farms specializing in horticulture, viticulture and vegetable growing in the country requires the supply of machinery depending on their area.

In particular, in recent years, the work on the supply of leasing equipment to farms specializing in horticulture and vegetable growing in the country is gaining momentum.

First of all, the serial production of small and medium-capacity universal and special tractors and machines is becoming a topical issue, relying heavily on the domestic potential of the republic and foreign investment. In this regard, it is necessary to attract high-performance, modern and resource-saving techniques to agriculture, first of all, to strengthen cooperation with leading foreign companies.

Due to rising prices for agricultural machinery in recent years, many farmers and dehkan farms are unable to afford them. According to the Ministry of Agriculture and Water Resources of the Republic of Uzbekistan, in 2010-2013, the share of the use of own funds in agricultural machinery purchased by farms decreased from 3.8% to 1.8% compared to the number of purchased machinery.

Today, the main goal of the development of agricultural service enterprises is to increase the competitiveness of agricultural enterprises using their services not only in the domestic market but also in foreign markets.

It is expedient to organize agro-technical services on the basis of public-private partnership in order to provide timely and quality mechanization services to agricultural producers, create favorable conditions for the development of leasing, renewal and technical modernization of the agricultural sector on the basis of public-private partnership. This requires local governments to:

1. Monitoring and determining the required amount of agro-technical services, calculating the need for public investment, calculating the expected investment of private partners, the amount of buildings, structures, equipment and machines for the operation of agro-technical services.

2. Organization of work on the creation of agro-technical services on the basis of public-private partnership with the involvement of private business entities that provide services to agricultural producers through competitions and tenders.

3. Determining the cost of services associated with the implementation of mechanization for agro-technical services, organized on the basis of public-private partnership.

4. Consideration of the possibility of using unused buildings, production areas, equipment of repair shops, garages with the participation of the State Asset Management Agency for the creation of agro-technical services on the basis of public-private partnership.

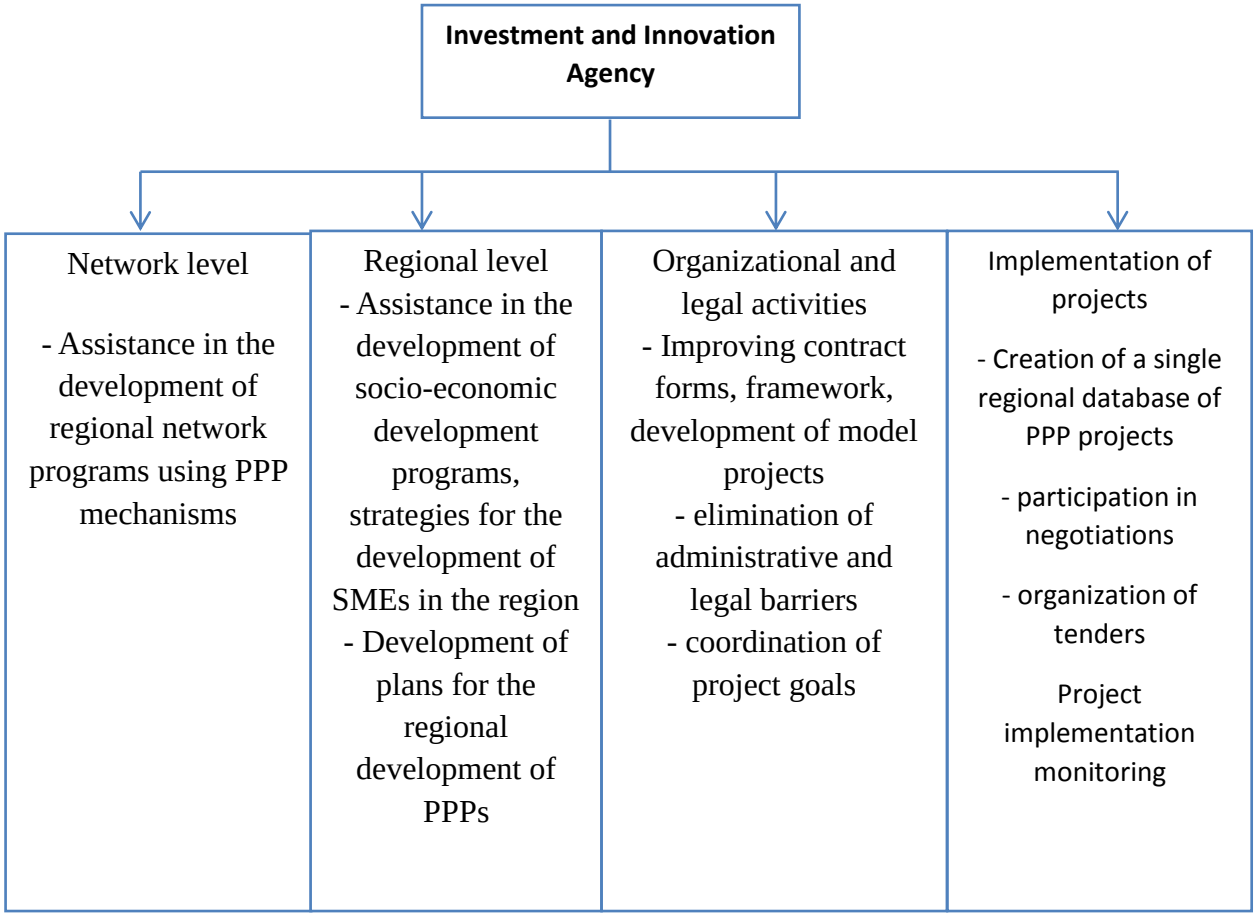
5. Implementation of organizational support for the provision of agro-technical services created on the basis of public-private partnership with electricity and other infrastructure services.

The Ministry of Agriculture of the Republic of Uzbekistan must:

- Assistance to local authorities in the organization of agro-technical services on the basis of public-private partnership;

- organization of collection of fees for the purchase of agricultural machinery from agro-technical services organized on the basis of public-private partnership to provide them with full machinery and ensuring the leasing of machinery through JSCB "Agrobank". [2].

At present, it is necessary to study the possibilities of production of agricultural machinery in local agricultural machinery enterprises of the country, to study the status and technical readiness of MTP in agriculture, to make proposals to improve the training of mechanization personnel for agricultural production. It is recommended to establish an investment and innovation agency (Figure 1).



Leasing is one of the most important forms of PPP that is suitable for implementation in the current conditions of the country's economy. Leasing activity as a type of investment activity has significant financial, practical, service organizational-user advantages. The use of leasing models in the economy of our country, in turn, strengthens the position of the private sector, enters into partnerships with the state, does not seek to apply innovative management technologies, invests capital with greater profits and maximizes profits.

Therefore, leasing is a sufficiently justified form of indirect financing of both entrepreneurship and innovation. The limited amount of liquid funds for the expansion and modernization of production, as well as problems with the sale of products characterize the activities of many modern organizations. At the same time, the successful introduction of innovation requires the production sector to use the latest technologies of financing. These may include leasing transactions. All enterprises, primarily small and medium enterprises, apply only to the leasing of fixed assets in a growing number. This means that 80% of firms in the U.S. routinely purchase the necessary machinery and equipment on lease terms; where the share of leasing is up to 30% of the total amount of capital investment in machinery and equipment.

Uzagroleasing JSC, which has been operating in our country for many years, also has a worthy place in the achievements of our country in the field of agriculture. This Society, which has been operating in our country for almost 20 years, has become the most reliable partner of farmers.

Today, Uzagroleasing JSC provides leasing to about forty thousand farmers and farms, machine-tractor parks, clusters of enterprises of Uzdonmahsulot JSC, Uzpakhtasanoat JSC and Uzagrokimyohimoya JSC on a lease basis. supplies agricultural machinery.

According to the Association of Lessors of Uzbekistan, Uzagroleasing JSC has been a leader in the national market for a number of years in the volume of leasing services.

In 2001-2018, the company supplied 71,448 units of machinery worth 3067.8 billion soums to agricultural enterprises of the Republic. Of these, 1,523 combine harvesters, 4,652 tractors, 23,484 mowers and transport tractors, and 41,789 units of various types of agricultural machinery.

By 2018, the range of delivered agricultural machinery has reached 90 units. In 2018, 5262 pieces of agricultural machinery worth 758.3 billion soums were leased to agricultural enterprises of the Republic. In particular, 525 driving tractors, 642 mowing tractors, 76 combine harvesters and 4019 different types of agricultural machinery. [3].

Further increase in the efficiency of the existing agro-leasing system is required. Because this system is so tightly regulated, it changes its essence a bit, that is, it turns it into a centrally distributed credit. In such a model, certain advantages of the agroleasing mechanism in comparison with other financial and economic mechanisms cannot be realized. The reasons for the ineffectiveness of government support are related not only to the scale of leasing development, but also to its over-centralization. In other words, the potential of agroleasing is not realized in such a model. This determines the role of public-private partnership in the development of leasing relations. [4].

- According to research, its advantages for lessees (including farms) are as follows:
- it is possible to pay the total cost of the purchased equipment in installments over a long period of time, rather than all at once;
- the same time it is possible to attract modern equipment and technologies, as well as expand production;
- Lease payments for machinery and equipment are paid from the income from their use;
- non-purchase of machinery and equipment at full value in cash allows to replenish working capital and release funds for other needs;
- Defects of leased equipment are eliminated by the lessor during the warranty period.

In our opinion, one of the most promising options in meeting the demand of farmers for machinery today is the joint work of farmers on the joint use of machinery. If the volume of production on a farmer’s farm does not allow him to own the machinery individually, several

farmers can work together to purchase and share productive machinery that is expensive. There are many advantages to this, which can be seen in the following:

- each farm has got rid of the need to purchase several types of equipment that need to be used in the production process, thereby saving on the purchase of equipment and sharing the costs associated with their operation;
- Due to the very short use of some technical means in agriculture, it is not efficient for a particular farmer to purchase and store machinery used in a few days;
- Accelerate the work on equipping farms with the necessary types of agricultural machinery;
- The joint use of machinery leads to the rational use of machinery, full mechanization of production, even in small and medium farms;
- as a result of saving on technical costs, the cost of production will be reduced.

However, there should be mutual trust between farmers and the process of sharing machinery should not lead to various conflicts. To prevent this, farmers can create car-tractor parks in the form of a limited liability company, a cooperative (full or limited company) or a closed joint-stock company, contributing as a co-founder. It is possible to organize agro-technical services on the basis of public-private partnership in order to provide timely and quality mechanization services to farmers, create favorable conditions for the development of leasing, renewal and technical modernization of the agricultural sector on the basis of public-private partnership.

The low level of technical equipment and the high level of obsolescence of the machine-tractor fleet are the reasons for the decline in agricultural production, the reduction of arable land and the number of livestock. There is a need to take measures to stop the next decline in the armament of agriculture with machinery and energy.

In the current situation, it is almost impossible to solve the problem of financing the technical re-equipment of agricultural producers without state support. The special status of agricultural production as an activity to ensure food security of the country necessitates the formation of leasing in the agro-industrial complex (AIC). This requires significant financial support from government agencies. In addition, the slow and inefficient development of lending to agricultural producers, low self-sufficiency of agricultural enterprises, high dependence on natural conditions further strengthen the need for government support in the leasing process. [5].

Thus, one of the promising forms of state support for agricultural producers using budget funds is the provision of the agro-industrial complex with machinery and pedigree cattle on a lease (financial lease) basis.

The state finances leasing for agricultural commodity producers through investment companies, while maintaining and supporting healthy competition in the leasing services market. In the first stage, the state can participate in the investment on the basis of non-discriminatory assistance, as a result of which the leasing company offers more favorable terms for agricultural producers. In addition, this scheme will solve the problem of shortage of investment funds for leasing companies.

The main advantage of leasing financing from subsidized agricultural lending as a measure of state support for agricultural producers is the return and reuse of budget funds, which increases the efficiency of the use of funds several times. Each subsequent year, budget funds are reinvested in the purchase of additional volumes of new agricultural machinery.

Thus, investing budget funds in the charter capital of a leasing company with state participation is one of the most effective ways to provide practical assistance to agricultural producers.

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Rezyume. *Maqolada fermerlarning texnikaga bo'lgan talabini qondirishda istiqbolli variantlardan biri fermerlarning texnikadan o'zaro hamkorlikda foydalanish bo'yicha uyushib faoliyat ko'rsatishidir. Qishloq xo'jaligi ishlab chiqaruvchilarini byudjet mablag'laridan foydalanib davlat tomonidan qo'llab-quvvatlashning istiqbolli shakllaridan biri lizing (moliyaviy ijara) asosida agrosanoat majmuasini mashinasozlik mahsulotlari va zotdor qoramollar bilan ta'minlash masalalariga qaratilgan.*

Резюме. *Одним из перспективных вариантов в статье удовлетворения спроса фермеров на технику является совместная работа фермеров по совместному использованию техники. Одна из перспективных форм государственной поддержки сельхозпроизводителей за счет бюджетных средств направлена на обеспечение агропромышленного комплекса техникой и племенным скотом на условиях лизинга (финансовой аренды).*

Kalit so'zlar**:** *фермер ва деҳқон хўжаликлари, davlat-xususiy sheriklik, innovatsion soha, innovatsion strategiya, davlat-xususiy sheriklik mexanizmi, инвестиция ва инновация агентлиги, innovatsiyalarni davlat tomonidan qo'llab-quvvatlash.*

Ключевые слова*: фермерские хозяйства и дехканские хозяйства, государственно-частное партнерство, инновационный сектор, инновационная стратегия, механизм государственно-частного партнерства, агентство инвестиций и инноваций, государственная поддержка инноваций.*

WASTE BASED DRILLING FLUID STABILIZER

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Summary. *The article presents the results of creating powdered stabilizers based on gossypol resin. It was found that by adjusting the amounts of modifiers of soda ash and alum, it is possible to purposefully change the stabilizing ability of the materials obtained. The results of laboratory studies show that the composition of the obtained stabilizer with CMC and PAA, along with inhibition, improves the viscosity rheological and filtration characteristics of solutions. This achieves a significant effect of reducing the consumption of materials to control the rheological properties of the drilling fluid.*

Key words*: gossypol, resin, alum, viscosity, fluid loss, CMC, PAA, drilling mud, electrolyte, inhibition.*

Introduction.

All over the world, there is a widespread exploration of oil and gas fields, as well as work on the development and operation of wells, taking into account their structure and drilling depth. Therefore, new types of drilling fluids are created using local clay minerals, chemicals and stabilizing additives from synthetic and natural materials [1-5].

To ensure the required properties of drilling fluids and maintain them during drilling, various chemical reagents are added to them [6]. Currently, more than 1000 chemicals are used to treat drilling fluids. Therefore, it becomes necessary to classify them. They are classified by composition, chemical nature, purpose, salt resistance, heat resistance.

Inhibitory drilling fluids are systems designed to prevent accidents and complications associated with talus and collapse of unstable clays. This type of drilling complications causes the greatest losses, which end with well abandonment [7-11]. The success of prevention of talus and rock falls in various geological conditions depends entirely on the correct choice of the type of drilling fluid, its composition and properties.

The aim of the research was the synthesis of new surface active substance - an inhibitor based on gossypol resin to prevent swelling of clay rocks under the influence of drilling mud filtrate.

Gossypol gum, a waste of fat and oil production, consists mainly of fatty acids and gossypol [12]. Gossypol is a compound of the polyphenol class which contains a carbonyl group and substituted alkyl radicals. They, as polyphenolic compounds, are able to interact with many substances, forming ethers and esters, amino derivatives [13]. Therefore, on the basis of this industrial waste, it is possible to obtain various new substances [14,15]. In this regard, research is currently underway to develop stabilizing additives for drilling fluids.

Objects and research methods

In the course of laboratory research, gossypol resin (GR) was used, obtained as a result of the extraction of fatty acids from soap stock of the Xojeli oil and fat plant. Data on the chemical composition of this resin are given in [16]. Its technological properties are characterized by the following indicators: homogeneous viscous-flowing mass of dark brown color; acid number and saponification number, mg KOH 75-90 and 110, respectively; ash and moisture content - 1 and 3%, respectively.

The modification was carried out by mixing the gossypol resin heated to 85-100 ° C with a solution of soda ash and potassium-aluminum alum with constant stirring for 15 minutes. To obtain quality products based on gossypol resin, a number of experiments were carried out. In the first case, a suspension was prepared, consisting of 50% gossypol resin, 5% soda ash, 1% alum and water (C1). In the second experiment, under the same conditions, a suspension was prepared, consisting of 50% gossypol resin, 10% soda ash, 5% alum and water (C2). In the third experiment, the ratio of the ingredients was 5: 1: 1 (C3).

After obtaining a homogeneous solid mass, drying is performed, then the products are chopped. It was found that in the process of obtaining a powdery reagent, it is also possible to use aluminum sulfate instead of alum.

The density of the drilling fluids was measured using hydrometers and a pycnometer. The conditional viscosity of suspensions is one of the main criteria that determines the suitability of clays for the preparation of drilling fluids; it characterizes the yield of drilling fluid m^3 from one ton of clay. The relative viscosity of the suspensions was determined using a DFV-2M (ВБР-2М) funnel with a 5 mm tube.

The static shear stress of drilling fluids was determined using RV-2 (ВСН-2) and SShS-2M (СНС-2М) instruments, and the fluid loss of suspensions was measured using a VO-6 (ВМ-6) instrument designed to measure static filtration at temperatures from + 10°C to 80°C and a pressure drop of 1 kgf / sm^2.

The concentration of hydrogen ions was determined by using both the calorimetric method using indicator paper and the potentiometric method using various pH meters (ionomer brand-160MI).

Results and its discussion

The properties of aqueous solutions of the obtained powder samples were investigated. Their results are shown in table 1.

Table 1.

Physicochemical characteristics of the developed modified forms of gossypol resin

Example	Concentration in solution,%	Solution parameters		
		CV	WY, sm^3 / 30 min	ρ, g / sm^3
C1	10	17	28	1,00
	20	23	23	0,96
C2	10	18	28	1,00
	20	23	21	0,94
C3	10	19	26	0,96
	20	26	19	0,92

From the data contained in the table, it can be seen that a solution based on C3 has relatively high viscosity values. A solution based on this is characterized by lower fluid loss values.

Further, their inhibiting ability was studied, for which an initial 4% clay suspension was prepared, and a clay powder from bentonite clays of the Krantau deposit was used as a dispersed phase [17-19]. The inhibitory effect of drilling fluids treated with modified gossypol resin was studied using models of clay components of rocks - local clays of the Muynak and Beltau deposits [20]. For comparison, the swelling capacity of these clays was also studied in a fresh inhibiting mud system. Sodium chloride was used to simulate the mineralization of clay solutions.

It was found that the above-mentioned fresh unstabilized clay suspension effectively penetrates into the interlayer space of clays and hydrates them well. The bentonite clay of the

Moynak deposit swells most intensively. This is due to the peculiarities of the crystal structure of the clay mineral and the composition of its exchange complex. During the first 5 minutes of the experiment, there is a sharp increase in the swelling rate, followed by a decrease after 30-35 minutes of contact with fresh clay drilling mud. At the same time, it turned out that the swelling of the Moynak bentonite clay is 2.6-2.8 times greater than the Beltau one.

The introduction of sodium chloride into the composition of fresh drilling mud led to the stabilization of the values of the swelling indices. The introduction of NaCl in an amount of 10 g / l leads to the stabilization of the process in 7-9 minutes from the beginning of the experiment. Such changes were also observed with the addition of potassium-aluminum alum. The amount of alum in the drilling fluid did not exceed 2 g / l, which is sufficient to stabilize the swelling process within 4-5 minutes from the beginning of the experiment. Such effects of alum are explained by the presence of a dual inhibition mechanism. First, potassium cations, penetrating into the interpacket space of sodium montmorillonites, prevent their hydration and swelling. Secondly, the aluminum hydroxide formed in the solution, being adsorbed on the surface of clay particles, prevents the dispersion of clay rocks. Since the surface layers of clay minerals are in contact with the molecules of the aqueous phase, the formed filter cake becomes loose under the action of the electrolyte solution.

The introduction of CMC into the drilling fluid in an amount of 1-5 g / l resulted in a sharp increase in swelling indices within 10-15 minutes. Even at CMC concentrations of 15-20 g / l, a zero value of its parameter was not observed. At the same time, at such CMC concentrations, the filtration rate of the solution decreases, which at the same time strongly affects the rheological properties of drilling fluids. The introduction of PAA (polyacrylamide) into the drilling fluid in an amount of 1-2 g / l leads to a sharp increase in swelling values within 30 minutes. On the contrary, at PAA concentrations of 15-20 g / l, there is a sharp decrease in these indicators to 1.2 sm^3 / (g·min). In addition, the thinning effect of the PAA reagent begins to manifest itself at concentrations above 0.2%. At a content of 0.5%, PAA exhibits a thickening effect and promotes the formation of dense, thin, elastic filter crusts.

Drilling mud treated with C3 in an amount of 10 g / l and more prevents the process of clay swelling and stabilization of the technological properties of the drilling mud. The filtration performance of the drilling mud treated with C3 in an amount of 2% decreases to 11 sm^3 / 30 min versus 21 sm^3 / 30 min. As shown by the results of the study, C1 and C2 have inhibitory properties significantly lower than those of C3. To achieve maximum inhibitory effects, much higher amounts of C1 and C2 will be consumed.

When considering the effect of the combined action of C3 and CMC in the composition of the drilling fluid on the swelling capacity of clays, it was found that when C3 and CMC are added in an amount of 5-8 g / l and 3-5 g / l, respectively, there is a sharp decrease in the parameters of clay swelling to zero values. The results of studying the process of swelling of clays in the presence of polymer and sodium chloride in the clay drilling mud showed that the electrolyte in the solution prevents the swelling of clays and helps to reduce the concentration of polymer and gossypol resin in the composition of the drilling mud. In addition, the combined use of C3 and polymers leads to a decrease in fluid loss values of the drilling fluid to 1-3 sm^3 / 30 min.

Analysis of the dependence of the swelling rate on the concentration of electrolyte, polymer and gossypol resin made it possible to establish the optimal ratio of the drilling mud ingredients prepared using them. The effectiveness of chemical treatment can be achieved by combining small additives of ingredients to the drilling mud, which significantly improves its quality and the corresponding technological parameters of the mud. Each of the ingredients individually enhances the inhibitory, rheological and filtration properties of drilling fluids.

Table 2 shows the results of laboratory studies with the combined use of reagents (C3 + CMC + PAA) for the treatment of drilling fluids. A clay drilling mud treated with a 3-combined composition of reagents possesses higher technological properties.

Table 2.

Results of experimental studies of the effectiveness of the stabilizing ability of reagents in their combined use (clay content 4%)

№	Compounds	%	Drilling fluid technological parameter					
			ρ, g / sm^3	WY, sm^3 / 30 min	CV	$SShS_1$, mgf / $sм^2$	PTh, mm	DS, %
1	C1-90, CMC-10	2	1,025	14	19	15	1	1
		4	1,026	11	23	18	1	1
2	C2-90, CMC-10	2	1,026	11	19	19	1	1
		4	1,027	9	24	24	1	1
3	C3-90, CMC-10	2	1,025	10	23	25	1	1
		4	1,026	9	25	31	1	0,7
4	C1-80, CMC-10 PAA-10	2	1,025	10	21	17	1	0.5
		4	1,026	5	24	21	1	0,5
5	C2-80, CMC-10, PAA-10	2	1,025	10	22	19	1	0,5
		4	1,026	5	25	24	1	0,5
6	C3-80, CMC-10, PAA-10	2	1,025	8	24	23	0,5	0
		4	1,026	4	29	25	0,5	0

The results of laboratory studies show that the composition C3 + CMC + PAA, along with inhibition, improves the viscosity rheological and filtration characteristics of solutions. This achieves a significant effect of reducing the consumption of materials for controlling the rheological properties of the drilling fluid.

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Rezyume: *Maqolada gossipol smolasiga asoslangan kukunsimon stabilizatorlarni yaratish natijalari keltirilgan. Kaltsinirlangan soda va achchiqtosh modifikatorlari miqdorlarini tartibga solish orqali olingan materiallarning stabillash qobiliyatini maqsadga muvofiq o'zgartirish mumkinligi keltirilgan. Laboratoriya ishlari natijalari shuni ko'rsatadiki, olingan stabilizatorning KMS va PAA tarkibi ingibitor bilan birga eritmalarning qovushqoqligi reologik va filtrlash parametrlarini yaxshilaydi. Shu bilan birga burg'ilash eritmalarining reologik xususiyatlarini nazorat qilish uchun materiallar sarfini kamaytirishning sezilarli samarasiga erishiladi.*

Резюме: *В статье приведены результаты создания порошкообразных стабилизаторов на основе госсиполовой смолы. Установлено, что регулированием количеств модификаторов кальцинированной соды и квасцов возможно целенаправленное изменение стабилизирующей способности полученных материалов. Результаты лабораторных исследований показывают, что композиция полученного стабилизатора с КМЦ и ПАА наряду с ингибированием, улучшает вязкостные реологические и фильтрационные показатели растворов. При этом достигается существенный эффект уменьшения расхода материалов для управления реологическими свойствами бурового раствора.*

Kalit so'zlar: *Gossipol, smola, achchiqtosh, qovushqoqlik, suv ajralishi, KMS, PAA, burg'ilash eritmasi, elektrolit, ingibirlash.*

Ключевые слова: *Госсипол, смола, квасцы, вязкость, водоотдача, КМЦ, ПАА, буровой раствор, электролит, ингибирование.*

UDK. 622.277.

EXPLORING THE METHOD OF SELECTIVE UNDERGROUND MELTING

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Summary: *In recent years, there have been trends in the expansion of enterprises specializing in the extraction of metals, which is likely to remain in line with the long-term, long-term plans of large enterprises. Most small gold and other metal mining companies do not have such prospects. However, without replenishing the subsoil, the underground resources will continue to run out. For small businesses, it is advisable to adopt a new technology of selective smelting of deposits, as this method has a number of technical and economic advantages over traditional technologies of gold mining.*

Keywords: *selective underground smelting method, solution, ore mass, filtration, gold, chlorine, sodium hychlorite, iodine, bromine, super toxicity, high chemical activity, composite materials, rocks, chloridion, decomposition, pipe set observation pipes, stationary mode, until one, debit current.*

Globally, the method of selective smelting of tubular underground has been developed on the basis of selective smelting technology, preparation process, layer opening and metal extraction, selective smelting systems in top-drilled pipes. piping system. The solution is then filtered in the ore mass, and the enriched solution is taken up by a system of suction pipes and transported for further processing.

In addition, the complete or partial dehydration of ores in the selective smelting of tubular underground, the dependence of holes and cracks on the mineralization of the ore, which provides the permeability of the ore. selective smelting is also being carried out underground under the pipeline. The method of selective smelting of metals underground has a number of advantages in choosing the method of development of deposits. These include:

- Preservation of the natural landscape (absence of excavations and quarries, non-washing of sands) is a factor that reduces the risk of direct contact of workers with rocks during operation, injuries during production.
- Removal of many technological processes from the production system (mining, transportation to concentrators, crushing, crushing, concentrating, hydrometallurgical processing of concentrates)
- 2-4 times reduction of capital expenditures in mining construction
- Possibility to organize the initial smelting of low-concentration metals;
- Possibility to use deposits of strong dehydrated rocks;
- Involvement of poor and off-balance sheet ores for open pit mining;
- Absence of waste and waste storage facilities that pollute the environment;
- Fully automated surface processing and mining of technological solutions.
- Improving the quality of technical and economic indicators in mining.

The technological process of selective underground smelting production also consists of a number of problematic issues, including;

- The complexity of the schematic diagram of the selective smelter;
- Difficulty in selecting environmentally and economically optimal reagents for selective underground leaching;
- Research stages;
- Research and development work to improve the techniques and technology of selective underground smelting;
- Study of the raw material base.

ECONOMICALLY AND ECOLOGICALLY ACTIVE REAGENTS FOR SELECTION OF GOLD UNDERGROUND.

At present, the main reagent for the extraction of gold from ores in hydrometallurgical processes is sodium cyanide. The increasing demand for environmental protection, especially the attention paid to the method of selective smelting underground, determines the urgency of finding reagents with low toxicity in the smelting of gold. Examples of such solvents are active halogenated reagents in the free halogen state and in the hypochlorite state. In addition, the use of cyanide is acceptable only for visible and finely dispersed gold.

Due to the high environmental requirements for selective underground smelting, the use of ore preparation and cyanides as solvents has been practically removed from the agenda.

Due to technological aspects, the use of cyanides to dissolve gold in heavy cyanides, which are highly soluble and in shale deposits, is highly inefficient. and oxidants (potassium or sodium hypochlorite, potassium permanganate, manganese dioxide).

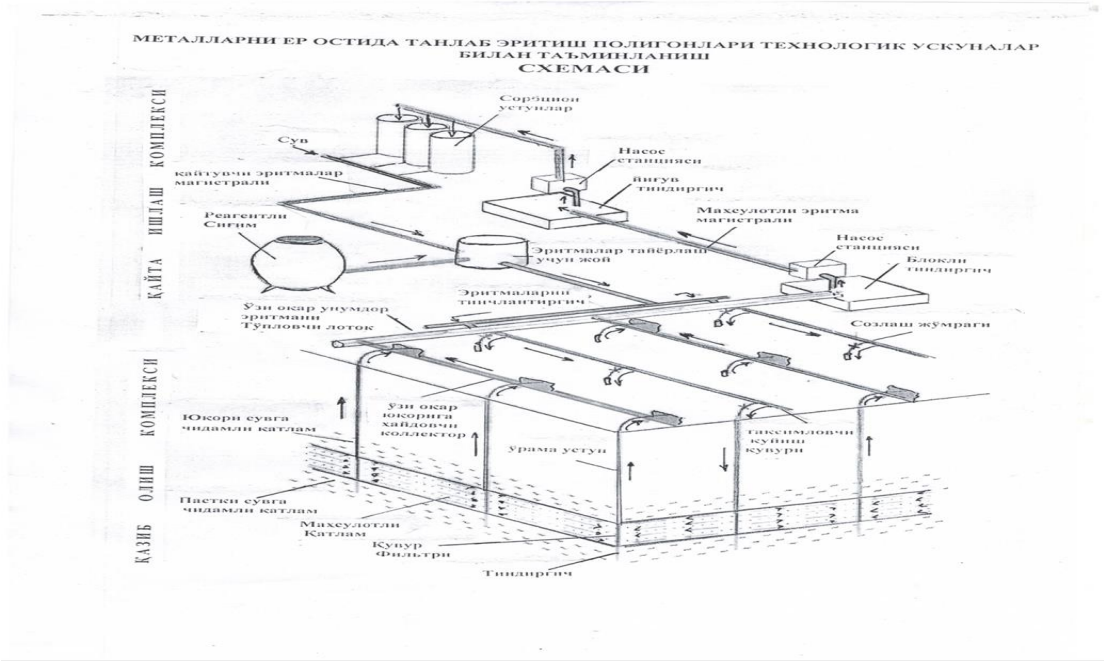

Figure 1. Advantages of selective gold smelting chloride system are as follows

- High oxidation activity;
- Ability to process gold-bearing materials at a higher depth, which allows to obtain a high level of gold;
- Availability of reagents and their low cost;
- Availability of reagents at the production site.

Disadvantages:

- Use of corrosion-resistant system in all technological processes;
- the complexity of processing and disposal of solutions.

Analysis of the scientific literature on the use of chlorine in the production of hydrometallurgical plants shows that the consumption of chlorine is more than 1-2 kg / g of gold obtained and the selective smelting time does not exceed 1-2 hours. increases.

The amount of silver interferes with the degree of extraction of gold from gold-bearing materials. If gold contains 30% or more of silver, i.e., the amount is 700 and below, the transition of gold to chlorinated solutions is completely stopped due to the screen formed of silver chloride around the gold.

The ecological principles of the use of chlorine in selective underground smelting show that, despite the extreme toxicity of active chlorine with its properties, its high chemical activity, its rapid

decomposition to non-toxic chloride levels when combined with gold-bearing materials and rocks, and its high instability.

The presence of small amounts of toxic compounds in the productive horizons of selective gold smelting facilities may accumulate in solutions exceeding the permissible concentration in the case of selective smelting with chlorine solutions. Such toxic compounds include mercury, arsenic, cadmium and non-ferrous metals. In this case, additional measures should be taken to neutralize them. Toxic compounds can also be present in ordinary groundwater.

Iodine and the iodide system are needed as iodine-oxidizing, iodide-complexing complex and gold-forming complex.

The iodine and iodide system has a number of advantages, including low toxicity, high stability of soluble complexes, and low redox potential compared to solvents used in the selective smelting of gold in other cyanide-free systems.

Many researchers are proposing an iodine-iodide system for the process of selectively smelting gold as an alternative to the cyanide process, as a promising system.

The ability of bromides to dissolve gold has long been known. In the early twentieth century, the widespread popularity of cyanide technology halted research and scientific studies on the development of a bromide system for the extraction of gold from gold-bearing materials. The use of bromine as a solvent is being considered at a new stage due to the increasing focus on environmental protection against the use of the cyanide method.

In January 1987, the Great Lakes Chemical Corporation of the United States received a patent for the process of extracting precious metals from raw materials using a bromine compound called gidantion.

The advantages of iodide and bromide systems are:

- high kinetics of gold melting and its increase in the process in an acidic environment;
- high production of gold;
- non-toxic concentration of solutions used in selective dissolution;

Disadvantages;

-Corrosion activity in the use of acidic media in the process of selective melting;

- High intake of rock solutions (cost);
- High cost of alloys.

Iodine and bromide regeneration is one of the prerequisites when using iodide and bromide methods and requires the selection of non-deficient oxidants, which is a very problematic issue. However, due to the possibility of complete regeneration in the process of selective leaching underground, it is possible to involve iodine and bromine in the process. Today, the solution to the problem of developing technology for the extraction of iodine and bromine from industrial wastewater and their subsequent use is close to reality.

Compared with other halogen systems, the chlorine-chloride method shows a clear advantage of the former.

The results of experimental production tests of the method of selective underground smelting are based on scientific literature on gold hydrometallurgy and the authors' research experiments on technological testing of gold-bearing ores at various facilities. criteria for the evaluation of deposits for the method of selective smelting underground with chlorinated solvents were developed. Chlorinated solutions include: chlorinated water, solutions of hypochlorites, additives of chlorides containing active chlorine and chlorides of metals (with or without them), other reagents,

Which solvent is used is not important for the evaluation criteria.

Conditionally divided into very convenient, convenient and inconvenient criteria according to the level of convenience.In addition, there are a number of factors that affect the economic and basic possibilities of using the method of selective smelting underground.

Sodium hypochlorite has the advantage of benefiting from hypochlorite in terms of safety compared to liquid chlorine. Sodium hypochlorite solution can be prepared directly in the workplace by electrolysis from an aqueous solution of sodium chloride, and electrolysis can be carried out in a continuous and intermittent mode. When conducting research on the selection of reagents, for each specific case, their effectiveness in autonomous and mixed variants should be evaluated.

RESEARCH STAGES OF GOLD UNDERGROUND SELECTION METHOD

In the objects selected on the basis of the method of selective underground melting, it will be necessary to conduct research in the following stages:

-laboratory research;

-advanced laboratory research;

-conducting experiments on the selected mining area;

-scheduled experimental and production tests;

-Research and development tests to improve the technique and technology of the underground selective smelting method.

At the stage of laboratory research, the mineral, chemical, granulometric composition of the sample is determined, followed by technological research.

In the first stage of technological research, a number of experiments on static (agitational) selective dissolution of the studied sample are carried out. Such experiments make it possible to determine the proximity of the solvent solution to the optimal composition by selecting a small amount of material and to determine the maximum amount of metal extraction from a specific sample.

It is known that the time required to reach the equilibrium concentration of the active substances does not exceed one day. at the end of the experiments, the average amount of gold obtained from the samples for all solutions is calculated.

According to the data of static tests, the consumption properties of the reagents are determined approximately.However, it is advisable to perform these experiments to control the quality of the final composition of the solvents in the solution.

Based on laboratory tests, the following geotechnological properties of gold-bearing materials are determined:

-filtration coefficient;

- degree of metal extraction from ore;

-S: Q ratio required to obtain the maximum amount of metal;

-characteristics of solvent costs (1 g. For the obtained metal in kg, for 1 ton of processed rock, in kg);

- average amount (concentration) of metal in productive solutions mg / l;

-Solution scheme of solutions.

At present, the staff of the Navoi State Mining Institute and representatives of NMMC Mining Department No. 5 have successfully conducted research on the selective smelting of complex metals in used uranium pipes, and a completely new approach to underground smelting technology is being developed.

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Rezyume: *Keyingi yillarda metall qazib olishga ixtisoslashgan korxonalarni kengaytirish tendentsiyalari kuzatilmoqda, bu esa yirik korxonalarning uzoq muddatli, istiqbolli rejalariga muvofiqligicha qolishi mumkin. Aksariyat kichik oltin va boshqa metall qazib oluvchi kompaniyalar bunday istiqbolga ega emas. Biroq yer osti boyliklarini to'ldirmasdan turib, yer osti boyliklari tugashda davom etadi. Kichik korxonalar uchun konlarni tanlab eritishning yangi texnologiyasini qo'llash maqsadga muvofiqdir, chunki bu usul oltin qazib olishning an'anaviy texnologiyalariga nisbatan bir qator texnik va iqtisodiy afzalliklarga ega.*

Резюме: *В последние годы наметились тенденции к расширению предприятий, специализирующихся на добыче металлов, что, вероятно, останется в соответствии с долгосрочными, долгосрочными планами крупных предприятий. У большинства мелких компаний, занимающихся добычей золота и других металлов, таких перспектив нет. Однако без восполнения недр подземные ресурсы продолжат иссякать. Для малого бизнеса целесообразно освоить новую технологию селективной плавки залежей, так как этот метод имеет ряд технико-экономических преимуществ перед традиционными технологиями добычи золота.*

Kalit so'zlar: *selektiv er osti eritish usuli, eritma, ruda massasi, filtrlash, oltin, xlor, natriy hixlorit, yod, brom, o'ta toksiklik, yuqori kimyoviy faollik, kompozit materiallar, tog 'jinslari, xloridion, parchalanish, quvurlarni kuzatish quvurlari, statsionar rejim, biri, debet joriy.*

Ключевые слова: *селективный метод подземной плавки, раствор, рудная масса, фильтрация, золото, хлор, хихлорит натрия, йод, бром, сверхтоксичность, высокая химическая активность, композиционные материалы, горные породы, хлоридион, разложение, трубный комплекс наблюдательных труб, стационарный режим, до один, дебетовый ток.*

UDC 621.313

PROSPECTS FOR THE DEVELOPMENT OF COTTON AND TEXTILE CLUSTERS IN UZBEKISTAN

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Summary. *The article analyzes the current state of forecasting electricity consumption in agricultural enterprises, provides an overview of methods and models for forecasting electricity consumption in agricultural enterprises, as well as studies on forecasting electricity consumption. The advantages of agricultural enterprises, including cotton and textile clusters, are also presented.*

Keywords: *agricultural enterprises, cotton-textile cluster, "inner chain", "industrial cluster", electricity consumption, forecasting.*

In recent years, terms such as "industrial cluster" and "cluster enterprise" have been frequently mentioned in the media. What is a production cluster? How do cluster enterprises differ from traditional enterprises and what are their priorities? A production cluster is a group of enterprises operating in the same type or interconnectedness of an industrial network. The main criterion for the formation of production clusters is not only their activity in the same type or in relation to each other, but also the criterion of the proximity of these enterprises in a particular area. [5; 9].

The production cluster is, first of all, the implementation of the process from raw materials to the finished product on the basis of a single technological chain. If we consider this in the example of a cotton-textile cluster (Figure 1), this technological chain includes the production of raw cotton, its processing, production of cotton yarn, fabric and finished products. The main goal of uniting all the enterprises involved in the process from the cultivation of raw cotton to its final product is to increase the competitiveness of the product by reducing energy and resource, ie production costs. [3; 9].

The term "cluster" was first coined by American economist Michael Eugene Porter in his book, Competitive Advantage of Countries. In his work, he cites and analyzes the results of in-depth studies of the economies of many industrialized countries, noting that the emergence and development of production clusters and their operation, regardless of the form of industry, serve as a basis for economic development. At the same time, in this play, the growth rates of the economies of the countries where cluster production enterprises are widely established are related in detail to the type of cluster production enterprises. [9].

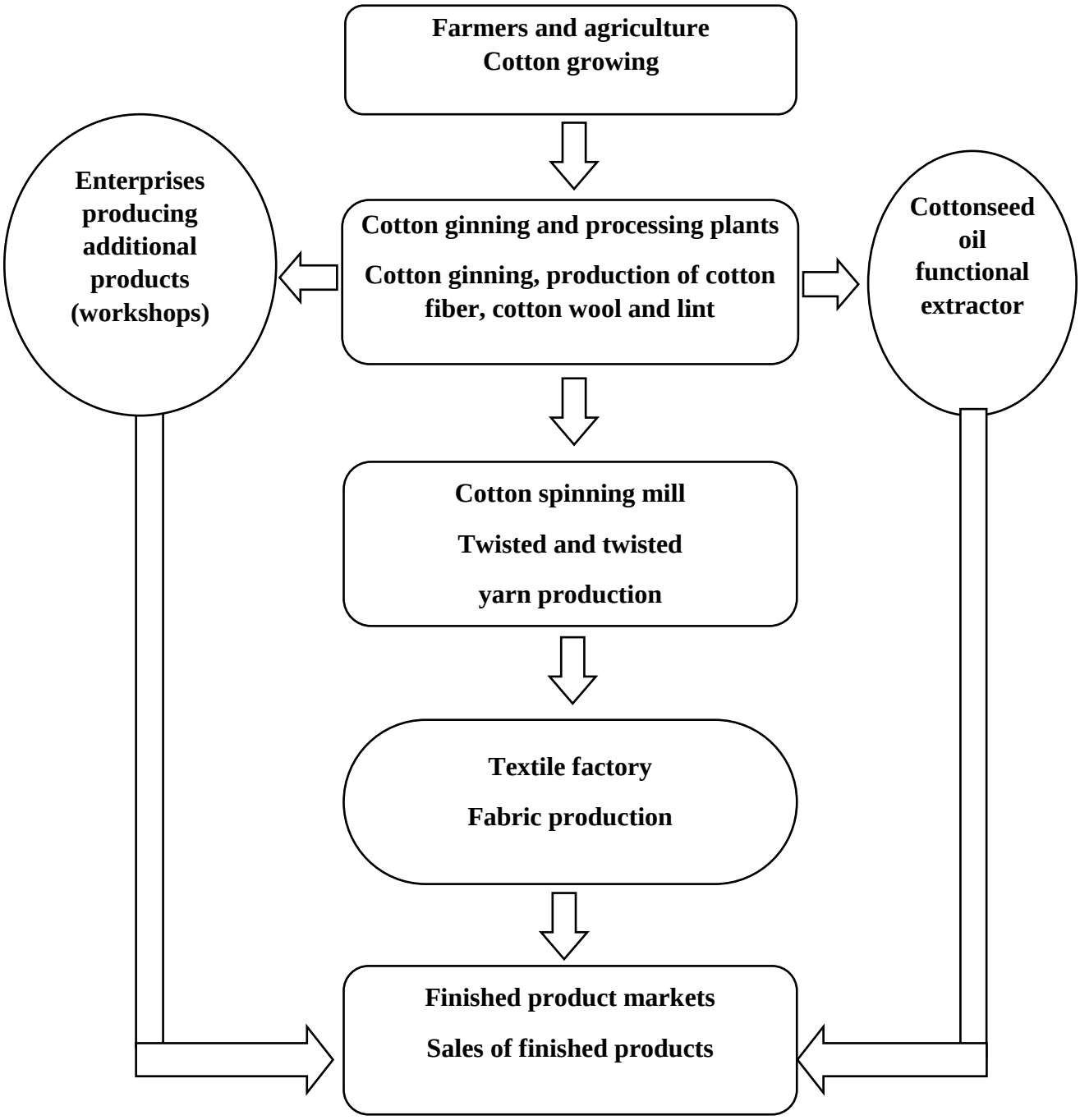

Figure 1. Technological chain of cotton-textile cluster

It is known that the entry of a new industry into the economy is constantly supported by the state. In particular, in order to effectively organize the activities of cotton and textile enterprises and cluster enterprises, to provide them with modern equipment, to improve product quality and increase the competitiveness of products produced by cotton and textile enterprises and cluster enterprises until January 1, 2022 on all customs duties a number of tax breaks have been created [9]. Strengthening vertical and horizontal ties between the participants of the cotton-textile cluster, issues of regional importance, including training, procurement of machinery and equipment, improvement of seed production and production of raw cotton - cotton fiber - cotton yarn - fabrics - sewing - marketing in the "internal chain" allows you to more effectively solve common tasks, such as reducing the cost of production [2].

All of the above links should work to address issues related to the production of competitive garments, the country's entry into international markets.

At the level of cotton-growing farms [11]:

- joint use of agricultural machinery during sowing, cultivation and harvesting of raw cotton;

- Centralized supply of seeds, mineral fertilizers, chemicals for processing plants;
- Establishment of a marketing system for raw cotton.

At the level of cotton processing enterprises engaged in the production of cotton fiber, seeds and raw cotton:

reducing the cost of cotton fiber by reducing the cost of raw materials supplied.

At the level of enterprises engaged in the production of cotton yarn:

- Reducing the cost of cotton yarn produced;
- Increasing the yield of cotton yarn by improving fiber quality.

At the level of fabric factories:

- Reducing the cost of cotton fabric produced;
- Improving the quality of cotton fabric.

At the level of factories engaged in the production of ready-made clothes:

- Reducing the cost of manufactured clothing by reducing the cost of fabrics supplied;
- Increasing the profitability of garments by improving the quality of fabrics and yarns [3].

An important feature of the cluster model is the formation of technological links between manufacturing enterprises, the creation of a complete production cycle within the cluster. This system, in turn, implies a number of economic advantages. In particular, support for domestic production will increase the rate of production of raw materials, the rate of domestic processing of most of the previously exported cotton fiber will increase, and most importantly, the finished textile products will be exported at high prices [9]. Forecasting energy consumption in large power plants is one of the most important scientific and technical issues today. The need for accurate forecasting of electricity consumption depends on technological and economic reasons [6; 9].

In the transition to the cotton-textile cluster sector, manufacturing enterprises face risks associated with the error of precise planning of the application for electricity. Exceeding a certain percentage of the actual consumption from the contracted values leads to the purchase of electricity at a higher price, or the payment of additional fines [6].

If the enterprise spends less on the application than the contract for the consumed electricity, it is also obliged to pay an additional penalty for the undelivered electricity, which is determined by the difference between the actual consumption.

Today, there are 96 cotton and textile production and cluster enterprises. This year they have grown raw cotton on nine hundred and six thousand three hundred and thirteen hectares of land. This accounted for 87.7% of the total area under cotton in the country this year. This figure shows that today the share of cotton and textile production and cluster enterprises in the production of raw cotton in the country is growing. [4].

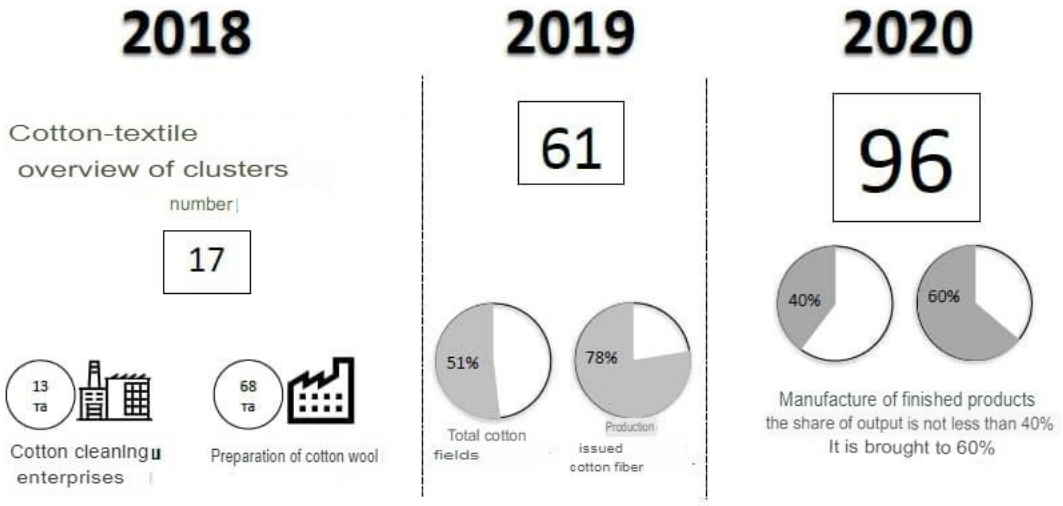

Figure 2. Number of cotton and textile cluster enterprises and production efficiency in Uzbekistan

An analysis of the trend in the number of cotton-textile production and cluster enterprises over the past three years (Figure 2) shows that in 2018 the number of cotton-textile production and cluster enterprises increased from 17 to 61 in 2019. today, the number has grown to 96. Its share in the production of raw cotton and finished products is also growing from year to year. In particular, in 2019, 51% of the total cotton area fell to the share of such enterprises, while in 2020 this figure was 87.7%. In 2019, 78% of cotton fiber production fell to the share of cotton-textile production and cluster enterprises, this year this figure reached 85%. In 2019, the share of production of finished products by cotton and textile enterprises and cluster enterprises reached 40%, this year this figure reached 60% [9]. The above figures show that the efficiency and effectiveness of cotton and textile production and cluster enterprises is growing from year to year. This, in turn, will create the basis for the development of enterprises in this sector in our country, the production of competitive products in accordance with international standards.

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Rezyume. *Maqolada qishloq xojaligi korxonalarida elektr energiyasini istemol qilishni bashorat qilishning hozirgi holati, qishloq xo'jaligi korxonalarida elektr energiyani iste'mol qilishni prognoz qilish usullari va modellarining umumiy ko'rinishi va elektr energiya iste'molini prognoz qilish bo'yicha olib borilgan tadqiqotlari tahlil qilingan. Shuningdek, qishloq xo'jaligi korxonalarida, jumladan, paxta to'qimachilik klasterlarining afzalliklari keltirilgan.*

Резюме. *В статье проанализировано современное состояние прогнозирования потребления электроэнергии в сельскохозяйственных предприятиях, дан обзор методов и*

моделей прогнозирования потребления электроэнергии в сельскохозяйственных предприятиях, а также исследования по прогнозированию потребления электроэнергии. Также представлены преимущества сельскохозяйственных предприятий, в том числе хлопко-текстильных кластеров.

Kalit so'zlar: *qishloq xo'jaligi korxonalari, paxta to'qimachilik klasteri, "ichki zanjir", "sanoat klasteri", elektr energiya iste'moli, bashorat qilish.*

Ключевые слова: *сельскохозяйственные предприятия, хлопково-текстильный кластер, «внутренняя цепочка», «промышленный кластер», потребление электроэнергии, прогнозирование.*

RESEARCH OF THE SINTERING PROCESS, INFLUENCE OF PORO-FORMING ADDITIVES, AND OPTIMIZATION OF COMPOSITIONS FOR OBTAINING CERAMZITE GRANULES

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Summary: *Annotation. The article presents the results of research on the development of compositions and technologies for obtaining expanded clay granules for thermal insulation materials based on the composition "bentonite-slime-licorice waste", as well as the study of their physical, mechanical and technological properties. It has been established that the obtained expanded clay granules of the developed compositions based on bentonites from the Severo-Jamansai and Kushkanatau deposits, using slime waste from the Kungrad soda plant and licorice roots waste, meet the requirements of current standards and are proposed for the production of heat-insulating building materials.*

Key words: *Key words: bentonite, sludge, licorice waste, chemical composition, physical and mechanical properties, expanded clay granules, heat-insulating material, energy-saving technology.*

As you know, when using pore-forming additives in the technological process of obtaining highly porous building and heat-insulating materials, during the interaction of clay raw materials with burnable and pore-forming additives at relatively low temperatures of their heat treatment, gaseous products are released from the firing zone [2].

According to the requirements of the current regulatory and technical documents, raw materials for the production of expanded clay must have the ability to swell during heat treatment in the range of 1050-1250 ° C.

At the same time, the raw materials used must ensure the production of a material that has a cellular structure with evenly distributed closed pores, and must also have a highly dispersed fraction and a small amount of sand (no more than 26%) with particles up to 0.005 mm in size - at least 20%; softening interval not less than 50 ° C, refractoriness not higher than 1350 ° C, without inclusions of carbonate rocks, with a loss on ignition of 6-10%. Table 3.9 shows the characteristics of clay raw materials used for the production of expanded clay, according to [1] in terms of chemical composition.

It should be noted that low-melting clays and bentonites are more common in nature, which do not fully satisfy the above requirements for porous aggregates, for example, there are few organic impurities, the minimum content of iron-containing compounds, etc.

For this reason, the question of eliminating these problems often arises by: improving the mechanical processing and homogenization of natural clay raw materials and introducing pore-forming and burnout additives into the mixture (charge), which can be used as agricultural and industrial waste, which contribute to an increase in the degree of swelling main raw material [1].

Table 1

Characteristics of clay raw materials by chemical composition, used for the production of expanded clay according to [9]

Swelling degree	Swelling coefficient, S_c, %	welling volume, S_{vol}, kg/m3	Mass content of oxides, %				
			SiO_2	Al_2O_3	Fe_2O_3	CaO	Na_2O+K_2O
High	>4,5	< 400	50-60	16-24	6-10	3-4	3-6
Average	2,5-4,5	450-700	60-70	10-16	4-6	1,5-3	3-4
Weak	<2,5	750-1250	>70	<10	<4	<1,5	>4

As a result, the use of burn-out and pore-forming additives contributes to an increase in the main quality characteristics of the obtained expanded clay granules. It should be stated that it is the

chemical and mineralogical composition that affects the assessment of the quality of the expanded clay raw materials used, which is not considered the only determining criterion. Thus, the best raw materials for expanded clay are clays with high contents of smectite group minerals (montmorillonite, hydromica, etc.).

In this regard, prototypes were made by plastic molding methods at a moisture content of 22-24% of bentonite clay raw materials to obtain expanded clay granules from expanded clay masses. Were prepared a series of experimental charge compositions with different ratios of the initial components and pore-forming additives for expanded clay granules, the component compositions of which are given in table. 1. In this case, in all samples, the waste of licorice root was added in an amount of 2 wt.% Of the total weight of the components, in excess of 100%.

Table 2

Charge compositions for obtaining expanded clay granules

Name of samples	Name and mass content of components, %		
	Bentonite clay	Waste soda production	Condition after sintering
CgSj -1	90	10	Compliant
CgSj -2	85	15	Compliant
CgSj -3	80	20	Compliant
CgSj -4	75	25	Compliant
CgSj -5	70	30	Compliant
CgK -1	90	10	Compliant
CgK -2	85	15	Compliant
CgK -3	80	20	Compliant
CgK -4	75	25	Compliant
CgK -5	70	30	Compliant

It was shown that for expanded clay raw materials with a high degree of swelling, the content of iron oxides should be in the range from 6 to 10 wt.%, Organic impurities - from 1 to 2 wt.%. %, solid additives are introduced in a stepwise manner. In this regard, first, 70 wt.% Of the clay component and the pore-forming additive are mixed, and then 5 wt.% Of the clay component and the pore-forming additive.

As a result of an experimental study, the maximum content of a pore-forming additive, a waste of soda production, was established, which amounts to up to 30 wt.% In a batch of bentonite clay. Consequently, in addition to the operational or construction and technical properties of expanded clay granules, the technological modes of their production also largely depend on the choice of the constituent components.

In the technology of obtaining expanded clay from clay raw materials, there are four main technological schemes for the preparation of raw granules, or four methods of producing expanded clay, such are dry, plastic, powder-plastic and wet.

To obtain expanded clay granules, we used traditional methods of plastic molding of prototypes of ceramic mixtures. Since the result of the process of heat treatment of expanded clay granules shows that under normal conditions, gas formation during the firing of bentonite clays occurs mainly at lower temperatures compared to the temperature of pyroplastic softening.

In this case, the dissociation of magnesium carbonate contained in the clay raw material occurs at temperatures up to 600 ° C, and calcium carbonate - up to 950 ° C, the dehydration of amorphous clay minerals occurs mainly at temperatures up to 800 ° C. Burnout of organic impurities occurs at a temperature of about 340-420 ° C, and the reduction reactions of iron oxide develop at a temperature of about 900 ° C, and at temperatures above 1100 ° C, the clays pass into a pyroplastic state [5].

The results of determining the main physical and mechanical properties of prototypes for expanded clay based on Severo-Jamansai (KGSzh) and Kushkanatuskaya (KGKsh) bentonite clay obtained by the plastic method are shown in Table 3.

Table 3

Basic physical and mechanical properties of expanded clay, obtained by plastic method

Name of samples	Bulk density, kg/m3	Strength of gravel, MPa for classes		Water absorption,%	Porosity,%		Average density, kg/m3
		A	Б		open	closed	
CgSj -1	785-850	6,5	6,0	16	10,2	70,2	950
CgSj -2	710-765	6,0	5,5	17	11,4	71,5	855
CgSj -3	615-675	5,5	4,0	19	12,2	72,5	765
CgSj -4	545-595	4,0	3,3	21	13,5	73,4	675
CgSj -5	490-530	3,3	2,5	23	14,9	74,3	585
CgK -1	765-810	6,5	6,0	17	12,4	70,6	935
CgK -2	700-755	6,0	5,5	18	10,5	71,9	835
CgK -3	600-665	5,5	4,0	19	7,9	73,1	745
CgK -4	525-575	4,0	3,3	22	5,8	74,2	655
CgK -5	460-510	3,3	2,5	23	4,7	75,4	560
According to GOST 9759-83	**150…800**	**0.6 ... not less than 4.5**	**0.8 ... not less than 4.5**	**15…30**	**Not standardized**		

The results of the tests showed that there is a regular decrease in the values of water absorption, open porosity and an increase in the indices of bulk and average density, as well as mechanical strength with a general increase in the content of bentonite clay in the studied prototypes for expanded clay granules.

As can be seen from the data in the table, all sintered expanded prototypes meet the requirements of GOST 9759-83 and GOST 32026-2012 [3, 4, 7]. According to this, the obtained expanded clay gravel according to the standardized value of physical, mechanical and technological indicators of expanded clay granules corresponds to the strength of the class "A" and the grade of gravel "1000". It should be noted that all samples in which soda waste in combination with waste of licorice roots served as a pore-forming additive, due to the low ash content, had a noticeably lower density.

CONCLUSIONS.

The results of a comprehensive physical and chemical study of clay raw resources of Karakalpakstan, in particular, the clay of the Severo-Jamansai and Kushkanatau deposits for the development of the composition of expanded clay building materials.

It is shown that, as a result of heat treatment processes, firing is accompanied by phase transformations of the initial raw minerals, leading to a new formation in the sintered shard, in particular, the formation of minerals mullite, wollastonite, alpha-quartz, as well as in a small amount of anorthite and amorphous glassy phase, which give the necessary physical -mechanical and operational properties of the finished material.

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Rezyume: *Maqolada issiqlikni himoyalovchi materiallar uchun «bentonit-shlam-qizilmiya chiqindisi» kompozitsiyasi asosida keramzit donalarining tarkiblari va olish texnologiyasini ishlab chiqish, hamda ularning fizik-kimyoviy va texnologik xossalarini o'rganish bo'yicha tadqiqot natijalari keltirilgan. Shimoliy-Jamansoy va Kushkanatau bentonit gillari asosida, Qo'ng'irod soda zavodining shlami va qizilmiya ildizi chiqindilaridan foydalanib, olingan keramzit donalarining amaldagi standart talablarga javob berishi aniqlangan, hamda issiqlikni himoyalovchi qurilish materiallari ishlab chiqarish uchun tavsiya etilgan.*

Резюме: *В статье представлены результаты исследований по разработки составов и технологии получения керамзитовых гранул для теплоизоляционных материалов на основе композиции «бентонит-шлам-отход солодки», а также изучение их физико-механических и технологических свойств. Установлено, что полученные керамзитовые гранулы разработанных составов на основе бентонитов месторождений Северо-Джамансай и Кушканатау, с использованием шламистых отходов Кунградского содового завода и отходов корни солодки, отвечает требованиям действующих стандартов и предложены для производства теплоизоляционных строительных материалов.*

Kalit so'zlar: *bentonit, shlam, qizilmiya chiqindisi, kimyoviy tarkib, fizik-mexanik xossa, keramzit donalari, issiqlikni himoyalovchi material, energiya tejamkor texnologiya.*

Ключевые слова: *бентонит, шлам, отходов солодки, химический состав, физико-механические свойства, керамзитовые гранулы, теплоизоляционный материал, энергосберегающая технология.*

UDC 621.313

CURRENT STATUS AND PROSPECTS FOR FORECASTING OF ELECTRICITY CONSUMPTION IN COTTON-TEXTILE CLUSTER ENTERPRISES

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Summary: *The article provides an overview of the current state of forecasting electricity consumption in agricultural enterprises, including cotton-textile clusters, an overview of methods and models for forecasting electricity consumption and forecasting electricity consumption, analyzes the research.*

Keywords: *cotton-textile cluster, forecasting, energy consumption, model, analysis.*

It is known that the cost of any product consumes a certain percentage of electricity. Increasing consumption of electricity and energy resources has a significant impact on the cost of the product. Given the demands of today's competitive market, the consumer's choice can reduce the demand for the product from the high cost. Today, the efficiency of electricity consumption in agricultural enterprises is achieved through the introduction of a number of measures in this direction. [3; 4; 5]. These measures, in turn, can lead to a further increase in the price of the product, in a sense, by introducing certain costs into practice. With the introduction of cost-effective measures, however, a sufficient level of efficiency may not be achieved.

Saving energy for consumption in any agricultural production enterprises will help to reduce the cost of consumption and increase the competitive tolerance of agricultural products. This is due to the fact that the increase in energy prices will increase the share of production in the cost of production by 5-7%, and in some industries even more than this figure. [1; 6].

Decree of the President of the Republic of Uzbekistan "On approval of the Strategy of agricultural development of the Republic of Uzbekistan for 2020 - 2030" PF-5853 dated October 23, 2019 and the Cabinet of Ministers of the Republic of Uzbekistan dated June 22, 2020 "On measures to further develop cotton and textile industry" No. 397 of April 13, 2019 "On additional measures to improve tariff policy in the electricity sector" No. 310, January 12, 2018 "On additional measures to improve the use of electricity and natural gas" No. 226 of August 29, 2020 "On measures to restore economic growth in 2020-2021 and the continuation of structural reforms in sectors and industries of the economy" No. 526, June 22, 2020 "On the cultivation of raw cotton Resolution No. 398 "On measures to organize the activities of processing cooperatives" i In order to ensure its viability, in the process of development today, many industrial enterprises are being set up in rural areas [5; 7]. In particular, there are issues of textile enterprises, cotton processing and fruit clusters, in general, in the context of agriculture, in which areas the products are produced, processed and sold on a cluster basis. In the next 5 years, electricity consumption in the agricultural production sector will increase by 2-3 times compared to today. Naturally, in such circumstances, there is a need to consider the issues of accurate and accurate forecasting of electricity consumption in manufacturing enterprises.

The experience of developed countries shows that additional penalties are applied for the consumption of electricity in excess of the established norm, ie the contract concluded with the power supply company on the basis of pre-determined obligations. This situation is reflected in the decision of the Cabinet of Ministers No. 22 adopted on January 12, 2018 in Uzbekistan on the basis of world experience. Initially, the decision stipulated that in accordance with the contract with the electricity supplier, if the specified electricity consumption is more than 5%, payment will be made on the basis of a coefficient exceeding 1.5 times for each kWh of electricity consumed. But that figure has dropped to 1.15 times since March 2019 [5; 4]. The decrease in the coefficient by 0.35

times can be explained by the fact that under the contract between the company and the power supply company consumed more electricity than the limit set by the company, and as a result, companies paid fines on the basis of significantly increased coefficients. Therefore, today in the design of agricultural electricity supply based on the actual consumption, it is both necessary and urgent to develop forecasting models that accurately determine the accuracy of the limit value set in the contract between the electricity supplier and the consumer [10; 11].

Existing software systems designed to forecast electricity consumption have a significant drawback, as it is not possible for agricultural enterprises to take into account production volumes when forecasting electricity consumption. In a market economy, production plans are largely determined by the market conditions of the product being produced. If the enterprise offers a wide range of products, the market position of a particular product determines the planned and its actual production volume. Thus, a long- and short-term production plan has many facets and will need to determine the growth rate of the production process. In turn, the volume of production to some extent determines the amount of electricity consumed by agricultural enterprises [3].

Therefore, the most optimal model for forecasting the electricity consumption of an industrial enterprise is a forecast model that is well adapted to rapidly changing environmental conditions and takes into account the production performance of the enterprise [8; 9].

Forecasting of electricity consumed in industrial enterprises, including cotton-textile cluster enterprises, is based on the method of expert assessment or the qualifications of specialists with many years of experience in the enterprise. Expert estimation methods, extrapolation, regression models and other methods are used to forecast electricity consumption, but the forecast indicators determined by these methods do not take into account the specific characteristics of agricultural enterprises, especially cotton-textile cluster enterprises. Therefore, in most cases, there is a discrepancy between the actual and forecast indicators in determining the forecast indicators of electricity consumption of industrial enterprises. This, in turn, necessitates the improvement of existing methods of forecasting electricity consumption, the creation of new ones based on the technological process of enterprises. [2; 5; 6].

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Rezyume: *Maqolada qishloq xo'jaligi korxonalarida, jumladan paxta to'qimachilik klasterlari korxonalarida elektr energiyani iste'mol qilishni bashorat qilishning hozirgi holati, elektr energiyani iste'mol qilishni prognoz qilish usullari va modellarining umumiy ko'rinishi va elektr energiya iste'molini prognoz qilish bo'yicha olib borilgan tadqiqotlari tahlil qilingan.*

Резюме: *В статье приведен обзор существующего состояния прогнозирования потребления электроэнергии в сельскохозяйственных предприятиях, в том числе хлопково-текстильных кластеров, общий обзор методов и моделей прогнозирования потребления электроэнергии и прогнозирования потребления электроэнергии, проанализированы исследования.*

Kalit so'zlar: *paxta to'qimachilik klasteri, prognoz qilish, elektr energiya iste'moli, model, tahlil.*

Ключевые слова: *хлопко-текстильный кластер, прогнозирование, энергопотребление, модель, анализ.*

SOCIAL SCIENCES

HISTORY OF THE STUDY OF PALEOLITHIC MONUMENTS OF KARAKALPAKSTAN

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Summary: *The article considers the history of archaeological study of Paleolithic monuments in the Aral Sea region and the possibility of revising existing archaeological materials, as well as raising the study of the Paleolithic period in Karakalpakstan to a new modern level.*

Key words: *Aral Sea, Ustyurt, archaeological research, Paleolithic, Neolithic, Teshik-tash, Esen-2, Karakuduk, Shakhpakti, Kokayoz, E.B. Bijanov.*

The last stone age of mankind is the longest historical period, which accounts for 99.8% of human history. The Stone Age is not only the beginning of all the achievements of mankind, but also the most interesting and ambiguous historical stage. The territory of Uzbekistan is one of the first regions of the world and one of the centers of culture. As in the Eurasian region, the history of our country dates back to the Paleolithic or ancient Stone Age. The study of the Stone Age in Uzbekistan was carried out in 1938- it all began with the discovery by A.P. Okladnikov of the world famous cave Teshik-Tash during the Middle Paleolithic period in Baisuntag in southern Uzbekistan. A number of places of this period have been registered and studied in our country. These include Selungur, Chashma in the Ferghana valley, the lower layers of the Kulbulak and Kizilolma monuments in the Akhangaron river valley in the Tashkent region, the finds of Jarsa, as well as the monuments of Ustyurt Esen-2, Karakuduk and Shahpakty, Bokantag and Kokayoz in the desert Along with the wealth of various and scientifically interesting archaeological sites of the Paleolithic period of Uzbekistan, there are a number of unresolved issues regarding the history of this period, the interpretation of monuments.

The Ustyurt plateau on the shores of the Aral Sea is one of the richest Paleolithic monuments in Uzbekistan. Ustyurt is an ordinary arid-desert plateau genetically associated with Mangyshlak, but separated from the last closed basin of Karindzharyk. A characteristic element of the Ustyurt Plain is the shallow hills (Barca Kelmes, Assake Audan, etc.). Almost all Paleolithic sites of Ustyurt are open areas and are connected with these hills [1; 32].

The Republic of Karakalpakstan is one of the regions rich in monuments of different stages of the Stone Age. The paleoecological conditions present here contributed to the development of mankind, as well as the creation of various cultures from the early Paleolithic. Esen-2, Karakuduk, Shahpatty and other monuments of the ancient Stone Age were discovered and studied here. But almost half a century has passed since these monuments were put into circulation. Now, with the advent of new research methods, it has become possible to re-study existing archaeological materials, get new information about them and at the same time raise the study of the Paleolithic period in Karakalpakstan to a new modern level.

The monuments of Esen-2, Karakuduk and Shahpakty on Ustyurt, which were previously identified and published as the Early Paleolithic, were initially identified as belonging to different stages of the Paleolithic, but later studies showed that they all belong to the transition period of the Late Paleolithic [2; 35] and are not fully substantiated.

Archaeological research in the Ustyurt region was carried out in different years. Based on the nature of these studies, their importance and focus on the history of the study of the Ustyurt Stone Age, they can be divided into three periods. The first of them is characterized by the collection of random data obtained by geologists in 1912-1960 years. The second period in 1960-1970, important steps were taken in the study of the Stone Age on Ustyurt under the guidance of the archaeologist of the Karakalpak branch of the USSR Academy of Sciences E.B. Bijanov, research was carried out and large Neolithic collections were collected. The third period covered the period

from 1970 to 1980. The archaeological department of the Karakalpak branch of the USSR Academy of Sciences conducted extensive systematic archaeological research, conducted regular surveys and studied the southeastern region of Ustyurt. As a result of regular archaeological excavations, hundreds of monuments of the Paleolithic, Mesolithic and Neolithic Stone Age were discovered here.

In 1977, the Upper Paleolithic settlements of Esen-2, Karakuduk and Shahpakty were discovered in the Karakalpak part of Ustyurt. An especially important and noteworthy first Paleolithic discovery was Esen-2, the most famous Paleolithic monument on Ustyurt [3; 48]. The monument was opened by E.B. Bijanov, A.V. Vinogradov [4; 522]. The location corresponds to an even surface of a low hill of 90x40 square meters. Archaeological finds have determined the stages of settlement of this vast territory of the Paleolithic period, which is still unknown during the Upper Paleolithic period of Ustyurt - an archaeological map of Eurasia. Finally, you can fill the chronological gap in the monuments of the Stone Age of Ustyurt.

In the initial data, Esen-2 materials are conditionally assigned to the Late Paleolithic period [4; 522]. For such a calculation, a comparison with materials of Central Kazakhstan is used. However, these Central Kazakhstan materials are not sufficiently published and do not allow for a complete comparison with them. In his later articles, E.B. Bijanov, based on the comparative data given above, listed the materials of Esen-2 with the end of the early Paleolithic or the beginning of the Middle Paleolithic [5]. Thus, Esen-2 and similar Kazakhstan materials also require a thorough reassessment [6; 56].

A.V. Vinogradov carried out a lot of work on the study of Esen-2 materials, for the Esen-2 collection the list proposed by E.B. Bijanov is based on a comparison with the monuments of South Kazakhstan (Borikazgan, Tanirkazgan, etc.). It should be noted that there are more differences than similarities between the materials of the above mentioned monuments, and they are characterized by the fact that South Kazakhstan, especially the Karatag region, has completely different cultural and technical traditions [7; 189-190]. Bifas or hand claws do not play an important role. In A.A. Alpisbaev's articles, only one desert deposit (found in the Akkol region) can be cited from early Paleolithic finds here, and only this deposit can be compared with the Esen-2 bifas. Other materials from South Kazakhstan are typologically closer to choppers or bilateral flange weapons.

Summarizing the above considerations, A.V. Vinogradov proposes to attribute the materials of Esen-2 not to the period of the ashel or ashel-mustye, but to the end of the Middle Paleolithic or the beginning of the Late Paleolithic. [6; 57].

Paleolithic monuments of Karakalpakstan were discovered and studied in the 70-80s of the last century. One of the current tasks is to rethink existing archaeological materials and interpret them based on modern requirements, study the oldest history of Karakalpakstan and raise it to the world level. The search for new monuments of the ancient Stone Age along the Southern Aral Sea, as well as the generalization of all materials on the Ustyurt Paleolithic, has not yet been completed. For example, individual Esen-2 materials were interpreted differently by different experts.

Thus, the Ustyurt region in the Southern Aral Sea region is very rich in Stone Age monuments, and they have materials that have made an invaluable contribution to human development. These monuments are diverse, extraordinary and original. But almost half a century has passed since these monuments were put into circulation. Now, with the advent of new research methods, it has become possible to re-study existing archaeological materials, get new information about them and at the same time raise the study of the Paleolithic period in Karakalpakstan to a new modern level.

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Rezyume: *Ushbu maqolada Orol bo'yi mintaqasidagi paleolit davri yodgorliklarini arxeologik o'rganishning tarixiga va mavjud arxeologik materiallarni qayta tadqiq qilish va shuning bilan birga Qoraqalpog'istonning paleolit davrini o'rganishni yangi zamonaviy bosqichga ko'tarish imkoniyati hakida fikr yuritiladi.*

Резюме: *В статье рассматривается история археологического изучения памятников палеолита в Приаралье и возможность пересмотра существующих археологических материалов, а также поднятие изучения палеолитического периода в Каракалпакстане на новый современный уровень.*

Kalit so'zlar: *Orol bo'yi, Ustyurt, arxeologik tadqiqot, paleolit, neolit, Teshik-tosh, Esen-2, Qaraquduq, Shaxpaqti, Ko'kayoz, E.B. Bijanov.*

Ключевые слова: *Аральское море, Устюрт, археологические исследования, палеолит, неолит, Тешик-таш, Есен-2, Каракудук, Шахпакты, Кукаёз, Е.Б. Бижанов.*

EFFICIENT USE OF LAND AND WATER RESOURCES IN AGRICULTURE

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Summary. *The article explains the essence and importance of efficient use of land and water resources in agriculture. The main focus is on the creation of a system of incentives for agricultural producers for the introduction of technologies to improve the reclamation, fertility and water supply of decommissioned irrigated and put into use and forest lands, as well as the creation of a system of incentives for agricultural producers. It aims to grow quality products through the efficient use of natural resources.*

Key words: *agriculture, innovation, land and water resources, land reclamation, food security, the creation of a system of incentives for agricultural producers.*

The formation of market economy relations in our country has radically changed the attitude to the efficient use of agricultural resources of our country. Because one of the main requirements of a market economy is to produce a large number and quality of products through the efficient use of resources, to sell them at free prices and to obtain high profits.

The total area of land in the Republic of Uzbekistan is 44,892.4 thousand hectares, which is divided into 8 categories according to the purpose and order of land use, including agricultural land; lands of settlements; land for industry, transport, communications, defense and other purposes; lands for nature protection, health and recreation purposes; lands of historical and cultural significance; forest fund lands; water fund lands; spare places.

Agricultural land is considered to be fertile land and is the main means of ensuring national wealth, agricultural production and food security of the country.

The total area of agricultural land is 20,236.3 thousand hectares, of which arable land is 3,988.5 thousand hectares, perennial forests - 383.1 thousand hectares, gray lands - 76 thousand hectares, hayfields and pastures 11 028.3 thousand hectares, other lands - 4 760.4 thousand hectares [2].

According to preliminary data, in January-December 2020, the total volume of agricultural, forestry and fishery products (services) amounted to 10,443.7 billion soums or 102.5% compared to the same period of 2019, in particular, agriculture and livestock, hunting and services in this area - 9739.5 billion soums (102.3%), in forestry - 447.3 billion soums (101.3%), in fisheries - 256.9 billion soums (111.7%). The share of the Republic of Karakalpakstan in the structure of agriculture, forestry and fisheries was 4.7% [3].

In recent years, the country has improved land and water relations, optimized agricultural land and applied a simplified procedure for their allocation, introduced modern market mechanisms in the use of land and water resources, the introduction of innovative and resource-saving technologies, low-yield cotton and Systematic measures are being taken to grow high-income, export-oriented products by reducing the area under crops.

At the same time, due to the rapid growth of the population of the republic, the transfer of agricultural land to another category and the sharpening of the impact of global climate change, the population per capita in the last 15 years has increased. the size of irrigated lands decreased by 24% (from 0.23 hectares to 0.16 hectares) and the average annual water supply decreased from 3,048 cubic meters to 158.9 cubic meters. As a result of long-term mismanagement of agricultural land, natural soil fertility and crop yields are declining, crop quality is deteriorating, and environmental pollution is increasing. In particular, in 93% of irrigated lands the amount of mobile phosphorus, in 68.3% - the amount of exchangeable potassium, in 79.3% - the level of humus (humus) fell below average. In countries with almost the same national income as Uzbekistan, 4-5 percent of the state budget is allocated for agricultural needs or more than 1 percent of GDP in developing countries,

and less than 1 percent in high-income countries. The average annual water consumption in agriculture remains high, at 45,696 million cubic meters, or 90 percent of the water consumed in the economy [2].

The volume of agricultural production in the Republic of Karakalpakstan in January-December 2020 amounted to 9666.5 billion soums or 102.1% compared to the same period of 2019, in particular, agricultural products - 4443.0 billion soums (100.4%), livestock products - 5223.5 billion soums (103.7%) [3].

In the context of increasingly scarce land and water resources, agricultural production remains low due to the lack of economic efficiency and market conditions in the placement of agricultural crops and the introduction of intensive agriculture. In particular, in developed countries, the cost of 1 cubic meter of water is 4-6 US dollars, while in our country the figure is 0.15 US dollars. The implementation of irrigation and reclamation measures requires large capital investments, the limited amount of budget funds allocated for these purposes, the issue of attracting direct investment, including on the basis of public-private partnership Due to the lack of attention, there are cases of decommissioning of agricultural lands, irrational use of resources and production potential of the regions, which in turn has a negative impact on food security and increase the export potential of the sector shows.

The concept of efficient use of land and water resources in agriculture is to increase the efficiency of use of agricultural lands and water and hydraulic structures, to achieve the maximum productivity potential of agricultural lands, to increase the volume of agricultural production, to restore soil fertility, creation of favorable conditions for the implementation of projects within the framework of private partnership, introduction of advanced farming systems and high and intensive agro-technologies of agricultural crops, improvement of agro-technical, land reclamation, modern irrigation and reclamation technologies and methods of irrigation Include the following key areas for the widespread introduction, selection and seed production, deep processing and sale of agricultural products, development of logistics and marketing systems, accelerating the integration of science and practice aid:

- creation of a system of benefits for agricultural producers for the introduction of technologies to improve the reclamation, productivity and water supply of decommissioned irrigated and commissioned lands and forest lands;
- put into operation on the basis of an investment agreement or public-private partnership for the use of agricultural land, pastures and other lands, repaired or rebuilt unusable water wells, irrigation pumps, irrigation and land reclamation networks state guarantees for business entities;
- further improvement by creating a transparent and efficient system of agricultural land allocation;
- aerial photography of all areas in order to ensure accurate accounting and updating of agricultural land, the formation of a database for each field contour;
- ensuring the accuracy and completeness of the state land cadastre data;
- complete inventory of low-yielding cotton, wheat and other crops, develop a program of measures to increase productivity and efficiency, as well as proposals for the placement of high-yield crops in these areas exit [1].

Radical improvement of the system of agricultural placement. To ensure that the main criteria are the level of soil, climatic conditions and water supply of the regions, the demand for products in the domestic and foreign markets, profitability. Placement of low-water, drought-resistant and water-harvesting crops in water-scarce areas. Improving the scheme of sowing of agricultural crops, increasing the number of seedlings per unit area to an acceptable level, based on the requirements of intensive development of the industry.

Take measures to harvest at least two crops per season from agricultural lands, and to achieve this goal, use seeds of fast-growing crops, seedlings, mineral fertilizers, fuels and lubricants, etc. creating a sustainable resource supply system. Introduce a science-based crop

rotation system to make more efficient use of irrigated land and increase soil fertility and crop yields.

Establish a procedure for calculating and reimbursing the cost of land (perennials, drip irrigation, etc.) spent on the liquidation or optimization of farms or other agricultural entities. Establish land allocation for gardens, vineyards, fish ponds and greenhouses, support the construction of greenhouses by hydroponics, vertical farms on decommissioned lands.

Build ready-made modern greenhouses with the involvement of foreign investors and foreign financial institutions in areas where there is a shortage of water and it is difficult to grow and use agricultural crops. Develop a procedure for reimbursing agricultural producers for costs associated with the introduction of technologies to improve the reclamation status, productivity and water supply of irrigated lands. Establish mechanisms for government support to increase the productivity and productivity of agricultural land. Introduce differentiated tax incentives for landowners, including incentives to maintain and increase soil fertility. Recognize economically inefficient, low-yielding orchards and vineyards as unsuitable and establish a procedure for classifying them as arable land. Establish a public-private partnership mechanism for the use of forest lands.

Create “agricultural investment newsletters” to present to local and foreign companies based on the agricultural potential of each region.

Allocation of funds from the state budget by the State Committee for Geology and Mineral Resources for the identification of groundwater reserves suitable for irrigation of agricultural crops. Extensive use of drip, sprinkler irrigation and other water-saving technologies in irrigating agricultural crops, expanding the incentive mechanism for landowners and water consumers. Improving the management and maintenance of agricultural water resources. This includes a review of the activities of water users' associations. Construction, reconstruction and rehabilitation of irrigation and reclamation facilities to improve and maintain the reclamation of irrigated lands.

Establishment of the industry for the production of lightweight plastic trays and pipes and the development of pumping units. increase skills and knowledge. Exploitation of dry lands through the expansion of the network of reservoirs. The main focus is on the construction of flood reservoirs and artificial reservoirs. Improving the efficiency of electricity consumption at pumping stations in the system of the Ministry of Water Resources. Gradual introduction of market mechanisms in the field of water consumption and the principles of public-private partnership in the operation of water facilities. determining the order of coverage by water consumers.

Forming a list of promising projects aimed at water resources management, water conservation and improving the technical condition and safety of hydraulic structures and their implementation at the expense of international financial institutions and foreign grants. Organize the gradual equipping of water consumers with water management and metering devices in water use areas. Development and implementation of technologies for the efficient use of groundwater resources. Prevention of unauthorized use and waste of groundwater in agriculture.

Redistribution and approval of scientifically based irrigated lands into hydro module areas in accordance with modern requirements. Organize the production of irrigation and land reclamation equipment, machinery and equipment that will save water and land resources and allow their rational use. Development of incentives for water users and water consumers, using water-saving irrigation technologies that use the established water intake limits sparingly. Regulation of water intake by water consumers and water users strengthening liability for violations.

Exploration, assessment hydro geological work to increase the groundwater reserves suitable for irrigation of agricultural crops, and research to improve the reclamation of irrigated lands. Implement a single State statistical reporting procedure for groundwater consumers and develop a system for monitoring groundwater use. Accelerate the development of clusters, which include the cultivation, processing and production of finished products.

Improving the quality, safety and conditions of delivery of agricultural and food products. Development of logistics centers, agro-industrial complexes in the cultivation, processing and

export of agricultural products. Development of state standards for the collection, storage, transportation and compensation of unforeseen losses of agricultural products that meet international requirements, based on the experience of developed countries, modern techniques and technologies applied in the field. Introduce an effective mechanism to increase agricultural exports.

Improving the quality of training of highly qualified marketers, taking measures to support the expansion of marketing research in the domestic and foreign markets of agricultural products. Widely introduce the mechanism of public-private partnership in conducting research in the field of agriculture, the development and implementation of innovative developments, effective mechanisms to encourage the participation of the private sector.

In short, the systematic organization of scientific and practical activities and cooperation in the field of localization of high-yielding varieties of agricultural crops and livestock, expanding the training of highly qualified researchers in the field through doctoral and basic doctoral programs, to create all conditions for them to conduct scientific research on problematic and topical issues.

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Rezyume. *Maqolada qishloq xo‘jaligida yer va suv resurslaridan samarali foydalanishning mohiyati va ahamiyatini ochib beradi. Asosiy e'tibor, foydalanishdan chiqib ketgan sug‘oriladigan va foydalanishga kiritiladigan hamda o‘rmon fondi yerlarining meliorativ holati, unumdorligi va suv ta’minotini yaxshilash texnologiyasini joriy qilganlik uchun qishloq xo‘jaligi tovar ishlab chiqaruvchilariga imtiyozlar berish tizimini yaratish, shuningdek, qishloq xo‘jaligi resurslaridan samarali foydalangan holda sifatli mahsulotlar etishtirishga qaratilgan.*

Резюме. *В статье разъясняется сущность и важность эффективного использования земельных и водных ресурсов в сельском хозяйстве. Упор будет сделан на создание системы стимулов для сельхозпроизводителей за внедрение технологий улучшения мелиорации, продуктивности и водоснабжения выведенных из эксплуатации орошаемых и введенных в эксплуатацию, а также лесных угодий, а также нацеленных на рост. качественная продукция благодаря эффективному использованию природных ресурсов.*

Kalit so'zlar: *qishloq xo‘jaligi, innovatsion soha, yer va suv resurslari, meliorativ holati, oziq-ovqat xavfsizligini ta’minlash, qishloq xo‘jaligi tovar ishlab chiqaruvchilariga imtiyozlar berish tizimini yaratish.*

Ключевые слова*: сельское хозяйство, инновации, земельные и водные ресурсы, мелиорация земель, продовольственная безопасность, создание системы стимулов для сельхозпроизводителей.*

WAYS TO EFFECTIVELY USE INSURANCE SERVICES TO REDUCE RISKS IN AGRICULTURAL PRODUCTION

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Summary: The article allows and achievement of effective insurance services in the article with the activities of agricultural enterprises, as well as the implementation of effective tariffs in assessing their activities, and conclusions were formed.

Keywords: Agriculture, agricultural production, agricultural production, agricultural insurance, risk insurance, risk insurance, seasonal risk, industrial risk, natural barrier.

Introduction. In order to solve the issue of how to reduce the risks in agricultural production, it is necessary to understand the essence of the risks associated with agricultural production. In the literature on risk management, there are 5 main sources of risk in agriculture: production risk; price or market risk; Institutional Risk; risk associated with the human factor; financial risk. [2].

In the last decade, vertical integration has gained wide popularity in the countries of the Commonwealth of independent states. The formation of agricultural clusters, which include the enterprises of the agro-industrial complex, allows to eliminate some of the problems associated with the cost risks in the enterprises of the agricultural and processing industry, as well as reduce the financial risks of the enterprises that are part of it. The positive effectirga is also achieved by diversification, which implies the combination of different production areas to reduce the serious fluctuations in revenue, and the situation in which the risk is generated allows for a reduction in risks by investing in such areas where the risk is almost diametrically advanced. Despite the generally positive impact of diversification, the possibilities of its effective application are often limited by the constraints of resources, problems with the sale of products, unfavorable weather conditions and other similar factors. Geographic diversification also helps in reducing risk. An enterprise specializing in the production of one type of products or a limited range of products can place their production in different regions, which differ from each other in terms of climate and market conditions. Large investors with relatively large and at the same time low land holdings can have an advantage over geographic diversification, that is, the Bunda is an enterprise based on contractual production, which can give part of the control over production to the consumer of the product. Due to the level of control transmission, it is possible to distinguish two types of Organization of production. A relatively simple form of them is the conclusion of a contract on a product whose quality is known, at a pre-agreed and guaranteed price. The risk associated with this price uncertainty goes to the buyer of the product. The volatility of the profit will be due to the presence of the risk of production. A relatively complex form is a contract of production, in which the obligation of an agricultural enterprise includes the provision of basic means of production, for example – the provision of land and labor. And the contract developer (the recipient of the product) leaves the issue of providing production with working capital (at the same time with feed and suction). This form of Organization of production means that more part of the risk is transferred to the developer of the contract.

Main part. The risks and their classification in agriculture are often interpreted as the uncertainty of the outcome of the risks and, consequently, the likelihood that management decision making will have undesirable consequences. However, one should not always be afraid of danger. Profit in business is often interpreted as a reward for risk, and this is not accidental. Therefore, the problem is not in the presence of risk, but in how to effectively manage risk, in the ability of a person to withstand negative consequences. At the same time, risk management is understood to develop and implement measures aimed at identifying, analyzing, assessing and combating risks in order to reduce the negative impact of risk on the state and development of an object under control.

In the system of these measures, a proper assessment of the probability and size of risks is of particular importance.

Classification of risks by sources of Origin plays an important role in improving the efficiency of their management. In order to solve the issue of how to reduce the risks in agricultural production, it is necessary to understand the essence of the risks associated with agricultural production. [2]

Industrial risk arises from uncertainty about the state of plants and animals, which is associated with unfavorable weather conditions, epidemics and diseases, as well as other unforeseen events. Since the time of making the decision to acquire the necessary resources does not coincide with the time of economic return from their use, the problem of uncertainty of the prices of production resources arises. It is almost impossible to reliably assess the market prices of the products of the company during the decision to produce them. This raises the problem of uncertainty of prices of agricultural products. Thus, entrepreneurs in the agricultural sector operate in conditions where there is a price or market risk. It should be noted that the relative fluctuations in prices by the months of the year can be similar to each other in different years. This is due to the seasonality of agricultural products. For example, high fluctuations in grain prices are characteristic of the harvest period, and in the post-harvest period, the price of grain decreases when the first information about the gross Harvest appears.

The desires of seasonal consumers can be another factor in price fluctuations throughout the year. Seasonal fluctuations in prices do not represent a serious source of risk and can be taken into account when developing plans to sell products. Price fluctuations over the years are primarily due to the volume of production in individual years, that is, its supply, as well as the demand in the domestic and foreign markets. In the years when unfavorable weather conditions have arisen and, accordingly, low yields, the price of plant products can significantly increase. On the contrary, in good years, the offer of products increases, which usually leads to a decrease in prices. [4].

This phenomenon is called a natural barrier. Natural hedging occurs when there is a negative correlation between yield and production cost. This has the effect of stabilizing the profits of the enterprises because the farmer farms can reduce the losses that may occur as a result of the decrease in productivity through higher prices. When describing the risks of production and price, it should be noted the following: for agricultural systems in which the most ancient (primitive) production technologies are used, the risk of production is more important. And this is not surprising: non-compliance with technologies, lack of irrigation and drainage systems, neglect of anti-erosion measures, refusal of sanitary and Veterinary Measures leads to the dependence of agricultural products on natural climate and other environmental factors, unstable harvest. In technology intensive systems with scientific studies, price risk is more important, especially the variability of agricultural products.

This is primarily due to the fact that the demand and supply in the food market are not elastic. The fact that supply and demand interfere with each other at any, even imperceptibly, level leads to a sharp change in price. Another important source of risk is the frequent changes in the regulation of agriculture by the state, the uncertainties in the legal provision of this industry and the non-existence of non-compliance. For example, in countries based on a transitional economy, this situation is subordinated to the legal framework aimed at regulating land resources. This situation indicates that there is a high risk for investors who want to divert capital for agricultural business. Another example can be cited the introduction of a restriction on the use of a certain type of method, which is considered a means of protecting plants. Such changes introduced by the state in the regulations have a significant negative impact on the income of enterprises that grow agricultural crops. Such risks are called institutional risks. Another source of risk – especially the risk encountered in peasant farms – is the risks associated with human dignity.

Family crises are recognized as such, that is, the death of the owner of a farm or farm can seriously damage the financial situation of this enterprise. Losses resulting from negligence on agricultural machinery and livestock are also included in the category of human-related risks. The

gross impact of risks associated with production, cost, institutional and human capital can be called business risk in one term. [2].

The possibility of introducing the above types of risks into a group is determined by the following: regardless of how these risks are financed, all enterprises are faced with these risks. Business risk reflects the aggregate impact of all uncertainties affecting the economic efficiency of this business operation. This risk affects the economic performance of the product cost, sales volume, profit, cash flows and other similar enterprise. It is difficult to find an enterprise where there is no creditor indebtedness, especially if it is an agricultural enterprise with seasonal characteristics. The higher the percentage of capital involved in the enterprise, and at the same time the higher the level of business risk in such an enterprise, the higher the probability of its occurrence in banking. And vice versa, if the contribution of private capital in such an enterprise is high, then the probability of bankrolling will be low. This can be explained by two factors, that is, the period of use of The attracted capital is limited, and at the same time, this amount is attracted on condition that it is returned with the addition of interest, and this interest rate can in most cases be higher. Due to this, the method of financing the economic activities of the enterprise itself is also a source of economic risk.

Conclusion. In place of the conclusion, it can be noted that the management of risks in agriculture is somewhat complicated, science and practice in the long historical process of Agricultural Management have created various instruments of risk management. These include the implementation of risk transfer between different subjects of the economy, the application of the cross taqsimlash strategy and the strategies for reducing the risks of the enterprise. It is possible to achieve effective risk management through the use of all these methods in its place. Of course within these, managing risks through insurance services with a long history and experience is a relatively simple and effective way.

Insurance is one of the main means of stabilizing the incomes of agricultural entrepreneurs, and when using it, it is important to pay attention not to violate the rules of the WTO (World Trade Organization). According to the FAO, today's crop insurance is carried out in more than 70 countries of the world. In addition, there is state support for agricultural insurance programs in more than 50 countries. [3].

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Rezyume:*Maqolada qishloq xo'jaligi korxonalari faoliyati bilan boǵliq risklar va ularni ilmiy jihatdan tasniflash, risklarni samarali boshqarish maqsadida turli xususiyatlaridan kelib chiqib baholash orqali to'ǵri tarif siyosatini qo'llash bilan ikkala tomon uchun ham samarali suǵurta xizmatlarini ko'rsatishga erishish masalalari yoritilgan va xulosalar shakllantirilgan.*

Резюме: *В статье опубликуется достижение эффективных страховых услуг с деятельностью сельскохозяйственных предприятий, а также реализация эффективных тарифов в оценке их деятельности, и были сформированы выводы.*

Kalit so'zlar: *Qishloq xo'jaligi, qishloq xo'jaligi ishlab chiqarishi, qishloq xo'jaligi risklari, ekinlar suǵurtasi, xavfni samarali boshqarish, xavf turlari, sanoat xavfi, narxlarning mavsumiy tebranishi, tabiiy to'siq.*

Ключевые слова: *Сельское хозяйство, сельскохозяйственное производство, сельскохозяйственное производство, сельскохозяйственное страхование, страхование риска, страхование риска, сезонный риск, промышленный риск, природный барьер.*

CONCEPT OF RISK, TYPES AND RISK MANAGEMENT IN BANKING

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Summary: *This article discusses the nature of the risks involved in banking, the contradictions between the definitions of scientists in this area, and the types of risks. As in the economy, in life, we can never say exactly what will happen in the future, and we will not be able to avoid the risk at all. However, with a few tools, we can bring it to a minimum. First, the risk-related nature of banks' activities requires that costs, losses, and losses be constant and that they be monitored on a daily basis. Second, the presence of costs, losses or losses in banks is not a risk in itself. It is thought that each of these concepts has its own essence. By studying the nature of banking risks, we would like to suggest that the risks that arise in banking have their own characteristics. For the purposes of the analysis, we noted that there are several types of risks faced by banks.*

Keywords: *risk, net risk, credit risk, diversification, hedging, deposit, risk zone, currency, loan portfolio.*

The Action Strategy for the five priority areas of development of the Republic of Uzbekistan for 2017-2021 provides for further strengthening of the banking system, increasing liquidity, improving financial stability, ensuring national currency and price stability, development of banking services, introduction of modern principles and mechanisms of banking regulation. In order to further increase the financial stability and reliability of the banking system, create favorable conditions for strengthening and developing the resource base of commercial banks, stimulate their investment activity, as well as ensure a higher level of organization of banking in accordance with generally accepted international norms and standards. The Central Bank of the Republic of Uzbekistan has started to further improve the regulatory requirements for the deposit and credit policy of the Association of Banks of Uzbekistan. In our daily lives, each of us encounters several situations that reflect abstraction. This uncertainty always arises when we do not know what will happen in the future. When such uncertainty affects our decisions and actions, our health, or our financial situation, such abstraction is called risk. Abstraction plays an important role in the emergence of risk, but it alone is not enough. The concept of risk is interpreted differently in the literature. While risk is interpreted differently in the scientific economic literature, it is treated differently in legislation. In the Russian Explanatory Dictionary, the word risk is called “risk” and is derived from the Greek word. It refers to the rock that leads to the destruction of ships and the death of people and the sinking of property, meaning "sailing through obstacles between rocks."

For example, the multi-storey house you built consists of 50 apartments, and you estimate that many customers will come to it. You also know that these customers will actually be 40 or 60. If you don’t care how many customers come to you (40, 50 or 60), then we can only say that such a situation is uncertainty. However, if all the money from the sale of these apartments at your disposal is expected to be directed to your loan, and the exact information about how many customers will visit is very important to you, then such uncertainty represents a risk for you. Typically, we think of situations where the expected outcome is likely to be negative as risky. For example, if you invest your funds in an organization’s stock, you run the risk of losing your own funds in the event of a sudden drop in stock prices. If the stock price goes up, on the contrary, you may see benefits and be cheerful.

In daily life, most people avoid risk, preferring minimal risk over high risk in a few equal situations. However, if they expect to be paid a reasonable extra fee for such actions, people will be willing to take that risk on themselves. The level of risk and the amount of additional payment will depend on the individual wishes of each person.

In the economy, as in life, we can never know exactly what will happen in the future, and we will not have the opportunity to avoid risk at all. However, through a few tools we can minimize it.

Lavrushin (2001) argues that "banking risk is a measure of the value of a probable event that leads to losses". Risk may not always lead to losses. When any business entity or individual intends to engage in a risky activity, it always intends to make a high profit. Therefore, we do not fully agree with the idea that this only leads to losses.

Another Russian economist, Panova (1997), defines risk as "the risk or opportunity of loss in the event of unforeseen events". In her description, Panova substantiated two main directions. These are, firstly, like Lavrushin's (2001) view of risk, which also states that risk represents losses, and secondly, that risk is an unexpected event.

Foreign scientists prefer to see their isolated species rather than classifying risks.

Rose (1992) gives a broader understanding of risks and says that banking risk consists of 6 main types of risk - credit risk, non-profit risk, liquidity risk, market risk, interest rate risk, insolvency risk, and these risks are the most significant risks in banking. Secondary risks for the bank include Rose political risk, abuse risk, currency risk.

The risk-related nature of banking activities requires that costs, losses, and losses are constant and that they be monitored on a daily basis. The presence of costs, losses or losses in banks are not a risk in themselves. Each of these concepts has its own content.

Scientific methods of studying the processes of economic reality - experimental research, generalization, grouping, logical and comparative methods of analysis, abstract-logical thinking, comparative analysis, statistical analysis, prospective forecasting, and other methods were used in the research process.

Losses of the bank occur as a result of inability to avoid the risks encountered in the activities of the bank. Risks in banking activities may arise because of failure to analyze future operations, failure to properly study the situation, inefficient placement of funds, incorrect assessment of market opportunities, inability to anticipate other circumstances that could lead to negative consequences for the bank. The high level of losses leads to large losses in banks.

As well-known economists point out, banking is associated with a wide range of risks, including "will the bank repay the loan on time? Will the share of deposits increase in the coming months? Will the bank's profit increase due to the increase in the share price of the bank? What will be the most important interest rates in the future, and how will they affect the bank's profitability?" Taking into account the analysis of these cases, the bank invests funds, aims to achieve a positive result. In our view, banking risk is part of the economic risk and is based on the economic relationship between the bank and individuals and legal entities. Examining the nature of banking risks, we would like to express the opinion that there are specific features of risks arising in banking activities. Depending on the reason of the examination, there are a few sorts of dangers confronted by banks. Below we list the sources with the most common risk.

The types of risks are interrelated and affect their activities to varying degrees. This situation makes it difficult to develop risk prevention measures and analyze specific types of risks, to determine the causes of their occurrence.

The process of determining all the income and expenses associated with a risk, as well as developing and making decisions to reduce it, is called risk management. It is important that all precautions be taken before or at the same time as the risk event occurs.

The risk management process involves the following steps:

- Risk identification
- Risk management
- Development of risk reduction measures
- Selection of risk reduction measures
- Evaluation of the result

Risk identification mainly involves identifying which risks the subject is most vulnerable to and finding a link between them.

As we noted above, it will be necessary to examine the effect of risk in relation to the sum of other complex assets and situations. Risk assessment is not only a quantitative measure of it, but also the determination of all the costs associated with it. In risk management, risk assessment is one of the most difficult issues. We will need information first to identify it. We can see that such information is based on historical data. For example, an investor wants to invest in a company's stock. In doing so, he worries that stock prices will fall. We do not know with certainty what the circumstances and situations will be in the future, but using the method of statistical analysis, we can predict the future price of the stock by assessing the historical changes in its stock.

There are 4 main approaches to risk reduction:

- risk avoidance
- control and prevention of damage
- risk transfer
- risk payment

In this regard, we can note the Regulation of the Central Bank of the Republic of Uzbekistan dated July 14, 2015 No 2696 "On the order of formation and use of reserves to classify the quality of assets in commercial banks and cover possible losses on assets."

One of the issues of proper organization of banks, minimization of existing risks is to identify and analyze credit risks, their quality and level.

Banks need to be more risk-averse or risk-averse than other lending institutions. This is due to the fact that the bank works with other creditors not with its own funds, but with borrowed funds, ie with the funds of individuals and legal entities temporarily in the bank. The bank's ability to lend depends on the resources it attracts. The bank, in turn, should be able to return these attracted funds to the customer at the required time. This opportunity requires the timely identification of existing risks in banking and the development of measures to prevent them.

Dividing loans into risk aspects, developing ways to minimize them, protecting the interests of the bank can be the basis for reducing credit risks. The main reasons for the emergence of credit risks may also be because loans are allocated to one industry, one sector, and the borrower does not comply with the risk. Dividing loans by risk level can indicate how much (how much) of the loan is in the normal risk or high-risk zone.

The risk factor can be used to determine the level of credit risk. We can see this in Table 1.

Table 1

Procedure for determining the risk factor

Indicators	Options	
	The first option	The second option
1. Own funds, mln.	10000	60000
2. The maximum number of possible losses, mln.	6000	24000
3. Risk coefficient	0,6	0,4

The data in the table show that the risk of investing in the second option is 1.5 times lower than in the first option (0.6: 0.4 = 1.5). It is possible to determine the risk zone depending on the size of the losses due to the risk.

There are no losses in the risk-free zone, i.e., its size is "0". In this case, the profit margin will be higher. The potential risk is a pre-determined, high-risk risk, the magnitude of which is imperceptible, always lower than the benefit to be obtained. The critical risk zone represents the risk of losses, the fact that a portion of the profits is directed to a process, and the risk of a return on those funds.

Therefore, having a clear idea of the direction in which loans are directed by banks, the existence of outstanding debts on them, that is, having accurate information, regular settlements will help reduce the level of risk.

Today, the sustainable development of the economy of the republic is closely linked, first, with the results of the ongoing reforms. Further deepening of reforms in the banking system is an important component of the priorities in the economic sphere. The banking activity of the Republic, the development of commercial banks, their liberalization is taking place in a very complex environment, i.e., in an environment of economic, social, and political competition. Today, in the context of liberalization of banking, the strengthening and improvement of interbank competition is becoming a necessity.

At the same time, under the influence of several objective and subjective factors, the situation may develop in such a way that, despite all the measures taken, it is impossible to develop a strategy for debt collection alone. The fact that the terms of lending are different and the conditions for the emergence of problem loans are not the same requires an individual approach to each problem loan. However, a common system for collecting problem loans needs to be developed. Characteristically, the loan recovery strategy cannot be determined without prior analysis of the client's situation.

Therefore, it is necessary to assess the financial condition of the client and develop a forecast of the situation.

It is important to understand that risk management skills are related to making informed decisions. These decisions should be based on the most useful and accurate information available in the current context. In practice, it is not possible to distinguish between simple luck and the results of long-term decisions.

The results of the analysis show that in the largest commercial banks of the country, the bulk of loans are accumulated in enterprises of certain industries. In addition, the accumulation of loans in certain forms of ownership creates a high credit risk for the bank. For example, a change in the ownership of a state-owned enterprise can lead to serious problems in repaying the loan.

In our opinion, the expansion of the loan portfolio of commercial banks, the effective use of credit investments will help to universalize and increase the competitiveness of banks and reduce credit risk. Diversification of funds attracted and placed by the Central Bank in the management of bank liquidity and compliance with economic standards will help banks to plan their lending operations. In this way, the commercial bank achieves the maximum return while maintaining the required level of liquidity. The process of loan portfolio formation should provide for its diversification in terms of determining the optimal credit policy. As the level of accumulation of loans among several customers and the total volume of lending increases, so does the bank's credit risk.

Therefore, banks should always try to provide small amounts of loans to many customers who are independent of each other. In addition, to reduce the negative consequences of risk, it is necessary to increase the range of banking services and further improve the quality of customer service, adapting banking legislation to current conditions. To increase the capitalization and financial stability of banks, increase their resource base, it is necessary to consider specific measures to attract the population's savings and free funds of economic entities to time deposits in banks and to develop the financial market. We believe that taking measures to ensure the liquidity of commercial banks using modern methods of asset and liability management will also serve to reduce the level of risk in banks.

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Rezyume: *Ushbu maqolada bank faoliyatida uchraydigan risklarning mohiyati, bu bo'yicha olimlarning ta'riflari o'rtasidagi qarama-qarshiliklar hamda risklarning paydo bo'lishi sabablariga*

ko'ra turlari haqida to'xtalib o'tilgan. Iqtisodiyotda, hayotda bo'lganidek, biz hech qachon kelgusida nima sodir bo'lishini aniq ayta olmaymiz va riskni umuman chetlab o'tish imkoniyatimiz ham bo'lmaydi. Lekin, bir qancha vositalar orqali biz uni minimumga olib kelishimiz mumkin. Birinchidan, banklar faoliyatining risk bilan bog'liq bo'lishi xarajatlar, zararlar va yo'qotishlar doimiy uchrab turishini va ular bank amaliyotining kundalik monitoringida bo'lishini taqozo qiladi. Ikkinchidan, banklarda xarajatlarning bo'lishi, zarar yoki yo'qotishlar bular o'z-o'zidan risk hisoblanmaydi. Bu tushunchalarning har biri o'zining mazmun-mohiyatiga egaligi to'g'risida fikr yuritilgan. Bank risklari mohiyatini tadqiq qila turib, biz bank faoliyatida yuzaga keluvchi risklarning o'ziga xos xususiyatlari mavjud, degan fikrni bildirmoqchimiz. Tahlil maqsadlaridan kelib chiqqan holda, banklarda uchraydigan risklarning bir nechta turlari borligini ta'kidlaganmiz.

Резюме: *В этой статье обсуждается природа рисков в банковской сфере, противоречия между определениями ученых в этом отношении и типами рисков в зависимости от причин. В экономике, как и в жизни, мы никогда не сможем точно знать, что произойдет в будущем, и у нас не будет возможности вообще избежать риска. Однако с помощью ряда инструментов мы можем его минимизировать. Во-первых, связанный с риском характер банковской деятельности требует, чтобы затраты, убытки были постоянными, и чтобы они отслеживались на ежедневной основе. Во-вторых, наличие затрат, убытков или убытков в банках сами по себе не считаются рисками. Считается, что каждое из этих понятий имеет свою сущность. Рассматривая природу банковских рисков, мы хотели бы предположить, что существуют специфические особенности рисков, возникающих в банковской сфере. Исходя из целей анализа, мы отметили, что существует несколько видов рисков, с которыми сталкиваются банки.*

Kalit so'zlar: *risk, sof risk, kredit riski, diversifikatsiya, xeydjerlash, depozit, risk zonasi, valyuta, kredit portfeli.*

Ключевые слова: *риск, чистый риск, кредитный риск, диверсификация, хеджирование, депозит, зона риска, валюта, ссудный портфель.*

THE IMPORTANCE AND IMPORTANCE OF PUBLIC-PRIVATE PARTNERSHIP IN THE FIELD OF INNOVATION

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Summary: *The article reveals the essence and significance of public-private partnership in the field of innovation. The main attention is paid to the issues of supporting innovation activities within the framework of PPP, improving relations and interaction between the state and business, as well as enhancing cooperation in the field of innovation.*

Key words: *public-private partnership, innovation sphere, innovation strategy, mechanism of public-private partnership, state support for innovation.*

In order to ensure the accelerated development of the country based on modern achievements of world science, innovative ideas, developments and technologies, as well as the consistent implementation of the tasks set in the Action Strategy for five priority areas of development of the Republic of Uzbekistan in 2017-2021. In accordance with Resolution No. PF-5544 "On Approval of the Strategy for Innovative Development of the Republic of Uzbekistan", "The Strategy for Innovative Development of the Republic of Uzbekistan for 2019-2021" was approved. The main goal of the Strategy is the development of human capital as a factor that determines the level of competitiveness of the country in the international arena and its innovative development [1].

The main objectives of the Strategy in achieving the main goal are:

- Entering the Republic of Uzbekistan by 2030 among the 50 leading countries in the world according to the Global Innovation Index;
- Improving the quality and coverage of education at all levels, developing the lifelong education system, ensuring the flexibility of the training system in accordance with the needs of the economy;
- creation of effective mechanisms for the integration of education, science and entrepreneurship to enhance the scientific potential and increase the efficiency of R&D, the widespread implementation of the results of research, development and technological work;
- strengthening the introduction of public and private funds for innovation, research, development and technology, the introduction of modern and effective forms of financing activities in these areas;
- Increasing the efficiency of public authorities through the introduction of modern methods and management tools;
- Ensuring the protection of property rights, creating competitive markets and equal conditions for doing business, developing public-private partnerships;
- creation of a sustainable socio-economic infrastructure.

In the conditions of the formation of a "new economy", traditional approaches to managing innovation, aimed at increasing material well-being and the accumulation of material assets by an enterprise, cannot adapt to changes (globalization, increased competition, development of sectoral structures), therefore, partnership in science and education should be supplemented by new approaches based on stimulating relationships [2].

At the same time, the transition to a new model of economic development is proceeding very quickly, therefore it is necessary to unify the organization of national, regional and sectoral innovation systems. Many elements of the national innovation system are in the process of formation. The level of activity of the financial system is practically incompatible with the goals of supporting innovative development: it is not a source of "long-term money", bank capital performs limited functions, credit institutions do not offer products and services that are practically necessary for innovative enterprises, Stock markets are underdeveloped; in large high-tech companies, the

process of forming companies and small innovative firms is slow. The problem of combating inflation is being solved.

The relationship between government and business is complex, and the level of arbitrary interference by government bodies and officials in the economic activities of enterprises in some cases remains high. All this makes it difficult to create a healthy competitive environment in which only an innovative economy can be formed.

An integral condition for high-quality economic growth on an innovative basis is constructive interaction between business and government.

The reason for the private sector of the economy to participate in a partnership is usually characterized by the highest profit opportunities and new opportunities for the development of innovative business. But private companies with very specific reasons for public-private partnerships, for example, public funding; using the results and developments of public sector research; may also be provided to provide access to public infrastructure as well as information and equipment.

The reason for the public sector to participate in partnerships is characterized by both general and specific objectives. Overall goals may include: economic growth and the competitiveness of scientific and technological products and services; stimulating innovative activity of manufacturers of high-tech products and service providers; creation of new information firms and support for small and medium-sized innovative enterprises; attraction of extra-budgetary funding sources; improve the efficiency of public spending on research and development.
Specific goals include: developing key technologies for public use; attraction and commercialization of research and development results at the expense of the state budget in the economic cycle; infrastructure development [3].

These relations are reflected in the institution of public-private partnership. In most countries of the Organization for Economic Cooperation and Development (OECD), public-private partnership projects account for an ever-growing share of the state budget in science and technology.

At present, it is especially important for our country to develop this mechanism of interaction between the state and business in the field of agriculture. This will successfully solve the export problem and ensure the country's food security. The attractiveness of agriculture for investors can be explained by the following advantages:

acceleration and implementation of new socially significant projects by attracting additional financial and other resources to agriculture;

the ability to use the established mechanism for managing large complex programs in agriculture;

increasing technological and financial potential in agriculture.

Public-private partnerships are important for bringing local agricultural producers to global markets, as well as for food security, as they increase farmers' access to technology and new markets. Private businesses in agriculture have good reasons to participate in PPPs:

direct support of agricultural projects by state bodies;

the possibility of long-term investment in agriculture under government guarantees;

new opportunities for innovative business in agriculture;

obtaining tax incentives for agricultural projects.

The role of the mechanism of public-private partnership in solving the issues of innovative development of the country's economy, supporting entrepreneurship is recognized at the state level in our country. Therefore, in the field of innovation, it is very important to determine the characteristics of public-private partnership and the mechanisms for its implementation in practice [4].

Public-private partnership (PPP) allows solving many economic problems facing the state, first of all, finding alternative investment resources and improving management efficiency. In the world experience, a number of PPP technologies have been accumulated that allow combining the

interests of business and the state in the provision of social services. This indicates a variety of organizational structures, legal forms, economic incentive mechanisms for the support and development of these relations. Abroad, the PPP mechanism is used in various fields - housing construction, energy, transport infrastructure, business infrastructure, innovation, education, healthcare, social and humanitarian (humanitarian) and others. Currently, partnerships are expanding in solving business development problems, enhancing innovation, creating clusters of manufacturers.

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Rezyume. *Maqolada innovatsiya sohasidagi davlat-xususiy sheriklikning mohiyati va ahamiyatini ochib beradi. Asosiy e'tibor PPP doirasida innovatsion faoliyatni qo'llab -quvvatlash, davlat va biznes o'rtasidagi munosabatlar va o'zaro munosabatlarni yaxshilash, shuningdek, innovatsiya sohasidagi hamkorlikni kuchaytirish masalalariga qaratiladi.*

Резюме. *В статье раскрывается сущность и значение государственно-частного партнерства в сфере инноваций. Основное внимание уделяется вопросам поддержке инновационной деятельности в рамках ГЧП, улучшению отношений и взаимодействия между государством и бизнесом, а также активизации сотрудничества в области инноваций.*

Kalit so'zlar: *davlat-xususiy sheriklik, innovatsion soha, innovatsion strategiya, davlat-xususiy sheriklik mexanizmi, innovatsiyalarni davlat tomonidan qo'llab-quvvatlash.*

Ключевые слова: *государственно-частное партнерство, инновационная сфера, инновационная стратегия, механизм государственно-частное партнерство, государственная поддержка инновационной деятельности.*

УЎК: 712. (575. 1-25)

HOUSING EVALUATION AND DESIGN STAGES

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Summary: *This article discusses the stages of housing design, the problems of aesthetic improvement of the living environment in accordance with the lifestyle of the population, the methods and principles of solving the problems of material and spatial organization of the main processes of life and leisure.*

Key words: *aesthetic, atmosphere, carbon dioxide, nitrogen, space.*

By the middle of the 21st century, the danger of human activity disrupting the basic conditions of life on earth is becoming even clearer. We all know that the most drastic change to date is taking place in the Earth's atmosphere. This is especially true that the greenhouse gases such as carbon dioxide and nitrogen oxides. It is difficult to predict how this situation will affect humanity, because the global climate is a very complex system. For example, it is possible to change the direction of winds, the amount of precipitation, which has been stable for hundreds of thousands of years and has decided the fate of millions of people [1].

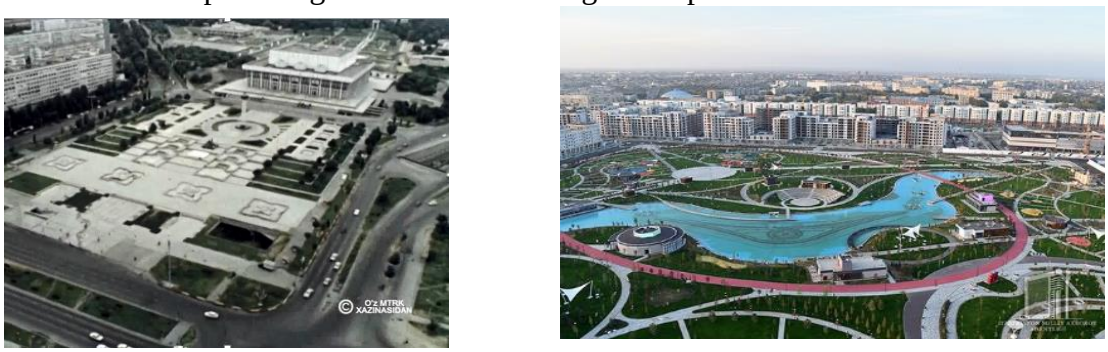
Problems in the aesthetic improvement of the living environment in accordance with the lifestyle of the population have a significant impact on the lifestyle of the population, solving the tasks of material and spatial organization of the main processes of life and leisure of the population. Therefore, the quality of the living environment can be assessed on the basis of social usefulness, reflected in its functional-historical, hygienic, technical and aesthetic characteristics. The housing appraisal program is directly defined by purposeful tasks such as life processes, meeting the multifaceted needs of the population, personality formation.

The philosophical understanding of nature created the need for its scientific, theoretical and practical study. Scientific philosophy is based on the data of the natural sciences, which believe that man is an integral part of nature, its highest product. In the early stages of human development, when man was just separated from nature, he lived a very helpless life, he was dependent on the forces of nature, he lived by consuming the finished products of nature. Then, through labor, a society of personality emerges based on the creation of weapons, the creation of material and spiritual wealth. He then learned to influence the forces of nature as a result of hard work and thinking [2].

The residential environment is organized at different stages with specific tasks and design program. The general purpose of the formation of housing can be defined as the effective spatial organization of the life and leisure processes of the population. It is possible to show three main, content-different stages of housing design. The first is the design of the living environment. At this stage, the social basis of design is the processes of individual, family, household and collective life. The living environment is a minimal integrated housing structure, a key element of the residential environment.

Tashkent settlements in 1900-1950. Examples from the creative work of Fatkhulla Khaitov

The second stage is the design of residential complexes at different levels: residential group, subdistrict, residential district. The social content of the urban development project at this stage is determined by the nature of the life processes, recreation, use of services carried out by the population living in the area under consideration. With some restrictions, multi-apartment houses and apartment complexes should be included in this stage. The tasks of spatial organization of life processes and recreation in the area under consideration in the project of this stage are solved by rational division of the territory and placement of the necessary elements of the living environment: housing, service facilities, recreation, sports, utilities, communications. . An important task of the design is to determine the nomenclature of types of housing cells and dwellings that correspond to the demographic composition of the population of the projected complex. At this stage, it is necessary to separate the task of forming urban populated areas and the urban part of the city as a whole. When designing them, the analysis of labor relations of the population and the spatial organization will be of great importance.



Tashkent after the 1966 earthquake. (left) 2020 Tashkent City. (right)

The third stage of the project is the formation of the local and regional population, the housing program of the Republic in general. This stage differs from the previous one in that its task is not to include the historical organization of specific residential areas, but to focus on the development of norms and typology of housing. They are determined on the basis of the composition of the temporary population, analysis of the demographic situation, including species and natural conditions, culture, regional and national characteristics of the economic structure. At all stages of housing design, the space of the social program of activities of the population in the spheres of life and leisure is realized. The program defines the descriptions of different types of activities, their interaction in time and space. The development of a social program is done in the form of normative and search forecasts. The first are target models of the organization of domestic processes, the second are models based on the extrapolation of modern trends and the analysis of their development under the influence of social processes. They are a necessary component of the forecasts being developed and help to assess the socio-economic and technical feasibility of the intended programs. Experts of Calatrava Grace Corporation predict that the population of Tashkent will increase by 12 million by 2030 [3].

Old and new Tashkent

The social program of aesthetic design of the living environment in accordance with the lifestyle of the population requires the prior determination of the social subject - the consumer of housing. For example, in hotels, dormitories, boarding houses for the temporary residence of social groups with different levels of organization and functional coherence - will vary in content and size. The inhabitants of an apartment house, a residential complex, form a territorial unit called a "neighborhood". The level of cohesion of a neighborhood community can vary and depends on cultural norms and stereotypes as well as the behavior of the communities. This is the difference between understanding the neighborhood in urban and rural areas, in the eastern 'neighborhood' and in the European quarter. The social foundations of housing design are related to the identification and description of different types of housing consumer and primarily family with different behaviors.

- Substantiation of urban planning parameters of design includes:
- Classification of processes that take place in the home;
- Spatial description of the environment of social processes taking place in the settlement: identification of the characteristics of the interaction on the parameters of activities that affect the parameters of architectural and urban solutions;
- to determine the dependence of domestic processes on the socio-demographic characteristics of the family, which is the main "consumer" of housing;
- To study the typology and demographic statistics of families in order to develop the nomenclature of housing, the ratio of distribution of district, city, regional, Republican housing stock;
- to determine the factors influencing the structure of domestic processes and housing: national and regional features of culture, natural and urban conditions of the population;
- identification of socio-economic and technical opportunities for the implementation of social programs of housing design[4].

Aesthetic improvement of the living environment in accordance with the lifestyle of the population is becoming a problematic process in cities. For example, modern cities today are complex organisms that have their own character and structure. This structure will consist of residential areas, highways and streets. It is the most important part of this complex, that is, modern methods of urban planning and design are used in the design of residential areas. Of course, taking into account the natural and climatic conditions will remain one of the main factors. In the preparation of the master plan of the city, its design solution is the main principle. Based on these principles, construction and landscaping, technical drawings are prepared. The project guidelines also provide answers to questions about the organization of the living environment, the creation of favorable conditions, irrigation, landscaping, transport, engineering and technical issues.

One hundred - two hundred years of growth rates of trees and shrubs, the processes have not been fully resolved. Water ditches and irrigation systems were generally out of demand. Such problems are found in all residential environments. From history, the concepts of Mahalla, Guzar have played an important role in the social life of the population. These have not lost their status even now. Centers and guzars have been established in each neighborhood, where consumer services such as teahouses, markets, and baths have been established. Only a new look, a new way of thinking, can lead to all this renewal, to change. In Uzbekistan, too, the construction of multi-storey buildings and the formation of microdistricts, the shape, appearance and requirements of the living environment have changed.

- In the middle of the last century, the search for the best project compositional solutions, ideas, ideas began in order to improve the living environment of the population and radically change them. The rapid increase in cars and their traffic has led to the widening and improvement of highways and highways. As a result, a number of problems arose in the districts:
- As a result of the construction of preschool institutions, schools close to settlements, the recreation conditions of the population began to deteriorate;

- As one school admitted children from several districts, children were forced to cross highways, which led to an increase in road traffic accidents;
- Scattered location of service points for daily needs of the population;
- The placement of public buildings along the main streets will adversely affect the movement of vehicles, the population and endanger their lives when people cross the street [5].

For decades, ways to overcome these problems have been sought, and projects have been developed to place preschools and schools in the interior of neighborhoods.

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Rezyume: *Ushbu maqolada turar-joylarni loyixalash bosqichlari haqida fikrlar bayon qilinib, turar-joy muhitining aholi turmush tarziga muvofiqligini estetik jihatdan takomillashtirishdagi muammolar, aholining maishiy dam olish jarayonlarini moddiy-makoniy tashkil etish vazifalarini yechish usulari va prinsiplari haqida ma'lumotlar beradi.*

Резюме: *В статье рассматриваются этапы проектирования жилья, проблемы эстетического улучшения жилой среды в соответствии с образом жизни населения, методы и принципы решения проблем материально-пространственной организации основных процессов быта.*

Kalit so'zlar: *estetika, atmosfera, karbonad angidrid, azot, makon.*

Ключевые слова: *эстетика, атмосфера, углекислый газ, азот, пространство.*

IMPORTANCE OF EVALUATION OF INVESTMENT ACTIVITY OF JOINT STOCK COMPANIES

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Summary: *The paper examines the joint stock company as a form of entrepreneurial activity and delves into the characteristics of joint stock company financing. The peculiarities of the joint-stock company's financial activity are described, and a method for estimating the efficiency of financial activity is proposed using a system method of financial reporting analysis based on the DuPont method. The existing models for diagnosing a joint-stock company's bankruptcy are analyzed.*

Keywords: *investment, finance, investment activity, financial activity, JSC, Altman.*

Introduction.

One of the most important spheres of economic activity of the enterprise is its investment activity, associated with the investment of funds in the implementation of long-term and medium-term projects.

Investment activity can be defined as a set of transactions for the acquisition and sale of long-term (non-current) assets, as well as short-term (current) financial investments that are not cash equivalents.

An enterprise can make investments of various types and in various organizational forms: the formation of an investment portfolio, participation in investment projects, etc. The directions of the enterprise's investment activities are of a different nature, the degree of responsibility and, accordingly, the nature of the consequences and the level of risk

The main areas of the company's investment activities are:

- renewal and development of the material and technical base of the enterprise or expanded production of fixed assets of the enterprise;
- increasing the volume of production activities;
- development of new types of activity.

The analysis of an enterprise's financial condition plays a critical role in ensuring efficient management because it serves as the foundation for the generation of financial, economic, and other data that influence the process of financial and investment decisions. At this stage of our country's economic development, analyzing an enterprise's financial condition is critical, as it affects almost all of the enterprise's activities. Management staff must be able to analyze and evaluate their company's financial condition first, and then that of competitors, if they wish for their company to be financially stable and profitable, rather than unprofitable.

Traditionally, a joint stock company is one that has a share capital divided into a fixed number of equal-valued shares, and shareholders are personally liable for the company's obligations only on the shares they own. From the specific nature of the joint-stock company, the following characteristics determine its legal status: A joint-stock company is a business organization of the corporate type, a subtype of business company; it is a type of capital association in which property elements predominate over personal ones (participation in a joint-stock company requires only a property contribution - payment of a share - and personal participation - labor, in the management of the company - is typically optional).

Due to the following advantages, joint stock companies have become a fairly common form of business organization throughout the world:

- the ease with which significant capital can be formed;

- limited shareholder risk in terms of the amount of money paid for shares, which contributed to the company attracting a large number of shareholders and achieving a high degree of capital concentration;

- stability of the joint-stock company's property phase, which is typically unaffected by the shareholder's exit from the company (which is accomplished by alienating the shares to others, which does not reduce the company's property base);

- shareholders' non-obligatory personal participation in the joint-stock company's activities, which facilitates participation and, as a result, allows for the recruitment of new shareholders and their funds;

- the possibility of involving large segments of the population in public joint-stock companies and, consequently, the distribution of profits among them;

- application in a variety of spheres and types of economic activity (banking, insurance, investment, industry, etc.) and in all sectors of the economy - public, municipal, and private - as well as the establishment of joint stock companies;

- the use of joint stock companies in the privatization process;

- the ability to exercise control over a business through ownership of a controlling stake (in the case of a strategic investor), without purchasing all of the shares [2].

However, joint-stock companies have a number of negative characteristics that necessitate state regulation to mitigate their potentially dangerous manifestations in society. Among these negative characteristics are the following:

- the degree of difficulty and duration of their creation (particularly public);

- stringent requirements for the authorized capital's minimum size and the complexity of registering its change;

- disregarding the minority's interests;

- separation of shareholders from joint-stock companies' management, owing to the possibility of forming an executive body of employees and shareholders' optional personal participation;

- the complexity of joint stock company management and shareholder control over its executive body, which is a result of the presence of the following system of bodies: general meeting of shareholders, board of directors, supervisory board, and audit committee;

- the possibility of abuse by the founders as a result of the ease with which funds can be accumulated;

- a proclivity for monopoly;

- the ability to exercise control over joint-stock companies as a result of holding a controlling stake, if that control is used to the detriment of the companies and their shareholders;

- a substantial (and frequently excessive) degree of corporate state regulation [3].

The finances of a joint-stock company are governed by the law on combining founders' and participants' contributions into the company's statutory fund as the collective property of shareholders, on the issue and circulation of shares, on income, distribution of property and profits in the company's funds, and on dividends on shares [4].

Analysis and Results

Each and every company is governed by a voluntary association of the founders and members' property for the establishment and operation of their business. For this reason and others, collective property rights can be established legally through the conditions of the necessary agreements, according to which the company's statutory fund is constituted (founders make their contributions under the articles of association, other shareholders - on the terms of purchase and sale of shares).

As an example, a scheme can be used to describe the joint-stock company's financial resource management system (fig. 1).

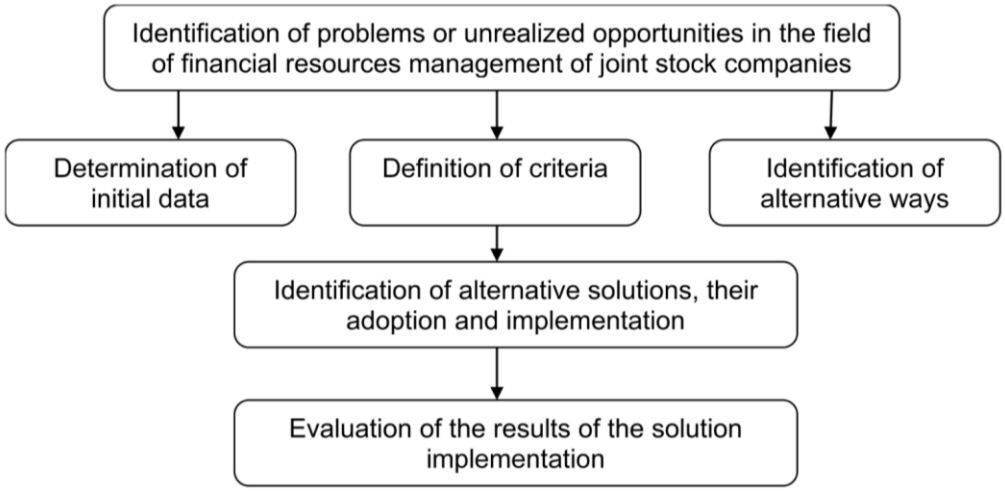

Fig. 1. **Management system of financial resources of a joint-stock company [5]**

Priority should be given to the following parameters of a joint-stock company's financial resource management system, for example [6]:

- determination of the actual amount of available financial resources; - justification of the optimal size of available financial resources, their distribution, and use, taking into account the needs of enterprises, the economic feasibility of expenditures, as well as their impact on the final results of production and economic activities of the company; - supervision of the rational use of financial resources.

The analysis and control of a business's financial activity serves as a diagnostic of its financial condition, allowing for the identification of flaws and miscalculations, the establishment and mobilization of internal reserves, the growth of revenues and profits, the reduction of production costs, the increase of profitability, and the overall improvement of the enterprise's financial and economic activities. Financial planning and forecasting both need the use of analysis materials. An audit commission, formed from among the shareholders, is responsible for monitoring the financial and economic operations of the board of directors of a joint-stock corporation [7].

Financial and economic activities should be organized as joint stock corporations to maximize capital raising opportunities, including equity. This is due to a number of reasons, which include the following:

- distribution of authorized capital on a fixed number of shares of equal nominal value, which may be quite small, allowing for the attraction of both small and large investors; - high mobility of corporate rights (shares), particularly if they are listed on a stock exchange, resulting in a low cost of ownership transfer; - simplified procedure for exercising the right to succession; -

According to the guidelines for preparing the auditor's report during the audit of joint stock companies, the auditor analyzes the financial condition of the joint stock company using the accounting data received, specifically the absolute liquidity ratio, total liquidity ratio, financial stability ratio (independence or autonomy), and coverage ratio equity liabilities. It is advised that when calculating the indicators, both the results and the technique for calculating the indicators of financial status are included in the audit report.

Liquidity analysis is performed in conjunction with the balance sheet and enables you to ascertain the company's ability to pay its current liabilities. Calculations of the following indicators (ratios) are used to conduct this analysis: coverage, rapid liquidity, absolute liquidity, and net working capital.

The solvency (financial stability) of the business is determined using the balance sheet, which details the structure of the company's resources, its level of financial stability, and its independence from external sources of financing. The following factors are used to determine solvency: solvency (autonomy), finance, the security of own-working capital, and the mobility of equity.

Other indications are calculated and, at the auditor's discretion, included in the conclusion.

Earnings per share information is included in financial statements prepared on behalf of shareholders and other interested parties. Additionally, the assessment of changes in the composition and structure of assets over the last three years, the assessment of future liquidity of assets, the analysis of the joint stock company's profitability, and - in the case of the joint stock company's foreign economic activity - the percentage of income from expert agreements to total income from all agreements of the company in a consolidated financial statement.

The overwhelming majority of experts recommend that joint stock companies' financial performance be determined through a rigorous analysis of Dupont firms' financial statements. The technique is predicated on the premise that the success of joint-stock companies is contingent upon the decisions taken by their governing bodies in three areas: production activities; investment activities; and finance activities[8].

The Dupont approach is based on a ratio analysis, which generates a return on equity (ROE):

ROE = NI / CE,

where *N*I (Net Income) - net profit;

CE (Common Equity) - share capital.

There are several versions of the method, which differ in the degree of detail.

1. Two-member version.

*ROE = NI / CE = NI • TA / TA • C*E,

where *TA* (Total Assets) - total assets of joint stock.

Otherwise you can write:

ROE = ROA • LR,

where *ROA* (Return of Assets) - return on assets;

LR (Leverage Ratio) - the ratio of financial leverage.

2. Three-member version:

ROE = NI / CE = NI • TA • NS / TA • CE • NS,

where - *NS* (Net Sales) - net (excluding VAT, sales taxes and sales taxes) sales volume.

Otherwise:

ROE = NPM • AT • LR,

where *NPM* (Net Profit Margin) - profitability;

AT (Asset Turnover) - asset turnover.

3. Five-member version.

ROE = NI / CE = NI • TA • NS • EBT • EBIT / TA • CE • EBT • EBIT • NS,

where *EBT* (Earning befour Taxes) - profit before taxes;

EBIT (Earning without Interest and Taxes) - earnings before interest and taxes.

Otherwise you can write:

ROE = TB • IB • OM • AT • LR,

where *TB* (Tax Burden) - tax burden;

IB (Interest Burden) - interest burden;

OM (Operating Margin) - operating profitability.

Conclusion.

When examining the financial status of joint stock businesses, special consideration should be given to the strategy used to forecast insolvency. Bankruptcy prediction systems were initially used to forecast risks during crises and afterwards to diagnose strategic difficulties. Each technique has a number of advantages and disadvantages that must be considered when selecting one to solve diagnostic difficulties.

Edward Altman is the creator of bankruptcy forecasting. He earned worldwide notoriety by developing a mathematical formula that quantifies a company's probability of bankruptcy (Z scoremodel). Altman established the significant coefficients of various elements in the integrated assessment of the possibility of bankruptcy using a survey of bankrupt firms. On a one-year

horizon, this model forecasts with a 95% accuracy, and on a two-year horizon, it forecasts with an 83% accuracy. The disadvantage of this methodology is that it can only be applied to major corporations that have publicly traded their stock.

Gordon L.V. Springgate established his own model for predicting the possibility of bankruptcy in 1978, based on the Altman model and step-by-step discriminant analysis.

The accuracy of predicting insolvency for the coming year was determined to be 92.5 percent during the testing of the Springgate model using data from 40 enterprises.

The advantages of this model are that the forecasting error is typically less than 10%; also, it does not take into account the market capitalization of businesses (not limited to joint stock companies). The Springgate paradigm, on the other hand, has several important disadvantages: Forecasting accuracy deteriorates with time; the model is a variant of the 1968 Z Altman account (the latter is obsolete and unsuitable for modern use). Uzbek businesses can adopt the Springgate model in addition to their own, as it does not take non-economic elements into account.

Thus, financial analysis of joint stock companies entails determining the optimal forms of financing, the structure of funds, capital, and reserves of the company, as well as the areas in which they are used, in order to maximize profitability while balancing receipts and expenditures; maintaining adequate liquidity and timely settlements.

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Rezyume: *Maqolada aksiyadorlik jamiyati tadbirkorlik faoliyatining bir shakli sifatida ko'rib chiqiladi va aksiyadorlik jamiyatini moliyalashtirish xususiyatlari o'rganiladi. Aktsiyadorlik jamiyatining moliyaviy faoliyatining o'ziga xos xususiyatlari tasvirlangan va DuPont usuliga asoslangan moliyaviy hisobot tahlilining tizimli usuli yordamida moliyaviy faoliyat samaradorligini baholash usuli taklif qilingan. Aksiyadorlik jamiyatining bankrotligini diagnostika qilishning mavjud modellari tahlil qilinadi.*

Резюме: *В статье рассматривается акционерное общество как форма предпринимательской деятельности и анализируются характеристики финансирования акционерного общества. Описаны особенности финансовой деятельности акционерного общества и предложена методика оценки эффективности финансовой деятельности с использованием системного метода анализа финансовой отчетности на основе метода DuPont. Проанализированы существующие модели диагностики банкротства акционерного общества.*

Kalit so'zlar: *investitsiya, moliya, investitsiya faoliyati, moliyaviy faoliyat, OAJ, Altman.*

Ключевые слова: *инвестиции, финансы, инвестиционная деятельность, финансовая деятельность, АО, Альтман.*

INFRASTRUCTURE SUPPORT FOR THE INNOVATIVE DEVELOPMENT OF THE INDUSTRIAL COMPLEX

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Summary: *The article examines the problems of innovative development of the industrial complex of its infrastructural environment in the context of the development of a market economy. And also proposed an economic mechanism for managing innovations in the industrial complex.*

Keywords: *Innovation, infrastructure, industrial complex, innovation infrastructure, infrastructure innovation.*

Introduction. The role of industry as a whole is manifested at every stage of the development of society, human life. It is the driving force behind the development of science, technology and other areas. The industrial sector of the state creates jobs, forms a large share of GDP, and also favors the development of the economy as a whole. The modern paradigm of the development of the world community, due to the increasing role of innovations in the system of social reproduction, makes new demands on ensuring the competitiveness of national economies.

So far, the problems of innovative development of the industrial complex of its infrastructural environment in the context of the development of a market economy have not been resolved. The efficiency of technological and production processes within the industrial sector of the economy is largely due to the development of the infrastructure environment of the industrial complex. Consequently, innovations in infrastructure and infrastructural environment and a unified scientific methodology for managing innovations fundamentally affect the development of the industrial complex as a whole. [5. 60-61].

Without the development of methods for determining the economic effect of the innovative development of the infrastructure environment, as an integral element of the industrial complex, the methodology for determining the economic efficiency of the functioning of the industrial complex as a whole cannot be considered fully completed .

Main part. Development of innovations in infrastructure surrounded by an industrial complex is one of the priority areas of national economy management and should include continuous monitoring as a level the economic efficiency of the functioning of the infrastructure environment, and the level of development of the industrial complex as a whole [5.45-51].

The efficiency of technological and production processes within the industrial sector of the economy is largely due to the development of the infrastructure environment of the industrial complex. At the same time, the infrastructural environment of an industrial complex is understood as a set of economic agents interacting with the production complex and using technologies for the effective circulation of inventory and information on the market as an independent business.

A typical infrastructural environment of an industrial complex is shown in Figure 1.

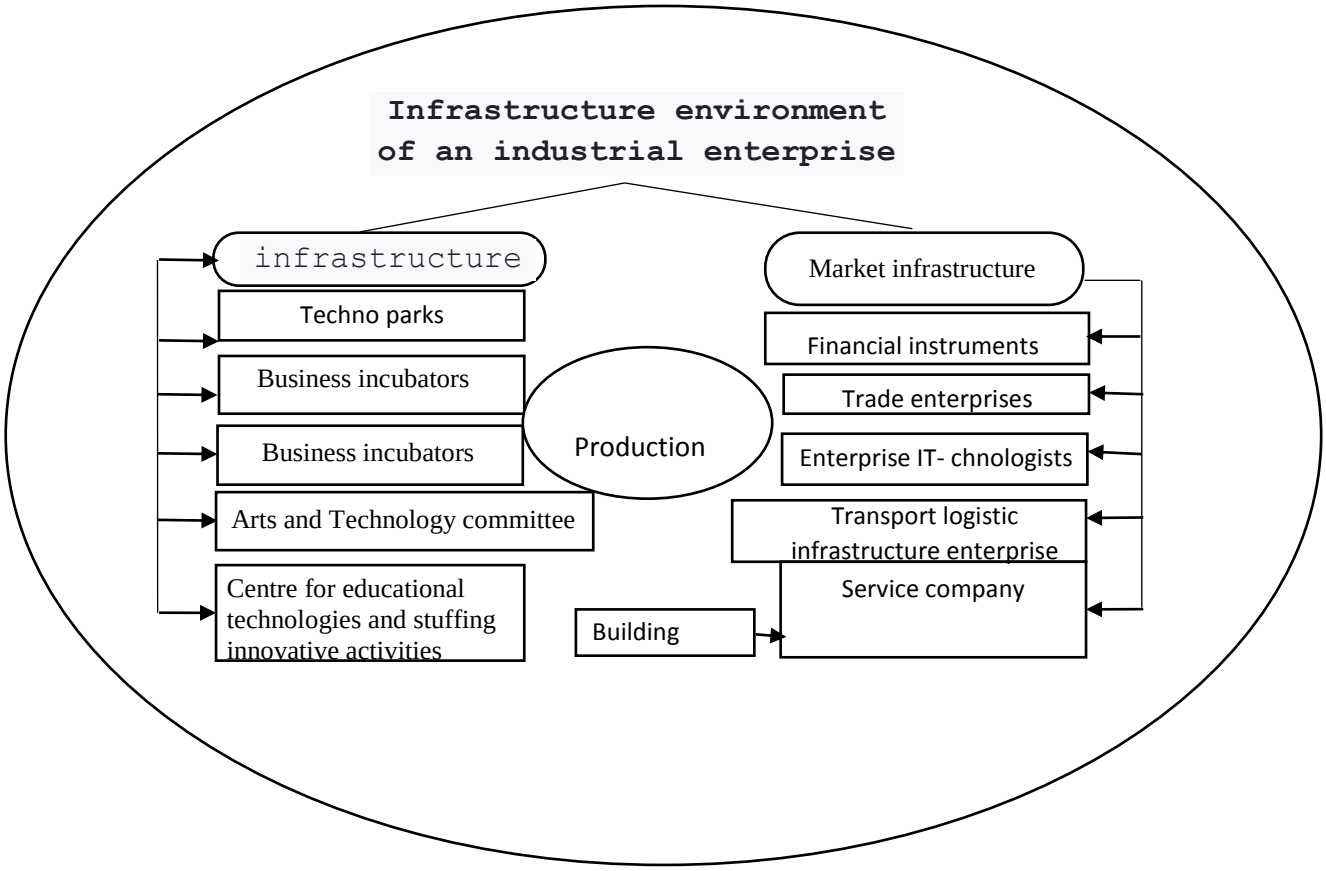

Figure 1 - Infrastructure environment of the industrial complex

Considering the fact that, within the framework of the modern concept of quality management, up to 95% of the enterprise's business processes are related to the sphere of circulation and only 5% are directly production, therefore, innovations in this area, which significantly affect the level of development of the industrial complex itself as a whole, can be highlighted in a separate category of innovations[3. 379-387].

Depending on the belonging to the structural elements of the production complex, all innovations are divided into industrial and infrastructural, thus, another type of innovation is distinguished - infrastructural innovations.

In accordance with research, infrastructural innovations of an industrial complex mean the introduction of new, more advanced business processes to the market, ensuring the smooth operation of the production complex, arising under the influence of market demand, creating conditions for the growth of added value and the effective development of the entire industrial complex.

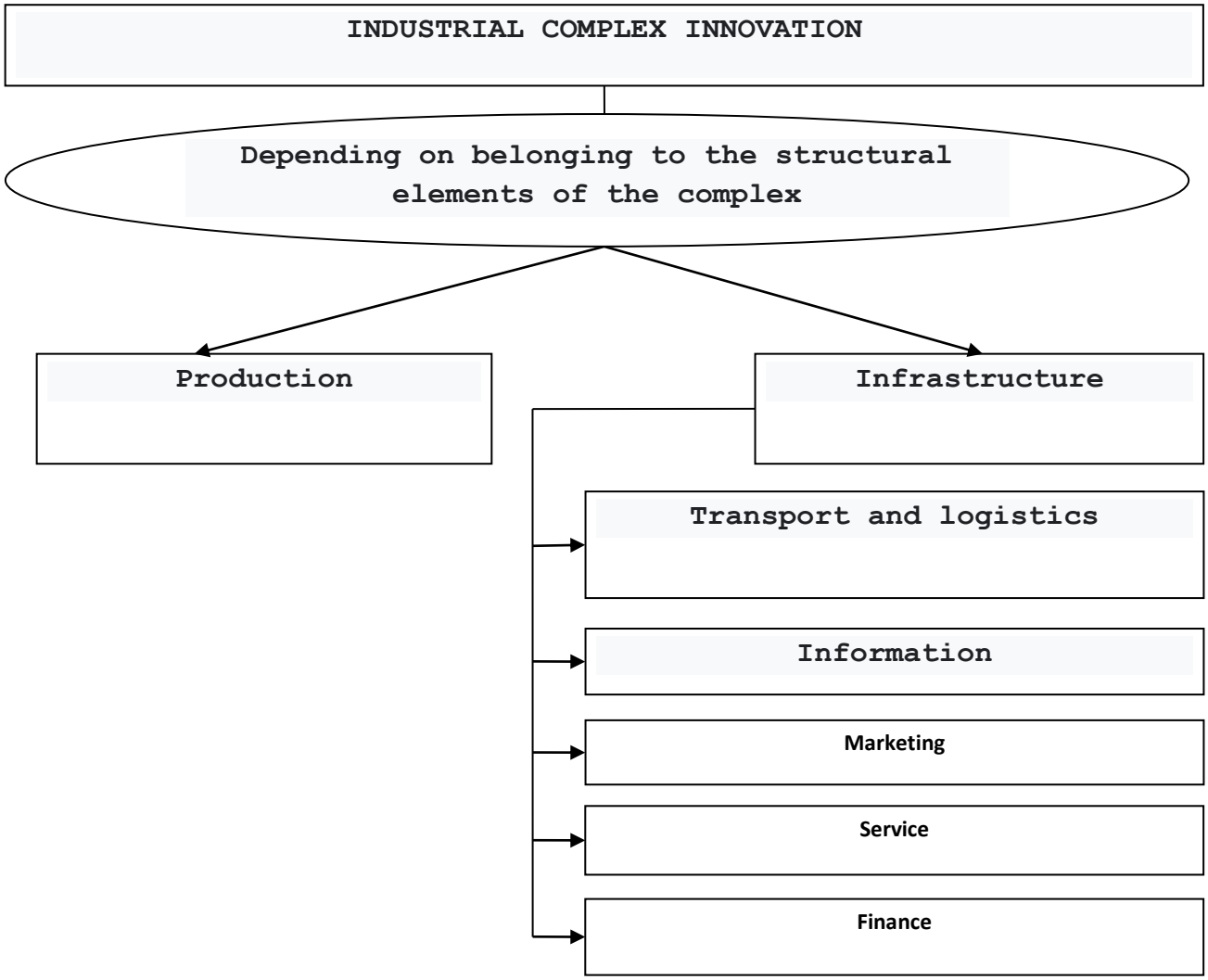

Figure 2 - Infrastructure innovations of the industrial complex

Innovative activity in the economy is explained by two hypotheses. According to the first hypothesis, this process is based on a technological impetus, in accordance with the other - the pressure of market demand. The technological push hypothesis is based on the idea of the autonomous development of science, which does not attach importance to the feedback between the economic environment and the direction of technological progress.

In support of the hypothesis of market demand pressure, American researchers distinguish between two kinds of factors that affect the efficiency of innovation: “demand push” is an economic incentive and “technology pull” is an awareness of new technical possibilities. The specific weight of each of these factors, according to their data, is 74% and 22% respectively [6. S. 88-89].

Thus, the allocation of infrastructure innovations as a separate type is appropriate because it is this type of innovation that most closely matches the hypothesis of market demand.

First, the development of the infrastructural environment of the industrial complex, based on the very concept, occurs in parallel with the development of technology and production capabilities of the complex.

Secondly, the development of the infrastructure environment of the industrial complex, and, consequently, the emergence of innovations in it, occurs largely under the pressure of market factors and depends on the state of the market at a particular point in time.

Thirdly, the emergence of infrastructural innovations is possible only if the improved business process generates added value, which subsequently creates an opportunity for the emergence of an independent innovative business in the infrastructure environment of an industrial complex.

Thus, we came to the conclusion that the implementation of innovations in the infrastructure environment makes it possible to reduce the risks associated with exiting an innovative project. For the most effective implementation of innovation in an infrastructure environment, a scientifically based innovation management mechanism is required [1.74-82].

The economic mechanism of management is understood as a set of economic management systems interconnected by a finite set of economic processes to achieve the set goals.

If we project this definition onto the economic mechanism for managing infrastructure innovations, then the economic mechanism for managing innovations in the infrastructure environment is a set of economic systems for managing innovations in business processes that ensure the uninterrupted operation of an industrial complex, interconnected by a finite set of economic processes for the purpose of increasing the efficiency of innovation.

In the course of the study, we examined the mechanism for managing innovative activities in market conditions, including a system of venture financing, a system for commercializing innovations, a system for financing R&D at industrial complexes, a system of interaction between enterprises and universities and research institutes.

As a result, we discovered a number of problem points associated with this mechanism:

• underdevelopment of the venture financing system;

• practical impossibility of the investor's exit from the project;

• lack of an intellectual property market

• formation of modern mechanisms of interaction between universities and industrial complexes in the field of R&D, at the initial stage of innovation development.

Thus, this economic mechanism for managing innovation is not adapted to the domestic conditions of the economy, and therefore in the article we proposed the author's mechanism for the industrial sector of the economy a mechanism for managing the innovative development of the infrastructure environment of an industrial enterprise (Figure 3).

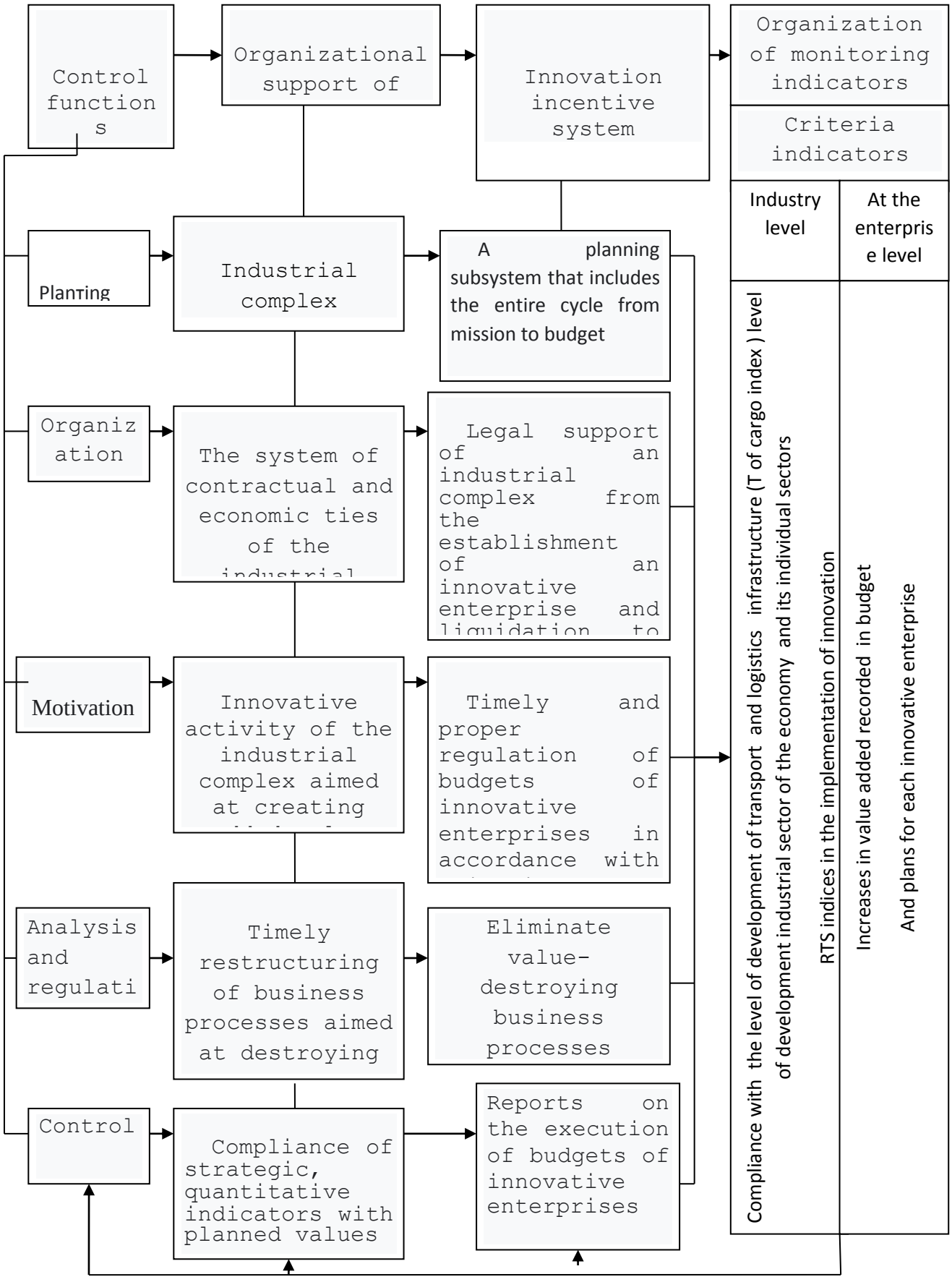

Figure 3 - The mechanism for managing the innovative development of the infrastructure environment of the industrial complex

For the practical implementation of the proposed mechanism, it is recommended to use the budgeting technology. It is budgeting as a management technology that allows you to implement all management functions, both on the scale of an individual enterprise and in its structural units, including those related to the infrastructure environment.

The interrelation of economic systems within the framework of the proposed mechanism is carried out on the basis of economic processes expressed in financial form, and the allocation of infrastructural innovations as a separate type allows us to generalize some of the features of their investment. Investing in innovative projects in the infrastructure environment of an industrial complex has its own characteristics. The main criterion for classifying a project as innovative rather than investment is its potential to generate significant amounts of added value, which increases the cost of the innovation complex [2. 35-38].

Figure-3 The main stages of the innovative development of business processes within the framework of the infrastructure innovation management mechanism

Stage name	Brief description of the innovative enterprise	Stages of investment in infrastructure innovation in the industrial complex
"Sowing"	Company formation, the presence of a project or business idea, the process of creating a management team, R&D and prototyping, marketing research. Business concept development	Company formation, the presence of a project or business idea, the process of creating a management team, R&D and prototyping, marketing research. Business concept development
Startup, initial	The company is formed. There are prototypes, the organization of serial production and work on bringing products to the market is underway. Start of production and marketing	Increase of innovative business processes in infrastructure. Funding comes from the current budgets of the industrial complex.
Early growth	Release and commercial sale of finished products. Gradual access to the “break-even point”. Growth in the volume of required working capital	The business processes of enterprises form a service that begins to be offered on the market. Financing comes from the current budgets of the industrial complex and proceeds from the sale of the service
Expansion	The company's occupation of certain positions in the market, access to sustainable profitability from the main business, expansion of production and sales, additional marketing research, an increase in fixed assets and the volume of working capital. The need for large investments in further development	The proceeds from the sale of the service form a profit sufficient to create an independent business Financing comes from the current budgets of the industrial complex and proceeds from the
Late stage, sustainable development	Strong positions in target markets. Sustainable profitability .	An independent enterprise is created in an infrastructure environment for the provision of services, which can be sold as a going concern

These processes occur with greater speed in the sphere of circulation, which is institutionally expressed by enterprises and structural divisions of enterprises related to the infrastructure environment. The relationship between the stages of innovative development and the specifics of financing infrastructure innovations in the industrial complex is shown in Table 3.

Conclusions. This approach allows you to create a system for financing innovative activities in the infrastructure environment of the industrial complex at the expense of the current budgets of the enterprise at the initial stages of the innovation process and by capitalizing economic profit with the subsequent sale of the innovative enterprise at the final stages of this process.

Thus, the financing of the investigated processes in the infrastructure of the industrial complex at the expense of the current budgets of the enterprise makes it possible to stimulate innovation without using venture funding sources, which is the closest to domestic reality.

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Resume: *Maqolada bozor iqtisodiyoti rivojlanishi sharoitida sanaot majmuasining infratuzilmaviy muhitini innovatsion rivojlantirish muammolari ko`rib chiqiladi. Shuningdek, sanaot majmuasidagi innovatsiyalarni boshqarishning iqtisodiy mexanizmi taklif qilindi.*

Резюм:. *В статье рассматривается проблемы инновационного развития промышленного комплекса его инфраструктурного окружения в условиях развития рыночной экономики. А также предложен экономический механизм управления инновациями в промышленном комплексе.*

Kalit so`zlar*: innovatsiya, infratuzilma, sanaot kompleksi, innovatsion infratuzilma, infratuzilmaviy innovatsiyalar.*

Ключевые слова: *инновация, инфраструктура, промышленный комплекс, инновационная инфраструктура, инфраструктурные инноваций.*

STATUS AND DIRECTIONS OF DEVELOPMENT OF FINANCIAL SUPPORT OF AGRICULTURE BY THE STATE

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Karakalpak State University named after Berdakh

Summary: *This paper studies the experience and reforms in Uzbekistan to make agriculture industry more efficient and competitive, uses the qualitative method and develops ways to improve the agriculture industry in Uzbekistan*

Keywords: *agriculture, competitive, efficient, government support, government finance, Uzbekistan*

Introduction.

Agriculture, which accounts for 32 percent of Uzbekistan's GDP and employs 27 percent of the working-age population, could be one of the key factors in the country's economic growth under effective public policy. Effective implementation of this policy will increase the volume of agricultural exports and incomes of farmers and agricultural organizations, and create thousands of new jobs in rural areas. Living standards will rise, a number of food products will become cheaper for the population, and the country will be able to ensure reliable food security.

However, barriers to transforming agriculture into a competitive sector that serves the interests of the private sector, the population and the state must be removed. The World Bank's analysis shows that there are currently five major challenges to achieving this goal. In this article, I have tried to show these problems and the possible measures that the government can take to address them.

Literature review.

Globalization's forces have profoundly altered agricultural production. On the one hand, agricultural production geared toward export has significantly increased access to agricultural commodities in inhospitable climates (e.g. the 3 billion bananas consumed in Canada every year [1]). These forces have accelerated the global expansion of export-oriented crop production. As a result, agricultural-directed foreign investment in exporting countries and food supply in importing countries have become inextricably linked. While theories of comparative advantage emphasize the benefits of this global supply chain, there are numerous complications. These include, but are not limited to, the negative impact of monocropping [2], which includes an increase in fertilizer and pesticide use in countries that rely on foreign investment [3], reliance on health- and environmentally-damaging crops such as tobacco [4], increased vulnerability to environmental and economic shocks [5], and the environmental consequences of extensive refrigeration and transportation emissions [6]. These issues at the crossroads of globalization and agricultural production are most acute in the supply of tobacco and crops used in health-damaging foods. Both categories of agricultural production are susceptible to the aforementioned risks, which are exacerbated by the concurrent process of attempting to control demand for these products and market instability.

The relationship between government policy and agricultural supply necessitates multiple levels of analysis. Government approaches to agricultural production are shaped by concepts of economic development, economic interests, the prescriptions and requirements of international agencies and regimes (such as the World Bank and the International Monetary Fund), local environmental conditions, and the legacies of national and sub-national institutions. Agriculture-related research, policy, and public health require consideration of all of these variables and efforts to piece together this puzzle into a comprehensive understanding of how these variables interact. This review examines national-level policies and programs as one piece of this puzzle, attempting to contextualize them within the broader international political economy. As a first step toward increased attention to agriculture and un/healthy commodities in relation to disease burden and

health more broadly, this review concentrates on the national level, recognizing that government policy is one of the more direct and tangible factors influencing agricultural production. The purpose of this scoping review is to identify lessons from government policies and programs that have attempted to shift agricultural production in some way, whether through policies to increase crop production, induce crop substitution, or redirect agricultural labor. We intend to do so by presenting a typology of policies used to influence agricultural production, a preliminary overview of the methods used to assess impact in this literature, and a comparison of this literature to the literature on food and tobacco supply. This information will serve as a springboard for conducting systematic research on how to shape the supply of healthier agricultural commodities and informing subsequent policy dialogue.

Methodology.

This paper uses the qualitative research method which analyzes the statistical data of government agencies, studies the cases of agriculture developed countries and develops proposals for using them in Uzbekistan.

Analysis and results.

1. It is necessary to balance the use of agricultural land.

In 2018, 70% of Uzbekistan's arable land was used for cotton and wheat. In recent years, some land has been excluded from cotton and wheat cultivation. However, in order to increase productivity in agricultural development, the additional land currently used for planting these two crops should be used later for other more useful crops, especially fruits and vegetables.

The World Bank estimates that reducing Uzbekistan's cotton and wheat acreage, for example by 50 percent, will increase agricultural output by 51 percent, agricultural employment by 16 percent, and water savings by 11 percent.

How soon should these lands be converted to more profitable crops? This process should be gradual and coordinated with changes in neighboring sectors. For example, the redistribution of land for growing fruits and vegetables should take place simultaneously with the improvement of agrologistics within the state and its customs borders. This, in turn, will ensure faster delivery of perishable fruits and vegetables from farmers to local consumers and the international market.

Otherwise, the profits from the processing of fruits and vegetables will be less than the profits from the sale of wheat and cotton.

2. It is necessary to increase the productivity of agricultural products.

The average yield of cotton, wheat, tomatoes, potatoes, milk and other products in Uzbekistan is much lower than their real potential. Increasing this figure will not only increase the profits and exports of farms and agro-organizations, but also provide an opportunity to use the areas currently occupied by wheat and cotton for more profitable crops.

Issues such as the lack of funding for research and services over the decades and the lack of services needed to develop the sector need to be addressed. In 2018, only 0.02% of Uzbekistan's gross agricultural output will be spent on agricultural research. At the same time, information and consulting services for local farmers are not available at all.

For comparison, middle-income countries with successful agriculture spend 1 percent of their gross agricultural output on agricultural research, while high-income countries spend an average of 2.5 percent.

3. Maximize export opportunities for agricultural development.

In 2018, Uzbekistan's agro-food exports amounted to just $ 1.3 billion, or $ 330 per hectare of arable land. By comparison, Vietnam exported $ 40 billion worth of agricultural products that year. The state's export earnings are $ 6,100 per hectare of productive land.

The government's economic reforms and measures to join the World Trade Organization will allow Uzbekistan to export agricultural products, especially fruits and vegetables, to many countries around the world.

Another key issue for the country's agriculture is the need to ensure the full participation of labor resources in the implementation of export opportunities. Today, 60 percent of fruits and

vegetables are grown on small farms and homesteads. However, their participation in the export-oriented production chain is still low.

Integration of agricultural cooperatives with these chains through state programs to encourage cooperation and cooperation of agricultural cooperatives with agribusiness and exporters would help to develop production capacity and increase the profitability of small farmers and private owners.

4. It is necessary to increase the efficiency of the use of budget funds to finance agriculture.

In 2018, public spending on agriculture in Uzbekistan amounted to 1.8% of GDP (in 2016 and 2017 it was 2% of GDP).

Other countries contribute a relatively small share of GDP to agriculture. Middle-income countries spend an average of 0.6 percent of GDP, while high-income countries in the Organization for Economic Cooperation and Development (OECD) spend 0.2 percent of GDP. In 2018, Kazakhstan spent 0.8% of GDP on agriculture, while Vietnam spent 0.5%. Even twenty years ago, when middle-income countries were poor, their agricultural budgets were 1.3 percent of GDP.

Despite high government spending, agriculture in Uzbekistan is still not very efficient. For example, in 2018, agriculture grew slightly above zero.

For example, most of the budget is now spent on electricity, which is used to irrigate the land, and on the management and operation of the irrigation system, which supplies water to cotton and wheat producers. At the same time, very little money is being spent on modernizing irrigation and land reclamation infrastructure. This means that more money will need to be allocated to modernize these infrastructure to serve the government's diversified agricultural needs in the short term.

In addition, many government programs that are critical to agricultural development have not always been fully funded. These programs include applied agricultural research, dissemination of knowledge, training in agricultural sciences, soil fertility, food security, veterinary and phytosanitary services, business support (agricultural cooperatives, clusters, effective partnerships), collection and analysis of statistical and market data, development of market infrastructure and agrologistics, environmental protection, policy analysis, training and monitoring of staff skills at any level. In the future, these programs may require large amounts of public funding.

5. The right of farmers to own land should be protected.

The land tenure rights of small farmers are legally protected. This is one of the main reasons why small farmers pay more for material and technical resources, although it is difficult to mechanize production on their small plots of land, and their productivity is higher than the average on large farms. .

However, for a number of reasons and at any time, large farmers may lose land leased from the state. This could be due to the reorganization of farms, non-compliance with the crop placement plan, or non-compliance with the state plan for cotton and grain harvests, which are the responsibility of local authorities.

The experience of China and Vietnam shows how to reform the approach to encouraging farmers. In these countries, the state procurement system has already been abolished, but this has not led to the collapse of agriculture. Here, the production of some strategic crops is stimulated by crop placement systems, direct budget payments to farmers and relevant government programs aimed at increasing productivity, improving product quality, as well as protecting them from pests and diseases. This approach is different from the existing state cotton and wheat production support systems in Uzbekistan.

Conclusion.

Of course, the list of tasks and challenges listed above may seem quite comprehensive. However, their solutions are fully viable, which is crucial for accelerating the modernization and competitiveness of agriculture, as well as for structural changes in the country's economy.

The National Agricultural Development Strategy for 2019-2030, which is currently being developed, should become a key document for the implementation of reforms in this area, which are

ready to be supported by the World Bank Group and other international partners. Its adoption and subsequent implementation by the government will pave the way for the above-mentioned challenges to become economic opportunities for the development of the country and the well-being of the people of Uzbekistan.

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Rezyume: *Ushbu maqola qishloq xo'jaligini yanada samarali va raqobatbardosh qilish uchun O'zbekistondagi tajriba va islohotlarni o'rganadi, sifatli usuldan foydalanadi va O'zbekiston qishloq xo'jaligi sanoatini yaxshilash yo'llarini ishlab chiqadi.*

Резюме: *В данной статье изучается опыт и реформы в Узбекистане, направленные на повышение эффективности и конкурентоспособности сельскохозяйственной отрасли, используется качественный метод и разрабатываются способы улучшения сельскохозяйственной отрасли в Узбекистане.*

Kalit so'zlar: *qishloq xo'jaligi, raqobatbardosh, samarali, davlat yordami, davlat moliyasi, O'zbekiston*

Ключевые слова: *сельское хозяйство, конкурентоспособное, эффективное, государственная поддержка, государственные финансы, Узбекистан.*

FINANCING OF INNOVATIVE PROJECTS OF ENTERPRISES IN UZBEKISTAN

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Summary: Innovative projects are designed to simplify and increase the transparency of grant and management procedures. At the same time, a proposal was made to re-establish the priority work of science and technology for the production and financing of targeted state scientific and technical programs, technological transfer and commercialization. This paper studies the features of financing innovative projects in Uzbekistan and develops conclusions according to the analysis

Keywords: innovation, innovative, innovative projects, financing, Uzbekistan.

Introduction.

Innovative projects are designed to simplify and increase the transparency of grant and management procedures. At the same time, a proposal was made to re-establish the priority work of science and technology for the production and financing of targeted state scientific and technical programs, technological transfer and commercialization.

In doing so, it attaches great importance to the satisfaction of its scientific developments in the management of the economic sector, in other words, its final consumer must clearly define it before conducting research. It is proposed to use the provision of access to management resources in the international investment market, as well as the subjects of innovative activities[1].

Simplification of bank loan procedures and related requirements. This will pave the way for an increase in the amount of loans allocated for similar innovative financing.

Venture financing will also be developed. This is largely due to the long-term risk to the share capital of the newly established high-tech promising companies in the production and manufacture of scientific products, which are not intended to benefit from the approximate increase in production. investments.

Unlike traditional investments, the venture financing model places great emphasis on merging and implementing each specific company. Profits are made at the expense of large returns on the largest investments. The activities of the administration are being compared with the new law.

This goal was initiated by the organization and development of venture (risk-based) financing with the participation of foreign organizations of venture capital. A proposal was made to take advantage of the opportunities created by state-owned joint-stock companies implementing innovative service programs. It is proposed to compare this activity with a special law.

Amendments to the laws "On microfinance" and "On the development of microcredit organizations" and join the procedure for their implementation. The news is aimed at financing projects in the field of innovation [2].

Measures are being taken to prioritize science and technology and to encourage sector participation in funding. A wide range of investors will be involved in the implementation of innovative projects. The share of funding for total internal expenditures on research and development is expected to increase.

Leading international innovation companies and multinational corporations are expected to be attracted as strategic investors.

A single database of innovative projects will be created, which will be updated regularly. A methodology for evaluating the effectiveness of various forms of project financing and potential investors will be developed.

The role of innovation in financing.

Funding plays an important role in innovation because it allows organizations to conduct research, master the technologies needed for inventions, as well as develop and commercialize

innovations. The use of external financing for innovation is an important challenge for firms. Firms can finance innovative activities using a variety of financing instruments offered by different types of financial intermediaries and investors. The use of external financial resources is often very difficult in the development and start-up phase of a business, as at this stage companies face major barriers to financing because they do not have the experience.

Literature review.

Numerous internet companies are now confronted with the challenge of overcoming financing constraints as the internet industry continues to grow in size and R&D investment increases. Inadequate financial resources may force internet companies to adjust their R&D investment and strategy, affecting their overall innovation realization [1]. Because innovation requires businesses to commit long-term and sufficient financial resources to research and development, understanding how these businesses finance their investment opportunities is a critical area of research in corporate finance. Numerous scholars [3–6] regard research and development efficiency and innovation performance as components of technological innovation efficiency. Although the logarithm of the sum of inventions and patents is frequently used to represent innovation performance, this method is not standardized [7, 8]. The low redeployability, non-exclusiveness, and liquidity of intangible capital is a characteristic of internet businesses. According to Qi Sun et al. [9], William Mann [10], Semyon Malamud and Francesca Zucchi [11], and other studies, debt financing innovation results in lower cash interest coverage ratios but increased net debt. Patents can be used to secure substantial debt financing. For equity financing, increasing equity is considered a form of financing innovation. This can be accomplished through equity pledges and employee stock ownership. To further standardize, more than half of the innovation frequencies of debt and equity financing of internet businesses during the observation period (2008–2017) are associated with financing innovative businesses.

Research methodology.

The article used high-quality analytical methods, expert assessment methods, scientific review, abstract-logical thinking, comparative analysis, as well as methods of induction and deduction. The study used statistical data from the Ministry of Economy and Industry of the Republic of Uzbekistan, the State Committee on Statistics of the Republic of Uzbekistan. The paper used secondary sources of information.

Analysis and results.

Significant institutional changes have occurred in Uzbekistan's innovation sector over the last decade. Gradually, a new public administration structure and legislative foundation are emerging, ensuring the continued viability of the entire innovation sector in market conditions[3]. Among the most significant institutional innovations are the following: the introduction of elements of competitive financing for scientific and innovative projects via a system of various funds, including venture capital funds; the provision of certain tax benefits for conducting research activities; and reforms in the area of intellectual property rights protection. Uzbekistan's new innovative business is guided by methods for applying scientific knowledge to economic activity that have been proven in global economic practice. At the moment, the development of science-intensive and technically complex industries is characterized by a high degree of globalization, the rapid spread of technological innovations via global trade channels and transnational corporations' global production and marketing networks. The organization of high-tech industries, first for export and then for the domestic market, is the primary factor driving many countries' economic growth. The current state of the world economy demonstrates that countries that develop an innovative economy actively and purposefully gain a significant competitive advantage. The essence of this superiority is determined by the fact that the intellectual products they produce (research and development results) are in high demand from states that specialize in material goods production. In Uzbekistan, 2018 has been designated as the year of active entrepreneurship, innovative ideas, and technologies. The primary objective is to provide comprehensive support to entrepreneurs, particularly in terms of facilitating the import and introduction of advanced technologies and

scientific advances into production. Along with natural and labor resources, the effectiveness of Uzbekistan's national economy is determined by the country's scientific and technological potential [4].

The economy's transition to a new qualitative state has increased the importance of innovation and the development of high-tech industries, which is ultimately the most critical factor in resolving the economic crisis and establishing the conditions for economic growth. In the last year, the country has established 12 free economic zones and 45 industrial zones, which have aided in the development of the republic's regions. Economic innovation is the process of creating and disseminating innovations in material production. It serves as a bridge between the scientific and industrial worlds, through which the technical and economic needs of society are met. The innovation sphere is distinguished from the scientific and production spheres by the presence of a distinct marketing function, distinct financing, lending, and regulatory mechanisms, and, most significantly, a distinct system of incentive for innovative activity. Finally, these methods are predetermined by the specifics of innovative labor and the circulation of funds, with the goal of generating economic revenue and developing an innovative product. Measures to develop and support scientific and technical potential are being developed in the context of Uzbekistan's economic reforms. For the country, the creative application of developed-country experience in implementing measures of state support for innovative processes in the economy, which will eventually enable the establishment of a domestic system to stimulate innovation, has taken on new significance [5].

At the moment, only the state is capable of providing the necessary investment through long- and short-term state programs. Innovations can be related to engineering and technology as well as to organizational structures for production and management. Each of them is interconnected and represents a significant step forward in the development of productive forces, thereby increasing production efficiency. The technical development of an enterprise is the process of establishing and improving the enterprise's technical and technological foundation with the goal of improving the enterprise's economic performance as a result of technological and technological innovations. Each enterprise's innovative activity is targeted. To begin, to increase the competitiveness of products (services). According to competition law, the world is objectively improving the quality of products (services) and lowering their unit price, which reflects the price of a product in relation to its beneficial effect. The incentive for innovation is the driving force behind competition. It is only through innovation that it is possible to improve the quality of products (services), increase the beneficial effect of the product, and thus achieve the product's competitive advantage. As a result, ensuring the competitiveness of goods requires an innovative, entrepreneurial mindset centered on the search for and implementation of innovations. An innovative strategy's central premise is the moral aging of products and technology. Enterprises should conduct certification of manufactured products, technologies, equipment, and jobs every three years, as well as market and distribution channel analysis of goods. Innovation is a labor of love that necessitates knowledge, ingenuity, and talent. It is worth noting that innovators typically specialize in a single field, as successful innovation requires enormous amounts of concentrated effort. Innovation should always be driven by the market, by its requirements. To engage in innovative activities, an enterprise's structure and mood must contribute to the creation of an entrepreneurial atmosphere, an atmosphere that views the novel as an opportunity. In this case, it is necessary to consider a number of critical points. The primary organizational principle guiding innovation is to form a team of the best employees who are exempt from their current jobs. As history demonstrates, every attempt to convert an existing unit into a carrier for an innovative project fails. Additionally, this conclusion holds true for both large and small businesses [6].

The fact is that keeping production running is already a significant task for those involved. As a result, they practically have no time left to establish a new one, and existing units, regardless of their function, are essentially limited to expanding and modernizing production. Entrepreneurial and innovative activity does not have to be continuous, especially in small businesses, where such a

statement of the case is frequently impossible. However, an employee must be appointed who is personally accountable for the success of innovations. He should be accountable for the timely identification and replacement of obsolete products, equipment, and technology, for conducting a comprehensive analysis of production and business activities (a business's radiograph), and for developing innovative measures [7].

The employee responsible for innovative activities should hold a position of authority within the organization. It is necessary to safeguard the innovative unit from external forces. Investments in the development of innovations should not be included in routine return on investment analyses until new products (services) are approved for sale. Profitability from the innovation project is significantly different than profit from the production of debugged products. For a long period of time, innovative endeavors can generate neither profit nor growth, but can only consume resources. Then, for a long period of time, the innovation should grow rapidly and return at least fifty times the funds invested in its development; otherwise, it will be considered unsuccessful. Although the innovation begins small, the end result should be large. The business must be managed in such a way that it fosters an attitude toward novelty, not as a threat, but as an opportunity [8].

Change resistance is rooted in fear of the unknown. Each employee should understand that innovation is the most effective means of preserving and strengthening their enterprise. It is critical to understand that innovation ensures each employee's employment and well-being. The organization of innovative activities around these principles will enable the business to grow and succeed. The management of an enterprise's technical development should include the following: setting goals and establishing their priorities; selecting technical development areas; evaluating the effectiveness of potential solutions; developing a technical development program; adjusting the plan and monitoring the implementation of measures provided for in the plan. At the enterprise level, organizational progress is measured by the enhancement of existing methods and forms of production and labor organization, which are critical components of the economic mechanism [9].

Additionally, the major contemporary trends in organizational progress include an acceleration of the development of individual social forms of production organization (deconcentration, cooperation, conversion, and diversification), a strengthening of labor motivation, and the development of a collective form of organization and remuneration. Technological innovation serves as a barometer of economic impact. It reflects private performance indicators such as labor productivity, capital productivity, material and energy intensity, as well as indicators of production technology and product quality. The economic effect of innovation is defined as the excess of the value of the results over the value of the total cost of resources over the entire period of measure implementation. When calculating the economic impact, it is critical to adhere to a national economic approach, which means that results should be considered not only at the location of technological innovations, but also in related industries and their impact on the country's final indicators of economic development. The on-farm (commercial) economic impact is then calculated for each stage of the reproduction cycle: research and development (R&D), development, production, and use of innovations. It enables you to assess the efficacy of specific innovations in the context of individual research organizations, manufacturing enterprises, and consumer enterprises. The term "costs" refers to the total amount of resources expended to achieve an effect (or their individual types). On a macroeconomic level, the cost is a combination of capital investments, revolving funds, and living labor (wages). Costs manifest themselves in the form of cost or production assets for an industry, association, or enterprise. When evaluating the effectiveness of organizational innovations, they are classified into two categories: those that require certain additional concurrent costs (capital investments) and those that do not [10].

Conclusion.

As a result, Uzbekistan's modern intellectual potential may serve as the foundation for its revival if the developments reach industry and reach the market. The country will be able to receive amounts comparable to the country's budget through the sale of licenses, development, fulfillment of external orders, and implementation of joint international innovation projects, which will result

in the economy's survival, the formation of a middle class, and the elimination of unemployment. The weak links in our chain of development – production – market are not so much financial as they are a lack of technological management skills, i.e. technological innovation management. We require trained specialists who are familiar with the specifics of the innovative product on the market and are capable of implementing it[11]. Without improving labor organization and training aimed at maximizing the creative potential of the team, reorienting all of the enterprise's work toward new competitive types of goods and services, and conquering new markets for products in contemporary conditions, it is impossible to reorient all of the enterprise's work toward new competitive types of goods and services, or conquest of new markets for products.

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Rezyume: *Innovatsion loyihalar grantlar va boshqaruv tartiblarini soddalashtirish va shaffofligini oshirishga mo'ljallangan. Shu bilan birga, maqsadli davlat ilmiy-texnik dasturlarini ishlab chiqarish va moliyalashtirish, texnologik transfer va tijoratlashtirish uchun fan va texnologiyalarning ustuvor ishlarini tiklash bo'yicha taklif kiritildi. Ushbu maqola O'zbekistondagi innovatsion loyihalarni moliyalashtirish xususiyatlarini o'rganadi va tahlillarga ko'ra xulosalar ishlab chiqadi*

Резюме: *Инновационные проекты призваны упростить и повысить прозрачность грантовых и управленческих процедур. В то же время было внесено предложение восстановить приоритетную работу науки и технологий по производству и финансированию целевых государственных научно-технических программ, трансферу технологий и коммерциализации. В статье исследуются особенности финансирования инновационных проектов в Узбекистане и делаются выводы по результатам анализа.*

Kalit so'zlar: *innovatsion, innovatsion, innovatsion loyihalar, moliyalashtirish, O'zbekiston.*

Ключевые слова: *инновации, инновационные, инновационные проекты, финансирование, Узбекистан.*

UDK: 930.2

SOME PROBLEMS OF THE JUDICIAL ADMINISTRATION IN THE AMU DARYA DEPARTMENT IN THE LATE 19TH AND EARLY 20TH CENTURIES

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Summary. *The article highlights the court cases of the Amu Darya Department of the Turkestan General Governorship of the late 19th and early 20th centuries, as well as the functioning and maintenance of documentation. It is confirmed by the fact that during that period between the colonialists and local authorities there were various disagreements, which in turn led to gross violations of human rights.*

Keywords: *Amudarya department, slavery, people's courts, muftis, aglam, shariat, adat.*

After the conquest of the region, the Russian administration, trying not to disrupt the way of life of the local Muslim peoples, retained, with minor changes, the court of the Qazis according to Sharia (Muslim religious law) for sedentary peoples and the court of biys according to adat (custom) for nomads. However, the imperfection of these vessels soon became clear. Kazii and biys (people's judges since 1886) took bribes everywhere. Things dragged on for months, sometimes years. Judges, especially biys, tied by strong family ties, made decisions in favor of their fellow tribesmen. In addition, the judges did not know much about Muslim legislation, adat, as well as Russian judicial legislation. The biys were especially unprepared. Many of them were illiterate and ignorant. The Muslim population constantly complained about the decisions of the people's judges, but did not file appeals to a higher Russian court, fearing revenge. The Russian administration, not having a sufficient number of officials in general, and especially with knowledge of local languages, almost did not check the decisions of the people's judges.

Many representatives of the Russian public, having got acquainted with the Turkestan People's Court, wrote about the need to abolish it. N. Dingelstedt, a regional researcher who has thoroughly studied the system of legal proceedings in Turkestan, wrote that with all the mass of shortcomings, the people's court has one advantage - it costs the administration nothing.

There were also shortcomings in the Russian courts of the Turkestan Territory: uyezd (peace from 1886) and district (regional). Cases were resolved slowly. The judges did not have the appropriate education. So in 1882 there were 17 uyezd judges in the region, of which only 10 had higher or secondary education. Of the rest, 4 did not study anywhere, but had judicial practice, and 3 did not correspond to the position held either in educational or in service qualifications.

Administrative interference was a serious violation in the activities of the Turkestan judicial authorities. So the circular of the governor-general of 30.7.1868 removed the military governors of the regions, their assistants, the heads of the departments of the military district administration, the governor of the chancellery and the heads of the counties from the jurisdiction of the district courts. All complaints against these persons, both criminal and civil, were ordered to be resolved by administrative procedure. And by a circular dated 2/29/1880, the governor-general granted military governors the right to reprimand and reprimand judicial investigators and county judges for omissions in service, which was a gross violation of the general charter of provincial institutions.

As you know, starting in 1873, the right-bank areas of the Amu Darya (present-day Karakalpakstan) were annexed to the Russian Empire, and the left-bank areas remained part of the Khiva Khanate. The highest judicial power in the Khiva Khanate was exercised by the khan. Sometimes he himself dealt with criminal cases concerning actions that encroached on the political regime. In the Khiva Khanate, the judicial system for indigenous nationalities remained basically the same until the October 1917 coup. At the same time, for Russians and representatives of other, non-indigenous nationalities, the tsarist reform of 1864 introduced courts in which the penalties

were milder. In the right-bank part of the Khiva Khanate annexed to Russia, their own courts were created. Officially, it became part of the Russian Empire as the Amu Darya Department of the Turkestan General Government.

On August 26, 1873, the Governor-General of the Turkestan Territory approved the "Temporary Regulation on the Administration of the Amu Darya District", according to which the old Kazi and Biysk courts were preserved, only their composition was updated and the name changed - from now on they began to be called "people's courts". A dualism of the judicial system arose, that is, in parallel with the royal courts, the courts of the kazis and biys operated. Sharia and adat were adapted to the needs of tsarism. The verdicts of the "people's courts" in criminal cases were subject to the obligatory approval of the military governor. The latter confirmed and dismissed the "people's" judges (kazievs and biys) at his own discretion. As a result, practically all administrative and judicial power in the region was concentrated in the hands of the military governor. In fact, it was he who performed the functions of the highest cassation instance (circular of November 3, 1878). In the first years after the creation of the Amudarya department, the tsarist authorities organized: first, two district courts - in the Shurakhan and Chimbay districts; secondly, the magistrates' court of the district with subordination to the Tashkent regional government and the representative of the Samarkand military-judicial commission; third, "people's courts" The people's courts consisted of two instances; individual people's judges and congresses of people's judges. People's judges were elected for three years by a congress of volost electives; for the sedentary population, one court for each volost, and for the nomads, one for each aul. No educational qualification was required from candidates for the posts of people's judges [1, 34].

The colonialist policy of the Russian autocracy as a whole coincided with the interests of local rulers. Therefore, the tsarist government in every possible way supported the local elite.

In 1876, elections were held for the positions of volost governors and their assistants, as well as aksakals, where positions were occupied exclusively by biys and atalyks or their sons, and the positions of “people's” judges (kazis and biys) were occupied by former biys and kazis or their relatives. After the expiration of the term of office of the "people's" judges of the first composition since 1880, on the recommendation of the organizational commission of the Amudarya department, created in 1875, the number of "people's" courts was increased. Now, in areas with a sedentary population (Shurakhani district), such courts were created in each volost, and on a territory with a semi-nomadic population (Chimbay district) in each settlement there was one judge (biy), in large settlements and in the center of the district (Chimbay) the courts of the kazievs also operated. According to the occupation of the population, the Amudarya department was divided into several judicial districts. In 1897, in the settled areas there were 15 judges and 2 congresses of people's judges, and in nomadic and semi-nomadic regions there were 7 regional, 24 aul and 2 congresses of people's judges. Since the judges did not receive remuneration from the treasury for their work, they were allowed to receive payment from the parties according to custom.

Approved in 1886. The regulation on the administration of the Turkestan Territory, having undergone some changes and additions, up to the October coup had the force of law. According to this “Regulation”, two judicial systems operated on the territory of Turkestan: one according to all-Russian laws, the other according to Sharia and adat [2,170]. The first system consisted of justices of the peace, regional courts and the Senate. However, on July 2, 1898, the tsar signed the law "On the transformation of the judicial department in Turkestan and the Steppe region", according to which the judicial system in the Turkestan region was rebuilt in accordance with the general imperial judicial statutes of 1864. According to these statutes, the following instances began to function in Central Asia: courts, district courts (instead of regional), judicial chambers, military courts.

The second system was made up of all the same courts for the local population: Kazi and Biysk, which served the local indigenous population. Sharia as a general rule remained an unshakable basis in the activities of the Qazi courts.

According to the "Regulations" of 1867, the Kazi courts were still intended for the sedentary population and conducted their activities. The changes introduced by this provision boiled down to the fact that the kazis were “elected by the representatives of the people” - that is, Pentecostals - heads of mahallas. In essence, the election of judges meant only the consolidation of the already existing method of forming local courts. The only new thing in the “Regulations” of 1867 was that it abolished the right of the Qazis to use certain types of corporal punishment, including self-mutilation. From now on, they could apply a fine, imprisonment, exile to Siberia and forced labor.
It should be emphasized that for the commission of most crimes, individuals of the indigenous population were prosecuted only under Russian law, and cases of these crimes could also be considered in the imperial courts. According to Art. 142 "Regulations" of 1867, the jurisdiction of the general imperial courts was also subject to cases of crimes committed by representatives of the local population in the territory where the Russian population lived. Kazi courts could not consider cases of malfeasance committed by officials from the local population, which ensured official supervision over them. The jurisdiction in civil cases was not strictly defined. The indigenous population was given the right in all cases, with the mutual consent of the parties, to appeal directly to the royal court, which in these cases rendered decisions not only according to the general laws of the empire, but also taking into account local customs.

The form of legal proceedings in the regions that were part of the Turkestan General Government has also undergone some changes over time. As a result, the procedure for considering cases in regional courts began to differ from the procedure adopted in the courts of the Bukhara Emirate or the Khiva Khanate. The Congress of Judges was the second instance, which considered cases in the order of a curtailed appeal, reminiscent of a cassation. He passed under the direct supervision of the district chief - the tsarist military official. It was attended by all the judges of the volosts (at least 2/3 of the kazis of the given district). At the same time, the congress rarely canceled judgments and decisions of judges, taking care of their authority, stability of judicial acts and their own peace of mind. During the secondary consideration of cases, it was allowed to increase the punishment in comparison with the initial one, which led to a decrease in the number of complaints brought and the upholding of decisions and sentences.
A man from among the local population could be elected Kaziy. There was a minimum age limit, i.e. reaching the age of 25. Although the "Regulations" did not formally establish either property or educational qualifications, however, when the candidate was elected to this position, the property status of the candidate was of decisive importance.

When deciding cases by Kazi courts, muftis and aglamas played a very important role. Kaziy, deciding cases on the basis of the above-mentioned rivoyats, applied them according to the conclusion of the aglamov - a kind of legal advisers.

The form of the process in the Kazi courts was simplified. The minutes of the court session were not kept. When the decision was made, the audience was removed from the "hall" of the court (the room in the house of the qaziy) and only the qadiy, the mufti and the aglam remained in the room. Coming to a definite conclusion, the kaziy passed a decree, which was recorded by the Mirzas in the "daftar" - a journal. After that, the parties were invited to the room and the resolution was read to them.

The adoption of the "Regulations" of 1886 and the Law of 1898, according to which the Judicial Charters of the Russian Empire of 1864 entered into force on the territory of Turkestan, to a certain extent served as a step forward in the organization and implementation of legal proceedings in the region. At the same time, the judicial districts were territorially disunited, their socio-economic conditions were not taken into account, the people's courts in reality were entirely dependent on the district justices of the peace.
After the first Russian revolution of 1905-1907. the elections were replaced by judicial appointments. There was not a single professional lawyer at the courts. The council of attorneys at law in Turkestan was created only in 1916 [3,8].

With the help of the two magistrates' courts operating on the territory of the Amu Darya department (in Shurakhan and Chimbay), as well as representatives of the Samarkand district and military courts, the tsarist administration mercilessly dealt with persons unwanted by it, using the death penalty, imprisonment for long terms and exile to Siberia. These measures were especially widely used in the fight against the local population and people of progressive thinking who opposed the tsarist officials. So, in 1880-1991. unrest of the masses was noted in the Sheikhabbazvali and Biybazar volosts of the Shurakhan area, headed by B. Utuzov. The tsarist justice brutally dealt with the rebels. June 29, 1891 The Samarkand military court sentenced B. Utuzov and his associates S. Nepesov and V. Ishlambetov to death by hanging. Ordinary participants in the uprising were sentenced to long terms of imprisonment or exile [4,155].

The same brutal measures were taken during the suppression of the popular uprisings of 1916 in Chimbay, in the Turtkul and Sarybi volosts of the Shurakhan area. By the Tsar's decree of July 17, 1916, martial law was declared in the Turkestan Territory, after which the repressions became even more brutal. At the same time, it should be noted that for all the cruelty of the colonial regime and its typical judicial practice, the annexation of the right-bank part of the Amu Darya to Russia, in particular, the protectorate of the latter over the Khiva Khanate, had some positive moments. Positive shifts were noted in the judicial system and legal proceedings. Thus, the very proclamation of the principle of electiveness of the Qazi and Biysk courts was a positive development, despite the fact that this election was observed only formally. The introduction of a procedure for cassation appeal against decisions and sentences of courts was also progressive, as well as permission for the local population in all cases in case of a mutual desire of the parties to appeal to a Russian court.

During this period, many legal norms of the Sharia were revised, and some types of punishments applied by them, distinguished by particular ferocity (death penalty by burying alive in the ground, stoning, cutting off hands, feet, ears) were destroyed. Kun, barymta, slavery and the slave trade were also abolished [5,48-49]. This is the general characteristic of the judicial system on the territory of the Amu Darya department during the colonial period.

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Резюме: *Maqolada XIX asr oxiri va XX asr boshidagi Turkiston general gubernatorligiga qarashli Amudaryo bulimidagi sud ishlarinin' yuritilishi, ularnin' ish olib borish funkciyalari yoritiladi. Usha davrda kolonizatorlar va mahalliy hukumdorlar tomonidan nizolarni u'zlarining qarashlaridan kelip shiqqon holda olib borganligi, inson huquqlari qupol ravishda buzulganligi hujjatlar orqali ku'rsatiladi.*

Резюме: *В статье освещены судебные дела Амударьинского отдела Туркестанского генерал-губернаторства конца XIX и начала XX века, а также функционирования и ведение документации. Подтверждается, тем что в тот период между колонизаторы и местные органы власти были различные разногласия которые в свою очередь привели к грубо нарушению прав человека.*

Калит сўзлар: *Amudaryo bu'limi, qullik, xalq sudi, muftiy, alam, shariyat, adat.*

Ключевые слова: *Амударьинский отдел, рабство, народные суды, муфтии, аглам, шариат, адат.*

THE SIGNIFICANCE OF THE CLUSTER SYSTEM IN ASSURING THE SUSTAINABILITY OF BUILDING MATERIALS INDUSTRIAL ENTERPRISES OF THE REPUBLIC OF KARAKALPAKSTAN

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Summary: *The article analyses the influence of external and internal factors on the development of the building materials industry of the Republic of Karakalpakstan. A cluster system has been proposed to ensure the sustainable development of the sector under study.*

Key words: *industry of building materials, sustainable development, cluster, innovation, synergistic Result.*

The Republic of Uzbekistan has a convenient geographical location. These dozens of different minerals are distinguished by the presence of subsoil rich in identified minerals. The country has rich resources of non-ferrous metals and fuel and energy, first of all, natural gas. Uzbekistan has rich deposits of marble, granite, soda ash and non-metallic materials, which form the raw material potential of the construction materials industry and are the basis for the effective development of the national economy. The existing forecasts indicate the existence of large-scale mineral deposits with high characteristics.

In the investment construction complex, the building materials industry occupies a key position. The level of convenience of construction, its quality and, in general, the efficiency of the investment process depends on the level of development of the industry. The building materials industry of Uzbekistan occupies a worthy place among other sectors of the economy. The industry produces thousands of products, as well as a wide range of construction materials, construction products and structures.

Undoubtedly, the construction period, its quality and economic results depend on the level of supply of construction materials with quality construction materials, timely delivery and price of these materials. For this reason, the sustainable development of the construction materials industry, which is a "service" in relation to construction, is of paramount importance today.

Ensuring the sustainable development of enterprises is carried out taking into account the impact of various factors. External and internal factors can influence the sustainable development of industrial enterprises.

External sustainability is determined by the stability of the economic environment in which the enterprise operates and is ensured by the state regulation of the formation of a market environment. In addition, the external stability of the enterprise is determined by its competitiveness and market share, the level of business activity, the ability to provide it with resources. This will help to increase the ability of the enterprise to introduce new methods and technologies of labor organization, social protection of workers and the welfare of society.

In order to achieve internal stability, it is necessary to implement the principle of rapid response to changes in various factors.

These internal factors of enterprise stability are as follows:

- connection of enterprise to the field;
- amount of own capital;
- composition of products sold, its share in total demand for solvency;
- the volume, composition and dynamics of expenditures in comparison with cash income;
- the state of financial resources and property, including reserves and reserves, their structure and composition;
- the degree of progress of the production process in the enterprise.

The analysis of modern developments shows that the formation and management of a group of business entities in a single sector ensures the sustainable development of a cluster approach, in particular, the formation of an innovative production cluster.

A number of studies show that the increase in the level of cluster development, based on data from the European Union, has a positive impact on the socio-economic development of the regions.

It should be noted that the use of cluster approach in global operations is often seen as one of the most effective ways to develop areas, as well as sectors of the economy. As a positive phenomenon, it should be noted that clusters are used in internal operations in both regional and network versions.

In the broadest sense, clusters are an integrated group of interconnected organizations that are: suppliers of products, components, and specialized services; infrastructure; research institutes; are complementary and separate companies as well as higher education institutions and other organizations that increase the competitive advantage of the cluster.

Undoubtedly, in order to become a cluster, a group of interconnected companies and related organizations must work in a certain area, they must be separated by a common activity and complement each other. The level of development and importance of the sources of competitive advantage determine the stages of development of competition, as well as models of economic growth of states, regions and enterprises.

From the point of view of a systematic approach, the cluster can be defined as a single organizational structure, the elements of which are interconnected and work for a specific purpose. It should be noted that clusters are very similar to well-known holdings, but unlike them, the elements of the cluster have different uses, and in holdings they are sufficiently tightly connected.

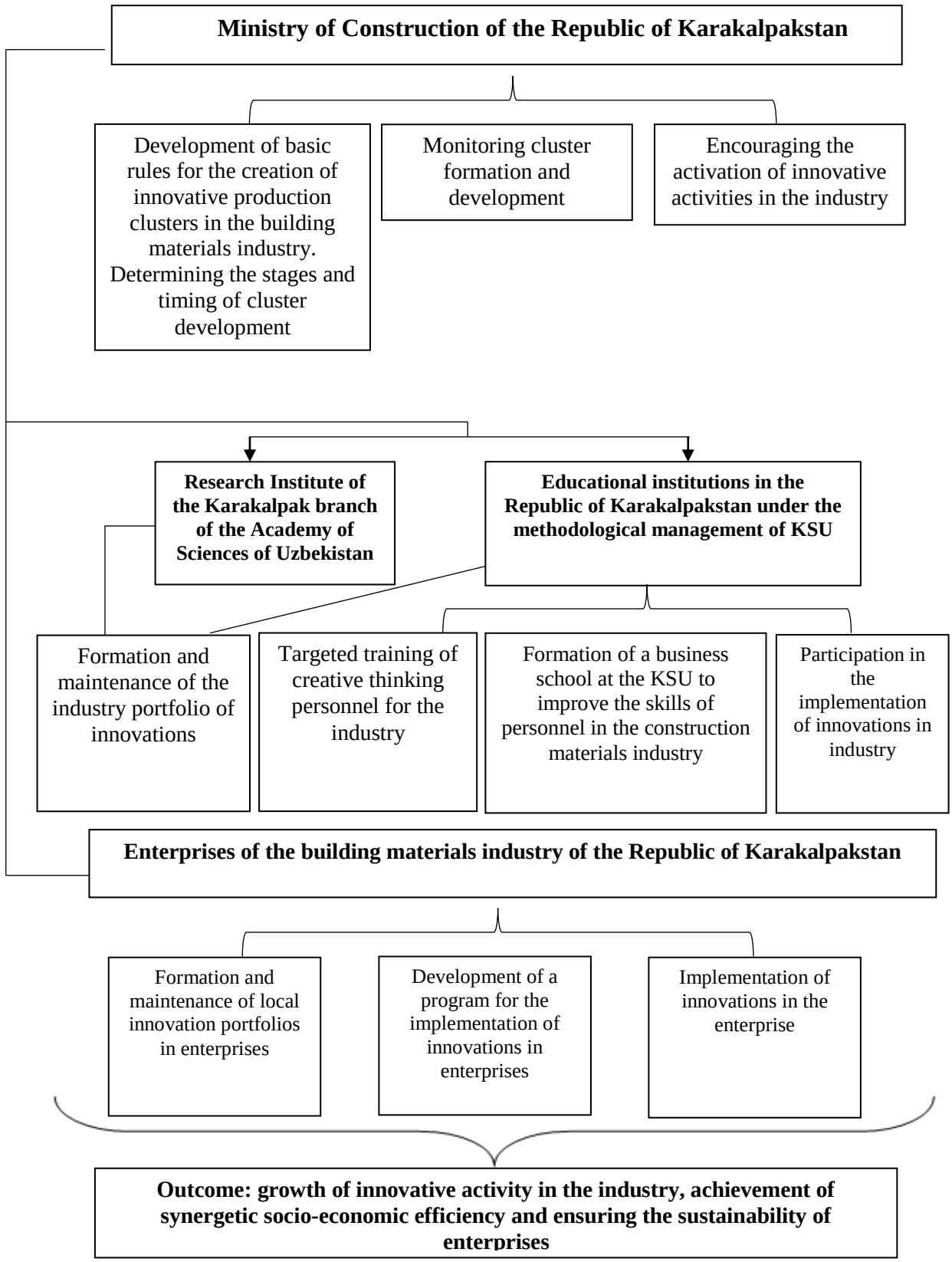
It was noted that the use of clusters for innovative development in foreign operations is effective. Such development and innovation clusters should, as a rule, include manufacturing enterprises and scientific organizations. Given the role of intellectual competence development, it makes sense to include scientific and educational institutions in such groups.

The Republic of Karakalpakstan has objective conditions for the creation of a cluster of production, innovation and education for the sustainable development of the construction materials industry, which, in our opinion, should include::

- Ministry of Construction of the Republic of Karakalpakstan;
- Karakalpak branch of the Academy of Sciences of Uzbekistan Scientific Research Institute, educational institutions (higher and secondary special educational institutions in the field of construction)
- design and survey and design organizations;
- enterprises of the building materials, products and structures industry;
- other enterprises and organizations providing services to industrial enterprises, including transport organizations, machinery and equipment repair enterprises, raw material suppliers and others.

In the above list of future cluster organizations, each group has its own tasks, goals and priorities. The point is to transform them from competitive organizations and enterprises into partner enterprises and organizations by creating a favorable environment within the cluster.

Of course, in order to ensure these changes, it is necessary to identify additional additional organizational measures, new management tasks within the cluster, distribution and redistribution tasks, as well as the necessary methods of influencing, including incentives. In addition, the implementation of these preparations should be based on a systematic approach, taking into account the objectives of the cluster, and without compromising the interests of each group in the cluster. (Picture 1)



Picture 1. The scheme of formation and development of the innovation-production cluster in the building materials industry of the Republic of Karakalpakstan[1]

[1] Author`s work.

In our opinion, the most important tasks of the Ministry of Construction of the Republic of Karakalpakstan should be the creation of organizational documents for the distribution of responsibilities among the members of the cluster, monitoring the development of the cluster and the promotion of innovation.

Tasks to form and support a sectoral portfolio of innovations should be carried out by the Karakalpak branch of the Academy of Sciences of Uzbekistan Research Institute and leading officials of Karakalpak State University. Under the methodical management of KSU, educational institutions in the Republic of Karakalpakstan provide training and retraining of personnel, participate in the implementation of innovations in enterprises.

The task of enterprises in the field is to form local innovation portfolios, develop guidelines for their implementation and introduce innovations in the enterprise.

The analysis shows that the innovative development of the industry is unsystematic. At the same time, on the one hand, the industry itself has a certain competence (the presence of many small enterprises, their underdeveloped material and technical base), but does not adequately respond to modern problems, on the other hand, the industry needs to form an innovation cluster based on the following trends:

- ensuring the hierarchical structure of the cluster (forecasting);
- consistent implementation of cluster formation processes using the "simple to complex" rule;
- clusters take into account all stages of the life cycle, start the formation of the initial cluster (first stage);
- if all levels of the cluster meet the requirements of this stage, the transition from one stage to another;
- ensuring the consolidation of movements at all levels of the cluster using a variety of impact methods;
- all efforts to form and develop the cluster should be carried out taking into account the need to achieve sustainable innovative development and synergistic impact..

In short, the use of clusters in ensuring the sustainability of the building materials industry can bring additional benefits to each of the cluster participants, create a certain incentive to form a system of work, and provide a system of unity, that is, it can reduce the overall costs of the cluster members, mainly through partnerships, to achieve a synergistic effect.

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Rezyume: *Maqolada Qoraqalpog'iston Respublikasi qurilish materiallari sanoatining rivojlanishiga tashqi va ichki omillarning ta'siri tahlil qilingan. O'rganilayotgan tarmoqning barqaror rivojlanishini ta'minlash uchun klaster tizimi taklif qilingan.*

Резюме: *В статье анализируется влияние внешних и внутренних факторов на развитие промышленности строительных материалов Республики Каракалпакстан. Предложена кластерная система для обеспечения устойчивого развития исследуемой отрасли.*

Kalit so'zlar: *Qurilish materiallari sanoati, barqaror rivojlanish, klaster, innovatsiya, sinergistik natija.*

Ключевые слова: *промышленность строительных материалов, устойчивое развитие, кластер, инновации, синергетический результат.*

KARAKALPAK CULTURE AND KARAKALPAK "BLACK HOUSES" DECORATION

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Summary: *Anyone who imagines the land of Karakalpakstan imagines the grass of this place, the black house. In our country, the black houses, which reflect such nationalism and history, will be restored during the people's elections dedicated to Navruz. This is not in vain, of course.*

We don't consider it necessary to comment on such fabrications. "

Keywords: *"black fur", "black house", "grass", chiylar ".*

INTRODUCTION

The Karakalpaks are the ancient inhabitants of the Aral Sea and Trans-Syrdarya deserts. In Rashididdin's work, he is referred to as "his people are black." Genghis Khan's invasion forced the Karakalpaks to move west along the Volga.

Information about the Karakalpaks and their arrival on the banks of the Syrdarya dates back to 1578 and 1582. In 1598 their name is mentioned in another source. The foundation certificate issued by Abdullah II for the tomb of the saint Ziyovuddin in Signak lists the names of nomadic, semi-nomadic and sedentary groups living in the area, and the name Karakalpak is mentioned among these tribes.

METHODS AND RECOMMENDATIONS

The Black House tells the story of the Karakalpak people

As part of the info-tour organized by the State Committee for Tourism Development of the Republic of Uzbekistan for the media in the Republic of Karakalpakstan and Khorezm region, the participants got acquainted with the process of building a black house

You've probably heard a lot about the Black House, you've seen it in the movies, but there are a lot of people out there who don't feel like being at home, relaxing, having a cup of tea.

The Black House is one of the unique national values of the Karakalpak people. The Black House stands out from the crowd with its unique look and feel. The Karakalpak people have been living in the grasslands for centuries.

Today, such grasslands are widely used to increase the tourist potential of the region.

Today, the grasslands planted in Ayozkala, Tuprakkala or Moynak, and even on the shores of the Aral Sea have become a place of impressions for foreign tourists.

Restoring this grass also requires a lot of work. Craftsmen who make tools for weeding are called "housewives". According to local experts, no wood can be used to restore the black house. Making grass is a ancestral heritage of the Karakalpak people.

Grass, in general, is one of the ancient values inherited from the ancestors of the Karakalpaks. Among the people there are such names as "black house", "white grass", "gray grass", "gray horde", and it has six, eight, twelve wings.

The grass is made of durable, flexible fiber. The black house is made in 3 stages - first, the kerege (wooden fence), then the shanyrak (the roof of the black house), and the last stage is called the uvik (pillar).

Preparing these parts is a very complicated process, and the dried wood is stored in water for some time. It is then dried again, peeled and brought to the required thickness. It is then immersed in water and placed in a special oven tube.

This clay pipe is 180 cm long and 90-100 cm wide. The smoke from the stove softens the wood and makes it bend easily. The beams are made of wood more than 2 meters long and are bent on a special device called "fast".

The upper bouts featured two cutaways, for easier access to the higher frets. The circumference is 8-9 and the thickness is one inch. Locals call him a "scoundrel." At the top of the ski pole, wicker sticks are bent into a dome and placed in the first row of holes cut from the top of

the ski. The sticks are cut in the shape of a cross and tied in the middle with a ribbon made of camel or ox skin. Along the base of the skewer is a red thread called a skewer.

The head has a threaded hole and the tip is sharp. The wooden fence of the black house also bends "quickly", and after bending the pole with the fence, "greening" begins. Greenery uses mainly teletin yarn (teletin - a yarn made of tanned black cowhide). The teletin thread and the wooden grid are attached to each other, and the ends are folded. The grille is stretched and folded through the greenery.

Shanirak is the most important part of the black house, which consists of a domed circle. A two-row semicircular tree bent in the middle of the shanirak is called a "knot".

Another part of the black house is called the door. It is run by another master. Erganak is decorated with carvings and painted in red.

There are 6, 8, 12 winged species of black house. 5-winged houses are rare. Typically, 6 wing houses are built specifically for young families. The eight-story houses were built after the number of families increased.

The largest, a 12-story house, overlooks the Maslahat Tepa outside the village, where the brothers, the biys and beks, gather to discuss important issues related to the fate of the country. All the black house decorations are handmade, that is, woven in cobwebs. The felt is mostly sheep's wool and the rope is made of camel's wool.

The black house is described as white grass, gray grass, depending on the pattern. In the middle of the black house, there is a four-sided stove, and the smoke comes out of the hole. Inside the house, there is an object that can be placed under the bed and stuffed inside.

Such homes have served the local population for centuries.

Particular attention was paid to the external equipment of the lawn. The "grasses" that are part of the grass protect the environment, as well as from various insects and rodents.

The raw materials are woven from five or six inches of reeds and tied to the rafters. Two or three raw was enough. The raw material for weaving is reed. The cane was first peeled and cut into five or six inches long. The loom was then woven with goat's wool yarn. After the "black house" keraga and thresholds were installed, a woolen knot from the keraga and ayil were turned and both ends were tied to the side thresholds. This will prevent the beams from sagging and warping.

In order to protect the soil from moisture, the grass is constantly covered with a mat and covered with felt.

There is an unwritten rule in the grass, with men sitting on the right and women on the left. The right side is considered sacred and it is strictly forbidden for women to occupy the seats where men sit.

Bending over the front door of a black house is a symbol of reverence and respect for the house.

CONCLUSION

In a sense, grass is a symbolic representation of Karakalpak history, nationality and traditions. In the village of Beskupir in Kanlikul district, a station was built in the project of a black house (grass), which embodies nationalism and modernity.

Once in the grass, it's like traveling through history. Traveling to the past and feeling the breath of ancestors is a unique experience. The breath of Mazi, the taste and skill of the ancestors, the absorbed national and applied art are always interesting for the future.

There is no doubt that such "black houses", which reflect our national values, created with high taste and skill, will not leave indifferent every foreigner who visits our country.

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Rezyume: *Qoraqalpoq o‘lkasini ko‘z oldida keltirgan kishining xayolida ushbu maskanning o‘tovlari, ya’ni qora uy gavdalanadi. Yurtimizda ham Navro‘z bayramiga bag‘ishlangan xalq sayllarida ana shunday milliylikni, tarixni aks etgan qora uylar tiklanadi. Bu bejiz emas albatta.*

O‘tov qurish, uni bezatish bilan bog‘liq ko‘nikmalarga ega bo‘lganlar oramizda kam uchraydi.Shunday ekan bu maqolamiz siz uchun as qotadi degan umiddaman.

Резюме: *Каждый, кто представляет себе землю Каракалпакстана, представляет себе траву этого места, черный дом. В нашей стране черные дома, отражающие такой национализм и историю, будут восстановлены во время народных выборов, посвященных Навруzу. Конечно, это не зря.*

Мы не считаем нужным комментировать подобные измышления. «Надеюсь, эта статья окажется для вас полезной.

Kalit so’zlar: *“qora bo’rkli”,qora uy, o’tov, oq o‘tov”, “bo‘z o‘tov”, “bo‘z o‘rda”,“to‘g‘in”,“chiylar”.*

Ключевые слова: *«черный мех», «черный дом», «трава», чийлар ».*

FOREIGN EXPERIENCE OF LIABILITIES MANAGEMENT OF COMMERCIAL BANKS

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Summary: *This article examines the existing problems of managing the liabilities of commercial banks in our republic and the existing mechanisms for managing the liabilities of foreign banks at the present time. Comparison of the practice of managing the liabilities of foreign banks, as in the USA and Germany, with the management of liabilities in the banks of our republic. In addition, theoretical and practical proposals were developed to improve the efficiency of liabilities management of commercial banks.*

Keywords: *Commercial bank, liability management, liquidity, liabilities, deposits.*

Effective management of liabilities in the banking system of the Republic of Uzbekistan has not lost its relevance to this day. Liability management in commercial banks of the country is not based on econometric and economic analysis or clearly defined and based models or formulas. This can be explained by the economic laws of the transition period and the specifics of the country's economy, small or short-term fluctuations in the activities of banks that have no macroeconomic significance, a situation that does not occur in the banking system of any developed country. At the same time, given the growing strong ties of our country with the world economic community, the safe operation of commercial banks, the structural and timing coordination of assets and liabilities of banks (transaction risk management):

- Development and implementation of effective methods for managing banks' liabilities;
- Diversification of deposit structure;
- Weak willingness of banks to use non-standard methods of resource development;
- We can say that the primitive formation and over-formalization of the stock market is becoming more important than ever.

The theory of liability management lies in maintaining the solvency of the bank, that is, through the effective management of liabilities has a positive impact on the bank's liquidity. Hence, commercial banks should also study this element of the balance sheet in private when managing their liabilities.

The basis of bank management is the analysis of the state of liabilities in modern banking. The study and application of world best practices in improving the activities of commercial banks, including the management of liabilities, is important for rapidly developing countries such as our country.

It is known that in the management of the bank it is important to effectively attract financial resources and increase the bank's source of income as a result of expanding active operations. At the same time, maintaining the bank's liquidity by attracting additional resources from the money market is a basic theory of liability management. The main advantage of this theory is that it allows banks to optimize the cost of passive operations without increasing liquidity risk. Today, commercial banks of the Republic of Uzbekistan use the following sources of money market in the management of liquidity: attracting interbank deposits, obtaining central bank loans - overnight operations, attracting time and savings deposits from legal entities, issuing certificates of deposit.

It should be noted that developed countries are increasingly abandoning the classical methods of liability management and using new mechanisms. In particular, if we study the structure of liabilities of US commercial banks, we have the following table (Table 1).

It should be noted that developed countries are increasingly abandoning the classical methods of liability management and using new mechanisms. In particular, if we study the structure of liabilities of US commercial banks, we have the following table (Table 1).

Table 1

Structure and dynamics of liabilities of U.S. commercial banks, in percent

Liabilities	**2015**	**2016**	**2017**	**2018**	**2019**
Deposits	77,9	77,0	78,4	79,7	80,4
Long-term deposits	12,6	12,4	12,0	10,4	10,8
Other deposits	65,3	64,6	66,3	69,2	69,6
Borrowings	12,6	13,4	13,9	14,1	14,1
Liabilities to foreign offices	5,0	5,2	3,3	1,9	1,7
Other liabilities, trade liabilities	4,5	4,3	4,5	4,3	3,8
Total liabilities	100	100	100	100	100

In order to study the structure and dynamics of deposits of local commercial banks in the United States, when we study the statistics of the US Federal Deposit Insurance Corporation (FDIC) on its member banks, it is known that today the structure of US domestic bank deposits consists of savings deposits (Table 2).

Table 2

Structure and dynamics of deposits of local US banks, in percent

Deposits	**2015**	**2016**	**2017**	**2018**	**2019**
Term deposits	15,7	15,6	14,5	13,4	13,6
Savings deposits	69,6	69,4	70,6	71,8	71,4
Demand deposits	14,7	15,0	14,8	14,8	15,1
Total deposits	100	100	100	100	100

Hence, the table above shows that the bulk of domestic U.S. bank deposits, or an average of 70 percent, is accounted for by savings deposits, and this share tends to grow from year to year. Due to the nature of deposits, the fund differs from time deposits by its low cost and flexibility of transactions. Therefore, it is not accidental that US commercial banks use more of these deposits in their active operations.

In this regard, it is expedient to study and compare the structure of liabilities of commercial banks of the Republic of Uzbekistan. When we study the structure of liabilities of banks participating in the analytical analysis of the National Rating Agency "Ahbor-Rating", we obtain the following data (Table 3).

Table 3

Structure of deposits of commercial banks of the Republic of Uzbekistan, in percent

Deposits	**2015**	**2016**	**2017**	**2018**	**2019**
Term deposits	27,2	29,9	30,2	29,5	24,9
Savings deposits	9,7	10,6	11,3	11,1	11,0
Demand deposits	63,1	59,5	58,5	59,5	64,1
Total deposits	100	100	100	100	100

As can be seen from Table 3, the bulk of deposits of commercial banks in the Republic of Uzbekistan account for the share of demand deposits, ie in 2017 this figure was 64% and had an upward trend. This, in turn, indicates that the banks of the country are operating at high liquidity risk. In contrast, the share of savings deposits is very low, almost unchanged in recent years, with an average of 11% in the structure of deposits. This means that commercial banks of the Republic of Uzbekistan are weak in offering new attractive products that meet modern requirements for savings deposits and are inexpensive.

It is known that when studying the liquidity of the bank, the ratio of loans to deposits is studied, ie the ratio of total bank loans to total deposits in that period is 100%, which means that the bank issued a loan of 1 soum from the accepted 1 soum deposit account. Typically, this figure is considered positive if it is 80-90 percent, because an excess of this indicator means that the bank is not liquid enough to meet unexpected requirements. Today, however, the figure for U.S. commercial banks is more than 100 percent.

This, in turn, shows that US banks are conducting active operations relying not only on deposits but also on other resources. It should be noted that US banks have maintained liquidity.

This trend is reflected not only in the management of assets and liabilities of commercial banks in the developed countries of the European Union, but also in US banks. In particular, the volume and ratio of deposits and loans of the banks of the Federal Republic of Germany, one of the most developed countries in the banking system in the European Union, can be seen in the following information. From the above data, it can be seen that the ratio of loans of German banks to deposits increased by 22% compared to 2010, while the volume of deposits tended to decline. Thus, in the practice of German banks, the tendency to carry out active operations on deposits has decreased, and the use of new sources is observed, as time deposits remain one of the most valuable resources today.

In a market economy, the effective formation and rational use of resources for commercial banks of the country is of great importance. In the management of liabilities of commercial banks, the main focus is on the effective management of funds on the liabilities of the bank's balance sheet. Therefore, based on the purpose of our research, we focused on identifying the existing problems in the practice of liability management of commercial banks of the country and on their basis to find ways to further improve the management of bank liabilities.

Having studied the theoretical foundations of liability management of commercial banks, we came to the following conclusion that the management of liabilities should be optimized not only to attract effective resources for active operations, but also to manage liabilities to maintain the bank's solvency. To date, the adequacy of the deposit base of our banks is negatively assessed, and in recent years the experience of banks in developed countries has shown that the large share of deposits has a positive impact on expanding the scope of active operations. Based on the best practices used by commercial banks in developed countries to increase the deposit base, it is necessary to offer attractive types of savings services for use in the practice of our banks. In addition, the creation of a single electronic deposit platform between businesses and banks to increase the efficiency of attracting financial resources and their rapid attraction will serve as a convenient mechanism for increasing the popularity of banking services and operational liquidity management.

International rating agencies recognize that the existing shortcomings in the management of liabilities in commercial banks of the country are strongly linked to a certain number of customers or customers of a particular economic sector. Therefore, we believe that banks should pay attention to the principles of diversification in the formation of deposit portfolios, and to do this, introduce into practice deposit services that are suitable for enterprises of different industries.

As a result of the study, we came to the conclusion that the stock market in our country is highly formalized. The current legislation and the current order of the securities market in our country make it difficult for banks to place their financial instruments in the securities market or to deal with financial instruments.

Banks should try to find and expand not only deposits, but also a new resource base, while expanding the circulation of debt securities. In particular, we consider it necessary to reconsider the possibility of reintroduction of promissory notes, which are effectively operating in the global financial markets.

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Reyume: *Ushbu maqolada respublikamizdagi tijorat banklarining majburiyatlarini boshqarishning mavjud muammolari va hozirgi vaqtda xorijiy banklarning majburiyatlarini boshqarishning mavjud mexanizmlari ko'rib chiqilgan. AQSh va Germaniyadagi kabi xorijiy banklarning majburiyatlarini boshqarish amaliyotini respublikamiz banklaridagi majburiyatlarni boshqarish bilan solishtirish. Bundan tashqari, tijorat banklarining passivlarini boshqarish samaradorligini oshirish bo'yicha nazariy va amaliy takliflar ishlab chiqildi.*

Резюме: *В данной статье рассматриваются существующие проблемы по управлению пассивами коммерческих банков нашей республики и существующие механизмы управления пассивами зарубежных банков в настоящее время. Сравнение практики управления пассивами иностранных банков, как в США и Германии с управлением пассивов в банках нашей республики. Кроме того, были разработаны теоретические и практические предложения по повышению эффективности управления пассивами коммерческих банков.*

Kalit so'zlar: *Tijorat banki, passivlarni boshqarish, likvidlilik, majburiyatlar, depozitlar.*

Ключевые слова: *коммерческий банк, управление пассивами, ликвидность, пассивы, депозиты.*

SYNERGETIC PARADIGM AS A METHODOLOGICAL STRATEGY FOR STUDYING ECONOMIC PROCESSES

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Summary: *The current study of economic processes has shown that the increase in complexity, uncertainty, unpredictability, imbalance in these processes, in turn, limits the methodological capabilities of the classical paradigm based on the concepts of linearity, stability, equilibrium. Because modern economic reality has complex, nonlinear features that we do not expect. Therefore, there is a need to develop alternative methods for studying the phenomenon of complexity in economic processes. This article reveals the methodological significance of the synergetic paradigm in the study of complex economic processes. Indeed, economic synergetics reveals the laws of development in an economic system through synergetic principles. A synergetic approach to modeling many economic processes and relying on its principles, the application of which creates opportunities for success in economic growth. The article reveals the methodological significance of synergy or the law of synergy in the economic development of our country, one of the most basic concepts in the paradigm of synergetics.*

Keywords: *economic development, synergetic paradigm, economic synergetics, synergy law, synergetic effect, dissynergy, integration.*

In modern economic reality uncertainty, complexity, nonlinearity, turbelence, risk are increasing day by day, and sometimes their unexpected negative consequences indicate that it is very difficult to model complex economic systems.

Especially, in the modeling of complex economic processes the problem of methodology in the modeling of uncertainty, chaos, nonlinearity, colorful complex relationships, which are its features, came to the fore.

Also, in the path of socio-economic development of our country, legitimate manifestation of complexity and nonlinear features are arising the nessecity to study the philosophical and methodological aspects of these processes. As the President of the Republic of Uzbekistan noted, "... it is no exaggeration to say that there is no state or society in the world that is not concerned about the current dangerous situation and political and economic crises. ... The question of how to behave in such a complex and dangerous situation, how to maintain peace and tranquility, to ensure sustainable development, should be seriously considered by all of us. " [1, 473].

Therefore, a philosophical understanding of the nature of complex economic processes, theoretical and methodological analysis of methodological approaches in its modeling is of great importance. In this article, we reveal the methodological significance of the synergetic paradigm in the study of complex economic processes.

On the basis of the direction of synergetic, the direction of economic synergetic was emerged. Economic synergetic examines the nature of synergetic processes in economic systems, including uncertainty, nonlinearity, openness, imbalance, instability, and self-organization. Economic synergetic reveals the laws of development in the economic system through synergetic principles. In modeling many economic processes a synergetic approach and relying on its principles creates opportunities for success in economic growth. One of the most basic concepts in the synergetic paradigm is synergy or the law of synergy.

The concept of synergy comes from the Greek word meaning "syn" - "together", "ergeia" - "effect", "labor", and is characterized by the interaction of two or more factors in a cohesive, cohesive way, showing a certain effect. According to the law of synergy, the effect of the effect of the sum of their components is greater than the result of the effect of the interaction of each of the components of the system. As for the application of the law of synergy in the economy, "the

merging, integration of individual parts of a holistic system can be understood as the efficiency of activity at the expense of a systemic effect or emergency, ie the emergence of a new quality in the system. [2, 495].

In short, it means a direction of joint, concerted action of several complementary factors towards a single goal. This instability contributes to the self-organization of the system in conditions of uncertainty. Otherwise it can manifest itself in a state of dissynergy in the system. In the case of dissynergy, there is no integration in the system. This situation causes conflicts in the system. According to the law of dissynergy, the sum of the parts of a system is smaller than the whole. That is, like 1 + 2 = 1, 1 + 1 <0. Simply put, the efficiency of the functioning of the whole system decreases as a result of the negative interaction of the elements entering the system without mutual agreement with each other. This is reminiscent of the "crane-scorpion-fish" scenario.

On the modern understanding of the synergy category in economics, according to Kuznetsov B.L., "it means the concept of cooperation and coordination, to be understood as a coherent effect. It takes the form of partnership, cooperative interaction." [3].

For example, the efficiency of joint ventures of firms, firms, or companies is greater than the sum of the efficiency of their separate operations, or the advantages are more efficient. That is, the benefit / profit in a merger of two firms or companies will be greater than the sum of the total profits when they are separate. R. Matthew distinguishes two models of the source of the manifestation of the synergetic effect in the economy, as above: subadditive and superadditive[4].

In this case, according to the first model, the function has a subadditive property, such as F (x1 + x2 +…. + Xn) ≤ F (x1) + F (x2) +…. + F (xn). If the value of the function of the sum of the variables is less than or equal to the sum of the values of the functions of each variable. In the second model, the function has a supereddative property, in which the formula F (x1 + x2 +…. + Xn) ≥ F (x1) + F (x2) +…. + F (xn) is appropriate. The subadditive nature is to reduce the total costs of merging companies (increase capital, employee duplication) while maintaining the existing sales volume. The nature of supereddictiveness is to increase profits by increasing sales. Hence the synergistic effect gives the sum of these two models. S = F1 + F2, F1- subadditivity, F2- supereddditivity [5].

Indeed, in the first model we see the principle of partial superposition. That is, "the result of the combined action of two different factors is a simple superposition of the effects of the separate effects," the closedness of the system in the external environment and its development lies only in the numerical changes, gradual, linear, non-alternative, ie. In the second model, it is seen that the principle of superposition is not appropriate in part (a situation that is not equal, but large). It exhibits a synergistic effect.

The subadditiveness of costs in an integrated economic system is characterized by a decrease in the total cost of production relative to the cost of production of individual enterprises until they merge into a single structure [6, 219-222].

Applying the concept of synergy to the field of economics, I. Ansoff considers that "the income from the self-use of resources is treated as a phenomenon that exceeds the income from the separate use of resources, and gives the effect of 2 + 2 = 5" [7].

For this reason, the synergistic effect in the sectors of the economy affects the efficiency of economic activity, which in turn is a powerful methodological tool for the effective functioning and development of the economy as a whole.

The synergistic effect can have a positive or negative effect on the system. From this it is possible to distinguish between a positive synergistic effect and a negative synergistic effect. 2x2 = 5 in the positive synergistic effect, 2x2 = 3 in the negative synergistic effect. This can be especially evident in innovative development.

Closed innovative development of innovative development can be divided into paradigms - linear development (direction of use of internal resources only) and open innovative development - nonlinear development (direction of use of internal and external resources). The inability to

adequately respond to today's real challenges of linear, closed innovation development (i.e., synergistic effects with real impact) requires modification of this model.

The nonlinear - open innovative development paradigm is one of the most effective models of innovative development, characterized by the manifestation of openness and interaction in the current process of globalization. As we can see, closed, linear innovation has a negative synergistic effect, while open nonlinear innovation has a positive synergistic effect.

Masaaki Hirooka, who studies the dynamics of innovative development, emphasizes that the innovation paradigm consists of three logistical trajectories: technology development, commercial product creation, and diffusion of innovative products in the market. In his view, the nature of innovative development is nonlinear. In our opinion, we can say that when the author meant the diffusion of innovative products, they meant synergy.

In the classical economy, ideals such as precision, balance, linearity, cause-and-effect proportionality, stability, a single value, order, and predictability prevailed. But it is dangerous to forget the uncertainty, instability, chaos, imbalance, non-linearity in complex economic systems. These risks in the system have not been adequately assessed by scientists. I.K. Kudryavtsev and S.A. Lebedev says of this world: "Mankind is an infinitely large globe, and does not think of their end, saying that space and infinite resources will reach everyone .... Space and time are unambiguous and isotropic, ... the world is full of past and future it was in the imagination and view that it was possible to make predictions "[8, 55].

Economic synergetics is the study of situations that are not taken into account in classical science, including economics.

It reveals uncertainties, risks, manifestations of chaos, and opportunities to overcome them. In this approach, more self-organizing mechanisms of economic systems are of interest.

In order for an economic system to have its own organization, first of all, the system must be open. For there to be synergy, the system must also be open.

Second, the development of the economic system is based on the principle of feedback. What is feedback? What strategic goals does this principle serve to achieve socio-economic development?

The principle of feedback was used by Norbert Wiener to know the processes of self-regulation. In feedback, cause affects effect, and consequence affects cause. Feedback is an integral part of the system. Feedback is the basis of system self-regulation, the growth rate of the system, the adaptation of the system to changing conditions.

There are two types of feedback: negative feedback (balancing feedback) and positive feedback (amplifying feedback). In it, as a negative feedback, it turns off possible random leaks, obstructs them, and simply stabilizes the system. Positive feedback was considered a mechanism for amplifying leaks and fluctuations. An example of this is the social state of escalation (escalation, expansion): for some social actors, violence escalates in turn, leading to a further escalation of violence.

Donella Medous gives the following examples of negative feedback (balancing feedback): "Balancing feedback improves the system's ability to self-regulate. For example, preventive medicine, exercise, and good nutrition support the body's resistance to disease; the law on freedom of information limits the government's ability to conceal information; Taxes, fines and other charges levied on environmental pollution are used in a covert manner for income, inciting the public to incur additional costs and expenses ". Hence, negative feedback is a mechanism that serves to maintain stability in the system.

What is positive feedback (i.e., amplifying feedback)? Positive feedback is a source of growth and even disruption in the system, accelerating the pace of development in the system. If the growth rate in the system is not controlled, the positive feedback will eventually lead to pathology - fragmentation of the system. Hence, positive feedback is controlled using negative feedback.

It should be noted that while negative feedback is studied by cybernetics, positive feedback is studied by synergetics.

There is always interaction between the state and society. Contacts can be made in both forward and reverse form. Direct communication is the influence of a governing subject (e.g., public authorities) on an object (e.g., the people). That is, it means control from above. In the feedback, it refers to the reaction of the object to the management subjects in the form of certain effects. That is, the feedback is the effect against the control object, which means control from the bottom. For example, the attitude of the object to the activities of the subjects of management is realized in the form of satisfaction or dissatisfaction with their activities. There must always be feedback between the state and society. This ensures the effectiveness of state activity, in short, the social control of society over the state. The reason is that the feedback mechanism (principle) serves as a control in public administration. If direct communication is absolute and there is no feedback, it will undermine the legal relationship between the state and society.

In short, the functioning and development of the economic system of our country requires, firstly, based on the law of synergy, ie the principle of positive synergistic effect, and secondly, the combination of the principles of direct and indirect feedback should become an important mechanism of economic development.

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Rezyume: *Hozirgi davrda iqtisodiy jarayonlarni o‘rganish shuni ko‘rsatdiki, bu jarayonlarning murakkabligi, noaniqligi, oldindan aytib bo‘lmaydiganligi, nomutanosibligining kuchayishi, o‘z navbatida, chiziqlilik, barqarorlik, muvozanat tushunchalariga asoslangan klassik paradigmaning metodologik imkoniyatlarini cheklaydi. Chunki zamonaviy iqtisodiy voqelik biz kutmagan murakkab nochiziqli xususiyatlarga ega. Binobarin, iqtisodiy jarayonlarning murakkabligi fenomenini o'rganishning muqobil usullarini ishlab chiqish zarurati tug'iladi. Maqolada murakkab iqtisodiy jarayonlarni o'rganishda sinergetik paradigmaning metodologik ahamiyati ochib berilgan. Darhaqiqat, iqtisodiy sinergetika iqtisodiy tizimning rivojlanish qonuniyatlarini sinergetik tamoyillar orqali ochib beradi. Ko'pgina iqtisodiy jarayonlarni modellashtirish va uning tamoyillariga tayanish uchun sinergik yondashuv, ularni qo'llash iqtisodiy o'sishda muvaffaqiyatga erishish uchun imkoniyatlar yaratadi. Maqolada sinergiya paradigmasining asosiy tushunchalaridan biri bo‘lgan sinergiya yoki sinergiya qonunining mamlakatimiz iqtisodiy taraqqiyotidagi metodologik ahamiyati ochib berilgan.*

Резюме: *В современности исследование экономических процессов показало, что возрастание сложности, неопределенности, непредсказуемости, несбалансированности этих процессов, в свою очередь, ограничивает методологические возможности классической парадигмы, основанной на концепциях линейности, устойчивости, равновесия. Потому что современная экономическая реальность имеет сложные нелинейные особенности, которых мы не ожидаем. Следовательно, существует необходимость в разработке альтернативных методов изучения феномена сложности экономических*

процессов. В статье раскрывается методологическая значимость синергетической парадигмы в исследовании сложных экономических процессов. Действительно, экономическая синергетика раскрывает законы развития экономической системы через синергетические принципы. Синергетический подход к моделированию многих экономических процессов и опоре на его принципы, применение которых создает возможности для успеха в экономическом росте. В статье раскрывается методологическое значение синергии или закона синергии в экономическом развитии нашей страны, одного из базовых понятий парадигмы синергетики.

Kalit so‘zlar: *iqtisodiy rivojlanish, sinergetik paradigma, iqtisodiy sinergetika, sinergiya qonuni, sinergetik effect, dissinergiya, integratsiya.*

Ключевые слова: *экономическое развитие, синергетическая парадигма, экономическая синергетика, закон синергии, синергетический эффект, диссинергия, интеграция.*

HUMANITIES SCIENCES

LANGUAGE PROBLEMS IN THE KARAKALPAK PERIODIC PRINTING

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Summary: *This article describes the materials of the analytical genre of the newspaper, including the specific features of the genre of the article, its purpose, lexical and stylistic features.*
Key words: *journalism, style, language, type of text, genre, words, analytics, newspaper.*

The state of development of the literary language today is widely reflected in the print media. The preservation of the norms of the literary language, including spelling, lexical, grammatical and stylistic, are observed in the current newspaper language. At the same time, the language of the press has distinctive features peculiar only to it:

1. The language of the print media is one of the types of journalistic style of written literary language. However, in its external form it differs from other functional styles of the literary language.
2. The printed language is a freely functioning, energetically changing linguistic phenomenon associated with the changes taking place in society.
3. The language of the printed media, in addition to a number of related features in relation to the written literary language, also has some neutral properties. This can be seen in the variety of styles and forms of description in the materials published in the newspaper.
4. The language of print media has its own grammatical and stylistic expressiveness.
5. In both printed and written literary language, and in oral colloquial speech, there are characteristic features of the style of official documents, artistic literary and scientific styles.
6. The main article, materials of various content and character, chronicles, resolutions and telegrams and other information are published in the press. However, they are fundamentally different from each other in their stylistic, grammatical and features of the coverage of events. This feature enriches the structure and content of the language of print media, creates the basis for its diversity.
7. The main distinguishing feature of the language of the print media is the use of standard phrases and stamps in it.
8. If fictional material is given on the pages of print media, then its emotionality, expressiveness and imagery begin to increase, in this case it is considered a distinctive feature of the language of print media [1].

Therefore, first of all, the study and scientific research of the language of the printed media is of great importance for linguistics. In our state, the press is seen as a means of influencing the consciousness of the population, a powerful tool for educating the people in the spirit of the idea of national independence, as an organization uniting representatives of all nations and nationalities. And therefore, the language of the print media should be simple and understandable for all segments of the population and, as far as possible, avoid high-flown words.

Of course, language is the national value of a people, which determines its unique features and spiritual world, it is not only a means of communication between people, but, at the same time, is considered an important tool for educating a person's personality. Every son of his people should make the unique possibilities of the language come true, take part in the development, enrichment and improvement of it and be responsible for his future and not remain indifferent in this matter. The Karakalpak language, while remaining the national literary language of our people, is at the same time the main means of forming high spirituality and culture, a messenger of pride in our achievements. This means that we must value and support him. If our task is to increase the authority of the literary language, then we must strictly follow its rules and norms.

In ensuring the place of the Karakalpak literary language as the state language, using it at a high cultural level in the print media, in the socio-political, spiritual, cultural and economic life of our republic, there is a close relationship between the development of the literary language with an increase in the standard of living of the people and the culture of communication between people with each other. friend.

Literary language is a delicate, sensitive instrument and, at the same time, it is a powerful instrument for influencing the minds and consciousness of people. Therefore, its rich features must be used in the right place. The answer to this question was the works of poets and writers, the speeches of scientists, teachers and journalists on radio, television, on the pages of newspapers and magazines. In their numerous speeches, disputes, meetings with labor collectives, students and students, they expressed their point of view on how to use the artistic word, grammatical forms of the language, new words and terms more correctly. Particular attention was paid to the language of the print media, because the language of the press is the beacon of the nation, the window of spirituality and enlightenment, the most important means of educating the younger generation. The implementation of the goals and objectives of promoting the possibilities of the language, designating its place and role in the future, strict observance of the laws and rules of the literary language, raising to a higher level of literacy, culture of speech and writing, great importance is attached to the media.

The Karakalpak literary language, strictly adhering to its laws and rules in writing and speaking, the Sami observe the norms of the literary language. Thus, we show deep respect for the native language, the language of the Karakalpak people. Mass media workers and journalists have a great responsibility in adhering to the norms of the literary language, because the language of the press is a mirror of the culture of the Karakalpak language. In the development of the rules of the literary language and strict adherence to them in practice, a special place is given to educational institutions, print media, radio and television. As we noted above, the print media have a great influence on the assimilation of the norms of the literary language, the observance of its rules in writing and speaking. Thus, the language of the press plays the role of a model in mastering the rules of the literary language. Therefore, the language of the press for all members of society is an example in improving their writing and speaking.

The development of life in society is impossible without contradictions and transformations in one area or another. Along with the above-mentioned achievements in the modern print language, there are some drawbacks that create problems when using the literary language in print media. First of all, these are spelling, punctuation and grammatical errors, as well as stylistic flaws. Especially many such shortcomings are found in regional, departmental, and also in some republican newspapers. All these shortcomings cause a lag in the development of the culture of writing and speaking. Let's dwell on some of them:

1. Disadvantages encountered when replacing Russian and other borrowed words with Turkish, Karakalpak, and Persian-Arabic languages. As a result, words and terms previously unknown to the population entered our language, the language of the press. For example, instead of *"autonomous republic" - "mukhtar zhumgiriyat", "plane" - "otarba"*. However, in most cases, explanations were given about the fallacy of replacing one word with another. As a result, many of these words and terms never caught on in our language. However, in their work, journalists still use new words and terms from other languages. In some cases, they are used as variants of other words: *programmist – dasturlewshi, sekretar – xatker, programma – dastur, bagdarlama, proekt – joybar* etc.

2. When using words in writing, there are both cases of repetition and cases of excesses. Such errors affect the content of the text and its perception. For example: *oqıw, úyreniw, isenim, sarplanǵan kúsh, eldiń xalıqtıń arı ushın umtılıwlar, sarplanǵan miynet kem-kemnen kózge kórine basladı.*

3. Sometimes the use of incomprehensible words in a newspaper requires clarification. The use of such words in the newspaper is undesirable: *baqlawshılar terakt aqıbetlerin túrlishe bayan etpekte. Feromon tutqısh qoyıp shıǵılıp, trixogramma jiberildi.*

4. Incorrect or excessive use of synonyms: *tiykarǵı nızamımızǵa tayanıp hám súyenip jumıs alıp barmaqtamız.*

5. 5. Stylistic mistakes in the sentence. For example, an unnecessarily stretched text and because of this, the semantic connection between sentences is lost: *Bizler apamız kórsetken gilem-quraq kórpeshe, diywaldaǵı ilderilgen gilem-apamızdıń 78ge shıqqandaǵı qol óneri ushın kerek bolar degen dámede naǵıslardıń atın sorap jazıp alıwǵa tırıstıq.*

6. The language of printing requires precision and specificity, each item must be named by its own name. In some cases, such mistakes are made in newspaper materials: *Ózbekstan qosıqlar bayram tańlawınıń respublikalıq basqıshında bul jámáát 2-orındı iyeledi.*

7. As a result of technical errors, the texts go out of print without a semantic link: *Ómirińizdi qalayınsha alıp barıw, shólkemlestiriw, oy-pikirińizdi basqarıw siziń ... ńızda!* In this example, the syllable is not printed - *qol - (qolıńızda)*.

One should not remain indifferent to the errors listed above. Of course, if we treat these shortcomings with indifference, this will negatively affect the young generation of journalists, their growth as professionals, the general education of society and the development of the language of the print media. Among the above errors, the most common are the incorrect use of words, the composition of the text, the stylistic error of sentences. Unfortunately, for some newspapers, these phenomena are becoming commonplace, since every day there are more and more of them. Sometimes there are more than ten different types of errors in just one issue of the newspaper. This poses a big problem for the development of the language of print media.

The language of the print media is an integral part of one of the main heritage of our people - the Karakalpak language, its mirror, an example of literacy and culture of speech. The aforementioned shortcomings are found more in some newspapers, in others less. Only a truly creative approach of a journalist to his duties, a sincere desire to fulfill the high mission of the profession can serve the development of the language of the print media. In our opinion, a great responsibility assigned to journalists is to create conditions under which the language of periodicals would always remain a model of correct writing and colloquial speech.

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Rezyume: *Gazeta tili adabiy tilning asosiy ko‘rinishlaridan biri bo‘lib, u o‘ziga xos uslubiy va leksik xususiyatlariga ega. Gazeta tilida ba’zi vaqtlarda adabiy til me’yorlarining bo‘zilish holatlari ham uchraydi. Ush bu maqolada gazeta tilidagi ba’zi leksik va uslubiy xatolar ilmiy jihatdan tahlil qilingan.*

Резюме: *Язык газеты являються одна из основных форм литературного языка, имеющая свои стилистические и лексические особенности. В языке газеты иногда наблюдаются случаи нарушения норм литературного языка. В статье научно проанализированы некоторые лексические и стилистические ошибки в газетном языке.*

Kalit so‘zlar: *matbuot tili, uslub, janr, so‘z, tahlil, gazeta, leksiu xususiyat.*

Ключевые слова: *язык газеты, стиль, жанр, слова, анализ, газета, лексические особенности.*

SEVERAL ATTITUDES ABOUT THE ORIGIN OF THE "NUKUS" TOPONYM

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Summary: *This article provides information about the term "Nukus", the various relations of historians, linguists, on the history of the origin of the term. There are oral legends among the people on the term "Nukus".*

Keywords: *Nukus, Nukus, Naukas, Nıxas, Novkus-Artesian, Noghay, Shora, nukus ethnonym.*

Toponymy – is a branch of linguistics that studies land and water terms. The first information on the study of toponyms of Karakalpakstan can be obtained from the historical and ethnographic works written on the basis of scientific expeditions of Russian scientists in the territory of Karakalpakstan in the XIX-XX centuries with political and economic relations.

Information on the toponymy of Karakalpakstan S. P. Tolstov, T. A. Jdanko, B. V. Adrianov, G. I. Donidze, V. V. Bartold, L. Uspenskiy, N. A. Baskakov, S. Ataniyazov and in the works of H. Vamberi and a number of other scholars, little is mentioned [1]. They noted that the study of toponyms directly benefits the study of the history, ethnography, administrative-territorial territories of the people, as well as the lexicon of history, morphology.

Opinions about the hydronyms of Karakalpakstan are expressed in the work of Ya. G. Gulamov [2]. He wrote extensively about the irrigation networks in the Amudarya delta, the history of the irrigation system of Khorazm, as well as the hydronyms Purkhan, Eshim, Kuwanishjarma, Kokozek, Qizketken, Dawqara, Kegeyli river, Mayjap and its tributaries in Karakalpakstan.

The first to study the toponyms of Karakalpakstan was K. Abdimuratov [3]. In his first article, the reasons for the origin of the term Nukus were scientifically substantiated. In 1966, the author developed his dissertation on the scientific-linguistic basis of Karakalpak toponyms.

He made a detailed study of the structural and semantic structure of a number of geographical terms in the region and analyzed them in terms of historical and etymological differences. The automated researches reveal the reasons for the origin of geographical terms in these regions, such as the branches of the Amu Darya, the lake horses in Karakalpakstan, the toponyms Nukus, Shimbay, Konirat, Khojeli and Tortkul. And in his article with T. Begjanov "Structure of Karakalpak toponyms" is devoted to the construction of Karakalpak toponyms [4].

In addition, a number of articles on local geographical terms of Karakalpakstan were published. For example, E. Murzaev mentioned the fact that the term Nukus is used in many places, while in the articles of M. Mambetullaev, A. Allamuratov and H. Esbergenov, the toponym of Knox, nd O. Bekbaulov, on the other hand, notes that the Nawkas toponym and the Nukus ethnonym are similar in appearance, and that the time of formation, meaning, and construction do not correspond to each other [5].

In some sources, the word "Nukus", the term "Nukus" and the term "Nokus fortress" are used in folklore. If we listen to the mouths, "Seven Birds" means "The ancestor of the Karakalpaks, Kara Qahan, gave to his seven sons the seven birds. In the left style, the Karakalpaks say that from time immemorial the birds wore certain sweaters. Kara Qahan conquered Muyten – iytelgi, Qonirat – lashin, Qitay – qarshiga, Kipshak – burkit, Keneges – sunqar, Mangit – tuygin. And a bird of Karakalpakstan, and it symbolizes the Nurkus that our ancestors worshiped [6.5]. In the predictions related to the toponym "Nokis", in the word "Kiyeli kus jurti" in the Arab world. According to the predictions about the toponym "Nokis", in the mouth "Kiyeli qus jurti" in the Arab world the name "qaqnus" ("haqqus" in the poems of Karakalpak poets) was known by Europeans as "phoenix". In other words, the phoenix is called in our language "Paniy bird". This indicates that the name of the bird has changed from the Eastern languages, especially its pronunciation to the Karakalpak

language. Its original text is derived from the Turkic languages. However, the word "bird" in the Karakalpak language still retains its original meaning.

Also, in the Karakalpak language, this bird has another ancient term - nurqus, that is, a bird created from light, the meaning - the guardian of mankind. Qumayqus is a symbol of fortune and wealth, while Nurqus is a symbol of wealth, eternity and existence.

It is also said that the area of the town of Knox has been a bird bazar since ancient times. It is said that the place of Kuskhana-Qizketken was always a horde of birds. It is also said that the image of a bird was found in a vessel belonging to a distant age found in the fortress of Kuyik kala. Some researchers have speculated that the bird may be a "Qumay bird." Probably, the left bird is not a sandpiper, but it is not far from the possibility of being a lighthouse, and there are speculations that the terms mentioned in the original sources in the form of Nuwkas, Nawkas, Nixas may have been derived from Nurkus.

In addition to this,in the location of Nukus,in qncient times lived people from different tribes,and there were many lakes around the location.It is called "Nukus" because there lived numerous birds like "Nuw Qus".These mouths will remain mouths. In this article, we do not want to repeat all the words or summarize their meaning. The fact that the name of the city of Nokis is associated with the habitat of birds is likely to arouse some feelings of confidence in the readers. It is a fact that birds are constantly in the woods. For example, in the northwestern part of the Kegeyli region, beyond the present-day Kokshiyel population, there are large interconnected lake basins, such as Kokshiyel, Nagalay, Koltykkol, Dautkol, Kazanketken and Aspantay. Due to the large number of birds in the area, one of the mountains is now called Kuskhanataw.

As we have already mentioned, the word Nokis in the above-mentioned myths is derived from the word bird, but most scholars and researchers associate the name Nokis with the Nokis tribe. But we also see the diversity of opinions in this forecast. A number of scientific studies have shown that for the last 250-300 years there have been military defenses on the site of the Nokis Fortress. Academician Gayratdin Khojaniyazov, an archaeologist and scientist, puts it this way in his research: It is known that in 1740-1741 the Russian ambassadors headed by D. Gladishev, who left the Or fortress and went to Khiva in the Nokis Fortress, stopped there. Khiva historian Yusup Bayaniy in his "Chronicle of Khorezmshahs" in 1778 in the fortress of Nokis was in residence of the Karakalpak sultan Gayipkhan Eshimov's son Abdirahman. It is also known that in 1855 the Karakalpak khan Zarlyk lived in the Nokis fortress. By 1873, with the conquest of the Khiva Khanate by the Russian Empire, the Nokis Fortress had become a strategic stronghold in the region. There are a number of European-style buildings and barracks for soldiers in the castle", he said. Moreover, "The city of Nokis is a city rebuilt on the site of an ancient settlement.In the past, the city which was known by the names of Nuskas, Nawkas, Nikhan, and now Nawket or Shora, Shorasha (Shorsha) is now called by the names of the great Karakalpak tribe Nokis. The genealogy of the city of Nokis is closely connected with its ancient Shorsha, parts of the medieval settlement of Kuskhana, and it covers more than two and a half thousand years of Islamic history. The archaeologist points out that in the Karakalpak epic "Er Shora" the Shorsha fortress was the fortress of the Shora drowning, and that the archeological leak of the "Er Shora" fortress in the Taslaq settlement of the Nokis Fortress should not be leaked. However, it is very difficult to conduct archeological research in the Er Shora fortress, because now there is a deposit in its territory, and therefore archeological research is limited there. The song "Shora batyr", which is a lyrical-epic composition of the Tugai people, contains the following trains:

Төре тувыл караман,
Анадан эгиз тувмай дараман,
Асылымды сорасанъ,
Нөкис улы тамаман.
Өз атымды сорасаң,
Нариктен тувган Шораман [7.74].

From the lines "If you ask for my nobility, I'm Nokis's son Tama" (Асылымды сорасанъ, Нөкис улы тамаман) we can see that the origin of Shora Batyr was from the Nokis tribe and the Tama tribe in his work. In the genus table of the Karakalpaks, the Keneges bee belongs to the Kogis, Nokis, Kenes, Kiyet, Altinpishak, Bozak, Jalayir, Jaypar, Koptir, Tama, Bayuli, Baymak, Mesit, and Jamanjaq clans. It should also be noted that the terms Jalayir, Tama, Baymak, Jaypar, Mesit are common in the Kazakh, Bashkir and Uzbek nations. Nowadays, the Nokis tribe belongs to the Keneges, and it is said that it has tires called Jamanjaq, Bozaq, Altınpışhak, Gobdir.

There is a village called Nokis (Novkus-Artesian) in the Neftekumsk region of the Stavropol Territory of the Russian Federation [8.219]. The official name of the village is Novkus-Artesian. The name of this village is spelled Novkus and it is called Nokis. The local people who make up the village are the noghays. There is also a tribe called Nokis in Noghai, and the reason why this village is called Nokis, in our opinion, is connected with the ethnonym Nokis of Noghay. Noghay linguists also consider the toponym Nokis (Artesian-Novkus village) as an ethnotoponym, associating it with the Nokis tribe: “We have collected field materials and found out that ethnotoponyms are not evenly distributed in the place of creation of modern noghay. In these regions, the noghay were the main occupations of the peasantry, and until the 1920s, they lived a nomadic and semi-nomadic life in order to maintain tribal divisions [9.48].

To conclude, we believe that the name of Nokis is come from the name of Nokis tribe, considering that in the area of Karakalpakstan people lived together according to their tribes and the area where they live was called the name of their tribe and this custom is still preserved. There have been a number of studies on the history of the origin of the term "Nokis", which means that the term should be studied in more detail today, taking into account its similarity in the languages of other peoples.

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Rezyume*. Bu maqola "Nukus" atamasi haqida, atamaning kelib chiqish tarixi bo'yicha tarixchi, tilshunos olimlarning har xil nuqtai nazarlari haqida ma'lumot beradi. "Nukus" atamasi haqida xalq og'zidagi afsonalar ham bor.*

Резюме. *Данная статья про название города "Нукус". В ней даётся информация о различных точках зрения учёных историков и лингвистов по этимологии данного топонима. В народе ходят различные легенды про происхождение названия "Нукус".*

Kalit so'zlar: *Nukus, Naukas, Nixas, Novkus-Artesian, Noghay, Shora, Nukus etnonimi.*

Ключевые слова: *Нукус, Наукас, Ныхас, Новкус-Артезиан, Ногай, Шора, этноним Нукус.*

SOME QUESTIONS OF THE ETYMOLOGICAL STUDY OF TOPONYMS OF THE KHODJEYLI REGION OF THE REPUBLIC OF KARAKALPAKSTAN

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Summary: *Studying of toponims in Karakalpakstan is started in 50-60 years of XX century. Their research was condueted by statements and classifications. The task facing these days – their ethimologicali research u analysis. This problem if briejiy inlightened in the article.*

Key words: *lexicology, onomastics, toponymy, toponym, word, indicator, topo basis, topoformant.*

A geographic name (toponym) is a public phenomenon, i.e. a socialinguistic phenomenon. This is one of the names of natural objects, based both on the linguistic basis and on the needs of society. Like the language brought to life as a means of communication, toponyms are also the result of a certain historical process.

Since ancient times, our ancestors strove to give a special name to each of the geographical objects, and an example of this is the toponyms of the Republic of Karakalpakstan, which are distinguished by special meanings and laconic form embedded in them.

In 2012, the Law of the Republic of Uzbekistan "On Geographical Names" was adopted, which says about the need to name geographical objects, their renaming (ie re-assignment of names), the need to strengthen the naming system in accordance with the ideology of independence of our state.

Toponyms incorporate ancient history, features of the worldview and worldview of our people, their way of life, ways to assign names to surrounding objects, natural phenomena and geographical objects. At the same time, place names are an indivisible part of the spiritual heritage and original values of our ancestors created over many centuries.

It is known that in their writings Abu Raikhan Beruniy, Narshakhi, Mahmud Kashgari explained the names of some localities. In the study of toponyms, the works of E.M. Murzaev, V.A.Nikonov, E.M. Pospelov, S. Ataniyazov, K. Konkobaev, S. Khudaibergenov and other scientists are of great importance. So, O.T. Molchanova, A. Abdrakhmanov created an explanatory and etymological analysis of the toponyms of Altai and Kazakhstan, in the studies of T.M. Garipov and F.G. Garipova, an analysis of the toponyms of Kazakhstan, Bashkortostan and Tatarstan was given. At the same time, at the conference on the problems of the etymology of the Turkic languages, the controversy of the theoretical aspects of the research of T.M. Garipov and F.G. Garipova was discussed, in particular, it was pointed out that the authors did not pay attention to the etymon. In works on the etymological analysis of the words of the Turkic language, E. Hasan seeks to determine from which language a particular word was learned and to reveal its meaning.

In the Central Asian region, in particular, in Uzbekistan, in the field of scientific research of opinions on the basis for giving names to geographical objects, motives, interpretation of some toponyms originate from the 60s of the twentieth century. To date, scientific research has been carried out to collect toponyms of the Republic of Karakalpakstan, Kashkadarya, Surkhandarya, Samarkand, Khorezm, Tashkent regions of Uzbekistan, the city of Tashkent, as well as some districts of Navoi and Fergana regions, research has been carried out in terms of classification, characterization and interpretation of the names of objects. In this regard, more than ten dissertations were presented and defended, a number of monographs were published, and explanatory dictionaries of object names were published.

Most scientific works on toponymy of Uzbekistan, as well as the Republic of Karakalpakstan as its constituent part, provide information in the aspect of the dictionary meaning of the names of objects. At the same time, they briefly analyze the dictionary meaning and partially express opinions regarding some toponyms. In addition, the classification, characteristics of the names of

objects are given in the aspect of interpretation, while opinions about the features of the formation of toponyms, their interpretation, and geographical description are superficial.

Due to insufficient development of criteria for etymological analysis, there is currently no monographic study on the toponyms of the Republic of Karakalpakstan. As a result, the path of etymological analysis of toponyms has not found application. This circumstance indicates that until now there has not been a complete collection of the republic's toponyms, respectively, a scientific analysis of their peculiar verbal and non-verbal features has not been carried out, the system of criteria for the etymological analysis of toponyms has not been an object of special study. In addition, the analysis of some names of objects was carried out in the form - registration - assumption - popular interpretation - partial commented analysis, and this means that the scientific analysis is not fully completed.

The etymological study of toponyms must be carried out in a logical sequence in the form problem - research - assumption - analysis - interpretation - solution, while it is required that the study reflects in a logical sequence the national spirit of the peoples living in our country and the patterns of development of their language system. It should be noted that place names and toponymic objects are considered the main sources in the development of historical local history and tourism.

Let us turn to the peculiarities of some studies on Uzbek toponymy. In the works of Kh.Khasanov, toponyms are listed and commented, but in them we do not find information on the etymological analysis of toponyms. E. Begmatov limited himself to writing articles on this area. A. Mukhammadzhonov's description and etymological analysis of toponyms is carried out in the historical aspect. Z. Dusimov in the brochure "Fundamentals of Toponymy" carried out a general descriptive analysis, gave a characteristic of historical toponyms, but did not raise the question of their etymological analysis. B. Yuldashev pays special attention to the main problems of Uzbek toponymy. K. Khakimov in the monograph "Toponyms of the Zhizzakh region" observed an approach to toponyms from the point of view of geography, while the question of etymological analysis was not even raised.

In the Karakalpak toponymy, it is also known about a number of studies. Thus, the names of localities in Karakalpakstan were commented on by K. Abdimuratov. We will find information on the names of localities and toponyms in the Karakalpak language in J. Matmuratov, while E. Berdimuratov limited himself to writing a number of articles on toponymy, and K. Koschanov expressed some opinions on toponymy. K. Ashirov provides historical data on the names of some localities in the southern regions of Karakalpakstan, while I. Khalmuratov's articles deal with the issue of toponyms and oronims of the Amudarya region of the Republic of Karakalpakstan. At the same time, although a description, characterization, and commented analysis of the names of localities were carried out in the Karakalpak toponymy, the problem of the etymological analysis of the Karakalpakstan toponyms remains unresolved to this day.

We also note that the reason for the emergence of disputes regarding the study of the toponyms of Karakalpakstan is the groundlessness of the ways of their study from a scientific and practical point of view. Despite the fact that a monograph was published on this topic, in modern toponymy one of the most urgent is the problem of etymological analysis and study of the toponyms of Karakalpakstan.

Thus, to date, a number of works have been carried out on the study of toponyms of both the Republic of Uzbekistan and the Republic of Karakalpakstan. To date, regional toponyms have been studied in linguistic, geographical, historical aspects in general, descriptive terms, comments and characteristics have been given to them. Consequently, at the present stage, an etymological analysis is required.

Since the second half of the twentieth century, work began on the description and characteristics of local attractions, in some of them an attempt was made to conduct an etymological analysis. At the same time, researchers have gone from the usual disclosure of the dictionary meaning of toponyms to a description in the historical, geographical aspect to a commented

description and characterization of the names of localities. Due to the fact that in them only an etymological analysis is given along the way and attention was not paid to the path of etymological analysis of the names of geographical objects, the etymological analysis from a scientific and practical point of view has an imperfect form.

Based on the foregoing, the following can be indicated as some of the problems in the study of toponyms of the Republic of Karakalpakstan:

1. The names of Nukus, Turtkul, Khodjeyli, Kegeyli, which differ in their ancient history, are explained and interpreted in different ways. Since each toponym has educational and educational value, to solve this problem, it is necessary to conduct an etymological analysis that allows us to put forward final conclusions.

2. It is necessary to clarify the scientific and practical aspects of the etymological analysis of the toponyms of the Republic of Karakalpakstan, for the currently available wide commented analysis of the names of localities is not really an etymological analysis.

3. Due to the fact that up to now there is no etymological dictionary of Karakalpakstan toponyms, it is required to compile this dictionary on the basis of a corresponding study of the names of regional geographic objects.

4. Conducting an etymological analysis of the toponyms of Karakalpakstan makes it possible to educate young people in the spirit of pride and devotion to the Motherland, independent in the conduct of domestic and foreign state policy.

5. A systematic study of the etymology of toponyms makes it possible to show the age-old mutual friendship and kinship of the Uzbek and Karakalpak peoples. No wonder people say: "Giving names (here: names) is also an art!"

Summarizing the above, it can be argued that each toponym presupposes the historical past and destinies of peoples. "Historical memory has an important place in restoring and fostering pride in the unbiased, genuine history of the native land, the territory of our country." The results of etymological research and analysis, coupled with public recognition, make it possible to form a final opinion on each of the toponyms.

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Rezyume: *Qoraqalpog'istonda toponimlarni o'rganish XX asrning 50-60 yillarida boshlangan. Ularning tadqiqotlari bayonotlar va tasniflar bilan ta'minlandi. Bu kunlar oldida turgan vazifa - ularning etimologik tadqiqotlari va tahlillari. Agar briejiy maqolada yoritilgan bo'lsa, bu muammo.*

Резюме*: Изучение топонимов в Каракалпакстане началось в 50-60 годах XX века. Их исследования проводились по утверждениям и классификациям. Задача, стоящая перед современными людьми, - их этимологические исследования и анализ. Эта проблема кратко освещена в статье.*

Kalit so'zlar: *toponimlar, bayonotlar, tasniflar, etimologik tadqiqotlar u tahlil.*

Ключевые слова*: лексикология, ономастика, топонимия, топоним, слово, индикатор, топосис, топоформант.*

THE ROLE OF CHILDREN LITERATURE IN THE DEVELOPMENT OF THE CHILD PERSONALITY

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Summary: *The article explores the educational significance of each genre in Karakalpak children's folklore in the formation of preschool children as individuals. Every genre in children's folklore helps the child to get to know the world, to interact with others, to adapt to society, to gain initial knowledge about the environment. Along with preparing preschool children for school, educating them in the spirit of patriotism, defending the motherland, educating boys in the qualities of courage, as well as educating girls in kindness, courtesy and decency are broken by these literary genres. Along with comprehensive education of children, these folklore genres help to increase their love for their native language and teach them to pronounce words correctly, to understand the meaning of each word. The reason is that the role of each genre in children's folklore is invaluable in the development of preschool children in a well-developed, culturally rich, able to think freely in their native language, understand their nationality and have their own personal opinion. These folklore genres have been inherited from our ancestors and it is our educative and teaching duty to pass them on to the next generation in a clean, pure state and to continue our national heritage!*

Key words*: personality of a child, folklore, tongue twister, rumors, counts, education, national heritage, folk pedagogy, preschool organization.*

Introduction. Resolution of the President of the Republic of Uzbekistan Sh. Mirziyoyev dated September 9, 2017 No PP-3261 "On the possibilities of radical development of the preschool education system" raised our social life to a higher level in line with modern requirements. The reason is that the upbringing of our children, who will continue our future, remains one of the most important issues of today [2].

By working closely with children, the coaches of preschool education will achieve good results in further strengthening the educational work, the introduction of new methods, forms, methods of education, as well as achieving the goals set for educational work with parents. Therefore, the role of folklore, especially Karakalpak literature, in the development of children's language and patriotic education in preschool education is of different importance.

To do this, every parent, teacher and coach must first see the person in the image of each child. Based on this simple requirement, we must accept that the main goal and task of education should be to bring up our children as free and broad-minded people. This requires close communication without separating the educational work from each other.

Methodology. In children's literature, the aspects of integrated education, which are necessary for the upbringing of children, have found their place in various genres and topics. The people of Karakalpakstan, through the examples of literary creations addressed to children from the folklore, have been educating them in detail and illuminating the clear paths of life. For example; In folk epics, they are nurtured by the pre-formed national views of the people, such as heroism, bravery, courage, preaching, and they begin to strive for such qualities in each person.

Abu Ali Ibn Sina, a well-known scholar and physician among the people, described the Háyyiw (Lullaby song) as one of the tools of education related to child care: "Sing Háyyiw (Lullaby song) is very useful and necessary for a child. Even if he is a newborn baby, he has feelings and intuitions, and the only thing that nourishes the child's soul is the songs of Háyyiw (Lullaby song). Háyyiw (Lullaby song) receives love through his mother's voice in his songs. A pleasant voice has a positive effect on the child's psyche and develops him mentally and spiritually [3].

Research and Discussion. Fairy tales are an integral part of children's lives and serve as an educational tool among the people of the world. For young children, for example, it is difficult to

grasp the wonders of life at once. In folklore, fairy tales for children are often described using images of their actions and characteristics related to animals and birds. Life is based on awakening children's feelings of friendship and love for each other by explaining its importance in addition to the content of the fairy tale that it is beautiful with friendship and love. Fairy tales further expand the child's imaginary world, enrich his spiritual world, nurture human qualities such as victory, achievement of purpose, justice, honor. Epics teach children to be brave, to be militant, and to protect the honor and dignity of their people. For this reason, each genre is considered to have a special significance in the upbringing of a child [6. 78].

Jumbaqlar (Riddles) for children also have a place in folklore. The service performed by the puzzles is of great importance to the child. Young children become very curious, sensitive to what is seen around them. It is designed to express the quality and character of the child in introducing him to the world around him. Riddles still provide educational services today. Jumbaqlar (Riddles) develop children's knowledge of the world, thinking about the mysteries of nature, imagination. He observes everything in nature that pertains to human life. Their color tells about the content. In addition, Jumbaqlar (Riddles) increase the child's language skills, vocabulary, develop logical thinking. Jumbaqlar (Riddles) are also designed for older adults and do not depend on a person's age. If we look at the history of the origin of riddles, it is impossible to say when it came into being. The reason is that since the advent of mankind, this world has been a puzzling world. This is why all the places where people sit and walk are full of puzzles, which can still be unresolved puzzles today.

1. Ózi aǵadı, ishseń shóliń qanadı, (suw) – *It flows by itself, if you drink it quenches your thirst (water)*

2. Appaq qarday, mazalı palday (qant) – *As white snow, and sweet as honey (sugar)*

3. Dásturxanda turadı, toqshılıq boladı (nan) – *It stays on the table, there is nourishment (bread)*

4. Túnde aspanda jańǵan, mıń shıraq kórdim (juldız) – *I saw a thousand lights burning in the sky at night (star).*

Through the given Riddles it is possible to develop the knowledge and imagination of 5-6 year old children. The child thinks, imagines to find the answer to the puzzle. It is connected to its surroundings by the words of the said puzzle.

Jańıltpashlar (tongue twister) was used by our people to teach children with speech defects to speak correctly and fluently by practicing the language, to develop the child's tongue muscles well, and to pronounce sounds correctly and clearly. In the family, the child's "r" sound, or "s" and in other cases when it is difficult to pronounce sounds, words are used in folk pedagogy [9. 36]: For example:

Meniń atam ertek aytar,
Arasında jıl qaytarar,
Qartaysada dım jas ele
Jaylaw betten mal qaytarar,
Qaytarsada tez qaytarar.
My father tells stories,
Between years,
He is still very young
Returns cattle to pasture,
If he returns, he will return quickly.

These tongue twisters are taught to children by adults. Children develop the ability to speak correctly by memorizing them.

Among folk songs, children's songs also have a wide place. Children's songs are an integral part of folk songs and are a type of national culture that has a great impact on the development of children's thinking, spirituality. Our ancestors, who lived before us, paid great attention to the upbringing of children. He created folklore patterns in which the child sat mentally, looking at

nature, psychology, understanding them lightly, performing them together with moving games, and developing them mentally. The fact that various educational aspects of modern pedagogy cannot replace a simple fairy tale in folklore fully reflects the fact that the genre of fairy tales still occupies a large place in the lives of children. In addition, children's songs such as proverbs, riddles, legends, epics have a great positive impact on the development of children. Children's songs are very interesting for children, even with their own performance. Children's songs are built with a beautiful, small plot, simple language, two or four lines of rhyme, which simplifies children's worldview, sensitivity, thinking, thinking. Many of the children's songs are performed in accordance with their respective musical titles, choreographic and dramatic movements. Peculiarities of children's songs N.Davkarayev writes: "Its peculiarities are first of all told in public. Secondly, the type of song is mixed when playing folk games, and thirdly, it is told in the form of questions and answers." For example, "Áwelemen-dúwelemen" helps to unite children's heads, organize the game and strengthen the feelings of friendship between them, and introduces the child to the seasons, and a song that should be performed in conjunction with the game:

«Áwelemen-dúwelemen»

– *Áwelemen-dúwelemen,*
– *Salqan iyttiń sanı menen,*
– *Qara qoydıń qanı menen,*
– *Áwez molla qayda ketti?*
– *Duzǵa ketti.*
– *Qashan keler?*
– *Jaz keler.*
– *Jaz kelmese,*
– *Gúz keler.*
– *Pállempish,*
– *Sen tur.*
– *Sen shıq* [8. 263].

With the number of dogs,
With the blood of a black sheep,
Where did the Áwez mullah go?
He went to the salt.
When will he come?
In Summer.
If he doesn't come in summer,
He will come in the fall.
Pállempish,
You stand.
You get out.

The children of two, three, and even more, sitting close with their feet together. And he continues to hold his fingers, saying every word. If the last word "You get out" hits someone's leg, that child pulls one leg. The game continues through repetition from the beginning. In the end, anyone has one leg left. The children complete this song with their action games, at the end of which the child with the remaining leg is placed on probation for swallowing the game. The loser child fulfills the condition of the game. The conditions of the game are different. If, in the evening, the children are playing inside the house, the loser child is told to go out of the house and walk around the house once. In this condition, children test whether the lost child is coward or not. The second condition requires him to tell a tale. In this case, it is clear how much the loser knows how to speak, how many fairy tales he knows. In the third condition, the loser is asked questions by the winning children.

Content of questions:

− Jer tegis pe, domalaq pa?
− Ay nege júzedi?
− Aspannıń shegi bar ma?
− Bult qaydan keledi?
− Payǵambardıń qılıshın kórdiń be? hám t.b.
− Eki ayaqlıda kim tatıw?
− Tórt ayaqlıda ne tatıw? hám t.b.
"Is the ground flat or round?"
"Why does the moon swim?"
"Is there an end to sky?"
"Where does the cloud come from?"
"Have you seen the sword of the Prophet?"
"Who's a friend to two-legged?"
"What's a friend to four-legged?" and others.

By saying "Áwelemen, dúwelemen," the children, with great attention and interest, observe and count how many feet are left in the middle. He also learns to count. On the other hand, the child who loses the game learns to perform tasks in order to fulfill the requirements set for him in the community on the basis of conditional play. If, as he tells a story, his eloquence, his culture of speaking, his singing, his natural talent and ability to sing is naturally known to other children. When a child is unaware of anything, when children like him laugh at him and treat him with contempt, the child begins to look for a second time to avoid such situations. When he is afraid to walk outside the house in the dark, after laughing at him, the child without enduring the shame develops a fearlessness, a desire for generosity (Figure 1).

Ótirik óleńler (Rumors) has it that children learn to raise their spirits and speak fluently. For example;

Shekshek barar shel menen,
Shawıp aldım bel menen,
Ishek qarnın alıp edim,
Tawısa almadıq el menen [7. 61].
The locusts walk beyond,
I ran with a shovel,
I took the belly,
We couldn't finish it by hand.

If we look at counting in Karakalpak folklore, this genre teaches children to count correctly, to develop thinking skills, and to add and subtract numbers from each other without error. For example:

Bir degenim – bilek,
Eki degenim – elek,
Úsh degenim – úshek,
Tórt degenim – tósek,
Bes degenim – besik.
One means – the wrist,
Two means – the sieve,
Three means – triangle,
Four means – a bed,
Five means – a cradle,

as well as enriching the initial mathematical concepts of the children, without showing resentment, it is also shown briefly and lightly for the 6-year-old to get to know the world.

Conclusion.

In short, in order to develop children's spoken language and logical thinking in the pedagogical process in preschool education, we need to take into account their age. The reason is that the content of Karakalpak children's literature songs, fairy tales and other works should correspond to the age characteristics of children. So, the role of each of these genres in the development of the child's personality is invaluable. Our ancestors used these examples of folklore in the upbringing of children in folk pedagogy, developing and perfecting their children in all respects. It is our human duty to teach this national heritage to future generations and to develop the child's personality while preserving our nationality!

Figure 1. **Áwelemen**, **duwelemen** song illustration.

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Rezyume: *Maqolada maktabgacha yoshdagi bolalarning shaxs bo'lib qoliblashishida qoraqalpoq bolalar folkloridagi har bir janrning tarbiyaviy ahamiyati urganiladi. Bolaning dunyoni tanishi atrofdagilar bilan muloqatga kirishi, jamiyatga moslashishi, atrof muhit haqida dastlabki bilimlarni olishda bolalar folkloridagi har bir janr bolaga yordam beradi. Maktabgacha yoshdagi bolalarni maktabga tayyorlash bilan birga ularni Vatanparvarlik ruhida tarbiyalash, ug'il bolalarni vatan qo'rg'ash, mardlik xususiyatlarida tarbiyalashga, unnan tashqari qiz bolalarni mexribonlik, ibo, odoblilik singari tarbiya qirralari ushbu adabiy janrlar orqali bolaga sindirilib boriladi. Bolalarga har tomonlama ta'lim-tarbiya berish bilan birgalikda ularning o'z ona tiliga bo'lgan muxabbatini oshirish va so'zlarni to'g'ri xatosiz so'zlashga o'rgatish, har bir so'zning mazmunini tushinishga ushbu folklorlik janrlar yordam beradi. Sababi, maktabgacha yoshdagi bolalardning har tomonlama rivojlangan, madaniy boy, o'z ona tilida erkin fikrlay oladigan, o'z milliyligini tushungan va o'z shaxsiy fikriga ega shaxsni ustirishda bolalar folkloridagi har bir janrning o'rni beqiyos. Ushbu folklorlik janrlar bizga ota-bobomizdan me'ros bo'lib qolgan va biz*

bularni kelajak avlodga toza, sof holida yetkazib berish va milliy me'rosimizni davom ettirish bizning tarbiyachi va o'qituvchilik vazifamizdir!

***Резюме**: В статье исследуется воспитательное значение каждого жанра каракалпакского детского фольклора в становлении дошкольников как личности. Каждый жанр в детском фольклоре помогает ребенку познавать мир, взаимодействовать с другими, адаптироваться к обществу, получать начальные знания об окружающей среде. Наряду с подготовкой дошкольников к школе, воспитанием их в духе патриотизма, защитой Родины, воспитанием мальчиков в мужестве, а также воспитанием девочек в доброте, скромности и порядочности эти литературные жанры незаменимы. Эти фольклорные жанры наряду с разносторонним воспитанием детей помогают повысить их любовь к родному языку и научат правильно произносить слова, понимать значение каждого слова. Причина в том, что роль каждого жанра в детском фольклоре неоценима в развитии дошкольников в хорошо развитых, культурно богатых, способных свободно мыслить на родном языке, понимать свою национальность и иметь собственное личное мнение. Эти фольклорные жанры унаследованы от наших предков, и наша воспитательная и обучающая обязанность - передать их следующему поколению в чистом, прозрачном виде и продолжить наше национальное наследие!*

***Kalit so'zlar:** bola shaxsi, folklorik ijodlar, tez aytish, bekorchi u'lanlar, **s**anamashlar, tálim-tarbiya, milliy meros, xalq pedagogikası, maktabgacha talim tashkiloti.*

***Ключевые слова:** личность ребенка, фольклор, скороговорки, частушки, считалки, образование, национальное наследие, народная педагогика, дошкольная организация.*

USAGE OF KINEMES IN THE ENGLISH AND KARAKALPAK TEXTS

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Summary: *The article deals with the kinematic units which are known as non-verbal language means and their usage in English and Karakalpak literary texts. In the research it is supposed to represent how kinematic units can be accompanied with speaker's utterance and without speech act of speaker. Besides that, some types of kinemes are studied in the article. On this purpose, I tried to do research on how kinematic units convey meaning in different context and the problem of the study is based on the examples of literary works by prominent English and Karakalpak writers.*

Keywords: *kineme, kinematic unit, verbal language, non-verbal language, karakalpak literature.*

Non-verbal language plays essential role in human communication and according to the definition given in the latest works by linguists it says that non-verbal communication is the transmission of messages or signals through a nonverbal platform such as eye contact, facial expressions, gestures, posture, and the distance between two individuals. Movement of human body conveys appropriate meaning and a lot of researches done on it by scientists. Body movements used in communication process are supposed to be kinematic units and it is known as non-verbal language that gives us information about what human body movements say.

In our life when we talk to our friends, relatives or to colleagues we can notice that people use different body movements during their speech and all of them convey some kind of meanings.

In our real life we can witness the usage of kinemes by people in their communication with each other. Besides that, we can come across with the usage of kinematic units in texts when you read novels or stories.

The object of the research is considered to be the kinematic units are expressed in the texts and object is to do analysis on what meaning kinematic units may convey in the examples which are taken from works of English and Karakalpak writers. Kinematic units can be accompanied verbally and nonverbally itself as well. If kinemes are accompanied with speaker's utterance it gives complementary meaning to what is said by speaker.

Looking back to long history and culture we can say that it is paid a great attention to human body language and non-verbal communication. It is known that the attention to the body language started from ancient time, because scholars and linguists prove that based on this body language appeared verbal language. Till this time there were researches in various spheres such as medicine, psychology, pedagogy, art, physiognomy, gesture, and mimics and body language considered to be object of these sciences.

«One of the pioneers in researching body language was a pastor John Casper Lavater from Zürich, and he published his work "Essays on physiognomy" in 1792. He pioneered a detailed observation and description of correlations between facial expressions and body configurations». [1.175]

«Kineme is a non-verbal communicative language which is expressed by gestures, mimics and by different poses. In communication, kinematic units indicate appropriate social culture and they can be used in two ways. In the first one listener gets information which is sent by speaker using kinematic units without speech and in the second one listener perceives the information which is sent by speaker using kinematic units with speech». [2.17]

For example,

(1) Daughter-in-low poured water guests' hands with quman before serving a meal.

(2) He said "Goodbye" waving his hand.

In the first example *pouring water guests' hands with quman* denotes to wash their hands before meal and it expresses definite meaning that a meal is ready to be served while in the second example *waving his hand* gives additional meaning to what speaker said.

The origin of the term "kinema" is connected to American anthropologist Ray Birdwhistel who is the author of the work "An introduction to kinesics, an annotated system of records of hands and body movements" which was published in 1952.

«R.Birdwhistel started to create the catalogue of human actions and poses of human in his own the laboratory where he opened at East-Pennsylvania psychiatry institution in 1959. From early time, R.Birdwhistel called human action as "kin" and "kineme". "Kin" means the smallest, not divisible further, the least noticeable movement, and "kineme" denotes larger units, through which real communication of people takes place. Kinemes form a structure and combine into larger units like kinemorphs and kinesyntagmas.» [3.17]

S.Makhlina (2010) in her work «Lectures on cultural semiotics and linguistics» states that a prominent Russian linguist G.E.Kreydlyn divides kinemes into three classifications: 1) the kinemes that have lexical meaning; 2) the kinemes that identify the fragment of communication; 3) the kinemes that regulates communicative process;

The first type of kinemes is called emblems, the second one is called illustrators and the third one is regulators. [4]

The first type of kinemes is emblems and they can have meaning in communication that is used differently from each other in different culture. For instance, in Russian culture *touching his/her stomach with hands and clapping it* says that person is satisfied with meal.

In the example mentioned above *daughter-in-low pours water guests' hands with quman before serving a meal*, in the Karakalpak culture it means that a meal is ready and is going to be served.

The meaning of the word *quman* is a dish made of cast iron, copper with handle and cover in a form of oval and it is used for boiling water and washing. [Kalenderov, Kidirbaeb, Saytov, Embergenov, Turabaev, Beketov. 1988: 188]

As we mentioned above that the first type kinemes have lexical meaning and these examples from different culture can be example for this type.

The second type kinemes is called illustrative gesture that can be used together with verbal language. Hand gesture is one of gestures that is mostly used together in verbal communication. Let us look at the example that mentioned before, *"He said "Goodbye" waving his hand."* In this example, you can see the relation of kinematic unit to verbal communication and the action of man "*waving his hand*" illustrates what he said.

The third type of kinemes is considered to be regulators and it serves as dialogue setting, supporting, and regulating action between speakers and listeners in verbal and non-verbal communication. For instance,

…'Well,' returned Mr. Peggotty, standing with his legs pretty wide apart, and rubbing his hands up and down them in his comfortable satisfaction, as he looked alternately at us and at the fire. … [5. 669]

In the examples, the kinematic units "*standing with his legs pretty wide apart*" and "*rubbing his hands up and down*" are regulating the action between speakers and listeners.

Supposing scientists' and linguists' views mentioned above and analysing all the kinemes which are used in the examples, we can come to the conclusion that the kinemes which are used as non-verbal communicative means are used in two forms. The first one is the kinemes that are used in the communication between speaker and listener without verbal language and they indicate appropriate meaning in communication. And the second one is the kinemes that are used in communication accompanying verbal language and they express supporting, complementary meaning to the context of verbal language that are used in communication.

Now let us view these two forms of the usage of kinematic units in the texts that we usually come across when we read a novel or stories.

Kinematic units that are used without speaker's utterance.

Here, in the examples below it is studied and done analysis on how kinematic units are used in some excerpts taken from the works of prominent English writer Charles Dickens and the Karakalpak writer Muratbay Nizanov. Examples were taken from the literary work *David Copperfield* by Charles Dickens and the novel *The last wish* by Muratbay Nizanov and comparative analysis were done between these two languages.

Example 1:

(English text) *... Mr. Micawber,* ***leaning back in his chair with his hands in his pockets****,* ***eyed us aside****, and* ***nodded his head****, as much as to say that the case was very clearly put. ...* [6. 622]

(Karakalpak text) *… — Әне, көрдиң бе, ата-ана перзентке ҳеш ўақта дусмалый ат қоймайды. Демек, көп жыл перзент күтип, енди арзыўыма жеттим, деп қойған екен я, солай ма?*

— Мен ***үнсиз бас ийзедим.*** *....*

Translation: « — You see, parents never put ordinary name for their child. So, your parents had been waiting a baby for a long time, after being realized their wish they put this name for you, didn't they?

— I **nodded my head** keeping silent. [7.10]

In the text taken from English literature, several kinemes are used and all of them indicate definite meanings. The kinematic unit *leaning back in his chair with his hands in his pockets* says that the person feels relaxation or feel himself easy while *eyed us aside* means curiosity or looking at something without turning your face in a manner of checking around.

In both English and Karakalpak texts, the same kineme *nodded one's head* are used. In the English text, it means satisfaction and in the Karakalpak text, it has meaning of agreement. As you see in most cases body movement can convey more meaning that one up to the context.

According to G.E.Kreydlyn (2002), he classified the kinemes into three types such as emblems, illustrators and regulators. The kinemes used in this example are supposed to be emblems that indicate definite lexical meaning.

There are two main semantic types of emblems - communicative and symptomatic.

Communicative emblematic gestures include kinemes that carry information that gesticulating in communicative act deliberately transfers to the addressee. Symptomatic gestures express the emotional state gesturing. [8.114]

The kinemes mentioned above can be examples for communicative emblematic gestures.

Example 2:

(English text) *… She* ***waved her hand*** *to me to go away, so earnestly, that, all confounded as I was, I turned from them at once. In doing so, I heard her say to the coachman, 'Drive anywhere! Drive straight on!' and presently the chariot passed me, going up the hill. ...* (*David Copperfield*. P. 520);

(Karakalpak text) *… Адамсыз үйди демде шаң басады. Ол есиктен кирип болып, шкафларға қонған шаңға бираз қарап турды да,* ***қолын бир сермеди****. «Кейин сыпырып аларман» деген кейипте еди ол. ...*

Translation:

« If there is not be anyone in the house it is quickly be dusted. After entering she looked at the dust of the cupboard for some time and unwillingly **waved her hand**. She intended to clean it later». (*The last wish.* P.68).

In the given examples the same kinemes are used in both English and Karakalpak texts, however, due to the context they differentiate from each other in meaning. The kinematic unit '*waved her hand*' used in the English text expresses the meaning of parting while the kinematic unit in the Karakalpak text has meaning of unwillingness.

The body movement *waved her hand* can indicate various meaning in different context. This kinematic unit can be used in order to say hello or goodbye, to attract somebody's attention, to

show where you are when somebody calls, and we can only identify the meaning considering how this unit is used in context.

Due to G.E.Kreydlyn's (2002) classification, the kineme 'wave her hand' is considered to be communicative emblematic gesture as it expresses lexical meaning without using verbal language.

Kinematic units that are accompanied with speaker's utterance

Kinematic units can be used in communication with accompanying verbal language as well, and now let's have a look at some analysis done on story *Relatives* which was written by well-known Karakalpak writer Aytbay Bekimbetov and compare selected examples with work of «David Copperfield» written by Charles Dickens.

Example 3:

(English text) *…'Traddles,' said I,* ***shaking hands with him again****, after I had sat down, 'I am delighted to see you.'* (*David Copperfield*. P. 559);

(Karakalpak text) *… Құрбан ҳайт күни зықна байдың жумысынан зөрға қутылып, азан менен өз үйине киятырған Мырзабай ақ шашлы апасын көрип:* ***- Ана!!*** *- деп* ***ентигип келип****, оның қабарған* ***қолынан алды.*** *…*

Translation:

«On Sacrifice Aid Day having hardly escaped from the work of bai, going back his own home Mirzabay saw his grey haired mother and said "**Mum!!**" **coming up breathlessly to shook her toil-hardened hands»**. (*Relatives*. P. 89)

Joe Navarro states in his work «Dictionary of Body Language» that the handshake is the favored greeting behavior in the West, appropriate in both professional and personal settings. A handshake is often the first physical contact and impression you will make and take away from another person, and so it is important to get it right. [9. 316]

Body action *shaking hands with him again* in the example illustrates speaker's utterance and expresses the meaning of happiness, gladness. In the example taken from the Karakalpak literature we can see that verbal language '*Mum'* accompanied with kinematic units *coming up breathlessly to shake her toil-hardened hands*. Here, the verbal language "Mum" is used to call mother's attention and kinematic units "coming up breathlessly to shake her hand" has a meaning of greeting which gives complementary information to the used verbal language.

Illustrative gestures are kinemes, highlighting some speech, gesture or other fragment in the act of communication and therefore always acting in the communicative act together with speech, its fragments or paralinguistic sound units. (Kreydlyn. 117)

According to G.E.Kreydlyn's (2002) view, we can say that the kinematic units which are used with speaker's utterance are considered to be illustrators.

Example 4:

(English text) *…'And, Peggotty,' says I, 'I shall be glad to see you, and I'll make you as welcome as a queen.'*

*'****Bless your dear heart!****' cried Peggotty. '****I know you will!****' And she* ***kissed me beforehand****, in grateful acknowledgement of my hospitality. …* [10. 169]

(Karakalpak text) *… Муңлы жүрегин жубатып, перзентине миннетдар болған Минайым:* ***- Бәрекелла балам, бүгин үйимизде құрбанлық шалынбаса да, әкеңниң құрал-әсбаплары қайтадан жаңлап, сейилдиң үлкени үйимизде болды. Мархум әкеңде саған ырза болып, оның руўхы жай тапқан шығар****, - деп Мырзабайдың қара терге малынған* ***маңлайынан сүйди***. [11.91]

Translation: «Minayim, who was pleased with her son, comforting her heavy heart said: "**Well done my son, in spite of the sacrifice wasn't slaughtered today, a big celebration was here at our home because of you made clinking of your father's tools again. Your dad's sole might calm down being satisfied with you**." **kissing** Mirzabay's sweaty **forehead**».

In the second examples the kineme serves as illustrators as it is accompanied with speaker's utterance and the kinematic unit or body movement *kissed* gives additional meaning to the verbal

language which expresses the meaning of *being thankful, supporting and love*. It defines two people's liking and fondness for each other. It is clear that speaker feels respect and love to the person who is saying to by his/her utterance, but kineme accompanied with verbal language gives complementary meaning.

G.E.Kreydlyn states that the meanings "human affection" and "love" are transmitted in European culture mainly by lips and hands; kiss, stroke, touch, hug, caress, etc. [12. 95]

In Karakalpak culture, act of kissing can only be done, visually for audience, between parents and children, relatives may kiss each other in greeting and parting or when they congratulate each other on some occasions. But due to the culture of Karakalpak kissing between spouses or any couples is not done visually in front of other people as it is considered to be shameful act.

In the given article we tried to give historical background of origination of the term kinemes and it is connected with American anthropologist Ray Birdwhistel. He states that human movements can be called as "kin" and "kineme" and "kin" means the smallest, not further divisible, the least noticeable movement, and "kineme" denotes larger units, through which real communication of people takes place. Moreover, it is studied Makhlina's work "Lectures on cultural semiotics and linguistics" and a prominent Russian linguist. Kreydlyn's classification of kinemes that are divided into three types such as the kinemes which have lexical meaning, the kinemes which identify the fragment of communication, the kinemes which regulates communicative process. The problem and the purpose of the article is to research the kinemes used in the text.

Focusing on the views of these scholars and linguists we decided to do analysis on the usage of kinemes in two forms: the first one is the kinemes that are accompanied without speaker's utterance together and the second one is the kinemes that are used with speaker's utterance. The findings represents that the kinemes used with speaker's utterance are considered to be emblems as they convey definite lexical meaning. And the kinemes accompanied with speaker's utterance are supposed to be illustrators as the kinemes used with speech act used by speaker indicates illustrative, complementary meaning,

Finally, we have come to conclusion that the kinematic units taken from the English and Karakalpak texts differentiate from each other according to the following reason: 1) the usage of the same kinemes in different context, 2) from the point of cultural background of English and Karakalpak people 3) accompanying with or without speaker's utterance.

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Rezyume: *Maqolada og‘zaki bo‘lmagan til vositalari sifatida tanilgan kinematik birliklar va ularning ingliz va qoraqalpoq badiiy matnlarida ishlatilishi haqida so‘z boradi. Tadqiqotda kinematik birliklar qanday qilib gapiruvchining so‘z bilan va nutqsiz faqat imo ishora orqali tinglovchiga yetkazib berilishi kursatilgan. Bundan tashqari, maqolada kinemalarning ayrim turlari o‘rganilgan. Shu maqsadda men kinematik birliklarning turli xil mazmundagi ma’nolarni qanday etkazilishini urganib chiqishga xarakat qildim va tadqiqot muammosi taniqli ingliz va qoraqalpoq yozuvchilarining adabiy asarlari matnlarga asoslangan xolda tadqiq etishga harakat qildim.*

Резюме: *В статье рассматриваются кинематические единицы, известные как невербальные языковые средства, и их использование в английских и каракалпакских художественных текстах. В исследовании предполагается представить, как кинематические единицы могут сопровождаться высказыванием говорящего и без речевого акта говорящего. Кроме того, в статье исследуются некоторые типы кинем. С этой целью я попытался исследовать, как кинематические единицы передают смысл в разном контексте, и проблема исследования основана на примерах литературных произведений выдающихся английских и каракалпакских писателей.*

Kalit so‘zlar: *kinema, kinematik birlik, og‘zaki til, og‘zaki bo‘lmagan til, qoraqalpoq adabiyoti.*

Ключевые слова: *кинема, кинематическая единица, вербальный язык, невербальный язык, каракалпакская литература*

УДК 413.162

ARCHAIC, OBSELETE AND OBSOLESCENT, INTERNATIONAL TERMS

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Summary: *This article investigatesthe category of archaic,obsolete obsolescent international terms belong many borrowings which have been kept in the literary language as a means of preserving the spirit of earlier periods.*

Keywords: *meaning,term,fundamental,large,goal,author,research,develop-ment*

The term-stock of a language is in an increasing state of change. Terms change their meaning and sometimes drop out of the language altogether. New terms sprig up and replace the old ones. Some terms stay in the language a very long time and do not lose their faculty of gaining new meanings and becoming richer and richer. Other terms live but a short time are like bubbles on the surface of water they disappear leaving no trace of their existence.

In recent years, terminological work has been carried out on a large scale; nevertheless, individual authors understand the goals and objectives of their research in different ways. There is also no common understanding of the fundamental terms. All this testifies to the growth and development of this branch of knowledge.

Although there are more than 200 languages in the world, the developed terminology exists only in 60 languages and covers about 300 professional subject fields, while there are not so many terminologically developed fields in each language. Terminological activity in each field depends on the productivity of the industry in which new concepts and names are created.

There are languages terminologically developed to a greater or lesser extent. Russian, French, English, Italian, German are well developed terminologically. In recent decades, terminology has been developed in the Republic of Uzbekistan.In terminologically developing languages, it is not so important to clearly distinguish between concepts and names that have long been in them.

The specificity of the terminological work in Uzbekistan is dictated by the multifunctional composition of the population of the republic.The languages of many nations are the object of study of linguists, historians, cultural figures. The terms included in school textbooks and found in the press stand apart. They are selectively taken from the terminology of individual scientific disciplines. At the same time, school terminology is combined into concentrates in accordance with the information available to students at a certain level of study, and newspaper terminology is to a certain extent accidental, since it is dictated by the relevance of the subject matter of today. The terminologist, for his successful work, needs mastering all the terms of a certain branch of knowledge, taking into account international archaisms and neologisms. Russian language occupies a special place among terminologically developed languages of the CIS countries. This is the language of international communication of the peoples of the CIS countries and international relations. The development of technology, culture, art generates its own special words. It occurs at different times, in different parts of the globe and is clothed in the material form of different languages. Not every special word is a term, and not any collection of special words can be called terminology. Terminology as a set of terms is part of international special vocabulary. The patterns of the formation and development of the latter are to some extent characteristic of terms. A powerful means of integrating science is its language, which is based on terminology.

The language "enters" into science primarily through terminology. Other elements of the language cannot be compared with the terminology.

Danilenko V.P. writes: «Под термином мы понимаем слово или словосочетание специальной сферы употребления, являющееся наименованием научного или производственно-технологического понятия и требующее дефиницию» [1; 15].

In registering these processes the role of dictionaries can hardly be over-estimated. Dictionaries serve to retain this or that terms in a language either as a relic of ancient times, where it lived and circulated, or as a still living unit of the system, though it may have lost some of its meaning. They may also preserve certain nonce-creations which were never intended for general use. In every period in the development of a literary language one can find words which will show more or less apparent changes in their meaning or usage, from full vigor, though a moribund state to death, i.e. complete disappearance of the unite from the language.

We shall distinguish three stages in the aging process of words:

Thebeginning of the aging process when the term becomes rarely used. Such terms are called obsolescent, i.e. they are in the stage of gradually passing out of general use. To this category first of all belong morphological forms belonging to the earlier stages in the development of the language. In the English language these are the pronouns thou and its forms thee, thy and thine: the corresponding verbal ending -est and the verb-forms art, wilt (thou makest, thou wilt); the ending – (e) th instead of – (e) s (he maketh) and the pronoun ye.

To the category of obsolescent terms belong many French borrowings which have been kept in the literary language as a means of preserving the spirit of earlier periods, e.g. a pallet (a straw mattress), a palfrey (a small horse); garniture (furniture).

The second group of international archaic terms are those that have already gone completely out of use but are still recognized by the English speaking community: e.g. methinks (it seems to me); nay (no). These international terms are called obsolete.

The third group, which may be called archaic proper, are international terms which are no longer recognizable in modern English, words that were in use in Old English and which have either dropped out of the language entirely or have changed in their appearance so much that they have become unrecognizable, e.g. troth (faith); a losel (a worthless, lazy fellow).

It will be noted that on the diagram the small circles denoting international archaic and poetic terms overlap and both extend beyond the large circle «special literary vocabulary». This indicates that some of the words in these layers do not belong to the present day English vocabulary. The border lines between the groups are not distinct. In fact they interpenetrate. It is especially difficult to distinguish between obsolete and obsolescent international terms. But the difference is important when we come to deal with the stylistic aspect of an utterance in which the given word serves a certain stylistic purpose. Obsolete and obsolescent international terms have separate functions, as we shall point out later.

There is still another class of terms which is erroneously classed as archaic, obsolete and obsolescent terms. By gone periods in the life of any society are marked by historical events, and by institutions, customs, material objects, etc. which are no longer in usefor example.: Thane, yeoman, goblet, baldric, mace. Terms of this type never disappear from the language. They are archaic, international terms and remain as terms referring to definite stages in theobsolete and obsolescent development of society and cannot therefore be dispensed with, though the things and phenomena to which they refer have long passed into oblivion. Obsoleteand obsolescentinternational terms have no synonyms, whereas archaic international terms have been replaced by modern synonyms.

Archaic international terms are primarily and predominantly used in the creation of a realistic background to historical novels. It must be pointed out, however, that the use of obsoleteand obsolescentinternational terms in a passage written in scientific style, say, in an essay on the history of the Danish invasion, will bear no stylistic function at all. But the same terms when used in historical novels assume a different stylistic value. They carry, as it were, a special volume of information adding to the logical aspect of the communication.

This, the main function of archaisms, finds different interpretation in different novels by different writers. Some writers overdo things in this respect, the result being that the reader finds all kinds of obstacles in his way others under estimate the necessity of introducing obsolete or obsolescent elements into their narration and thus fail to convey what is called «local color»

As a matter of fact the heroes of historical novels speak the language of the period the writer and the reader live in, and the skill of the writer is required to color the language with such obsolete or obsolescent international elements as most naturally interweave with the feature of the modern literary language. These elements must not be archaic in the narrow sense.

They must be recognizable to the native reader and not hinder his understanding of the communication.

In accordance with these principle Walter Scott never phonographs the language of earlier periods; he sparingly introduces into the texture of his language of few words and expressions more or less obsolescent in character and this is enough to convey the desired effect without unduly interlarding present day English with outdated elements of speech. Therefore we can find such words as methinks, haply, nay, travail, repast and the like in great number and, of course, a multiplicity of historical terms. But you will hardly find a true international archaism of the nature indicated in our classification asinternational archaisms proper.

Besides the function just mentioned, archaic terms and phrases have other functions found in other styles. They are, first of all, frequently to be found in the style of official documents. In business letters, in legal language, in all kinds of statutes, in diplomatic documents and in all kind of legal documents one can find obsolescent international terms which would long ago have become obsolete if it were not for the preserving power of the special use within the above mentioned spheres of communication. It is the same with archaic and obsolete international terms in poetry. As has already been pointed out, they are employed in the poetic style as special terms and hence prevented from dropping completely out of the language.

Among the obsolescent international elements of the English vocabulary preserved within the style of official documents, the following may be mentioned; aforesaid, hereby, there-within, herein after named. The function of archaic international terms and constructions in official documents is terminological in character. They are used here because they help to maintain that exactness of expression so necessary in this style.

Archaic international terms and particularly archaic forms of terms are sometimes used for satirical purposes. This is achieved through what is called anticlimax. The situation in which the archaism is used is not appropriate to the context there appears a sort of discrepancy between the terms actually used and the ordinary situation which includes the possibility of such a usage. The low predictability of an international archaism when it appears in ordinary speech produces the necessary satirical effect.

Archaic international terms, terms-forms and word-combinations are also used to create an elevated effect. Language is specially mounded to suit a solemn occasion; all kinds of stylistic devices are used, and among them is the use of international archaisms.

Some archaic international terms due to their inner qualities (sound - texture, nuances of meaning, morphological peculiarities combination power) may be revived in a given.

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Rezyume*:Maqolada oldingi davrlarning ruhini saqlab qolish vositasi sifatida adabiy tilde saqlanib qolgan ko'plab qarzlarga tegishli arxaik, eskirgan xalqaro atamalar toifasi ko'rib chiqilgan.*

Резюме: *В статье исследуется категория архаических,устаревших международных терминов, принадлежащих многим заимствованиям, которые были сохранены в литературном языке как средство сохранения духа более ранних периодов.*

Kalit so'zlar: *ma'no, atama, fundamental, katta, maqsad, muallif, tadqiqot, ishlabchiqish.*

Ключевые слова: *значение, термин, фундаментальный, крупный, цель, автор, исследование, разработка.*

THE ROLE OF THE DIRECTION OF SUFISM IN THE WORKS OF AJINIYAZ KHOSYBAI ULY

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Summary: *This article describes the religious direction of Sufism. The article says that God is the creator of everything and grants life and spirit to man.*

Keywords: *Sufism, power, God, thinker, aspiration, religious activities, Muslim, creator.*

According to Ajiniyaz, the religious direction of Sufism teaches that all innumerable subjects and phenomena exist in interrelation and interaction according to the sacred law determined by God. According to God's command, people have different destinies and paths in life ("Not all were equal"). God himself orders all phenomena in the world. It is necessary to believe in him candidly and pray. It is wrong to be offended and angry with God. Such behavior is considered blasphemy. God Himself blesses or punishes a simple suicide bomber at will.

God created the way,
Don't do anything tricky to anyone,
Poor Ziywar is not grieving,
May God himself be merciful [2:43].

He wrote, asserting that the almighty God observes the universe and orders it.

According to the poet, people can only address the Creator in prayer and ask him to improve their difficult situation.

However, God's servant has no right to order God and demand from him a certain task except to beg him.:

"My name is Ajiniyaz, My shout does not reach God" is difficult to achieve [2: 41]. He warned that God perceives the desires of his servant of God, given the level of his goodness to other obedient Muslims or at his own discretion.

Ajiniyaz thought that God is the creator of everything and gives life and spirit to man, and in his worldview he attached great importance to the question of human soul and body. According to the concept of the thinker, the Almighty, who rules the world, gives the soul (spirit) to the human body before its birth, while it is still in the womb. Therefore, a human being consists of body and spirit. The body can dissolve in the ground, but soul, spirit will not disappear, they live forever. Spirit is the power that sets the body in motion. Spirit has the ability to think. When the spirit leaves the body, like other things, the body turns into a soulless substance. When man dies, the Creator takes the soul from the body with the help of Azrael, one of his four angels. The soul fundamentally belongs to the Almighty and is only a gift from God.

"If the soul dries like a flower,
I'm hearing from Asrail,
Will take the soul from the body,
There's nothing worse...
One day my soul will leave my body,
There is no doubt about it" [2:50].

So he explained in verse to people where the soul comes from and what happens to it later. According to the doctrine of Sufism, the soul turns into a spirit after it leaves the body and lives apart in space. On a certain day, the spirit returns to the place where a person lives. Therefore, the relatives of the deceased perform rites to commemorate him, and other religious activities to soothe his soul. All this, according to the poet, is carried out in order to calm the spirit of the deceased and to prove that his relatives highly respect him. In the poem "They Speak" the poet believes that in life the soul and body of a man is one and the same, his body:

"One must understand the soul and body" [3]. This is how the poet determines that the

clarification of this question is an important task for the followers of the teachings of Sufism, scientists and theologians.

Ajiniyaz thought that man is composed of spirit and body, so there are laws according to which these two substances, spirit and body keep the human body in unity, and man tries to keep them. The body takes food, drinks drinks, receives carnal pleasure, while the spirit is inherent: mind, thinking, knowledge, feeling, will, positive or negative behavior, and all other mental processes occurring in a person.

When the spirit and body together, apart from the desire for faith and comprehensive education, a person may have difficulties and problems. Sometimes, the human being is dominated by the desire for passion, especially for carnal desire, and he indulges in the pleasures of the mortal world. A person absorbed by passion can weaken spiritually, and have lowly feelings.

Therefore, the thinker taught that man should pay special attention to his spiritual experiences, mind, will, passion, as, in the end, it determines the behavior of God's servant and his faith in God. He understood that faith in God is the power that elevates man and educates devout people who put society in order.

Ajiniyas believed in Sufism and paid great attention to humanism; this can be seen from his equal treatment of people of different ethnic origins and religious denominations. The poet brought up the issues of tolerance in religion as he believed that according to the Sufism doctrine not only the followers of Muslim religion but also the whole humanity is valuable. In his poem “Dildarym” (My Beloved) he also analyzed the social circumstances in other countries and said: “Muslims are being burden to Russia” [2:15] which is a clear proof of it.

The thinker wanted all the humanity to live in abundance, and thought that it was compulsory for every law-abiding citizen to support the whole world in its efforts to live in sufficiency and prosperity.

In spite of religious confrontations and differences, Ajiniyaz expressed his humanistic feelings saying that there were people in Russia who were like his countrymen, and the social life was not easy for them either.

According to the poet neither religious nor national differences can prevent peoples from making friends with one another and having fraternal relations. Proceeding from this idea, in his work “Demishler” (They Say), he said respectful words about the prophet Jesus Christ and his mother Mary, the book Evangel and Jews, and underlined that even if peoples belonged to different religions, they were created by God and have one and the same source of origin. Saying, “We are human being of one origin,” [3] he put forward the idea that religious differences must not generate unpleasant ideas among humans.

In fact, God treats all living beings and the dead with mercy and care. It is his duty as the Creator. Therefore, people always should improve their manners and behavior by acquiring excellent qualities and manners peculiar to God in order to come closer to him. As the love of God and coming nearer to him start with acquiring his excellent qualities and implementing them regularly in your own behavior. In accordance with Sufism doctrine, the spirit is the power, inspiration, which comes into Man’s soul from outside. The spirit constantly leads Man to excellence, develops his mind, inserts in him humanistic features and makes him subtle and beautiful.

The greatness of Man depends on the highness of the spirit. The humanistic quality of man is defined by his level of spiritual development, and the spiritually developed man dominates the men whose humanistic qualities are low.

According to poet’s opinion, the man who believes in God and thinks that all his activities are watched by God, and tries not to make mistakes in his life, has few drawbacks. Sometimes, when he acts impolitely by chance, he remembers The Lord at once, and acknowledges his mistake, repents of what he has done and makes prayers. Furthermore, he takes an oath not to act in such way anymore. Acknowledging one’s mistakes and repentance is the main feature of Sufism teaching. If a man commits misconduct, showing arrogance, he should repent of his misdemeanor.

Repentance is acknowledging one's fault, retreating, withdrawing, and regretting sins. This means that a man is capable of reeducating himself. If someone tries to show repentance, it means that he has started to reeducate himself and will get a great power and spirit to get rid of sins. Repentance is a rather impressive instructive feeling, as consciously understanding of humaneness and longing for the good act together in it. Therefore, the poet said as is mentioned above: "Taube khylyptasaddykhkhylbaryngdy" (Repent and praise what you possess) [1:134].

In accordance with Sufism doctrine the Earth is created by God. The God has the authority over the natural world, the existence. Because everything in the heaven and the earth belongs to God (Surah Ibrahim, ayah 2). According to the law of creation, there will be doomsday. The doomsday - the last day is the end of the world. It is the time when the existence in the world will come to an end and the doomsday sets in.

In order to describe the idea of doomsday in full, he gave information about four archangels of God. He said that the archangels differ from human beings in that they didn't have their own will, hence did whatever God ordered them to do. He said that one of them was Israfil (Surah Nahl, ayah 50).This archangel, according to God's order, will sound the trumpet on the Day of Judgment, heralding the end of the world. Due to the sound of the trumpet, a strong gale will appear. As a result a great commotion will take place, the world will be turned upside down, and the sun will go out and will move from its orbit. The stars, which have lost their light, will crumble into fragments. Tall mountains will be flying in the sky. Seas and rivers will brim over and join together. The sky will lose its usual appearance and turn into mess. On that day, the dead men resurrect and rise from the dead, and will be interrogated, with their sins and good deeds being weighed on the scales. They will be sent either to the hell or to the paradise with Munkar waiting for them at the gate to the Paradise and Nakir waiting at the gate to the hell. Knowing this well, Ajiniyaz in his poem "Bolmasa" (Otherwise) said:

"Akhyrbir kun bolurakhyrzamany,
Israfilsurginiiykharlardaghny"
Eventually, there will be doomsday,
The hardships caused by Israfil will destroy the sins - [2:86]

Sufis were interested in the structure of the universe, in spiritual differences among peoples, in the idea that people were the greatest living being created by God and were busy with studying the world, civilization, relations of individuals, and with the formation of an advanced, perfectly educated man. While the great discoveries and achievements made by man were in the center of their focus, the spiritual and psychological feelings of a living man, especially his internal purity, his excellent qualities and leading his life in order to be a unique man to be found only once was the most important of all.

On the basis of his belief in the world relying on Sufism doctrine, the poet spoke against the social inequality of his time, dishonest ruling of the state, invading of one country by another and strictly criticized such activities in his poems "Bozatau" and "Analar" (Mothers). According to Ajiniyaz, the Lord created man clever, advanced, ready for most trials of life, and capable of learning secrets of nature. It is wrong of a man created perfectly to be dull and cruel. God endowed him with the ability to work using his wisdom. Taking into consideration this fact, the poet said that no one in the world has the right to be conceited, to vent his indignation on others, to bend them to his will and make them follow his commands, to force them to withdraw their words, and make them do what they do not want to do[2]. Such people are considered to be against the Creator, and having contributed to making evil and cruelty on the earth. Therefore, Ajiniyaz argued against social inequalities, the despotism of padishahs and noblemen in his poems "Endi" (Now) and "Bozataw". He brought up democratic and humanistic issues stating that all humans are equal before God, human rights of people cannot be higher or lower, but equal, one must treat the poor, the weak and orphans humanely. "Everyone was not equal," he said in his poem.Thus, under the influence of Sufism, the poor layer of the population started to strengthen their social status.

Moreover, Sufism was close to farmers' and cattle breeders', craftsmen's and educators' and ulema's everyday concepts, and their goals for the future.

He, especially, talked about vital social and political interests of this layer of the population and described their dissatisfaction with the rich's and high-ranking officers' unjust treatment of the poor and cruelty towards them. He demanded that the rich respect the poor and help them. In his poem "Ne Bilsin" (How does One Know?) the poet said: "Charity suits rich" [2:95]- and added that one of the peculiar features of the rich is humanity, generosity and they should take care of the poor and distribute some portions of their riches among the poorest.

Ajiniyaz was the advocate of using the rules and regulations of Sufism doctrine adapted to the conditions of people's life. He strove for uniting it skillfully into a whole unit without causing damage to the Islam religion and its traditions. He evaluated the Sufism doctrine as the source ensuring the improvement of people's spiritual development, as a strong sociopolitical power acting as a catalyst of the country's goal to achieve a prosperous life.

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Rezyume: *Ushbu maqola tasavvufning diniy yo'nalishini tavsiflaydi.Maqolada Xudo hamma narsani yaratuvchisi va insonga hayot va ruh ato etishi aytilgan.*

Резюме: *В данной статье рассматривается религиозное направление суфизма. В статье говорится, что Бог-творец всего и дарует человеку жизнь и дух.*

Kalit so'zlar: *Sufizm, kuch, xudo, mutafakkir, intilish, diniy faoliyat, musulmon, yaratuvchi*

Ключевые слова: *суфизм, власть, Бог, мыслитель, устремление, религиозная деятельность, мусульманин, творец.*

UDK: 81.373.213

ORONYMICAL TERMS IN THE STRUCTURE OF TOPONYMS

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Summary. *This article explores the oronymic terms used in toponyms. The etymology of the terms and their use in Turkic languages are shown comparatively. Their role in the formation of the names of geographical objects is determined by the example of oronyms in the Republic of Karakalpakstan. A comprehensive study of such terms from a linguistic point of view, their scientific generalization can play a significant role in the classification of toponymic materials.*

Key words: *toponym, oronymical term, mountain, hill, hole, bare, sand, edge.*

Forming of toponyms is closely connected with appearing the nation of that territory, the language of nation of that territory, customs and traditions, ethnic staff, place, social life, the world of animal and plants of that territory. People express the best characteristic peculiarities of the natural geographical scene of the place which they live in the names of their village. Because of it, there are many viewpoints in composing the classification of toponyms by the principal of naming. Because there is much common sides of forming toponyms with many language, together with this there is different sides with each language dependent on its laws.

All nations in the world make terms by giving names to geographical objects of the place they live. These terms are formed according to any signs of this object (weight, situation number, temperature and etc.). Because of it toponimist scientists are interested in searching the types overall by etymology of terms in language, the semantic peculiarities and its structure.

Republic of Karakalpakstan in the structure of Uzbekistan has rich toponymy. Karakalpak terms, their meanings, the causes of calling can be defined by searching the toponyms of city and region in the territory of republic in according to language laws.

The terms of geographical object in the city and region of many countries in the world are being searched and learned in the linguistic aspect. The classification of toponyms is given in those scientific works. But the oronyms in the republic of Karakalpakstan weren't the special searching object of toponimistic scientists since nowadays. Only in the works of K.Abdimuratov [1.60-66] and M.Kurbanov [9.9] the toponyms of region were written little. So, we learn the toponyms of this district and the oronymical terms of their structure in our article.

The oronyms of Karakalpakstan take important role in forming many terms in the system of personal names. Changing personal names into geographical term is widening linguistic process. This comes out first of all, because of the close connection of two systems – onomastics and oronymics with each other and their specific peculiarities. Because of it, searching overall the connection of these two and in the base of it, the forming laws of region toponyms can be base for solving many theoretical and practical problems of karakalpak linguistics. These given scientific opinions inform about the actuality of theme.

The names of earth-water of the region oronyms form the special group of geographical terms of the republic. Searching them, learning the history of formation helps us to define many things. Because they serve to define many factors as the people living that territory, their tribe, relatives and situation of the nation of this place, customs and traditions, professions and etc., the oronyms of region express the peculiarities of geographical objects and the natural condition. Cause of it, searching overall them by linguistic side is one of the important problems of karakalpak linguistics which is one of the Turkic language.

Oronyms means the names of mountains, hills depths and other objects. Oronymical terms like *bel (spade), kum (sand), qir (hill), oy (hole), oypatlik (depths), takir (bare), taw (mountain), tas (stone), to'be (hillock), to'beshik (uplands), to'belik (top), shel (border), shin' (peak), do'n'(knob)* participate in forming them. These terms make the local terms by coming in the structure of the

names of geographical object. They form the toponymical system which expresses the natural peculiarities of this place.

Oronyms takes important place in the structure of oronyms of the republic of Karakalpakstan. In this territory mountains and other oronymical objects are few. So, the oronymical terms which used in the structure of local toponyms are in the few numbers. During the learning the names of earth-water of this place we can see the usage of oronymical terms like *taw* (*mountain*), *to'be (hillock), kum (sand), oy (hole), tas (stone)* in the structure of terms. We want to stop to tell about the toponyms which formed by those terms.

Tau (mountain) – is a term which is used in all language. This oronymical term is used in some turkish language and it is met in different variants. In bashkurt, kazak, tatar it's *tau (mountain),* in kyrgyz it's *too,* in altai language *tuu*, in azerbaijan, turkmen *dag*, in hakas, tuba, uyghur, shor, chulym it's *tag*, in uzbek it's *tog'*, in old turkic language *tag'*, in turkish language it's *dag*. This term came from iran language into Turkic language and has differences by usage and semantics. Dag is used in Afghanistan as «mountain, desert, field» in the west part of Pakistan from the meaning «field» there is «road, way», in Kirim as «forest, forest of mountain». *Taw (mountain)* is used to express «the lands which are parts of earth surface or many slopes» in all turkish languages. In karakalpak language it means «knob from surrounded place, uplands, very stoned place» [7.287]. The names which formed by this term sometimes are called in according to the outlook or type of the objects. Toponyms which formed by this term are met in Karakalpakstan toponymy: *Ha'ktau, Karatau, Bo'rshitau, Kuskanatau, Kumlitau*.

Tau (mountain) term also was used in present meaning in Old Turkic written memories. This means that it formed as oronymical term earlier. For example, in the Kultegin written sources [2.144-145], in the dictionary of Mahmud Kashkariy, it's met as *tag'* [10.167]. But P.G'ulamov said that we could call *tau (mountain)* which is 600 meter high [5.107]. This word before was pronounced like *topa, topu,* and it meant the top part of hend, head and top, peak the top of any things [6.580].

To'be (hillock) term means like «high place with top dome» in the toponymy of Karakalpakstan. In karakalpak language the names of the place which was not enough high from earth are called with the oronymical terms like *to'be (hillock), to'beshik (uplands), to'belik (top)*. This word is met in Turkic languages in different variants: in azerbaijan language it's *tepe,* in bashkurt and tatar languages it's *to'bo'*, in turkmen language *depe*, in uzbek language *tepa*, in old Turkic languages *to'pu'*. It participates in forming many toponyms and the area of spreading is wide. In the base of the term *to'be (hillock)* the names of many places in Caucasus the border of Volga, Kazakhstan, Central Asia, Siberia, and Peninsula of Balkan were formed: *Akto'be, Takhtato'be, Korganto'be*.

The term *to'be (hillock)* is used productively as the one element of oronymical terms. As the other turkish languages in language of the local people of region there are variants like *to'be (hillock), to'belik (top), to'beshik (uplands)*. This term in the spoken language of written territory is used in phonetic change like «to'pe». In toponymy of region there is a toponym *Kalmurat to'pe* which is formed with this term.

Oy (hole) – means the depth, low, hole place. The area of spreading of this term in Turkic languages is wide. As O.T.Molchanova wrote, that there are variants like *oy, oyuk, oydim, oyim, oybok* in Mountainous Altai, they especially participate in the structure of hydronymical terms, sometimes in forming the oronymical terms [11.198-199]. In some researches the term *oy (hole)* is given as hydrographical term. It frequently is used to express the names of water objects. In Karakalpakstan any depth is given as *oy (hole)*. In much condition it has no water.

The term *oy (hole)* is used as the one of the appellative and compound toponyms. This term is often met among Karakalpakstan toponyms. It participates in forming the oronyms of region. For example: *Kazak oy, Iyshan oy, Ayteke oy*.

The term *kum (sand)* is used productively in forming the toponyms of the republic. It is used in the structure of terms of open sandy areas in the territory republic of Karakalpakstan, but it's not often met: *Allanazarkum, Bekbaykum, Esbergenkum, Tamlikum, Egizkum.*

In Old Turkic language this word is used in present meaning. As Mahmud Kashkariy wrote that the oguzs called the sand as *kayir* [9.180]. In many Turkic languages this term is used with some phonetic peculiarities. For example in uzbek, kazak, karakalpak languages it's *kum,* in azerbaijan and turkish languages it's *gum,* in turkmen language *gum* means «sandy place», «sandy landscape», «sandy desert», also the word *chege* in this language means *sand* [4.91]. In altai language the word *sand* means *movable sand,* also the word *kumak* of this language and the word *kumakh* in yakut language means *sand.*

The term *kum (sand)* transferred through the Turkic language to other languages. For example in mongol language the word *kumak* means *little sand, sand crumbs,* the word *kum* means *dust, paw,* in Irish language the word *kum* means *sand, kumzar* means *sands* [12.314]. Also in some Turkic languages the term *kum (sand)* forms the compound terms with the help of the words *ak, kara (white, black).* For example, as S.Ataniyazov wrote that the oronym *Akgum* in Turkmenistan was a geographical term, meant *movable sand with clean top without plant* [3.29]. S.Karaev explained that *karakum (black sand) – it's the sands were there are plants and doesn't move* [8.180]. So, the term *kum (sand)* almost is used in all turkish and other languages widely and forms new toponyms.

In summary, learning the names of geographical objects in the word informs us about the territory, population, nation, national language. About this learning the toponyms of the territory in the territory of the republic of Karakalpakstan gives rich materials for onomastics. As other regions the geographical terms take important place in forming the toponyms of the republic of Karakalpakstan. They join to different parts of speech and mean the personal name of geographical object, and its base to forming the compound toponyms and expresses the type of geographical object. Some of these oronymical terms which met in toponyms of region consist of the friend words to Turkic languages by the history of formation. Oronyms of this territory still demand holding the scientific research work widely by its semantics and structure.

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Rezyume: *Ushbu maqolada toponimlar tarkibida qo'llaniladigan oronimik terminlar o'rganilgan. Terminlarning etimologiyasi, turkiy tillarda qo'llanilishi qiyosiy tarzda ko'rsatilgan. Ularning geografik ob'ekt nomlarini hosil qilishdagi vazifasi Qoraqalpog'iston Respublikasidagi oronimlar misolida aniqlangan. Bunday terminlarni lingvistik nuqtai nazardan har taraflama tadqiq etish, ularni ilmiy jihatdan umumlashtirish toponimik materiallarni tasniflashda salmoqli o'rin egallashi mumkin.*

Резюме. *Статья посвящена изучению оронимических терминов, используемых в составе топонимов. Дана сравнительная характеристика этимологии этих терминов, их употребления в тюркских языках. Их роль в формировании названий географических объектов определена на примере оронимов Республики Каракалпакстан. Всестороннее изучение таких терминов с лингвистической точки зрения, их научное обобщение представляет значительную роль при классификации топонимических материалов.*

Kalit so‘zlar: *toponim, oronimik termin, tog‘, tepa, pastlik, taqir, qum, qir.*

Ключевые слова: *топоним, оронимический термин, гора, холм, низменность, плоскость, песок, высота.*

UDC: 002.704.3 / 5

LANGUAGE AND STYLE OF ANALYTICAL GENRES IN A NEWSPAPER AND ITS SCIENTIFIC RESEARCH (based on the Karakalpak periodicals)

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Summary: *This article describes the materials of the analytical genre of the newspaper, including the specific features of the genre of the article, its purpose, lexical and stylistic features.*

Key words: *journalism, style, language, type of text, genre, words, analytics, newspaper.*

The analytical genre occupies an important place among newspaper materials. In this genre, a journalist analyzes events and incidents, proceeding from his point of view and giving an appropriate assessment, makes a conclusion. However, the point of view and opinion of a journalist on any event may not always coincide with the point of view and opinion of readers. Nevertheless, based on the role and place of the newspaper in society, the spirit of its time, social ideology and politics, he sketches and advances a certain idea [1].

In analytical genres, as well as in informational, the tasks of concretization, reality, efficiency, impressionability and generalization are set [2].

Specifically, analytical genres are in their essence an evolutionary continuation of information genres.

If the facts that have taken place in the world, the events and incidents that have happened are their external, visible to the eye layer, then the direct meaning and objective regularity of these facts, events and incidents is considered to be the invisible to the eye, the inner depth layering. To get to this layer, to feel it and to get to know the previous one more deeply, a person includes in his work methods of analysis and research. Here, this pattern will surely find its sanctification in analytical journalism [3]. If a person sees, learns, reading about events and facts taking place in life, then, thanks to analytical genres, he will understand and feel the inner meaning of these facts and events, will draw appropriate conclusions for himself, denoting their social significance. Analytical genres cover all aspects of public life. The knowledge of the person around the world, observation or events, phenomena, movements that occur in society, is perceived through the prism of published in the press materials of the analytical genre [4]. Through them, he learns the laws and contradictions of society, is aware of all the problems and the rich issues relating to the economy, science and culture, literature and art and other spheres of public life. In other words, the materials of the analytical genre give people knowledge of a socio-political, legal, moral, scientific, historical, philosophical, artistic and aesthetic nature and through them the education of a person, the formation and formation of his personal qualities are carried out.

To be fair, it should be noted that analytical and informational genres are always closely related. If in the materials of the information genre there are elements of an analytical nature, then in analytical materials we can observe elements of an informational nature. The newspaper complements these two types of genres. However, in some cases it is necessary to limit the use of the above-mentioned genres. Naturally, the article in the newspapers, being the main analytical genre, creates its basis. Analyzing events and incidents, the political and economic situation in society, it directs the reader's attention to the most vital issues of society and, at the same time, is considered a figurative source of information. One of the features of the genre, the article is to submit a message by analyzing the facts and summarizing opinions. If we give a general description, then the article is a small-scale scientific and journalistic work intended for publication in collections, journals and other similar media. In scientific sources, the article appears divided into several types. However, the purpose and purpose of its division into types is determined only by the position from which it is desirable to highlight this or other task. The main requirements for all

these articles are objectivity, in-depth analysis and general conclusions on their coverage [5]. The use of stable phrases in the article, writing it in the spirit of the modern requirements of the time, in the presence of features peculiar only to it, distinguishes it from other genres.

The rubric of articles is distinguished by its constancy and concreteness. Despite its brevity, the heading gives preliminary information about the topic covered in the article, its content, issues that are solved in it. For example: “Point of View”, “Agroindustry”, “Morality”, etc. The permanent and special headings are put to the problem articles. For example: “How do you provide services?”, “Ordinance and its execution”, “Society and a teenager”, etc. The meaning of making such headings is that they unequivocally indicate either the industry that will be spoken about or questions covered in the article.

Along with the analysis of the facts, in the article a special place is occupied by the exact designation of issues and their solutions, generalization and specific conclusions. So, such duties are reflected in the rubrics of the articles. For example: “On appeal - response by work”, “Crime and punishment”, “Law in action”, etc. (newspaper: EK). Among newspaper materials, the article occupies a very important place, since this genre contributes to the revitalization of readers to share their opinions and make suggestions [6]. Therefore, when choosing a topic of an article, preference is most often given to phrases that quickly catch the eye and attract the reader’s attention. A number of other distinctive aspects of the article from other genres of print are the use of proverbs and sayings in the title: “If the young man takes up the work ...”, “State and the bar (the water also has demand” ... (newspaper, EK, april 12, 2011.), “Knowledge will open the way for happiness” (newspaper: KJ, march 2, 1995.), “Healthy mind has a healthy body” (newspaper: HX, February 5, 2009.) and other proposals with interrogative intonation: “Will the world forgive my carelessness” (newspaper: KJ, march 2, 1995.) and phrases with elements of artistic images: “Water also has a demand...” (newspaper: EK, april 12, 2011.), “Keys to a love box in full hands”, “If my people will be satisfied, I will be in a good mood”, “Studio Theater has taken the first step” (newspaper: KJ, march 20, 1997.) etc.

One of the effective techniques of the genre of the article is putting the heading of interrogative sentences. For example: “Are you ready for winter trials?” (newspaper: EK, October 29, 2005.), “What should modern textbooks be like?” (newspaper: KJ, march 20, 1997.), “Why we do not read books?" (newspaper: KJ, March 2, 1995.) and others. A distinctive feature of some articles is the division of the main theme into subheadings. For example: The voluminous article “Knowledge will open the way for happiness” is divided into several sub-headings: I sing my student and young years”, “He who listens attentively, he becomes wise”, “What is culture?” (newspaper: KJ, march 2, 1995.).

The article genre has ample opportunities to use the enormous wealth of the native language. Along with the use to the meta word combinations with a neutral meaning, it is possible to widely apply emotionally expressive means and combinations of words with elements of artistic images. Great opportunities for this create the volume and content of the article genre. Therefore, the article often brings together elements and terms inherent in artistic and journalistic genres. (For example: essay, sketch, feuilleton) and some informational genres (for example: reporting). In the lexical composition of the article, along with socio-political, economic, literary, medical terms, you can use the terms inherent in other industries, as well as fruitfully apply words with different stylistic coloring. In recent years, articles published in the Karakalpak periodicals quite successfully and used emotionally expressively colored words and lexical pairs to the site: “A plot of land is a source of wealth” (newspaper: EK, april 12, 2011.), “A seller thinking finding "(newspaper "Karakalpak University", January 1-2, 2008.) etc. Naturally, the use of proverbs and sayings, stable combinations of words and idioms in newspaper articles has long become a tradition [7].

However, there is a feature. Frequently, national proverbs and sayings are not used in newspapers in their original form, but on the basis of them are formed elements and types that, taking into account the peculiarities of the press language, reveal the meaning of the content of the text of the newspaper. For example: “With a weak law, you cut your hands” // should be: “If you

don't hold the cane firmly, cut the hands", "You will work without being lazy, your land will blossom" // must be: "You will work without being lazy, there will be a stomach your fed" and others.

The tradition of using in the press folk proverbs and sayings, popular words and phrases, idioms has long been one of the most common methods. If, on the one hand, a concrete and clear expression of thought is meant here, on the other hand, all this will provide the newspaper with an affinity for the national language. Thirdly, the press thus tries to make the articles more attractive and readable. The techniques for providing a newspaper article with words of emotionally expressive coloring consist of the following:

1) To the place and productively use proverbs and sayings in the article;
2) Correctly and correctly apply interrogative and exclamatory sentences;
3) Choosing the right theme;
4) It is right to choose and use the words with emotionally expressive coloring to the place;
5) Accurately and correctly apply phrases, catch words and phrases;
6) To the place to use the dialogues.

In general, the article has a wide range of possibilities for using words of emotional and expressive coloring, as a result of which it becomes bright, colorful, interesting and attracts the attention of the reader.

At the same time, we consider the level of research language of the newspaper in the field of linguistics. Since then, the media began to study the language as an object of study. Scientists focus on media issues. In the early 1980s, due to the rapidly developing socio-economic development, mass communication was perceived as a specific form of speech influence. Currently, the field of media research has expanded considerably. The study of topics such as the language and language of the media, the media and society, media and cultural studies, the media and politics, is becoming a hot topic. Sociological, cognitive, semantic, psycholinguistic, pragmatic and culturological, debatable principles provide ample opportunities for a complete understanding of the unique socio-linguistic phenomenon, called the media language.

In the context of the sociological aspect, an interest in the language of the media, its advantages or, conversely, in its limitations, it is of interest to analyze journalistic ideas about extraneous events. One of the experts in the field of media literary criticism VN Demyankov described: "The semantics of the media is of vital importance, that is, how it was created and how it is organized."

Linguists are also interested in the verbal aspects of the media. According to Chudinov: "the choice of language means in the mass media is usually associated with a system of orientation to values, which are primarily focused on targeted influence, conceptual, imaginative and emotional characteristics" [8]. When studying the psychological characteristics of the media, the psycholinguistic interpretation of mass communication (YES), proposed by D.A. Leontyev, attracts the attention of media researchers. According to him, the language not only reflects the thoughts, but also greatly impresses. What cognitive science brings to the media is the general direction in which it works. The principle of cognitive study of a media language is closely related to the aspect of pragmatic research. The media world, created by the media, is designed to deliver, persuade and influence. It is determined by the ideological, political goals and views of many adults. That is why the media can simultaneously generate multiple worldviews. Linguistic pragmatism is a science that is used as a tool used by people in their work, and not "by itself" [9]. "Pragmatics is a special field of linguistics that explores the choice and application of linguistic unity in the context of its research and the influence of these departments on the participants in the dialogue. The analysis of this phenomenon of linguistic phenomena allows us to identify the obstacles and limitations that exist in one or more of their applications "[10].

Much attention is paid to the study of texts relating to the field of culture in the field of cultural literacy. It is important to interpret the cultural characteristics of the media in context.

The study of the characteristics of the media genre is considered relevant in any historical period. The need for a particular genre is due to the requirements of the cycle. Great attention to the experimental aspects of the extreme detailing of the genre system by researchers leads to “forgetting the essence of the genre category” [11]. The problem of learning the language of the media is still the focus of attention of linguists. Despite years of research, some problems have not yet been resolved. Therefore, this is a problem - as one of the pressing issues of linguistics. The first studies of the language of the newspaper were undertaken by experts in the field of lexicology and the history of literary language. The work of G.O.Vinokur “The Culture of Language” [12] is devoted to the features of newspaper speech, in which a qualitatively new approach to the study of the language of newspapers was proposed. The language of newspapers is considered as a functional and stylistic unity, which is conditioned by the canons of the Russian language. Speech stamps, that is, the maximum standardization of language means, are determined by the scientist as one of the fundamental features of the language of newspapers. Modern linguists do not recognize this provision as indisputable, although it is the theoretical propositions outlined by G.O. Vinokur that still serve as the basis for scientific research in this field.

In the 20s. XX century. G.O. Vinokur planned functional-stylistic direction for the study of speech newspapers, but at that time it does not receive proper development. In the Russian linguistics of the following decades, the language of the newspaper is traditionally studied in the normative-stylistic terms, from the standpoint of the "correctness of the use of individual words and constructions". From the point of view of this direction, the works of K.I.Bylinsky, D.E. Rosenthal, M.Gus and other researchers were written. Attempts to stabilize the literary norm are apparently due to this provision.

In the mid-60s. XX century. The language of the newspaper is being explored in the functional and stylistic aspect, based on the theoretical developments of G.O. Vinokur.

Labor V.G. Kostomarov “The Russian language on the newspaper page” [3] is the first in Russian science a special monographic study of the newspaper-publicistic style within the framework of functional stylistics. Work G.Ya. Solganika “System analysis of newspaper vocabulary and sources of its formation” [2] is also significant in this aspect. And V.G.Kostomarov and G.Ya.Solganik in their monographs critically rethink the theoretical propositions put forward by G.O.Vinokur. In the future, scientific research outlines the diversity of approaches to the subject of study: newspaper communication is viewed both in terms of common features (Kayda L.G., Kostomarov V.G.) and in terms of stylistics of genres (Vompersky V.P., Solganik G. I., Lysakova I.P.), sociopsychological specificity (Zulberg B.A.), use of figurative resources (Stuflyaeva M.I.), etc.

The interest of researchers in the language of the media in the 90s increases noticeably. Twentieth century. According to Yu.N.Karaulov, the “Russian language” researchers-Russianists “never really studied”. And since “only the press, and above all the newspaper, are able to immediately record and convey to the reader everything new that is observed in the language,” the media gain the status of a full-fledged source for linguistic research. Thus, at the present stage of development of science, the language of the mass media is not only a reliable source for linguistic research, but also an object of interdisciplinary research. The result of scientific research in this area was the definition of the specifics of newspaper communication, a description of its functions, which, however, modern scholars are refined and rethought. This study is a continuation of the functional and stylistic study of language means in journalistic texts.

Lexico-grammatical means of expressing qualifying modal categories are not considered by chance in the language of the newspaper, because newspaper journalism is a field of language that most quickly reacts to new linguistic phenomena and gives a truly impressive picture of using the language, which causes great and keen interest of philologists and requires constant and careful research. Modern newspaper text fully reflects not only the changes occurring in the socio-political and socio-economic life, but also, which is especially important for linguistic studies, changes in the language. According to V.G. Kostomarov, "... without materials extracted from newspapers, it is

now becoming increasingly impossible to study the language as a whole, the definition of its general norms and current stylistic ramifications." E.A. Zemskaya believes: "... the language of modern newspapers can serve as a mirror of modern Russian life. It reflects all the good and bad that is characteristic of our reality: refusal from pretense and hypocrisy, from official bureaucracy and facelessness, demonstrates looseness, emancipation, the desire to express one's personal opinion, increased expressiveness, generating and high civic pathos, and sharpness reaching rudeness ". In an effort to get away from the dry, monologue, official-book, impersonal newspaper language of the preceding period, the language of the newspaper is becoming more and more natural and alive, surprising language, stylistic, content and ideological diversity. According to G.Ya. Solganika, "now we are witnessing a period of intensive development of the newspaper-publicistic style. The range of newspaper style styles has significantly expanded: there was a differentiation of newspapers according to a stylistic basis. There are radical changes in the system of genres. The processes of development of assessment, the use of various layers of vocabulary are deepening and expanding, and in connection with this, the formation of a new lexical systematization of the newspaper is taking place. All this has an impact on the development of the literary language, expanding the possibilities of its expression, in particular, increasing the potential of intellectual and emotional-evaluative means. " Thus, at the turn of the XX-XXI centuries. in the language of the newspaper-publicistic style, evolutionary processes occur due to external and internal causes.

The problem of functional styles in Karakalpak linguistics is one of the least studied areas. The monograph of Professor E. Berdimuratov "Development of Karakalpak vocabulary in connection with the development of functional styles of the literary language" was published in 1973. In this monograph, functional styles of the Karakalpak vocabulary were first studied [13]. In 1973, the scientist defended his doctoral dissertation on the same topic. In 1990, the textbook of A. Bekbergenov "Stylistics of the Karakalpak language" was published (Nukus, 1990). This book is valuable because it is the first manual on the style of the Karakalpak language [14].

Professor M. Ayimbetov defended his thesis on the theme "The experience of linguistic and stylistic analysis of the vocabulary and morphology of the Karakalpak journalistic text" [15]. Special research was also conducted on the functional styles of the Karakalpak literary language. Among them K. Bekbergenov [16] on scientific styles, B. Yusupov [17] on the literary style defended his thesis. In 2016, the monograph by T. Masharipova "One whole concept of the theory of journalism: a scientific and methodological analysis (with examples of Karakalpak press materials)" was published [18].

The newspapers of the Republic of Karakalpakstan have a 90-year history. During these years, the vocabulary of the Karakalpak language developed, words and terms came from other languages. However, this question is ignored by experienced scientists. Today, there are a number of scientific articles on this topic and only one PhD thesis [19]. That is, the linguistic community in this area has much in common with scientific research. Because any newspaper article is a mirror of our literary language.

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Rezyume: *Ushbu maqolada matbuotidagi tahliliy janrlardagi materiallar tilining uslubiy va leksik xususiyatlari, o'ziga xos tomonlari va ularning tadqiqi haqida ma'lumotlar kompleks tahlil qilinadi.*

Резюме: *В этой статье говорится о материалах аналитического жанра газеты, в том числе и о специфических особенностях жанра статьи, ее назначении, лексических и стилистических особенностях.*

Kalit so'zlar: *jurnalistika, uslub, til, janr, so'z, tahlil, gazeta.*
Ключевые слова: *журналистика, стиль, язык, жанр, слова, аналитика, газета.*

УДК 413.162

ESSENTIAL PROBLEMS OF LEXICOGRAPHY AS A LINGUISTIC DISCIPLINE

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Summary: *This article investigates the essential problems of lexicography as a linguistic discipline.*

Keywords: *compiling, term, important, fundatmental, systematization, degree.*

Lexicography, that is the theory and practice of compiling dictionaries, is an important branch of applied linguistics. The fundamental paper in lexicographic theory was written by L.V. Shcherba as far back as 1940. A complete bibliography of the subject may be found in L.P. Stupin's works. Lexicography has a common object of study with lexicology , both describe the vocabulary of a language. The essential difference between the two lies in the degree of systematization and completeness each of them is able to achieve. Lexicology aims at systematization revealing characteristic features of words. It cannot, however, claim any completeness as regards the units themselves, because the number of these units being very great, systematization and completeness could not be achieved simultaneously. The province of lexicography, on the other hand, is the semantic, formal, and functional description of all individual words. Dictionaries aim at a more or less complete description, but in so doing cannot attain systematic treatment, so that every dictionary entry presents, as it were, an independent problem. Lexicologists sort and present their material in a sequence depending upon their views concerning the vocabulary system, whereas lexicographers have to arrange it most often according to a purely external characteristic, namely alphabetically.

It goes without saying that neither of these branches of linguistics could develop successfully without the other, their relationship being essentially that of theory and practice dealing with the same objects of reality. The term d i c t i o n a r y is used to denote a book listing words of a language with their meanings and often with data regarding pronunciation, usage and/or origin. There are also dictionaries that concentrate their attention upon only one of these aspects: pronouncing dictionaries (by Daniel Jones) and etymological dictionaries (by Walter Skeat, by Erik Partridge, "The Oxford English Dictionary").

For dictionaries in which the words and their definitions belong to the same language the term unilingual or explanatory is used, whereas bilingual or translation dictionaries are those that explain words by giving their equivalents in another language. Multilingual or polyglot dictionaries are not numerous, they serve chiefly the purpose of comparing synonyms and terminology in various languages.

The most important unilingual dictionaries of the English language are "The Oxford English Dictionary", A.S. Hornby's dictionary, Webster's, Funk and Wagnells, Random House and many more (see Recommended Reading at the end of the book).

Unilingual dictionaries are further subdivided with regard to the time. Diachronic dictionaries, of which "The Oxford English Dictionary" is the main example, reflect the development of the English vocabulary by recording the history of form and meaning for every word registered. They may be contrasted to synchronic or descriptive dictionaries of current English concerned with present-day meaning and usage of words. The boundary between the two is, however, not very rigid: that is to say, few dictionaries are consistently synchronic, chiefly, perhaps, because their methodology is not developed as yet, so that in many cases the two principles are blended.3 Some synchronic dictionaries are at the same time historical when they represent the state of vocabulary at some past stage of its development.

Both bilingual and unilingual dictionaries can be general and special. General dictionaries represent the vocabulary as a whole with a degree of completeness depending upon the scope and bulk of the book in question. The group includes the thirteen volumes of "The Oxford English Dictionary" alongside with any miniature pocket dictionary. Some general dictionaries may have very specific aims and still be considered general due to their coverage. They include, for instance, frequency dictionaries, i.e. lists of words, each of which is followed by a record of its frequency of occurrence in one or several sets of reading matter. A rhyming dictionary is also a general dictionary, though arranged in inverse order, and so is a thesaurus in spite of its unusual arrangement. General dictionaries are contrasted to special dictionaries whose stated aim is to cover only a certain specific part of the vocabulary.

Special dictionaries may be further subdivided depending on whether the words are chosen according to the sphere of human activity in which they are used (technical dictionaries), the type of the units themselves (e. g. phraseological dictionaries) or the relationships existing between them (e. g. dictionaries of synonyms).

The first subgroup embraces highly specialized dictionaries of limited scope which may appeal to a particular kind of reader. They register and explain technical terms for various branches of knowledge, art and trade: linguistic, medical, technical, economical terms, etc. Unilingual books of this type giving definitions of terms are called *glosses* ever increasing. A completely new type are the m a c h i n e translation dictionaries which present their own specific problems naturally differing from those presented by bilingual dictionaries for human translation.

Finally, dictionaries may be classified into linguistic and non-linguistic. The latter are dictionaries giving information on all branches of knowledge, the encyclopedias. They deal not with words, but with facts and concepts. The best known encyclopedias of the English-speaking world are "The Encyclopedia Britannica" and "The Encyclopedia Americana". There exist also biographical dictionaries and many minor encyclopedias.

English lexicography is probably the richest in the world with respect to variety and scope of the dictionaries published. The demand for dictionaries is very great. One of the duties of school teachers of native language is to instill in their pupils the "dictionary habit". Boys and girls are required by their teachers to obtain a dictionary and regularly consult it. There is a great variety of unilingual dictionaries for children. They help children to learn the meaning, spelling and pronunciation of words. An interesting example is the Thorndike dictionary.3 Its basic principle is that the words and meanings included should be only those which schoolchildren are likely to hear or to encounter in reading. The selection of words is therefore determined statistically by counts of the actual occurrence of words in reading matter of importance to boys and girls between 10 and 15. Definitions are also made specially to meet the needs of readers of that age, and this accounts for the ample use of illustrative sentences and pictures as well as for the encyclopedic bias of the book.

A dictionary is the most widely used reference book in English homes and business offices. Correct pronunciation and correct spelling are of great social importance, because they are necessary for efficient communication.

A bilingual dictionary is useful to several kinds of people: to those who study foreign languages, to specialists reading foreign literature, to translators, to travelers, and to linguists. It may have two principal purposes: reference for translation and guidance for expression. It must provide an adequate translation in the target language of every word and expression in the source language. It is also supposed to contain all the inflectional, derivational, semantic and syntactic information that its reader might ever need, and also information on spelling and pronunciation. Data on the levels of usage are also considered necessary, including special warnings about the word being rare or poetical or slangy and unfit to be used in the presence of "one's betters". The number of special bilingual dictionaries for various branches of knowledge and engineering is ever increasing. A completely new type is the machine translation dictionaries which present their own specific problems, naturally differing from those presented by bilingual dictionaries for human translation. It is highly probable, however, that their adversaries. They are often prepared by boards

or commissions specially appointed for the task of improving technical terminology and nomenclature.

The second subgroup deals with specific language units, i.e. with phraseology, abbreviations, neologisms, borrowings, surnames, homonyms, proverbs and sayings, etc.

The third subgroup contains a formidable array of synonymic dictionaries that have been mentioned in the chapter on synonyms. Dictionaries recording the complete vocabulary of some author are called concordances, they should be distinguished from those that deal only with difficult words, i.e. glossaries. Taking up territorial considerations one comes across dialect dictionaries and dictionaries of Americanisms orpiment win eventually lead to improving dictionaries for general use.

The entries of a dictionary are usually arranged in alphabetical order, except that derivatives and compounds are given under the same head-word. In the ideographic dictionaries the main body is arranged according to a logical classification of notions expressed.1 but dictionaries of this type always have an alphabetical index attached to facilitate the search for the necessary word.

The ideographic type of dictionary is in a way the converse of the usual type: the purpose of the latter is to explain the meaning when the word is given. The Thesaurus, on the contrary, supplies the word or words by which a given idea may be expressed.

«Словари-тезаурусы (от лат. заимствования из греч.thesaurus ′сокро- вищница, богатство′) это словари, в которых представлены все известные слова данного языка» [1;50].

Sometimes the grouping is in parallel columns with the opposite notions. The book is meant only for readers (either native or foreign) having a good knowledge of English, and enables them to pick up an adequate expression and avoid overuse of the same words. The Latin word *thesaurus* means 'treasury'. P. Roget's book gave the word a new figurative meaning, namely, 'a store of knowledge', and hence 'a dictionary containing all the words of a language'.

A consistent classification of notions presents almost insuperable difficulties. Only relatively few "semantic fields", such as kinship terms, color terms, names for parts of human body and some others fit into a neat scheme. For the most part, however, there is no one-to-one correlation between notions and words, and the classification of notions, even if it were feasible, is a very poor help for classification of meanings and their systematic presentation. The system of meanings stands in a very complex relationship to the system of notions because of the polysynaptic character .of most words. The semantic structure of words and the semantic system of vocabulary depend on many linguistic, historical and cultural factors.

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Rezyume: *Maqolada leksikografiyaning dolzarb muammolari lingvistik fan sifatida ko'rib chiqilgan.*

Резюме: *В статье исследуются актуальные проблемы лексикографии как лингвистической дисциплины.*

Kalit so'zlar: *kompilyatsiya, atama, muhim, fundamental, tizimlashtirish, daraja.*

Ключевые слова: *составление, срок, важное, фундаментальное, систематизация, степень.*

CROSS-CULTURAL MANAGEMENT IN MULTINATIONAL COMPANY AND SOME NATIONAL POLITENESS PRINCIPLES WITHIN UGCC GSP & POLYMER PROJECT

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Summary: *This article deals with general information about company's administration's and HSE departments' cultural management in relation to representatives of different nationalities, social groups and cultures both office and site workers who were participating in the project. In particular, it lists the theoretical examines of cross-cultural issues by researchers as well as casual behavioral rules for everybody, cultural events, daily timetable and interactions among labors which are contribute to creating of a favorable atmosphere at the given environment.*

Keywords*: cross-cultural, management, tradition, cooperation, politeness, communication, social norms.*

Abstract.

1. Introduction. This article deals with general information about company's administration's and HSE departments' cultural management in relation to representatives of different nationalities, social groups and cultures both office and site workers who were participating in the project. In particular, it lists the theoretical examines of cross-cultural issues by researchers as well as casual behavioral rules for everybody, cultural events, daily timetable and interactions among labors which are contribute to creating of a favorable atmosphere at the given environment.

2. Method. Material was collected through observations, conversation and relevant documents. In 2014, the author of this article worked at HSE department as company's social worker who had been closely contact to common events and labors by accepting their complaints and suggestions.

3. Analysis. Data were analyzed with the help of software for qualitative analysis, where all sentences from both interviews and field notes were collected. The conceptual framework used is the sociology of knowledge.

4. Results. The every day's life and its relationship, also cultural events can show us how think about the relationship between culture and human information behavior. This model also identifies elements of the model, which are habits, tradition and prejudice and suggests how we can apply the concepts of information for further experiences in the field of friendly communication between different cultures.

Picture of the contemporary world shows an integration as well as interrelation between representatives of the different people in different fields of public life, as objectivity natural sequence of globalization processes. Development of the theory and practice of intercultural dialogue in Uzbekistan has huge value as one of the ways chosen by the President is a priority as mutual so multilateral relation in foreign policy and international consensus religion tolerance. In this connection Uzbekistan enters into the integration world market through «cultural cooperation». Moreover, there are so many representatives of different nations and confessions live together in Uzbekistan, that's why almost all local citizens have a great historical experience on both international and interethnic consensus.

The world today is characterized by an ever-growing number of communications between people with different linguistic and cultural backgrounds. It is likely that you will make such contacts because they occur in the areas of business, military cooperation, science, education, mass media, entertainment, and tourism, and because of immigration brought about by labor shortages and political conflicts as well as informally in Internet chat rooms and on Internet bulletin boards. Just a quick example will make this point. [1;p:61]

The motivation for writing this article due to the fact that conflict, appearing because of relationships may have different aspects or issues depending on whether it is between people of different cultures or people from different ethnic, political, or other groups (seen as in- and out-groups) in a society. Intercultural communication conflict, including cross-cultural negotiation, small-group communication decision-making, and intercultural or cross-cutlural views of conflict are receiving increasing attention, with chapters in many intercultural textbooks on the subject. [2;p:280]

In 1954 the book of Edward T. Hall and George L. Trager "Culture as communication" was published, in this book the term cross-cultural communication was offered for the first time. Hall the first suggested making a problem of cross-cultural communication as subject of particular educational discipline. In the 1960 this subject began to be taught in some universities of the USA. The importance of this problem caused by diversity that causes certain problems those are as follows:

1. Communication becomes more difficult. Employees from different cultures fail tounderstand one another. Firms operating in different language areas find difficulty incommunicating with the local employees as local employees speak different language.
2. Diversity increases ambiguity, complexity and confusion.
3. Diversity also causes problems when managers and employees overgeneralize organizational policies, strategies, practices and procedures.
4. Cultural diversity creates difficulties for an organization when it wants to reach on a single agreement.
5. Cultural diversity increases the complexity and problems in developing overall organizational procedures. [3;p:17]

According to the scientists, main objectives of researches in the field of cross-cultural communication are:

• Description of the main problems and subjects of cross-cultural communication, acquisition of basic concepts and terminology;

• Development of ability to the correct interpretation of concrete manifestations of communicative behavior in various cultures;

• Formation of practical skills and abilities in communication with representatives of other cultures.

Diverse workforce (diversity) refers to the co-existence of people from various socio-cultural backgrounds within the company. Diversity includes cultural factors such as race, gender, age, colour, physical ability, ethnicity, etc. (Kundu and Turan, 1999). Diversity includes all groups of people at all levels in the company. Diversity requires a type of organizational culture in which each employee can pursue his or her career aspirations without being inhibited by gender, race, nationality, religion, or other factors that are irrelevant to performance (Bryan, 1999). Managing diversity means enabling diverse workforce to perform its full potential in an equitable work environment where no one group has an advantage or disadvantage (Torres and Bruxelles, 1992).Geert Hofstede is a sociologist who studied employees working in a multi-national corporation (Reynolds & Valentine, 2011). He described four ways that can help in analysing and understanding other cultures as follows:

1. Individualism vs. Collectivism: In some cultures, the individual is emphasized while in others the group is emphasized.
2. Power distance: The culture that believes that organizational power should be distributed unequally.
3. Uncertainty avoidance: Hofstede found that some cultures tend to accept change as a challenge while others don’t.
4. Masculinity vs. Femininity: Hofstede himself tends to reject the terms “masculine” and “feminine”. [4;p:106]

These two terms should be overlooked in order to value other issues which are more important to the organization such as achievement and assertiveness.

After acquisition of independence by Uzbekistan, interaction and collision of different cultures meets oftener at the interregional and international levels. Social and interpersonal solidarity gains great value, the international tolerance takes the priority part of spiritual life in our country, at the same time they play an important role against the background of expansion of forms of international communication. Cross-cultural communication represents a necessary step of logical transition from knowledge to practice in all areas of life, especially on production of transnational corporation.

In the Republic of Uzbekistan are undertaken positive reforms in all areas of socio-economic life directed to improvement of welfare of the people. In this regard, in the Republic of Karakalpakstan are also implemented large-scale actions as construction of the Ustyurt Gas-chemical complex in Kungrad district which has no analogs in all Central Asia.

General information: qualified personnel and workers from India, Korea, Philippines, China, Bangladesh, Thailand, Holland, Romania and other countries of the world worked hard on building sites of factory, in the territory of the procuring platform. Also, at workplaces there are lot of compatriots from the different regions of Uzbekistan who put the efforts for the national economy in the conditions of the global market and internationalization of production. All foreigners and the majority of local lived in the camp of the Samsung engineering company.

Thus, all social conditions were created to workers of this project thanks to assistance of the government of Uzbekistan and the company participating in construction of factory. In particular, "in temporary" office of the building site of Samsung engineering there were modern conveniences to work and rest. There were specialized rooms (for example, an office of labor and environmental protection) conference rooms, sanitary rooms, warehouses, offices for hot drinks, dining rooms, etc.

Temporary dining rooms for the Korean, Uzbek, Filipino and Indian cuisine were built near the building site. These dining rooms were supplied with fresh and quality products three times a day in full accordance with the adopted rules. Besides, workers of evening and day shifts were round-the-clock provided with coffee, tea, water and sweets. In the company camp were also created all modern conditions of infrastructure (kitchens, table, laundry, hairdressers, sewing, gyms, toilets and bathrooms separate for each nationality, shops, etc).

From 2013 to 2015 three large Korean companies Samsung engineering (SECL), GS & Hyundai engineering participated as general builders of construction of the Ustyurt gas-chemical complex which customer is "UzKorGaschemical". By the management of SECL site office, cross-cultural and humanitarian actions were carried out during construction. The value of this work consists on that the author of article was directly involved as the social worker in site office of Samsung engineering in 2014.

For a start it is necessary to begin with the charitable events held directly on financing of Korean company. So, for the holiday devoted by 9th May "Day of remembrance and honors" site office of the Samsung engineering company organized an action by mutual proposals of social workers of three general contractors of Samsung, GS and Hyundai engineering and the social worker of UzKorGaschemical. Having conferred they made the joint plan of action. Then, the administration of Samsung engineering site office organized financing on a purchase of valuable presents for veterans of the World War II and Afghanistan. Thus, 15 veterans of the World War II and 1 veteran of Afghanistan in the settlement of "Kyrk-kyz" (this settlement has a particular importance allow for the fact that the factory is constructing on their territory) received valuable presents. On June 1, 2014 the company also organized a charity event in honor of "the international Children's Day", together with other companies organized gifts for the children having a rest during the celebration in the park of Kungrad city. Moreover, the management of Samsung engineering site office on account of own expenses organized repair work of the gym, library and classes of school in the settlement of "Aksholak", also presented school stock and books.

In such conditions, introduction of management on a cross-cultural training and carrying out of cross-cultural actions gets the special value for representatives of different cultures, with a glance to cultural features of the prevailing masses. The management of department of HSE made the decision on need of introduction, during the training on safety measures, a method of cross-cultural training by acquaintance with the cultures of those people who took part in process of construction of factory. The Cross-cultural training was included in HSE structure of the obligatory course on training of all beginners who just got a job on the website.

Below we will consider some fragments of the presentation on a cross-cultural training which was provided for those who just got a job. Thus, HSE trainers of each newcomer besides safety regulations informed the basic rules of behavior of those people which worked within this project with the purpose to have some representation of their cultural values.

So, some fragments of this training will be presented below:

1) Different cultures have different norms about the accepted distances between people:

- Intimate space 18 ins;
- Personal space 18 ins – 4 ft;
- Social space 4 ft – 9;
- Public space over 9 ft.

2) Different cultures have so many ways to greet also place different emphasis on the ritual of greetings. So we tried to describe both general and national ways which demonstrate on speech and non-speech levels:

Say “Hello, Hi” and usual handshake between men;

- Say “Hello, Hi” but without handshake between sexes;
- Also we can use phrases like good morning, good afternoon or good evening;
- desirable you can use general Muslim speech greeting “Assalamaleykum”;
- Korean “Annyoughaseyo” with mutual regards ;
- Indian “Namaste”;
- Philippine's “Kumusta” ;
- Chinese “Ni hao”;

3) As farewell you can use such English forms as “Good bye”, “see you”. “Good night” and ect.

Also some general rules in public places for intercultural community:

- Preferential attention should be given for English languages as medium of communication among different nationalities. In connection with that we usually use English Politeness phrases at the moment of communication;
- It's desirable to greet each other in work place (office, site, camp, kitchen and etc.) with using English politeness phrases like good morning, good afternoon and so one.
- Follow housekeeping everywhere. Administration asks to relate to living and working places as well as your own home.

Do not forget fallow some etiquette rules in the canteen:

A) Don’t shout at the table when you have a meal;
B) Please make a single line when taking your meal in the mess hall;
C) Please do not swear in public places, moreover in the kitchen.

Appreciation and respect for regional, country, and cultural differences - known as cultural diversity. Asking you respect the habit of another national cultures.

- Strongly prohibited shouting, swear, insult, mock, cuss out in own languages, laugh at each other;
- Communicate to each other with using English politeness words like “sorry, thanks, please and etc.”;
- To stand in a queue (entering to the bus, in canteen and other places.)
- Strongly prohibited to smoke in rooms, at office, drink in living rooms, fighting and so one.

Also cross culture training is provided with some important local administrative and criminal low information aiming at prevention of the breaking of the low by HSE trainers as well as respecting local community people.

Following fragment shows some features of the national cultures from presentation of adopted by HSE trainers:

Nation	Culture	Remarks
Uzbek	1. Seniority is important	Respect the all elder people, we never call them by their names, instead we are using an uncle or grandfather definitions
	2. Greeting	Handshaking is very common, every day we are handshaking when we see our friends or acquaintance. A hugging is to be done while holidays..
	3. Behavior	Entering an intmate relationship with a girl without marriage is strictly prosecuted.
	4. Smoking	Smoking is prohibited on front of our father and mother including seniority. Besides that drinking is strictly prohibited.
	5. Eye contact	In Uzbekistan prolonged eye contact is considered rude.
	6. Nonverbal language, gesture saying “hello”	It is not an ethical to point out other people by hands or fingers. It will be assumed as a bad sign. When we meet a new person we greet them: “Assalamualaykum”.
	7. Verbal “high content” greeting	Uzbekistan people speak in quite, low tones. When we greet an elder person, we put our right hand on our chest which will show a respect.
		While we address to other person we never call by names except younger persons.
Korean	1. Seniority is important	Respect to the elder people
	2. Handshaking is common when we meet after long time, not hugging except special case	Handshaking is not common between a man and woman but possible. Also hugging is not required. (Handshaking is used only a right hand)
	3. Shouting & ordering	Sometimes, a boss or elder people can Abuse to their subordinate without insulting. Also used to ordering by crude language. - Not allowed
	4. Drinking & smoking	Smoking is prohibited in their father and mother including seniority (Usually drink is allowed)
	5. Eye contact	In Uzbekistan prolonged eye contact is considered rude

In addition to this Samsung site office social worker provides information with common etiquette and behavioral manners accepted by traditions of participating nationalities at this project collected individually. According to training presentation information about cultures were presented in series from culture to culture.

For example we would like to present some cultural aspects relating to one or another nationality. With respect to Korean greetings and salutations, handshaking, bowing among family, among close friends, among colleagues, first time meeting, casual meetings, formal situations, etc. Greetings follow strict rules of protocol. The Korean word for greeting is InSa. Bows are traditional and common in Korea. With your legs together, and your arms straight at your sides, bend forward at your waist and do not maintain eye contact.

Dining etiquette - seating, utensils and glass use, who orders first?, Who pours first for whom? When do we eat, when do we talk? If you are invited to a Korean's home - it is common for guests to meet at a common spot and travel together. Try your best to arrive on time. However, you will not offend if you. are a little late. Remove your shoes before entering the home. Hosts greet each guest individually. The host pours drinks for the guests in their presence. The hostess does not pour drinks. The host usually accompanies guests to the gate or to their cars when they are leaving because Koreans believe it is insulting to wish your guests farewell indoors. Send a thank-you note the following day after being invited to table. Table manners: Wait to be told where to sit. There is often a strict protocol to be followed. Always agree to allow the host of your dinner to seat you. The seat of honor is the one that is facing the front door. If you get seated there, it is polite to protest slightly .The eldest is served first. The most senior person is the one who starts the eating process. Never point with your chopsticks. Do not pierce your food with chopsticks. Do not cross your chopsticks when putting them on the chopstick rest. Do not leave your chopsticks sticking out of a bowl of rice. This is reserved for ceremonies for the dead. It is very disrespectful for your hosts. It is polite to pass or accept food or drink with your right hand while (net.materilas).

It should be pointed out that all attempts of cross-cultural management promotes to preserve harmony in society and to maintain the clarity of hierarchical structure. Showing respect to others acts as a crucial social lubricant. Respect is conveyed through language, behavior, etiquette, body language, and other subtle forms of non-verbal communication.

This fact is in a way interesting, but dealing with people from different cultures requires knowing the cultural diversities; for instance the way we deal with them, what we say and what we should avoid saying, how to communicate and to be aware of the cultural taboos because what is accepted in one culture might not be accepted in another. What applies to every day communication among cultures applies to communication in the workplace. Working with people in an organization requires dealing with certain issues such as motivating employees, structuring policies and developing strategies. In this case, there has to be a kind of understanding of the cultural diversities in order to apply the afore-mentioned issues in the workplace.

Besides cross-cultural training the SECL site office administration had organized sport competition activities and other cultural events. For example, administration personal was informed well that Indian prefers cricket, Philippines like basketball, Korean and Uzbek labors give their preference to football, that's among labors of each nationality were conducted such sport competitions which are desirable to them. Korean office labors and Uzbek civil department labors played final game on football with one another. Also Philippines played basketball and Indian – cricket between both staff and site labors of different SECL site departments like administration, civil, FMC, HSE, electricity and etc.

So the cultural impact on management is reflected by basic values, attitudes, beliefs and behavior of the people. Culture can affect technology transfer, managerial attitudes, managerial ideology and even government-business relationships. Moreover culture affects how people think and behave (Hodgetts and Luthans, 1994).

It should be also pointed out that during project time, it about more than three years international employers had been invited to national holidays, family's events as weddings, birthday parties of local Karakalpak and uzbek employers who lives in Karakalpakstan. Surely it can be considered as part of cross-cultural integration process that differ from official cross-cultural management. Inviting of the foreign guests accepted by local etiquette traditions because of any foreigner is respected. The same time international employees in the person of Korean, Philippine,

Indian and other staff had an opportunity to meet local traditions and hospitality. It is also cross-cultural event managed by self-organization institutions as local traditional communities.

Thus everybody should hold the opinion that culture is not a box but a fluid concept that is an ever-changing, living part of you, reflecting your learned, socially acquired traditions and lifestyle. That's why each element of culture can be changed, we have just illustrated those elements that are frequently repeated.

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Rezyume: *Ushbu maqolada turli millat vakillari, ijtimoiy guruhlar va madaniyatlar vakilari UGCC GSP & Polymer loyihasilf asos'iy ishtirokchisi bulgan Samsung engineering kompaniyasining ofis va qurilish ishchilarining kundalikli madaniy turmishi va madaniy voqealar uz aksini topgan. Kompanya ma'muriyati va bo'limlarining madaniy boshqaruvi haqida umumiy ma'lumotlar keltirilgan. Xususan, ijtimoiy ishchilar tomonidan madaniyatlararo masalalar bo'yicha nazariy tadqiqotlar, shuningdek, har bir kishi uchun odatiy xatti-harakatlar qoidalari, madaniy tadbirlar, kundalik dastur va ma'lum bir muhitda o'z-aro munasobatni barkomal etuvchi crossmadaniy trening o'tkazilgan.*

Резюме: *В данной статье представлена общая информация о культурном менеджменте администрации компании и отделов в отношении представителей разных национальностей, социальных групп и культур, работавших в рамках проекта UGCC GSP & Polymer компании Samsung engineering. В работе были перечислены теоретические исследования вопросов исследований и приведены общие правила поведения для всех участников проекта, культурные мероприятия, ежедневное расписание и взаимодействие между рабочими, которые способствуют созданию благоприятной атмосферы в данной среде.*

Kalit so'zlar: *krossmadaniyat, menedjment, an'ana, hamkorlik, muomala madaniyati, munasabat, ijtimoiy me'yorlar.*

Ключевые слова*: кросскультура, менеджмент, традиция, сотрудничество, этикет, коммуникация, социальные нормы.*

CHARACTERISTICS OF THE TECHNOSPHERE PERIOD. FEATURES OF "LINEAR" THINKING

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Summary: *This article characterizes the human society divided into three periods and classifies the thinking and its types that are an integral part of journalism formed in each society. In particular, linear thinking has proven to be a priority in agro and technosphere states. Linear thinking is the ability to think about these events in a flat, the same, very similar way.*

Key words: *Linear, thinking, divergent, industrial, agro, technosphere, wave, civilization, synthesis, analysis, comparison, infosphere.*

There are several sociological, journalistic, and historical theoretical studies on the differentiation of the world into different periods. While some studies are very scattered and they cannot express the general periodicity completely, briefly, some theories have classified the periodicity according to the nature of society. Sociologists classify it into five societies: hunting and harvesting, animal husbandry, horticulture, agriculture, industry, and post-industry. Other sociologists distinguish between "pre-industrial", "industrial" and "post-industrial". Anderson and Taylor, on the other hand, recommend the study of the human age into six: "feeding, animal husbandry, horticulture, agriculture, industry, post-industry." This differentiation of the classification was studied by the American scientist Alvin Toffler into three main waves. He divides the history of mankind into three parts in his 1980 work, The Third Wave. "The first stage is the agrarian period." This period began 8-10 thousand years ago and lasted until 1650-1750. At this stage the main wealth was the land, and the person who owned it also owned the world. In the first wave, large landowners had restrictions on communication between ordinary people. Messages written on heralds, couriers, or special boards have gained a limited amount of publicity. In the agrosphere, oral communication was a priority. The first historical appearances of information were in a simple form, and so were the methods of conveying and disseminating it. “During the first wave of civilization, all these channels of communication served only the rich and the rulers, and ordinary people were deprived of access to them. According to historian Laurin Zilliakus, the rulers were even skeptical of "attempts to send letters in other ways" or forbade it altogether. or emerging methods of sending information outside the residential area were a forbidden field for ordinary people and were used mainly for social or political control purposes. In fact, they were the weapons of a group of cyborgs. " Orkhon Enisey inscriptions, various characters engraved on stones, inscriptions inscribed on special leather, printed works taken from the first machine are the directions of transmission of information generated by the first wave. But this type of text civilization took on a whole new look in the Second Wave. This phase covers the period from 1750 to 1950. A. Toffler calls it "industry". The main wealth was the machinery, the manufacturing industry, the factory with the machinery, the owners of the fabric owned the world. In all the constellations of the "second wave" world - in Japan, in Switzerland, in the United Kingdom, in Poland, in the United States, most people begin to follow a pre-determined way of life. At every stage of his life, man is under the control of one of the main institutions of the Second Wave. Due to this control function, the team did not have full access to objective information. Other Western researchers have also advanced A. Toffler’s theoretical views on the second techno sphere wave. Theorists call this the industrial age, showing that technology is a major force in society. But Alvin Toffler showed a news view of each period, focusing more on specific methods, means of producing and transmitting information in each epoch wave. In our opinion, the agrocontent of information was created in the first wave. In the second wave, data transmission technologies were invented. The creation of the postal service, telephone, telegraph are technical methods of conveying information, that is, information was created using techniques in a certain sphere of the

Second Wave. “... civilization is not just a technosphere and the social sphere that coexists with it, but a phenomenon larger than them. All civilizations also need a field of information through which they can spread their fame. In this regard, the changes caused by the Second Wave will be very significant and bright.

"All three periods serve as the basis for the initial appearance and formation of data, the stages of development. In the first wave, the first views of information were created, in the second stage, the specific nature, characteristics, directions of receiving, writing and editing information, transmission emerged. According to A. Toffler's theoretical views, the process of text preparation is a phenomenon closely related to the properties of the technosphere.

Scheme of writing, distribution, control of information in the technosphere

(Control, Data acquisition, Data writing, Data control, editing, form of transmission)

At the techno sphere stage, information was formally requested from an industrial institute. It was prepared by the administration of that management institute. Based on the information provided by management on the requested information, the database was compiled based on the topic. In the process, the information was completely under control. As a result, the initial acquisition of information by institutions turned the task of journalism into a technically simple one, that is, a person who creates creative techniques, such as receiving, shaping, and disseminating information on a topic. In the second wave, journalism was seen as a more creative technical organizing field. At the data writing stage, materials were written based on the data collected. This information was published under the supervision of certain institutions, ie editing. Receiving, writing and editing information, transmission is a sequential process in which the text is created in a "linear" form. Though this sequence of ideas, meanings, and methods of delivery partially responds to the textual component in journalism, the existence of control has led to a lack of fairness in terms. As a result, the technosphere has become a period of technical armament of journalism.

Data control and editing, in the form of delivery, the material was reviewed and edited by the person in charge or institutions during the editing phase. In the same process, the content of the material changed due to the fact that the material was changed and enriched with additional ideas by other people. The edit shows that due to this control in writing, the properties of the technosphere are strong in the second wave.

In general, both periods were stages of preparation for data preparation and delivery. The infosphere, on the other hand, was a time of information transmission as an uncontrolled institution.

"In the 'primitive' communities and the First Wave communities, the information needed for economic production would be relatively scarce, and it could be obtained from someone in the immediate vicinity, either verbally or by gesture." According to Toffler's theory, only the agrosphere was formed in the first wave. In the second wave, the technosphere was at the center of society. By the third wave, the infosphere was considered important. "This infosphere, the technosphere, has become intertwined with the social spheres and has begun to help them adapt

economic production to the behavior of certain people." According to E. Toffler, the technosphere creates material materials, and the infosphere disseminates information to society as a whole. Both define the architecture of a society. From this it can be concluded that in the first stage the agrosphere existed, and then it formed the techno and infosphere.

At this point, it is necessary to dwell on the issue of thinking, which is one of the main features of journalism. Because at the root of any creative work is the opinion, thought, point of view of the author and the protagonists. “Thinking is a person's cognitive activity. This is a generalized way of reflecting a point of view. The result of thinking is an idea. ” There has been thinking since man began to understand the events around him. Thinking is about perceiving and analyzing this information, drawing conclusions. He also "... knows events with the help of intuition, perception." So, thinking is a product of human intuition. There are also types of creative, critical, creative, inductive, deductive, parological thinking. There are also types of thought such as discursive, creative, dialectical. But these species are built on thinking in two main directions. The first is linear, the second is nonlinear.

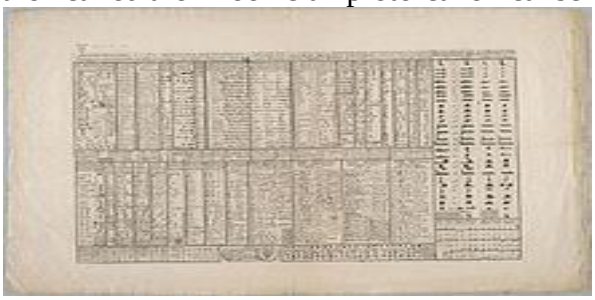
Linear thinking is the sequential evaluation of events in an interconnected way. “The following thinking operation takes place:

-analysis;
- synthesis;
- comparison;
- generalization;
- classification;
- abstraction;
- specification”.

However, in many cases, certain aspects of the thinking operation, i.e., the form of concretization or analysis, may not be used in the thinking process. It depends on how much, in what situation, and in what situation the person is thinking. The way a person thinks about something or an event based on a certain sequence of thoughts is linear. In doing so, the thinking becomes a flat one. The operation of thinking in a rhythm is linear. The first visualization of "linear" thinking is explained by the fact that a person sees a series of observations. So, this thinking began with the transformation of humanity into a conscious, homahaviles. This thinking, which has existed since mankind lived in the conscious species, is a traditional type of thought. It is obvious that most people perceive the events in society in a flat, very similar way, think about it relatively closely, and accept it. Claude Bernard writes in the introductory part of The Study of Experimental Medicine that "the essence of observation is the linear control of events without interfering with their motion." In the process of observation, seeing events inanimate, simply in sequence, not interfering with the action, and perceiving the situation directly without imaginary change, constitutes linear control. From this statement of the researcher, it can be understood that linear thinking is the way a person perceives events as they are, without giving in to emotion. Such traditionalism in human thinking also has a strong influence on their behavior, speech, and thought process. For example, consistency in dress habits, greetings in speech, inquiries and transitions, and coherence in movement are stereotypes formed on the basis of linear thinking. One of the main reasons for this is inextricably linked to human character, knowledge and thinking. Thinking as everyone thinks, thinking as many think is also linear. In the first and second periods (Agrosphere, Technosphere), "linear" thinking and horizontal delivery of the text, the form of writing prevailed. The sequential writing of data in a certain form and the integral connection in the form of its transmission give rise to a form of "linear" text transmission. There are different views in science on the form of "linear" text. It is derived from the English word “Linear”, which means “linear”.

There is a view that “linear” texts “appeared with or without the first appearance of hieroglyphic writing” (a special type of linear thinking. The centralized type of certain concepts is Tsenno concentratsiskits, holistic concentrated). The emergence of hieroglyphs in China and Japan, distinguished by their symbols from the pictograph, ushered in a new era of graphics. In Phenicia,

however, he abandoned the symbols denoting joints and began to use faft letters in writing. This was the beginning of the Greek alphabet. An alphabet is a standardized set of written symbols and graphics (called letters) that represent the phonemes of a particular spoken language. In history, a complete phonemic script, then called the Phoenician proto-canonical script, is the first alphabet.



(1. Phonemic notation)

Written characters in the alphabet, graphs are written in sequence. Unlike today's alphabets, it has graphics. The phoneme, the orderly placement of the graphics, gives rise to a form of "linear" thinking and text transmission. Because the alphabet is a structured form of written characters. Nowadays, names are written in alphabetical order, and the fact that some documents are written in alphabetical order proves that people are very prone to "linear" thinking. In doing so, man is involuntarily subject to the standardized laws of the alphabet, not by choice. So, another reason for "linear" thinking is related to the invention of the alphabet. Some researchers associate "linear" thinking with the invention of the alphabet. We think that this process is related to the life of Adam and Eve on earth before that. This is because the first visualization of "linear" thinking is the process by which a person sees what he is observing in sequence. A person's consistent, standard view of what is happening leads to "linear" thinking. In this case, first the first situation in front of the eye, then the second event is visualized in sequence. As a result, organic bonding leads to "linearity". The composition of the events takes place in a "linear" way. Initially, the injured person suffers from whey from the pain, then he is treated, taken to the hospital, examined, analyzed and treated. The occurrence or occurrence of events in a "linear" type causes "linearity". Also, waking up every morning, washing your face and hands, then having breakfast, going to work, and returning home at a certain time each day is a standard "linear" situation. Therefore, "linear" thinking is a characteristic of human nature. It is the "linear" text that is the product of human "linear" thinking. This is because man has created forms of text transmission based on his own comfort and inner capabilities. Hence, a "linear" text is a traditional text that must be read from beginning to end. In addition, this type of text will have an order or sequence. Usually, the author of the text determines the order of the text or the way it is read. In journalism, any text printed on paper is considered linear text. " In mass media, "linear" texts are a form of expressing an idea in a flat traditional way, or traditional text. It is a sign of "linearity" that it is connected to each other and written in a series of ideas or in order.

Linear thinking is about having a traditional look. The term applies not only to linguistics or journalism, but also to algebra. "The branch of linear algebra mathematics that studies linear spaces and their linear reflections." "In many cases, you have to deal with objects that need to be added and multiplied by a number." Linear algebra performs addition and multiplication of linear spaces. The notion that emerged in the 19th century implies that it stems from the characteristics of "linear" thinking. In this case, if the ideas are expressed sequentially, in "linear" algebra, the spaces increase in a specific number. The greatest feature of "linearity" is the organic connection or expression of ideas or spaces.

Thinking in journalism takes one or more forms. "Linear" thinking is exactly the same form. Printed books or published information allow the reader to read and think in a flat, unobtrusive way. This shows that linear thinking was a priority when the press emerged. Because this type of text, thinking is more of a typical type for print media.

Another feature of “linear” thinking has been proven to be related to its control function. The struggle between linear and nonlinear is rising to the level of state, nation ideology. Because the state needs unity in thinking, an integral connection, and this unity is provided by linear thinking. Nonlinear thinking causes everyone to have their own ideology. This may not be in line with the state’s control policy. After all, the state must maintain the unity of the nation and the government. Again, this leads people to express certain views, to deviate from one side of their thinking. In nonlinear thinking, everyone nods their head.

There are several features of linear thinking. The first control feature negatively affects principles such as pluralism, free expression of opinion, objectivity in journalism. The reason is that due to the controllability of linearity, the journalist is not able to convey information in a certain narrow range, objectively. Certain stereotypes and laws prevail. As a result, the problem of freedom of speech in society arises. Due to the predominance of linear thinking and text in the Agrosphere, Technosphere, there were problems in the field of journalism in the impartial, objective transmission of words and information. However, this trend continued to dominate society until 2017. The writing of template articles, the similarity in the composition of the material, and the similarity in thinking were due to linear thinking and text transmission. This has led to an increase in the number of like-minded people in society and a slowdown in development. In our view, the over-popularization of linear thinking in society has caused people to become more like one another. Thoughts also affected diversity and stunted development.

Another feature of linear thinking is closely connected with its compulsive-voluntary subordination to the point of view of thought, choice. During the technosphere, the ability to read newspapers was formed. At a glance, one chooses voluntary newspapers. Reading whatever you want from the materials on the pages is also done at will. However, due to the limited amount of information published in the newspaper, the reader is forced to read the available information. This makes it possible for the reader to be informed, to receive information on a voluntary basis.

"Thinking like most people think is linear." Linear thinking is a consistent, straightforward thinking on a particular concept. In this case, the concept of the event, the thoughts are systematized in a series, interconnected. This is the most basic feature of linear thinking. Moreover, pluralism is partially limited in this type of thinking. People have the same idea of the event and have similar thoughts. Third, the state’s ability to manage and control consensus will increase. Fourth, the functions of objectivity and objectivity in journalism lose their power due to linear thinking. Mass media, on the other hand, requires diversity of opinion and uncontrolled information. These features are the main distinctive impressive manifestations of linear thinking.

While linearity was a high priority in the agrosphere period, the discovery of new communication technologies in the Technosphere partially reduced the popularity of linearity. It was found that this type of thinking and type of text was influenced by the volume of information production in society, how democratic and open the information was. Linearity has been proven to exist since the creation of man to the present day. Only its superiority and influence in society varied according to the characteristics of the periods.

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Rezyume: *Mazkur maqolada uchta davrga bo‘lingan insoniyat jamiyatiga xarakteristika berilib, har bir jamiyatda shakllangan jurnalistikaning tarkibiy qismi hisoblangan fikrlash va uning turlari tasniflangan. Xususan, agro va texnosfera davlarida chiziqli fikrlash ustuvorlik kasb etganligi isbotlangan. Chiziqli fikrlash bu voqea-hodisalarni bir tekis, bir xil, bir biriga juda o‘xshash tarzda o‘ylash, fikrlash ko‘nikmasidir.*

Резюме: *Данная статья характеризует человеческое общество, разделенное на три периода, и классифицирует мышление и его типы, которые являются неотъемлемой частью журналистики, сформированной в каждом обществе. В частности, линейное мышление оказалось приоритетом в странах агро- и техносферы. Линейное мышление - это способность думать об этих событиях одинаково, очень похоже.*

Kalit so‘zalar: *Chiziqli, fikrlash, divergentlash, sanoat, agro, texnosfera, to‘lqin, sivilizatsiya, sintez, analiz, taqqoslash, infosfera.*

Ключевые слова: *линейное, мышление, дивергентное, индустриальное, агро, техносфера, волна, цивилизация, синтез, анализ, сравнение, инфосфера.*

UDC: 801.311

THE PROBLEM OF WORD AND TOPONYM IN THE KARAKALPAK LANGUAGE

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Summary: *The problem of word and toponym is controversial in onomastics, in particular, in its toponymy section. This article comprehensively traces the changes in the lexical unit that occur during its toponymization, as well as the processes of converting toponyms into simple words.*

Key words: *word, vocabulary, lexical unit, toponym, onomastics, semantics, appellative.*

The word contains a lexical meaning, as a result of which in the lexicology section of the science of linguistics (the science of language) the word is investigated from a scientific and practical point of view [1]. Being the name of any geographical object, toponyms are included in the toponymic vocabulary of onomastics. Despite the fact that they are the names of a specific object, they consist of words or phrases. But, unlike ordinary words, they are distinguished by a certain meaning, motivation in the process of naming, the presence of a topobase, topoformant and indicators, as well as the ability to become the name of an object in the process of toponymization. If these processes of isolation can reveal the characteristic features of the problem of a word and a toponym, in this case the way of their etymological analysis is revealed. It would be wrong to talk about the norms of studying the etymology of toponyms without knowing and not taking into account the natural, social characteristics inherent in them.

It is advisable to consider the following properties of toponyms:

1) the relationship between the word and the toponym;
2) toponym and its lexical basis;
3) the concept of a topographic base, topoformant and indicator;
4) the process of toponymization;
5) motivation (motivation) of the lexical basis of the toponym.

Although toponyms are formed from words or phrases, they differ from them.

At the same time, toponyms are comprehensively studied in history, geology and geography, and in the studies of these sciences, toponyms, like other onomastic units, differ from words in the following properties:

1. The word has a lexical meaning. From a historical point of view, the word has two uses: 1) in its main meaning; 2) as a proper name. Toponyms are proper names that reveal the names of natural and geographical objects, i.e. toponymic meaning. Here, the term toponymic meaning is an encyclopedic definition and to some extent makes it possible to determine the national identity of the people who gave the name, and is also used as a designation of geographical and ethnographic features. Consequently, there are no names without content and definite meaning.

If a word in a broad sense is a product of the name of a certain object, then toponyms refer to one of the forms of proper names formed in the process of toponymization and denoting toponymic meaning. For example: *Baqsı qaraǵan, Bekkeldi* – it is a syntactic unit, i.e. a sentence that, as a result of derivation from a syntactic unit, turned into a whole word and passed into toponyms: *baqsı+qara+-ǵan > baqsı qaraǵan > baqsıqaraǵan > Baqsıqaraǵan* (name of the villages), *bek+kel+di > bek keldi > bekkeldi > Bekkeldi* (street names).

Taxta+kópir >taxta kópir – here two words, joining, formed a phrase. *Taxta+kópir > taxta kópir > taxtakópir > Taxtakópir* ere two words, joining together, formed a word combination, and then - a complex word. Subsequently, this complex word, thanks to toponymic conversion, passed into onomastic vocabulary and formed a toponym. Thus, the above two

toponyms differ in that they are formed from a certain combination of words in the process of toponymic derivation and onomastic conversion.

But, bearing in mind that toponyms consist of words, it is necessary to pay some attention to the basics of its formation, according to which they are formed. Although the toponyms used since ancient times have now become one word, previously they consisted of several words.

Place names can be cited as an example *Xojeli, Xalqabad, Qaraózek.*

Just as the science of linguistics today represents a whole system, onomastics is a special section. This means that the boundaries between a word and toponyms are relative, and it is also important to take into account that the etymological analysis of the word is the basis for the etymological analysis of toponyms. Naturally, the necessity of naming objects caused the appearance of toponyms, therefore, the formation of words, i.e. lexical bases of toponyms associated with the socio-cultural, political and economic needs of society [2], for example *Nókis > nókisli, Xojeli > xojelishi*.

Toponymic materials show that words are divided into two groups:

1. Words available in the language, but not chosen to name objects and do not have a toponymic meaning.

2. The lexical bases chosen for the naming of objects in connection with the need and having a toponymic meaning.

Our main goal is to study the names of localities from the point of view of the etymology of the word of the second group, i.e. lexical bases chosen for the naming of objects in connection with the need and having a toponymic meaning. Thus, there is a constant relationship and relationship between the word and the toponym.

If in some cases, although this relationship is limited, it still takes place in the appellative and onomastic vocabulary, since "the name is a reflection of reality (object, feature, etc.) in the language" [3: 288]. The word that became the basis of the toponym, i.e. the lexical base in connection with onomastic conversion differs from simple words in the designation of a certain toponymic meaning.

Without taking into account the lexical basis of a toponym, it is impossible to analyze it from an etymological point of view in any direction, by any methods and under any factors, because "a toponym is considered the name / name (name) of a certain one. This shows that the analysis carried out is incomplete. Taking this into account, it is concluded that it is imperative to apply the term and the concept of the lexical basis (appellative) to clarify the content of etymological research in toponymy. To solve this problem, a number of studies have been studied [4: 188].

If the need for naming objects has become the reason for the formation of toponyms, their naming is the result - a word is needed to obtain this result. But not all words are used to refer to objects. Selected and toponymically meaningful words, as a rule, are used when naming objects. As a result of the coordination of these two processes, a toponym is formed from the lexical base [5: 159-165]. If we take into account the formation of toponyms in the process word + reason> toponym and the collected names of objects, then not all words in the language can become the name of an object. There are a number of studies in which words / suitable / for naming objects are given, and the opinion is briefly expressed that they carry a special specific meaning [6:78]. This opinion is a sign of the existence of lexical bases chosen for naming objects and having a specific toponymic meaning.

A.P. Dulzon notes that in order to become toponyms, the names of objects must be formed from words with distinctive semantic meanings and their etymological analysis must be carried out on the basis of general rules and laws [7: 37-48]. A.V. Superanskaya, emphasizing the need to use the term appellative (lexical basis) in the etymological study of toponyms, writes: "The problem, conventionally designated appellative - opota, provides for the study of complex cases where it is not obvious that the word in question belongs to the appellative or onymic lexicon, as well as cases of various transitions of lexemes from one nominative series to another "[8: 5-33].

In one of the works on the study of toponyms, the author singles out appellatives, i.e. lexical foundations from ordinary words and proves: *"Questions about the etymology of proper names were asked by the participants of the II Moscow Onomastic Conference. The answers turned out to be varied, up to diametrically opposite: a) the etymology of a proper name does not differ in any way from the etymology of the appellative; b) the etymology of a proper name differs significantly from the etymology of the appellative. Running a little ahead, let us express our point of view: a proper name is fundamentally outside the etymology in the traditional sense of the word"* [9: 256]. We consider the first answer to be incorrect. Calling any toponym "the effective name of an object" does not take into account its scientific, practical, historical and socio-political significance. The second answer is correct, because the etymological analysis is associated with the etymological analysis of the appellatives that became its basis, i.e. lexical foundations. In this case, their etymological study will, to a certain extent, become the basis for the etymological analysis of the names of localities. The word has several meanings, as a result of which, when choosing one of its meanings as the name of the area, a toponym is created.

The famous Uzbek scientist T. Nafasov, using various examples, proves the formation of toponyms from such parts of speech as a noun, an adjective, an adverb, but does not use a term that makes it possible to distinguish them from ordinary words [10: 301].

In the study of K. Konkobaev (the word lexical basis (appellative) is considered as the root / basis of common nouns: "... the appellative toponym: Tangi, Tagap, Gaz, Guzar" [11: 172]. But this circumstance is not taught. The need to pay attention to their lexical basis is given by A.V. Superanskaya in the following lines: *«Toponymic appellatives constitute one of the categories of words that are quite easily onymized. In such cases, they lose their basic lexical meaning and become onymic bases, which are equalized within toponyms with bases of other types (onymic, etc. [12: 176]. This opinion is confirmed by the fact that they are designed to designate objects, as a result of which appellative bases can give rise to denominations, can form the basis of local denominations»*.

The term lexical base is used by V.P. Yailenko in the sense of common nouns, which became the basis for the formation of toponyms [13: 736]. EM. Murzaev examines the lexical foundations of the toponyms of Central Asia and gives examples [14: 198-211]. Considering the meaning of the term in considering toponymic issues, A. Otazhonova calls it the lexical foundations of ethnotoponyms, i.e. specified the use of the term appellative [15:24].

As you know, the word tzuim (tribe) was used earlier in the meaning of a certain group of people. At the present time, this word in the Karakalpak literary language is used only as a historical term [16: 184].

In addition to common nouns, the names of the area also include other parts of speech. Here we mean topolexemes as part of toponyms, i.e. the words. This means that when using the term "appellative" along with common words and lexical bases, their equivalence was noted. At the same time, in the composition of toponyms, in addition to words, there are topoformants that play the main role in their formation. It is advisable if the toponym consists of words. But how can you name the topoformants in its composition? Bearing in mind the role of topoformants in the formation of toponyms, it would be correct to call them as appellative topoformants. In this case, the function of topoformants will be taken into account, which, along with common nouns, play the main role in the formation of the names of the area. Thus, when using the term "lexical basis of toponyms", the following is taken into account:

1. Lexical basis (common noun): boz > Boz (name of the area), dárbent > Dárbent (name of the area), doslıq > Doslıq (street names), qaratal > Qaratal (street names) etc.

2. Lexical base + topoformant: Gúlistan (the names of the aul), Almazar (street names), Baǵanalı (street names), Belewli, Gújimli (street names), Ǵazalkent (street names), Gúlabad (nazvaniya ulicı), Diyqanabad (locality) etc.

It would be advisable to divide the lexical bases into the following groups:

1. Lexical bases, consisting of one word: Aǵla (street names), Bereket (street names), Boz

(name of the area), Dárbent (names of the area), Qırq (names of the area), Lawzan (street names), Múlk (the names of the aul), órnek (the names of the makhalla), Taz (the names of the area) etc.

2. Lexical bases, consisting of two words: Íssıbulaq (street names), Shıpabaǵısh (street names), Shopanqazǵan (area names), Tentekarna (area names), Teńgeshashqan (street names), etc. Shegaraterek (place names), Kindikózek (place names), Besqala (street names), Kanalsaǵa (place names), Kebirawıl (mahalla names), etc.

Based on the composition, the lexical bases are divided into two groups - the topological base, the lexical base in the form of an indicator. If we consider that the concept of "lexical bases" means common words and topoformants, then they differ from common nouns. Only in the case when the appellatives of toponyms are involved in etymological analysis, it is possible to achieve a certain result in the study of toponyms. In the theoretical and practical study of names, one must bear in mind their lexical basis - the appellative. Lexical bases, along with common nouns, include words related to adjectives, pronouns, verbs, adverbs. It is advisable to call this whole complex lexical bases, because:

1. In the composition of toponyms, along with the words that make up the noun, words related to the numeral, adjective and verb are used, for example: Onekiúy (settlement), Ontam (settlement), Teńgeshashqan (street names), Qızılózek (the names of the aul), Jankeldi (street names), etc. These examples are the evidence base of the opinion that the lexical bases underlying toponyms can include not only common nouns, but also numerals, adjectives, adverbs, verbs, and also the chosen ones, i.e. underlying (names of toponymization) of the object are common nouns.

2. As well as the fact that words called lexical stem belong to different groups, their meaning includes certain toponymic concepts to designate objects. Along with the lexical meaning, there is a toponymic meaning that appeared as a result of its choice as the name of the object.

Just as toponyms are formed from common nouns, lexical bases are formed from toponyms. According to observations, common words formed from toponyms are formed in two ways:

1. Toponyms, changing semantically, turn into common nouns: Paxtakesh (names of the area) - *paxtakesh* (a farmer who grows cotton, Mayshı (settlement) - *mayshı* (a person engaged in the production of butter) etc.

2. Toponyms, adding *-lı, -li, -shı, -shi* are used as a lexical basis, meaning a person living in a certain area: Nókis (city names) - nókisli, Kegeyli (district names) - kegeilishi, Qońırat (district names) - qońıratlı, Moynaq (names of the district) - moynaqshı.

Thus, lexical foundations refer to common nouns chosen to denote objects and have toponymic meaning. Therefore, it is natural that they include words related to nouns, adjectives, numerals, pronouns, adverbs, and verbs. As a result of the toponymization process, these words turn into the names of various objects, and later become the object of study of onomastics, in particular toponyms, and serve as the basis for creating toponyms.

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1. This does not mean words in parts of speech (word as part of speech).

2. It is necessary to conduct a special study.

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Rezyume: *So‘z va toponim masalasi onomatologiyada, xususan toponimiya sohasida bahsli. Ushbu maqolada leksik birliklarning o‘zgarishi, uning toponimizatsiyasi va toponimlarning odatiy so‘zlarga aynalishi jarayonlari ko‘zatiladi.*

Резюме*: Вопрос слов и топонимов является спорным в ономатологии, особенно в области топонимии. В статье рассматриваются процессы смены лексических единиц, её топонимия и преобразование топонимов в обыкновенные слова.*

Kalit so'zlar: *so‘z, leksika, leksik birlik, toponim, onomatologiya, semantika, apellyatsiya..*

Ключевые слова*: слово, лексика, лексическая единица, топоним, ономатология, семантика, апелляция.*

USING ACTIVE METHODS IN FINE ARTS LESSONS

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Summary: *The state speaks of the use of active teaching methods in teaching fine arts, the development of the student's ability to actively learn, conducting such classes in the art of stimulation.*

Keywords: *visual arts, student, active teaching methods, lessons, heuristic conversation*

In our country, there are many opportunities for a radical reform of the education system, the widespread use of communication tools, as well as the development of the intellectual and creative potential of young people. It is very important to acquaint students with the values of our country, its rich culture, improve their skills, enrich them, form aesthetic concepts, form requirements for gaining knowledge about culture and art.

Without a deep knowledge of the centuries-old values, the vast, rich and cultural heritage of our people, it is impossible to understand national identity, a sense of national pride. The cultural wealth they create serves as an important tool in educating young people. Through the writings of great thinkers, students gain a broad understanding of the rules of good morality, happiness, honesty, purity, kindness, and respect for parents. The teacher's contribution to the upbringing of the younger generation is invaluable.

In particular, in the implementation of the educational process, a specific goal is set, laws are adopted, programs and activities are developed, plans are established that are implemented at the current level of demand. So, design before education is a project, construction, pedagogical technology of a certain pedagogical system. From this point of view, “personality formation” is also a project of a certain pedagogical system.

There is a goal, content, methods, forms and means of upbringing a harmoniously developed person, which is also a unique technology. Today, the state pays special attention to educating the younger generation in educational institutions, as well as creating the necessary conditions for all teachers to work on themselves, conducting research and organizing the educational process at the level of modern requirements on a scientific basis. Increasing the level of knowledge, experience and level of teachers, a condition for awareness of innovations in their field is their attitude to independent work.

Educational innovations are forms, methods and technologies that can be used to solve a problem in the field of education or the educational process on the basis of a new approach and guarantee a more effective result than before. [1;10]

One of the most important problems in teaching fine arts today is the establishment of targeted education. In the field of visual arts, the goal is to accelerate the development of students' intellectual abilities through the acquisition of historical knowledge, concepts and ideas about the visual arts, their interpretation, and the formation of skills and competencies. Intellectual potential requires joint actions of teacher and student.

That is, they have a choice of which technology to use to achieve the goal, because the main goal of both parties is to achieve a clear result, depending on the level of knowledge of the students, the nature of the group, the technology used, for example: a film, handouts, drawings and posters, various publications, information technology will be needed, it depends on the teacher and the student.

The teacher must design the educational process in advance, in which the teacher must take into account the specifics, location and conditions of the subject, and, most importantly, the abilities and needs of the student, as well as the ability to organize joint activities so that the desired

guaranteed result can be achieved. Achieving such a result requires the use of innovative and information technologies in the educational process in practice. [1;64]

Interactive learning, interactive methods of regular communication it is a system of methods based on the collaborative and active learning of students it is a system and methods of collaborative learning. In other words, interactive teaching methods - cognitive and communication activities it is a special form of organization in which students know are involved in the process, know and think they will be able to understand and think. [2;11]

They are very different. These include new interactive teaching methods and methods, as well as modern technologies currently used in the educational process. At the same time, it should be noted that with the widespread use of the aforementioned modern methods or technological trainings, which help to increase the effectiveness of learning, students develop logical, intellectual, creative, critical and independent thinking.

In particular, it helps students develop their skills, become competitive, mature professionals and develop the professional qualities required by a specialist. Active learning is a systemic pedagogical process that ensures conscious and active participation, independence and creativity of teachers and students in the educational process. The methods of cognition and action acquired in an active learning environment are ideally structured in content, logically complete and suitable for use in various work situations.

The following teaching methods are mainly used:

• discussion - discussion; participation in thinking; reinforcement on the board;

• introduction of various educational and professional games, etc.

The ability to actively learn from students studying the visual arts, that is, an active approach that stimulates students' interest in research (creativity) and learning (aspiration), can be the main didactic basis for activating teaching methods.

Active learning methods are methods that encourage students to think and practice as they learn the material. Active learning involves the use of a method that is focused primarily on the teacher's presentation of ready-made knowledge, and not on memorizing and retrieving them by students, but on the students' independent acquisition of knowledge and skills in the process of active perception and practice.

The characteristics of active teaching methods are to encourage students to actively perceive and practice, without which it is impossible to move forward in the acquisition of knowledge. The educational process was preceded by the emergence and development of active teaching methods. It is characterized not only by the transfer of knowledge to students, but also by new tasks, including cognitive interests and abilities, creative thinking, as well as the formation and development of skills of independent mental work.

The emergence of new tasks is based on the rapid development of information. Active teaching methods are used at different stages of the educational process: the initial acquisition of knowledge, consolidation and improvement of knowledge, the formation of skills.

When choosing a teaching methodology, first of all, it is important to analyze the content of the educational material and the creative thinking of students using active methods, their cognitive abilities, life experience, the ability to adapt to real activities.

Informative learning methods include the ways in which students receive instructional information in a finished form or in which the teacher can narrate: lecture, storytelling, explanation, conversation, independent work with a book. A distinctive feature of problem-based teaching methods is the addition of questions for students to which they need to find independent answers, create new knowledge for themselves, “discover” and formulate theoretical conclusions.

Education - for purposeful personal improvement is an organized pedagogical process that allows you to systematically and systematically influence the teacher. [3;63]

These include: problem report, heuristic dialogue, research report, search lab, research method. The essence of active skills-building methods is to get students to complete tasks that they can take on in the solution process. The science of fine arts education provides the younger

generation with a wide range of opportunities for the formation and development of aesthetic taste, artistic thinking, intellectual potential and, most importantly, a general outlook.

Thus, the introduction of promising innovative approaches based on historical experience, analysis of modern situations over a certain period of time, will ensure the development of the industry, the correspondence of art education to the educational needs of society.

So, you need to understand that the creative thinking of students, the new formation of artistic thinking allows you to achieve positive results only with the help of modern approaches. The educational task of visual arts is to convey the rich cultural, artistic and aesthetic heritage created by humanity to future generations, to satisfy the needs of people, to control their emotions, to change the world based on the laws of beauty. Our experienced teachers will achieve the desired results with a positive approach.

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Rezyume: *Maqolada tasviriy san'at darslarida o'qitishning faol usullaridan foydalanish, ta'lim oluvchilarda faol o'rganish qobiliyati, ya'ni ta'lim oluvchilarning ijod qilish va o'rganishga qiziqishini yuzaga chiqaruvchi faoliyat haqida yozilgan.*

Резюме: *В статье говорится о применении активных методов обучения в преподавании изобразительного искусства, о развитии у учащихся способности активно учиться, то есть проведении таких занятий, которые стимулируют интерес учащихся к творчеству и обучению.*

Kalit so'zlar: *Tasviriy san'at, o'quvchi, o;qitishning faol usullari, dars, evristik suhbat.*

Ключевые слова: *изобразительное искусство, студент, активные методы обучения, уроки, эвристическая беседа.*

UDK: 82-14

THE STUDY OF KARAKALPAK LYRICS OF THE XX CENTURY IN THEORETICAL ASPECTS

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Summary. *The article examines the study of theoretical aspects of Karakalpak lyrics of the XX century. This problem is considered in the article on the basis of the research of literary critics B. Dauletov, D. Pakhratdinov, E. Eshniyazova, A. Dosymbetova.*

Key words: *lirika, theory of literature, literary genre, literary studies, karakalpak poets, dissertation, karakalpak literature.*

In the early years of the XXI century, the study of the lyrics of the individual poet in theoretical terms continued. During this period, creative path of Kazy Maulik, the lyrics of T.Matmuratov, the issue of artistic form in the lyrics of Sh.Seytov, the traditions of the Eastern classics in the lyrics of I.Yusupov were studied in the dissertation plan.

In the dissertation of the writer B.Dauletov “Kazy Maulik poet's creative way (Life and work, ideological-thematic, genre features of lyrics. Textology)” (Nukus, 2001) Kazy Maulik's work peculiarities, genre features of lyrics, the problem of textology are studied from a scientific point of view.

Some opinions are given on the work of the poet Kazy Maulik in works of N.Daukarayev [1. 194-196], Q.Ayymbetov [2. 155-159], A. Pakhratdinov [3. 154-178] and others. However, the work of Kazy Maulik has not been studied in a separate monograph.

Two different perspectives can be seen in the study of the literary heritage of Kazy Maulik during the period of the former Soviet government.

1. It was considered in the form of works that do not respond to the scientific interpretation of the past period (socialistic realism method). Kazy Maulik was considered as a poet who sang the songs of merchants and mullahs.

2. The issue of mastery in the lyrics of Kazy Maulik was given a positive assessment.

B.Dauletov also expresses his position on these issues in literature and wrote: “The main reason was that in 1927-30 the Soviet government began to persecute the old representatives of intelligentsia with religious knowledge. Kazy Maulik came from the family of great scholars, he was an akhun, and for a few years he was a kazy in the Shymbay region. The man who was in exile from 1929 to 1950 cannot be overestimated. The policy of the “Red Empire” at that time demanded it. “ [4. 7-8]

B.Dauletov separated Kazy Maulik's lyrics by its theme and content as follows: “1. The theme of homeland in the works of Kazy Maulik. 2. Love lyricism in the works of Kazy Maulik. 3. Didactic lyrics in the works of Kazy Maulik. “

The artistic methods of Kazy Maulik's poems dedicated to the description of his homeland “Shymbai baiazy” and “Jasargan ilham”; poems on the theme of love, such as “Griptar emdi”, “Megzettim”, “Yadyma tushti”, “Aqlym hayrandur”, “Periyzat” are in harmony with the artistic method of Ajiniyaz's work. Indeed, Kazy Maulik sees the traditions of Eastern poetry as the next poet after Ajiniyaz. He studied at the Karakum Iyshan Madrasa, then at the Kokaltash Madrasa in Bukhara and reached the level akhun.

We can assume that Sufi poetry, which was based on Islamic teachings, had an influence on the sound of love lyrics in the poetry of Kazy Maulik and Ajiniyaz. In the dissertation of B.Dauletov given following information: The Karakum Iyshan Madrasah studied Sufi literature, which had little connection with religious teachings and literature. He studied the poems of Ahmed Yassawi, Najimatdin Kubra, Sulayman Bakirgany, Mashrep at the madrasah. [4. 21]. This means

that Kazy Maulik was well acquainted with the teachings of the literary currents, which were formed on the basis of both the teachings of Sufism and the teachings of Nakshbandi. However, the dissertation does not mention this.

At the same time, the researcher conducts a scientific analysis of the genre forms in the lyrics of Kazy Maulik and identifies their types, such as four-line poem, strophe, description (qasida), muashshaq, bayit. It is noteworthy that the definitions of their forms, mastered by the poet, rather than their classical biblical form, are noteworthy.

In the dissertation of the literary critic E.Eshniyazova the studied the ideological and thematic direction, formal diversity, beauty and structure of T.Matmuratov's lyrics. “E.Eshniyazova writes that the work of the poet Tolepbergen Matmuratov is ideologically and thematically diverse. His poems are about love for the motherland, love for one's lover, wisdom, beauty of the world, friendship between people, feelings of kinship, deep thoughts about man and his place in the life of the world..” [5. 119-120]

In the dissertation of E.Eshniyazova the lyrics of the poet T.Matmuratov are studied separately by types in terms of both ideological and thematic content and poetic form. They are divided into examples of creativity about love, homeland and philosophical content in terms of content and ideas.

In the dissertation, the researcher identified several formal types of lyrics in T. Matmuratov, analyzed their theoretical description, the method of comparison of stylistic features. Gathering the scientific ideas of the researcher can be summarized as follows:

1. In T.Matmuratov's lyrics it is noted that folklore forms (haujar, terme-tolgau) have a place and their content is written in the spirit of modern times;

2. It is proved on the basis of analytical data that the four-line form of poetry in the poet's lyrics is more advanced than the other forms;

3. Examples show that the four-line form of poetry in the poet's work was created in several thematic directions;

4. The formation of the free form of poetry in the poet's lyrics and its theme, theoretical description are to some extent determined.

At the same time, part of the dissertation is devoted to the study of poetic structures of the works of T. Matmuratov. In clarifying this issue, he relies on the scientific work of M. Hamraev, U. Tuychiev, Z. Akhmetov, K. Risaliev and others. T.Matmuratov's lyrics are written in “barmak” and free size, in two, four, five, six, eight and ten lines in the form of a couplet, and at the same time there are different forms of rhymes.

Several monographs and dissertations on the works of the poet I. Yusupov were written in Karakalpak literary criticism. As a result, the formation and development of the science of Ibraimtaniu(Study of Ibraim Yusupov's works) took place. In the first years of independence, I. Yusupov's work was studied in detail. The scientific works of J. Magsetova [6], M. Mambetova [7], A. Hamidova [8] were devoted to the study of new aspects of the poetics of his works. This scientific research has continued in the XXI century. Literary critic D. Pakhratdinov defended his dissertation in 2001 on the topic: “Classical traditions of the East in the works of I. Yusupov (on literary connections and influences).” In this scientific work the lyrical traditions of I.Yusupov's works from the poetry of the peoples of the East, including the world of images and the process of placement of lyrical forms are discussed on the basis of scientific approaches.

The first chapter of the dissertation deals with the mastery of the images of Eastern thinkers and oriental poetry in the works of I. Yusupov, the ideological and thematic content of resin works. Although the ideological and thematic features of the formation of individual resins in the dissertations discussed above have been specifically studied, their scientific results seem to be the same. D. Pakhratdinov's dissertation also studies thematic elements such as homeland, place of birth, nature, mentality.

In the second chapter of the work the process of establishment of lyrical forms in Eastern classical poetry under the direction of I. Yusupov, their distinctive features are considered in the

aspect of literary influence. The issue of literary influence in the education of I. Yusupov was also specially studied by the literary critic A. Khamidova.

In A.Khamidova's dissertation "I.Yusupov's creativity and European literature (problems of literary relations and literary influences)" (Nukus, 1999) I.N. Theoretical puzzles on the state of formation of sonnet, ballad, romance, impromptu, elegy, epigram, epitaph forms in the literature of Western peoples in the education of I. Yusupov, individual methods and mechanisms of mastering these forms were sought.

According to D. Pakhratdinov: I. Yusupov wrote poems while preserving the formal features, differences, dimensions, similarities of the lyrical genres of gazelle, rubai, muhammas, masnavi, murabba. In I. Yusupov's lyrics, they are created in accordance with their conditional requirements and modernity in terms of content, theme, form. [9. 139]

Poet I. Yusupov had a deep knowledge of the biblical forms of the genres of gazelle, rubai, murabba, masnavi, written in the form of aruz. These forms were adapted according to the rules of finger size, which are characteristic of the Karakalpak compound.

The question of whether the genre of rubai was formed in Karakalpak lyric poetry among literary critics dates back to the 60s of the last century. D. Pakhratdinov expresses his opinion on this issue. He came to the conclusion that in the lyrics of I. Yusupov the genre of rubai was established. Literary scientists K. Zharimbetov [10. 72-74] and K. Orazymbetovs [11. 166-170] theoretically confirms the fact that in the Karakalpak lyric the genre of rubai in the size of aruz is not formed, there are quartets close to rubai.

It is also worth noting the scientific work of the writer A. Dosymbetova in assessing the theoretical foundations of lyrical forms of individual resin education. She studies the artistic forms in the lyrics of Sh. Seitov in the dissertation project.

The first chapter of the dissertation deals with the peculiarities of the development of the traditional form in the lyrics of Sh. Seitov, the external and internal formal structure, the synthesis of traditional and new forms. Features of the free form of the mixture and the form of the mixed mixture in the formation of resin were identified. A. Dosymbetova introduced the mixed form for the first time in scientific circles. According to the scientist, as a result of the mixing of the elements of the traditional compound and the free compound in the formation of resin, a mixed compound was formed. "We can consider Sh. Seitov's compounds of this form (mixed form) as manifestations of the process of transition from the traditional form of resin production to the free form." [12. 45]

Analyzing the lyrics of resin, A. Dosymbetova gives scientific works on their stylistic figures, methods of creating a poetic image. At the same time, the theoretical problem of free resin compounds is studied in the unity of content and form.

In short, in each of the above dissertations, individually selected resin education is studied on the basis of the achievements of modern literary science. Despite the fact that the object of research is diverse, there is a similarity in the scientific approach and research methods in these dissertations.

1. It is aimed at studying the most relevant theoretical exercises.

2. Revealing the ideological, thematic and semantic properties of the studied resin lyrics in a comparative-historical and artistic-aesthetic aspect was a matter of priority.

3. The formal (traditional and free) and genre nature of the studied resin lyrics is studied in a structural-poetic and comparative-typological way.

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Резюме. *Maqolada XX asr qoraqalpoq lirikasining nazariy aspektlarda tadqiq qilinishi o'rganilgan. Maqolada mazkur vazifa adabiyotshunos olimlar B. Davletov, D. Paxratdinov, E. Eshniyazova, A. Dosimbetovaning tadqiqotlari asosida ko'rib chiqiladi.*

Резюме. *В статье рассматривается изучение теоретических аспектов каракалпакской лирики XX века. Данная задача в статье рассматривается на основе исследований литературоведов Б. Даулетова, Д. Пахратдинова, Э. Ешниязовой, А. Досымбетовой.*

Kalit so'zlar: *lyrika, adabiyot nazariyasi, adabiy janr, adabiyotshunoslik, qoraqalpoq shoirlari, dissertatsiya, qoraqalpoq adabiyoti.*

Ключевые слова: *лирика, теория литературы, литературный жанр, литературоведение, каракалпакские поэты, диссертация, каракалпакская литература.*

KHOJA SULAYMAN BAQIRGANIY (KHAKIM ATA) SHRINE

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Summary: *In the article we will focus on the material culture, history of research and information about it in historical and written sources of the complex of Khakim ata Sulayman Bagirganiy, a sacred shrine in the South Aral Sea region, which is the center of our civilization.*

Keywords: *South Aral Sea, Muynak district, Khakim ata, archeological monuments, shrine, research, written sources, material culture, cultural heritage, archeologists, past history.*

In the territory of Muynak region there is a mausoleum of Khoja Sulayman Baqirgani, known among all Turkic peoples by the nickname Hakim Ata. There are many wonderful myths and legends about this great person among the people, the details of which were published in the press in the XIX century. You can see the information below in one of those traps. Hodja Ahmed Yassawi sent Hokim Ata to South Aral along with Toqpaq Ata, Zangi Ata and Qoshqar Ata, who graduated the madrasah. The current location of his father's tomb was the place where he originally came from. There was a sign of his father's camel on the road. We will call that place "boydalı" after the people. It is the present-day Shimbay district, the territory of Shimbay.

Alisher Navoi, in his book Nasoim ul-Muhabbat, states that "Sulayman, the main name of Hakim ata, is one of the most prominent murids of Khoja Ahmad Yassaui," and that Hakim Ata's wisdom is very popular among the Turkic peoples.

In the legends published by K.G. Zelman in 1828, it was said that Hakim ata was born in the village called "Bakyrgan" near the Aral Sea and was buried there. At the same time, some information was received about the care of a shaykh named Seyid Ata (Seyid Ahmed) from Zangi Ata to the mausoleum of Hakim. During the Mongol conquest of the South Aral Sea, the tomb of Hakim Ata was submerged by the Amu Darya River for forty years.

The Russian ambassador, G.I.Danilevsky, who came to Kungrat in 1842 wrote that he had been to the tomb of Hakim Ata, and that there were several black (Karakalpak) houses next to it.

According to scientific sources, Hakim ata's nickname is Sulayman Baqirjaniy. He is a graduate of Hoja Ahmed Yassawiy Madrasah and one of his early students. He was a great poet, a continuator of his teacher’s poetic traditions. His "Book of Screams" was published several times in the XIX century. Following the example of Suleiman Baqirganiy, published in Kazan in 1848 and 1898, the book "Baqirgan" was first published in Tashkent in 1991 by I.Haqqulov and S.Rafiddinov in the "Writer" publishing house.

In 1991, in Tashkent, Sulaiman Baqirganiy's works were published under the title "Book of Bakirgan", 11 narrations related to his life, "The Book of the Hakim Ata" (published by the famous historian K.G.Zelman) in 1898 published by A.Jabbarov, Kh. Jabbarov in Nasaf Publishing House, Karshi, 1993[1.1993].

According to the famous orientalist Fitrat, in his scientific work, the book "The Book of Shouts" was published in Kazan in 1906. Not all of the additions in this 75-page booklet belong to Hakim ata, but Hakim ata has 36 additions, for a total of 1,180 lines. Fitrat cites 21 other poetic names in this book as "... Hubbiy- Hubbiy Khoja, the son of the ruling father". It is clear that Hubbiy Khoja followed to his father and became a Sufi poet [2.2010].

The book "The book of Bakirgan" by Sulaiman Baqirganiy was first published in 1991 by literary critics I. Hakkulov and S. Rafiddinov [3.1991]. In G.Bayniyazov's book "Hakim Ata - Sulayman Baqirganiy - our land" speaks about Hakim Ata - Sulayman Baqirganiy [4.28]. Wisdoms of Ahmed Yassavi and Sulayman Baqirgani by Toji Qoraev and Abul Bozorov have been published [5.2011]. The book "Sulaymon Bogirjoniy (Hakim ota)" by U.Embergenov and J.Shamurodov was published in 2015 [6.272]. In addition, his wisdom has been repeatedly published in countries such as Turkey and Kazakhstan. While writing about Hakim ata, I found it necessary to write in two ways: 1) history 2) literary method. Why do you say that Hakim Ata Sulayman Baqirqani Baba, on

the one hand, is a historical figure, and on the other hand, his epics, and wisdom are considered to be the winners of our literature [7.41].

Sulayman Baqirgani's birth dates are unknown, but his death has been shown in two ways in a number of sources. A) 1186 y B) 1192 y. According to folklore, Hakim Ata died during the time of the Prophet. So the year of birth is 1129 years. If we look at the story of Ahmet Yassawi, who has been educated at the age of twelve, and went to Turkestan, it is 1141. The inscriptions show both the narration and the epics. Recent research in this area suggests that the tomb is a medieval step. The inscriptions clearly indicate the place of the Hakim Ata cemetery in the legends. It is located in the Muynak district.

Recent observations in recent years have shown that the tomb was a shrine from the earliest times. For example, on the west side of the new mausoleum, the length of the old building is 2-3 m. height 0.3-0.5 m. the walls are preserved. The size of the wall is 24x24x5 cm. and baked bricks were used. The desirable nature and size of the coats of arms belong to the XIII-XIV centuries. This shows how the tomb was built not only on the tomb, but also around the tomb.

If we rely on the writings of the Arab-Persian geographers Ibn Ruste, Istakhri, Maqdisi, the works of the famous scientist SPTolstov and Ya. The castle (Takhtakopir) was surrounded by peasantry. Not far from the Hakim Ata shrine were settlements of the Middle Ages, such as Burakhan, Madmina, and the daughter of the Prophet.

The judge also mentions information about Hakim ata and his tomb was mentioned in later times. For example, scientific maps on the ethnic settlement of the Karakalpaks in the XVII-XVIII-XIX centuries show the site of the current mausoleum of Hakim Ata between Kongrat and Muynak.

The tomb of Hakim Ata Suleiman Baqirjani, a well-known religious poet and poet, who died in the 12th century, is located in the Muynak district. His mausoleum was built several times in the XII-XIV-XVI-XIX centuries. The last mausoleum, rebuilt during the reign of Allaqulikhan (1826-1843), collapsed during the floods in 1935-1946 [8.2002]. Under the leadership of the Dawletali Jabbarov, Hakim Ata and Seyit Ata built a dome with a stone emblem over their graves [9.3-4].

The location of Baqirgani, the city where the Hakim ata was born, is not clear in modern science. According to academic archaeologist Ya.Gulamov, the fortress of Havoqand, which is located in the inscriptions of the Khiva khanate, is the fortress of Bagrakhan between the Qoqirat fortress and the mausoleum of Hakim Ata Baqirqani [10.158-159].

In the 19th century, K.E. Zelman wrote that the tomb of Hakim in Baqirjaniyya had nothing to do with it, although it was not in the lower reaches of the Aral Sea at the foot of the Bagrakhan Amu Darya in the history of Seyd. He fell ill and died shortly after the conquest of Bukhara. The toponymic term Bakigon is written to have changed over time to Bagrakhan. Academician V.V.Bartold (1868-1930), who studied the ancient sources written in Arabic, Persian and Turkish languages, confirms the views of K.G.Zaleman and in his article "Hakim ata", in the article "Hakim ata on the issue of the place of birth" he wrote that "Hakim Ata is a Turkic-speaking saint from Khorezm". Disciple of Ahmed Yassavi, who died in 1166. His name was called Sulayman Bagirjani, and he was also called Sulayman ata or Hakim ata. The place called Bakyrgan is located a little lower than the present-day city of Kogyrat: the mausoleum of Hakim Ata is still considered a place of pilgrimage, a sacred place.

The well-known Bashkir scholar and orientalist V. Togan (1890-1970) wrote that he came to Kungrat in the autumn of 1920 and left the following information.

Kungrat is the regional center of the Khiva khanate. Despite the fact that it is a small fortress consisting of several hundred seats, Bolivia still has a name on the map of Hamburg, Germany, Manchester, England, and Shanghai, China. On the geographical map of the Arabs in the 10th century, this fortress was called Bakirkhan, which is located in the western part of the present-day Kungrat. There is a mausoleum of the famous Sheikh Hakim Ata Baqirqani. He wrote us suffizm in Turkish. A number of scientists are conducting research in Russia and Turkey.

In 1857, Hakim Ata's "Screaming Book" was first published in Kazan. As a child, I read and remembered his poems. Taking advantage of the fact that we stopped for an hour while shouting, I

visited the tomb of the sheikh. "So, according to Zaki Validi Togan, Bagirjan is the old name of the city of Konirat [11.107].

23 km from the Qoqirat fortress on the west side of the Muynak-Kungrat road there is a large mausoleum of Hakim Ata's tomb. The name and form of these places have changed several times in the eight hundred years since it was created. During the reign of the ruler, water was taken from Quwandarya Jayhun, passed through the cemetery and poured into the Aral Sea.

In the 20s and 30s of the 20th century, the water level of the Amu Darya increased dramatically. The people of Elgelumjap, who became a great nation, now call it Aqbasli. It is known from history that the people who lived here joined the Kungrat and Qanlikul rivers due to the flood. In the 70's, the lands were reclaimed, and under the auspices of the Governor-General, the new "Dosliq" cattle-breeding farm was established. The people of this land are not only engaged in cattle breeding, but also in agriculture and gardening.

"When we went to the shrine of Hakim Ata with the grandson of the poet Ajiniyaz, Quwandiq Dastan oglu, Saqi Turdimurat Allamurat oglu, the teacher of Kungrad, Kayipnazar Allaniyazov, we saw that the farm" Dustlik "was growing crops and fruit trees. The Sheikh of Mazaristan, Saribay Nurabilla uli, showed us the graves of the two men lined up. One of them was Hakim Ata Sulayman Baqirgani, and the other was the tomb of his wife Seyd Ata. We saw that they were brought to the place of the place where they were built, and that the stones were torn down as a sign [12.3-4]. Bugrakhan is located in the area of an old castle built in the Middle Ages. Bugrakhan is located 14 km behind the Kungrat fortress. It was inspected in 1946-1959 by members of the Khorezm archeological and ethnographic expedition led by SP Tolstov. In 1960, it was studied by archaeologists of the Karakalpak branch of the Uzbek Academy of Sciences [13.39].

Its topographic plan was excavated, and archeological data were collected around the castle. There are various legends about Bugrakhan among the local people. For example, the Qala and its tomb are associated with the Bugrakhan horse, which was located around the Aral Sea during the Kungrat which was explored thousand years ago. The peoples of the Aral Sea are fighting for their independence. At that time, he married the daughter of a local cleric, Bugrakhan.

Later, the local people turned to Bugrakhan, who was trying to establish kinship ties, and his people were on the side of Kashgar. According to scholars, this myth must have included Bugrakhan Bolivian, the king of the Karakhanids, who invaded Central Asia at the end of the 10th century. This is because Khorezm was temporarily dependent on the Karakhanid state in the early 11th century. In recent years, the castle has become a haven, and it is still used by the local people around it. The remaining area is more than 60 ha. It consists of a quote, a county, and a defenseless rabat. The area of the citadel is about 60-50 m. There was a spring and a short mosque and the remains of a huge minaret of the castle.

The citadel is located in the northwestern part of the county. The mausoleum "Bugrakhan" was opened from the dome of the citadel. The area of the city is 250-200 m. It is surrounded by a protective wall made of cotton. There is a rabat around him. A large house was built on the west side of the castle. It consists of 25 rooms. It consists of 4 sections. The walls are made of baked brick [14.2002]. Therefore, we believe that this city was the capital city of the lower reaches of the Amu Darya River and that most of the life of Hakim Ata was connected with this city. Muslim holidays, Eid al-Adha and Nawriz are still celebrated today.

The castle was built in the VIII-IX and XII-XIV centuries. It is necessary to briefly dwell on the biography of Khoja Ahmed Yassawi, whose status is the highest famous miracle (matavaliy) and the boundless meltdown without borders ”.

The year of Yassawi's death is known as 1166. The year of his birth is variously mentioned in the literature. Ahmet Yassawi went to Bukhara in 1110 and was educated by Yusuf Hamadani (1048-1140), the great poet of his time. After his death, he became a "pirimurshid" in the place of his teacher for a while and returned to Turkestan, handing over this task to Khoja Abdulkhalik Shijdiwani (1103-1179). Now let's return to our grandfather Sulayman Baqirjaniy. In the year of his death, there are two types of writings in the scientific literature: 1186, 1192. We are confident that

the end of Amirbaya's restoration will be successful. According to folklore, Hakim Ata died at the age of 63. This means that the year of his birth was 1129. According to the legend, he went to study at the hands of Ahmet Yassawi at the age of twelve, which corresponds to 1141.

According to Professor K. Mambetov, Sulayman Baqirjani died at the age of 63, the age of the prophet. This is reflected in the popular myths about the age of life.

In 2002, the Department of History, Archeology and Ethnography of the Republic of Uzbekistan jointly with the Institute of History, Archeology and Ethnography, KSU named after Berdakh, Kungrat region, Sulaiman Baqirganiy's 880th anniversary of the founding of the Republic of Uzbekistan The Republican scientific-theoretical conference "Sulaiman Baqirgani and his era" was held. In fact, the wisdom and songs of our great compatriot, the wise, thoughtful and talented poet Hakim-Sulaiman Bakyrganiy are the cultural heritage of our people. Sulayman Bakyrganiy's thoughts on cleanliness of hands and feet, social justice, kindness, generosity, preservation of friendship, purity of conscience, reverence for ancestral heritage are still relevant today. The secret of the fact that the wonderful brains of Sulaiman Baqirgani, Hakim ata's, have not lost their value for almost nine centuries, but have been cherished and preserved by our people, must be one of them.

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Rezyume: *Maqolada tariximizning sivilizatsiya markazlari xisoblangan Janubiy Orolbo‘yi hududidagi muqaddas ziyoratgoh xisoblangan Xokim ota Sulaymon Boqirg‘oniy majmusining moddiy madaniyati, tadqiqot tarixi va u haqida tarixiy va yozma manbalarda keltirilgan ma’lumotlarga to‘xtalib o‘tildi.*

Резюме: *В статье мы сосредоточимся на материальной культуре, истории исследований и сведениях о ней в исторических и письменных источниках комплекса Хокима ота Сулеймана Багиргани, который является священной святыней в регионе Южного Приаралья, который является центром наша цивилизация.*

Kalit so‘zlar: *Janubiy Orolbo‘yi, Muynoq tumani, Xokim ota, arxeologik yodgorliklar, ziyoratgoh, tadqiqot, yozma manbalar, moddiy madaniyat, madaniy meros, arxeolog olimlar, o‘tmish tarixi.*

Ключевые слова: *Южное Аральское море, Муйнакский район, Хаким ата, археологические памятники, святыни, исследования, письменные источники, материальная культура, культурное наследие, археологи, история прошлого.*

THE USE OF SCIENCE IN TEACHING CONSTRUCTION MECHANICS TO BUILDERS-ENGINEERS

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Summary: *The article describes the use of "construction mechanics" science, which is considered one of the Universal disciplines in the preparation of engineers-builders in higher educational institutions, in interaction with other disciplines. Also, the objectives and tasks of the subject" construction mechanics", the main sections of the subject, the main concepts that will be studied by the students in these sections and that will serve as the basis for in-depth study of future specialty subjects are indicated.*

Keywords: *civil engineer, curriculum, general professional disciplines, continuity, inter-subject communication, theoretical mechanics, material resistance and construction mechanics.*

1. Introduction.

The calculation of structures for strength is so embedded in the consciousness of a modern engineer that the very idea of building a responsible structure without such a calculation is difficult to imagine. But only 130 years ago, Navier wrote in the Preface to the first edition of his course (1826): "Most designers set the dimensions of parts of machines and structures on the model of the implemented structures. They rarely calculate the forces acting on these parts or the amount of resistance of these parts.

It should be considered certain that before the beginning of the XIX century, both architecture and bridge construction were guided mainly only by traditions and recipes accumulated over a number of centuries, and no matter how diverse the architectural forms of structures were, from an engineering point of view, they usually represented only imitation of previous proven models [1].

Today, the higher education system is one of the main problems of creating a science-based system for the full formation of professional knowledge, skills and abilities of students at the level of state educational standards by ensuring continuity and continuity between General subjects in existing curricula.

For the formation of deep knowledge, skills and abilities of future specialists-civil engineers in the course of training, it is of great importance to study interrelated academic disciplines, their sections and individual subjects. In particular, today the training of students studying in higher educational institutions based on the interaction of social science disciplines is a guarantee of effective improvement of the quality of professional and practical training of future bachelor engineers.

2. Methods.

This work presents views on the use of the discipline "structural mechanics", which is one of the recognized disciplines in the preparation of bachelors, engineers in the direction of education, building and construction (industrial and civil construction), approved by the Ministry of higher and secondary special education of the Republic of Uzbekistan № 744 dated August 25, 2018, in interaction with other subjects.

3. Results and discussion.

The problem of interdisciplinary is a problem with a longer history that arises with the introduction of separate science teaching in educational institutions. However, despite the vast amount of research devoted to interdisciplinary interaction, there is no single approach to its

interpretation. In the scientific and pedagogical literature, there are various definitions of the concept of "interdisciplinary communication".

Including M. N. In his research Skatkin isolated intermediate interdisciplinary relationship between the three types of previously mastered knowledge and study the knowledge between the studied knowledge and future acquired knowledge, as well as between simultaneous assimilation of knowledge.

A. V. According to Usova, the impact of interdisciplinary cooperation on the education and total development of students by improving and restructuring the internal logical structure methods and methods of training [4].

Scientists of our Republic have also done a lot of work on the study of interdisciplinary connections between Sciences. A. A. Khasanov noted that as a result of interdisciplinary connections, new knowledge is formed (formed as a result of mastering the relationships between knowledge in various disciplines) or new generalized skills (formed as a result of mastering the relationships between the methods of educational and cognitive activity used in various disciplines) [5].

5340200-construction of buildings and structures training of students for five semesters. The volume of allocated classroom hours for General science is 328 hours, of which 164 hours are allocated for lectures, 146 hours for practical classes and 18 hours for laboratory classes. Science is taught to students in the second semester of the first year, in the third and fourth semesters of the second year, in the fifth and sixth semesters of the third year [2].

The science of "Construction mechanics" consists of theoretical mechanics, material resistance and construction mechanics and is one of the main public disciplines for students studying in the field of "architecture and construction". Construction mechanics is the science that ensures the durability of structures and structures by calculating their strength, strength, durability, and methods for calculating their strength and strength.

The purpose of the training is to develop students ' relevant knowledge, skills and abilities in the methods of calculating structures for strength, strength and superiority, as well as methods for determining stresses and deformations formed in structures and structural elements.

The discipline's goal is to develop students ' initial skills in design calculations, which are one of the main issues in the process of designing structures [3].

In essence, the question is put physics, methods for solving this problem use mathematical weapons. Therefore, it is advisable to start teaching the discipline from the second semester of at least the 1st year.

The science of structural mechanics is one of the universal Sciences and is closely related directly to physics, higher mathematics, drawing geometry and engineering graphics and serves as the basis for in-depth study of such specialties as computer technology, wooden structures, metal structures, reinforced concrete and stone structures, earthquake resistance of buildings and structures.

In theoretical mechanics, which is the first part of the discipline of structural mechanics, students study three sections: statics, kinematics and dynamics.

In statics, the doctrine of the disequilibrium of material bodies under the action of forces is presented. The main task of this section is to teach the student to perform operations with various systems of forces in space and on a plane. These values are necessary for studying the courses of resistance of materials, structural mechanics, bases and foundations, and some other special disciplines in determining the reactions of connections of various structures. The calculation apparatus of statics is widely used in the statics of structures and disciplines related to the design of various building structures. For undergraduate students 5340200-Construction of buildings and structures section " Statics" it is fundamental.

When studying such subjects and concepts as the vector method, the coordinate method, the natural method, the trajectory of a point, the velocity and acceleration vectors of a point, as well as the Basic concepts at the entrance to dynamics, the vibrational motion of a material point, the

General theorem on point dynamics, the mechanics section and a number of concepts in physics, such as a material point, a numerical system, a radius vector and trajectory, the concepts of speed, the General theorem on point dynamics., angular velocity and acceleration, dynamics of a material point, force momentum, kinetic energy, moment of inertia. This means that the above-mentioned quantities of physics must be theoretically and practically communicated to students before the beginning of the science of structural mechanics.

Concepts such as the numerical system of higher mathematics, vectors, unit vectors, Integral, clear Integral, derivative, initial conditions, first-and second-order differential equations are used as weapons in solving problems in structural mechanics.

Students study drawing in drawing geometry and engineering graphics based on state standards. In the science of structural mechanics, a large number of drawings are also used, and there are even ways to graphically solve the problem (Maxwell-Cremona diagram in truss calculations and graphical representation of speeds and accelerations in straight parallel motion). In the sections of statics, kinematics and dynamics of science, various diagrams and drawings are widely used to Express equilibrium and motion, and in the section of resistance of materials and construction mechanics-to draw diagrams.

The science of structural mechanics considers tensile or compressive deformations in the section resistance of materials, determination of internal forces, cutting method, normal, motion and total stress, types of normal deformations, stresses and deformations in tension or compression, calculation of systems that work for tension or compression, strength and curvature, fixed stress, margin factor, static indefinite problems that occur during tension or compression, bending deformation, flat bending of a regular rod, determination of the normal stress of the cross-section of a beam when bending, from concepts such as determining the cross-section of a beam when bending, checking the strength of beams by head stresses, determining the deformation of a beam when bending, calculating wooden elements in the science of wooden structures by boundary States, types of loads, standard and design loads and their definition, calculation and design of wooden structures, calculation of elements of wooden structures for compression and tension, it is used in the study of such fundamental concepts, as the calculation and calculation of wooden elements that work on compression and tension, and the definition of cross-section surfaces, the calculation of elements of wooden structures for bending, the design and calculation of wooden fences, the design and calculation of truss fences.

Also topics in the section materials science in structural mechanics listed above, calculation of metal structures using the limit state method, calculation of the boundary state of the first and second groups, calculation of bending elements, calculation of Central elongation elements, calculation of Central compacted elements, truss calculation, determination of forces formed in truss elements, torque method, truss cutting method, node cutting method, Maxwell – Cremona chart, the definition and calculation of cross-sections of trusses, the calculation of reinforced concrete structures on the subject of concrete and reinforced concrete design, strength calculation of normal section of reinforced concrete elements exposed to bending, the calculation of strength of reinforced concrete elements, working in compression, reinforced concrete elements working in tension, and serve as a basis for forming theoretical and practical knowledge about the basics of design and calculation, and structural elements of reinforced concrete buildings.

The basic functional structure of construction mechanics and its relations with structures as a fundamental basis for their development is shown in figure 1. Here, three sources are identified – three components of construction mechanics:

- formalized (calculation methods and algorithm);
- Informal (ideology, models, hypotheses, external influences, connection with the external environment, etc.);
- the experimental part, including production experience, which is a criterion for verifying the accuracy of the calculation and a source for improvement and development [6].

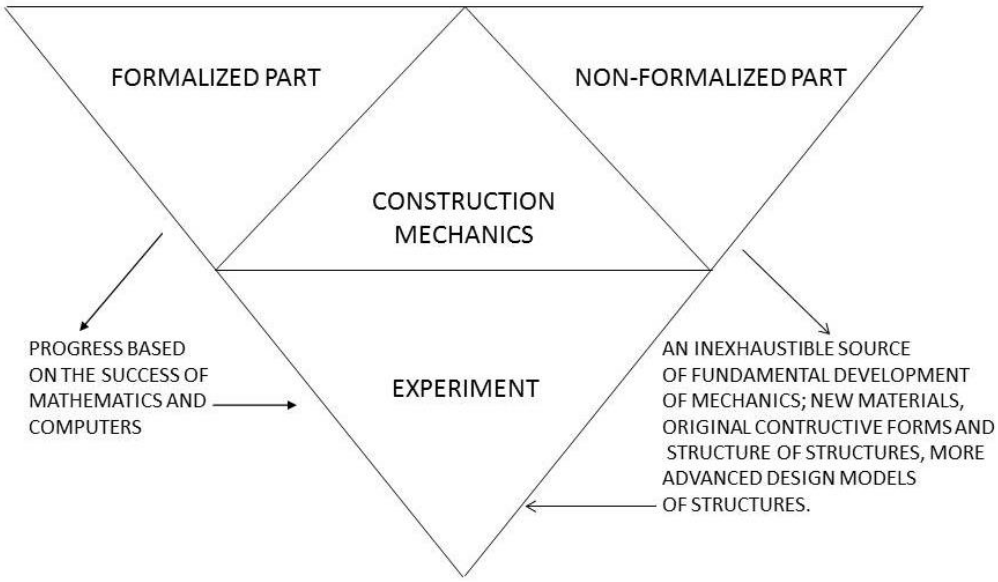

Fig. 1. Three components of Construction Mechanics

Note that the informal and experimental parts construction mechanics are an inexhaustible source of its development. This is the history, present and future of this science.

The relationship of construction mechanics (structural mechanics) with previous disciplines (applied mathematics, numerical methods, computer engineering), with structures, materials, construction technology and experiment, operation experience is shown in figure 2. Fundamentally different approaches are highlighted here:

- passive - aims to analyze i.e. register and understand the situation that arises;
- active - aims to subordinate the construction the desired requirements of its Creator-designer.

The basis of educational and methodological support for active learning is a class of models of controlled structures for laboratory practice, textbooks and tasks of a new type that form a creative attitude not only to the analysis, but also to the synthesis of new constructive forms.

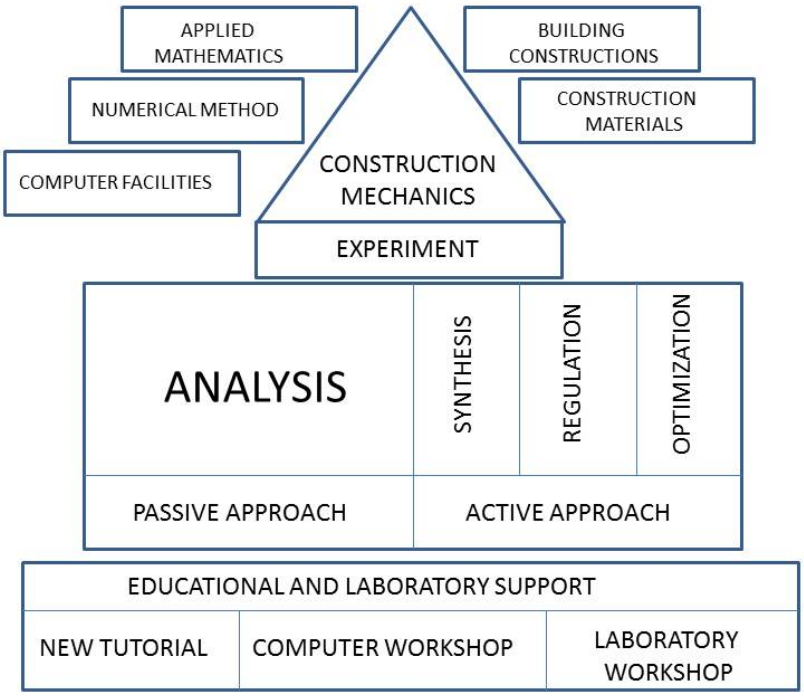

Fig. 2. The relationship of Construction Mechanics to other Sciences

Students of Construction field necessary to acquire knowledge and skills (practical experience) not only to analyze the set, but also to synthesize the new on the basis of overcoming the contradictions and negatives of the old [6].

The use of interdisciplinary interaction in the educational process for a deeper and broader coverage of the content of the studied science gives positive results in education. To achieve this, it is important to properly distribute subjects in the curriculum between courses and semesters, as well as to ensure proper interaction between them, and then develop performance programs.

4. Conclusions.

This means that using interdisciplinary interaction and securing membership in the study of General and specialized Sciences, the study of one of which will serve as the basis for the study of the other. This ensures the unity of requirements for knowledge acquisition, mastery of skills and abilities, as well as flexibility in the formation of understanding, skills and abilities in the science taught.

Based on the above, assuming that the science of "construction mechanics" will be taught in conjunction with other subjects, the focus of training will allow you to form theoretical knowledge, practical skills and skills of students by purposefully analyzing the content of curricula, programs of academic disciplines, determining the relationships between them, that is, horizontal and vertical links.

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Rezyume: *Maqolada oliy o'quv yurtlarida muhandis-quruvchilarni tayyorlashda umumkasbiy fanlardan biri hisoblangan "qurilish mexanikasi" fanining boshqa fanlar bilan o'zaro aloqada qo'llanilishi bayon etilgan. Shuningdek," qurilish mexanikasi" fanining maqsad va vazifalari, fanning asosiy bo'limlari, ushbu bo'limlarda talabalar tomonidan o'rganiladigan va kelgusida mutaxassislik fanlarini chuqur o'rganish uchun asos bo'lib xizmat qiladigan asosiy tushunchalar ko'rsatib o'tilgan.*

Резюме: *В статье описывается применение предмета "строительная механика", которая считается одной из общепрофессиональных дисциплин при подготовке инженеров-строителей в высших учебных заведениях, во взаимодействии с другими дисциплинами. В статье также указаны цели и задачи предмета строительной механики, её основные разделы, а также основные понятия, которые будут изучаться студентами в этих разделах и которые послужат основой для углубленного изучения специальных дисциплин.*

Kalit so'zlar: *muhandis-quruvchi, o'quv rejasi, umumiykasbiy fanlar, uzviylik, fanlararo aloqadorlik, nazariy mexanika, materiallar qarshiligi va qurilish mexanikasi.*

Ключевые слова: *инженер-строитель, учебный план, обще-профессиональные дисциплины, преемственность, межпредметная связь, теоретическая механика, сопротивление материалов и строительная механика.*