

**ҚОРАҚАЛПОҒИСТОНДА
ФАН ВА ТАЪЛИМ**

**ҚАРАҚАЛПАҚСТАНДА
ИЛИМ ҲАМ ТӘЛИМ**

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В КАРАКАЛПАКСТАНЕ**

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ACTUAL PROBLEMS OF PHYSICAL EDUCATION AND SPORTS

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Summary: *The article analyzed the problems encountered in the implementation of fundamental reforms in Uzbekistan, the development of physical education and sports, and the processes of scientific justification of their solutions. In order to achieve the set goal, fundamental reforms implemented in the country, life experiences gained in the field were studied in the method of theoretical analysis, problems related to physical education and sports were studied and analyzed.*

Key words: *"Physical training", "sport", "physical development", "physical readiness" and healthy lifestyle, physical culture system.*

Fundamental changes implemented in all fields in our country, leading our people to spiritual and physical improvement in all aspects, a new Uzbekistan, material support from national recovery to national growth, making the country a prosperous, powerful trade, taking its place among the countries of the world to provide.

In that case, the second of the five important initiatives of the head of Uzbekistan's strategy for the development of the country and raising the morale of young people and meaningful organization of their free time is "Creating the necessary conditions for physical training of young people and their ability to demonstrate their abilities in the field of sports" is confirmed by the Decree of the President of the Republic of Uzbekistan No. PF-5953 dated March 2, 2020.

Ensuring the implementation of the objectives defined in the state program on the implementation of the strategy of actions on the five priority areas of the development of the Republic of Uzbekistan in 2017-2021 in the "Year of development of science, enlightenment and digital economy", as well as in the field of physical education and sports in order to improve the quality of training qualified personnel with comprehensive knowledge in accordance with international standards, to rapidly develop science in sports, to further improve the processes of training highly qualified competitive trainers-teachers, specialists and scientific staff, and other state documents, the content of physical education and sports in the country, from a strategic point of view, it requires a new organization. "Scientific justification of the problems faced in the implementation of fundamental reforms, development of physical education and sports in Uzbekistan."

In order to achieve a specific goal, fundamental reforms implemented in the country, life experiences gained in the field were studied in the method of theoretical analysis, decrees, decisions of the President of the Republic of Uzbekistan, laws on sports by the Cabinet of Ministers, and the following scientists [7] V.D. Chernyavsky., [10], Ya. M. Abdullaev [11] D.Y. Turdimurodov's opinions were studied and analyzed.

As a result of the conducted research, the following was determined. Today, in order to make our country one of the developed countries, major fundamental reforms are being implemented. In the implementation of these reforms, the field of physical education and sports has been making its proper contribution. At the same time, it has been proven once again that the spiritual and physical health of the people is one of the important factors in the implementation of fundamental reforms in the country. In that case, it is enough to recall sahibkiran Amir Temur's idea, "A country with healthy children will be powerful."

Since the birth of man, as a result of the change of eras, we can see that sports resources such as running, javelin throwing have been used to chase and hunt various prey in order to live. Along with this, the importance of physical education and sports in ensuring health has already been

scientifically proven. But there are a number of unexplored problems waiting to be solved in the extent to which it uses its capabilities and reserves. One of the biggest problems for human health in the field of physical education and sports was proved by the corona virus pandemic that shocked the world in 2020. Of course, as a result of the reforms carried out in our country, a number of things are being done to protect human health, and there are many opportunities for this. Some of such opportunities and reserves are included in the Decree of the President of the Republic of Uzbekistan No. 6099 "On measures to widely promote a healthy lifestyle and further develop mass sports" adopted on October 30, 2020. was shown.

In addition, the main directions for the implementation of a healthy lifestyle and the further development of mass sports were defined. Studying real-life experiences, the interests of people in the field of physical education and sports also showed the existence of opportunities and reserves that serve the interests of people positively. This is first of all reflected in the problems of physical education and sports education.

Physical education and sports education is a unique and complex system of collective education, which is distinguished by some features compared to the education of other subjects. Its unique main feature is that field education is aimed at "shaping the physical culture of a person" and is inextricably linked with the development of theoretical knowledge, practical physical movement skills and abilities, as well as the cultural improvement of the regions. "Physical culture education" is its it is also observed that the effectiveness of only theoretical knowledge, or only the skills and skills of practical physical actions, cannot sufficiently benefit human health. Because it is effective only when it is implemented in a coordinated way. In order to achieve this effect, the following problems exist in Uzbekistan's new approach to physical education and sports, and they await their positive solution.

In that case, one of the most actual problems of the day is the proper name of the field in Uzbek language. In the past, the field was represented by the concepts of "Physical culture", "Physical culture and sport", later "physical education and sport", and in some sources only "Sport". Among the population, the role of the industry in raising the general culture of people by shaping the physical culture of a person is being overshadowed.

According to the decree of the head of the country on October 21, 2019 "On measures to fundamentally increase the prestige and position of the Uzbek language as a state language", naming the field with the concept of "physical culture" and giving it state status, the main concepts of the field " Physical education", "sport", "physical development", "physical fitness", etc. and perfect the terms, developing on a scientific basis, deepening the "education of physical culture" and raising the general cultural level of the masses has great potential. One of the most painful points in the field is to improve the general culture of the population through physical culture education in the effective use of these opportunities. For this, it is important to increase the quality and efficiency of physical culture education in all educational institutions.

In Uzbekistan, the problem of developing a system of physical culture with content suitable for the modernizing Uzbekistan is emerging. In this regard, the goals and tasks of the system in society, the general principles (principles), foundations, its enrichment with new types of sports, specific and non-specific activities (functions) of physical culture in our society, sports, the modern purpose of sports , tasks, content, details of modern systems of sports training, determination to ensure the popularity of sports, system of training a new generation of specialists in the field, etc., is one of the urgent problems waiting to be solved in the field. For this, there is a need to create a new system of physical culture specific to Uzbekistan.

In Uzbekistan, the problem of developing a system of physical culture with content suitable for the modernizing Uzbekistan is emerging. In that case, the goals and tasks of the system in society, the general tenacity (principle), foundations, its enrichment with new types of sports, specific and non-specific activities (functions) of physical culture in our society, sports, modern sports purpose, tasks, content, details of modern systems of sports training, determination to ensure the popularity of sports, system of training a new generation of specialists in the field, etc., is one of

the urgent problems waiting to be solved in the field. For this, there is a need to create a new system of physical culture specific to Uzbekistan.

As in all fields, in the field of physical education and sports, all qualifications are mainly provided by specialists. Therefore, it is necessary to create and implement in practice the scientific and organizational foundations of training a modern new generation of specialists from the point of view of the essence of "Physical culture" in modern Uzbekistan. Currently, physical educators are physical education instructors in preschool educational institutions, physical education teachers in secondary schools, physical education teachers in sports, physical education teachers in preschool educational institutions for physical educators. All of these are based on the organizational processes of educational - teaching, training - coaching, public health - sports events. According to the results of the analysis, the work processes in all of them are aimed at education and training in the field of physical culture. Based on this, in our opinion, it would be appropriate to switch to the training of specialists in the single "Physical Culture" direction in the bachelor's degree in the higher education system.

References:

1. "Healthy Generation" State Program of the Republic of Uzbekistan. - T., 1998.
2. Law of the Republic of Uzbekistan "On Physical Education and Sports". - T., 2000.
3. Decree of the President of the Republic of Uzbekistan "On the Development of Sports". - T., 2003
4. President of the Republic of Uzbekistan Sh. Mirziyoev's Decision on "Measures for further development of physical education and mass sports. -T., 2017
5. President of the Republic of Uzbekistan Sh. Mirziyoev's Decree "Measures for wide implementation of a healthy lifestyle and further development of mass sports". - T., 2020
6. Khodjaeva E. Stanovlenie lichnosti sportsmenov. -M.: Fizkultura i sport, 1995. -451 p.
7. Chernyavsky V.D. Physical culture and health. / M. Ergasheva's translation. -T.: Ibn Sina publishing house, 1990. -183 p.

Rezyume: *Maqolada O'zbekistonda amalga oshirilayotgan tub islohotlarni amalga oshirishda, jismoniy tarbiya va sportni rivojlantirishda duch kelayotgan muammolar, yechimlarini ilmiy asoslab berish jarayonlari tahlil qilindi. Belgilangan maqsadni amalga oshirish uchun, mamlakatda amalga oshirilayotgan tub islohotlar, sohada erishilayotgan hayotiy tajribalar nazariy tahlil uslubida o'rganildi, jismoniy tarbiya va sportga oid muammolar o'rganildi va tahlil qilindi.*

Резюме: *В статье проанализированы проблемы, возникающие при реализации коренных реформ в Узбекистане, развитии физической культуры и спорта, и процессы научного обоснования их решения. Для достижения поставленной цели в стране методом теоретического анализа изучался жизненный опыт, накопленный в этой сфере, изучались и анализировались проблемы, связанные с физической культурой и спортом.*

Kalit so'zlar: *"Jismoniy tarbiya", "sport", "jismoniy rivojlanish", "jismoniy tayyorlik", sog'lom turmush tarzi, jismoniy madaniyat tizimini.*

Ключевые слова: *физическое воспитание, спорт, физическая развития, физическая подготовка, здоровый образ жизни, система физической культуры.*

DETERMINATION OF MOBILE PHOSPHORUS IN THE DRYING BOTTOM SOILS OF THE ARAL SEA

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Summary: *The article studied mobile phosphorus, in degraded soils, absorbed by plants in the conditions of desertification of the dried bottom of the western part of the Aral Sea. From 1960 to the present, all areas, the amount and distribution of mobile phosphorus matter in the soil profile of the soils of the dried seabed have been described. According to the preliminary data obtained, an increase in their number to the lower layer, compared with the upper layers of the soil profile, was noted.*

Key words: *dry bottom of the Aral Sea, mobile phosphorus, desertification, soils, degradation.*

Due to the fact that the drying up of the Aral Sea has a negative impact not only on Uzbekistan, but also on the whole world. The European Union has been closely cooperating with Uzbekistan, and it is mentioned in many press reports that the government is supporting a number of initiatives aimed at restoring the environment and developing the Aral Sea region in particular. In the Aralkum desert of Karakalpakstan and its nearby settlements, greening, prevention, restoration and conservation projects and state grant projects are being carried out by establishing environmental forests adapted to the climatic conditions of the region. This means that each tree must be planted in a place with favorable conditions for its growth and development. In the case of the Aral Sea, we can see that there is a lot of information in information technology about the long-term planning of the area's biodiversity preservation [1].

"On the initiative of the President of the Republic of Uzbekistan, in 2019, the Aral Sea region was declared to be a zone of ecological innovations and technologies. Currently, the State Ecology Committee is actively working on attracting experienced specialists, creating economic and financial conditions for attracting entrepreneurship and investment to the region. It is planned to establish monitoring scientific stations that will allow studying the bottom of the Aral Sea, as well as conducting large-scale research with the involvement of foreign and local experts,"- said Jusipbek Kazbekov, Deputy Chairman of the The State Committee of the Republic of Uzbekistan on Ecology and Environmental Protection [2].

In the 60s of the last century, there is a lot of information about the fact that experts have detected the shrinking of the Aral Sea basins from space. Over the past period, sea tragedies have increased, and the huge sea, which once flowed in waves and provided water to the people of Central Asia with more than 60 million inhabitants and took the 4th place in the world in terms of size, has now been replaced by the Aral desert, which consists of 5.5 million hectares of harmful salts and sand.

Doctor of Geographical Sciences, B. Jolibekov cites that the change of the soil layer in the archipelago is caused by anthropogenic and desertification factors, which are manifested differently in the conditions of different landscapes [3]. The dry bottom of the Aral Sea is currently the most intensively developed and defoliated area, and under the influence of natural and anthropogenic factors, desert sand, barren, marshy salt marshes, hydromorphic salt marshes, residual salt marshes and other primary soils are formed (developing) and it is considered as the "Aralkum desert".

The Decree of the Cabinet of Ministers of the Republic of Uzbekistan No. 132 dated February 15, 2019 and dated January 18, 2022 "On additional measures to establish "green covers" - protective forests on the dry bottom of the Aral Sea and in the coastal areas of the Aral Sea" were adopted. More than 500 projects were implemented within the framework of the 2013-2017

comprehensive program of measures to mitigate the consequences of the Aral disaster and develop the Aral Sea region. More than half of them are national projects.

The Scientific Research Institute of Soil Science and Agrochemistry is also conducting a scientific State grant project on the development of the Aral sea region. Samples were taken from the soil of the western part of the dry bottom of the Aral Sea and chemical analysis of mobile phosphorus was studied in laboratory conditions.

The aim of the study is to determine the soils of the dry areas of the Aral Sea on the basis of chemical analysis in laboratory conditions.

Research location and methods of implementation. The desiccated bottom soil of the western part of the Aral Sea is a place of research. In the course of research, soil samples, chemical analyzes in laboratory conditions and research studies were carried out on the basis of methods developed by Uzbek Scientific Research Institute of Cotton Breeding and Seed Production and Scientific Research Institute Of Soil Science & Agrochemistry, generally accepted in the republic [4, 5, 6].

Research results and their discussion. According to O.A. Sobirov: "over the last 40-45 years, the level of the Aral Sea has decreased by 22 meters, the water area has decreased more than 4 times, the volume of water has decreased up to 10 times (from 1064 cubic km to 70 cubic km), the amount of salt in the water is 112 g/l, and in the eastern part of the Aral reached 280 g/l [7].

F.I. Khakimov conducted scientific experiments on desertified deltas. In his data, he studied the dry bottom of the Aral Sea - the former water part of the Amudarya delta, the characteristic areas of the semi-slope of the delta surface with low tides [8].

In recent years, a number of researchers have predicted the development of automorphic soil groups in the Amudarya delta as a result of sudden climate change in the Aral Sea and Aral Sea watershed, changes in the soil and landscape in water shortage conditions [9, 10, 11, 12].

The "mobile" phosphorus in the soil was determined by the method of 1 percent ammonium carbonate. This method was proposed by B.P. Machigin and is based on the extraction of the mobile phosphorus compound using a 1 percent ammonium carbonate solution. The determination is based on the formation of an air-colored complex solution - a compound $[(\text{MoO}_2)_4(\text{MoO}_3)_2\text{H}_3\text{PO}_4 \cdot 4\text{H}_2\text{O}]$ of phosphoric acid with molybdenum anhydride and potassium chloride.

The work procedure is as follows: 5 g of soil is taken on a technical scale (passed through a 1 ml sieve), placed in a 200-250 ml conical flask. 100 ml of 1 percent ammonium carbonate solution $(\text{NH}_4)_2\text{CO}_3$ is poured over it. The flask is shaken for 5 minutes and left for 18-20 hours. Then it is filtered. After filtering, take 15 ml, pour 35 ml of reagent "B" on it and pass it through the photoelectric colorimeter apparatus. It is carried out after 10 minutes from the photoelectric colorimeter apparatus, it is not possible to spend 2.5 hours. Mobile phosphorus in the soil of the dried Aral bottom in different periods was studied in soil samples that were drained in 3 periods, that is, the first period was 2 cross-sections and 8 layers of water-free areas before 1990, and the second period was water-free areas from 1991 to 2016 2 sections 10 layers and the third period after 2016, we studied the samples taken from the soil of 2 sections 10 layers. According to the results of the chemical analysis of the soil of the dry bottom of the Aral Sea, in the first period, that is, before 1990, the mobile phosphorus in the soils of the areas freed from water was high in the surface layers, i.e., from 14.0 mg/kg to 18.24 mg/kg. In the second period, it was found that mobile phosphorus is less in the upper 0-8 cm and lower layers of the earth than in the middle layers (table). In the third period, that is, after 2016, phosphorus is very different in the lands opened from water. That is, from 17.28 to 13.12 mg/kg.

The dry bottom of the Aral is different in areas where it is freed from water in 3 periods
Phosphorus indicator in sections and layers, mg/kg

Table

Section №	Layer, cm	Phosphorus, mg/kg
The area was free of water until 1990		
64	0-5	18,24
	5-35	13,76
	35-70	14,0
	70-110	8,96
66	0-20	9,92
	20-60	8,64
	60-100	13,76
	100-150	10,56
The area opened from water in 1991-2016		
41	0-8	14,08
	8-62	18,88
	62-100	18,56
	100-140	19,52
	140-180	13,76
45	0-18	14,72
	18-50	19,52
	50-100	19,52
	100-150	14,0
	150-200	13,44
From 2016 until now, the area has been opened from the water		
28	0-3	15,36
	3-41	12,8
	41-80	14,72
	80-122	15,68
	122-170	13,76
29	0-3	13,12
	3-40	13,44
	40-70	17,28
	70-100	14,08
	100-166	15,36

Summary. In summary, mobile phosphorus ranges from 8.64 to 19.52 mg/kg in the dry bottom soils of the Aral Sea. Due to strong salinity, it was noted that the amount of phosphorus in the areas exposed to water for the next 30 years was higher in the lower layers, i.e. 15.36 to 17.28 mg/kg. This, in turn, is directly related to the internal weathering process in the soil-soil layers and the level of salinity.

References:

1. Internet resources: (<https://yuz.uz/news/ozbekistonda-tuproq-unumdorligin-asrashga-qaratilgan-yangi-tizimlar-ishga-tushmoqda>)
2. Қорақалпоғистон Республикаси Экология ва атроф-муҳитни муҳофаза қилиш қўмитасининг матбуот хизмати (<https://ekolog.uz/?p=3670>).
3. Б.Жоллибеков. Изменение почвенного покрова и ландшафтов южного приаралья в связи с антропогенным воздействием. // Нукус. 1995. стр.244
4. Р.Қўзиев ва бошқалар. Давлат ер кадастрини юритиш учун тупроқ тадқиқотларини бажариш ва тупроқ карталарини тузиш бўйича йўриқнома. / Меъёрий ҳужжат, Тошкент, 2013. 52 бет
5. С.А.Арабов ва бошқалар. Ўзбекистон Республикасида ер мониторингини юритиш услуги. / Тошкент, 2011. 62 бет.

6. ЎзПТИнинг Пахта майдонларида тупрокларнинг агрофизикавий, агрохимёвий ва микробиологик хоссаларини ўрганиш услублари. / ЎзПТИ. Тошкент.1993, 37 бет
7. Ў.А.Собиров Оролбўйи минтақасининг экологик муаммолари ва унинг оқибатлари. / Ўзбекистон Республикаси табиатни муҳофаза қилиш Давлат қўмитаси, Давлат бионазорати. 2012.
8. Ф.И.Хакимов Почвенно-мелиоративные условия опустынивающиеся дельт. // Пушино. 1989, 217 с.
9. В.Е.Сектименко, А.Ж.Исмонов. Особенности опустынивания почв Приаралья // “Теоретические и прикладные проблемы географии на рубеже столетий”. Материалы Международной научно-практической конференции. - Алматы: Казахский Национальный Университет, 2004. - С. 164-166.
10. В.А.Рафиков. Состояние Аральского моря и Приаралья до 2020 года. 2014. Ташкент. стр.111
11. А.Ж.Исмонов., А.А.Турсунов Характеристика засоленных почв низовий р.Амударья // Сборник научных статей Международной научно-практической конференции, посвященную 25-летию Прикаспийского НИИ аридного земледелия по теме “Современные тенденции развития аграрного комплекса”. Астрахань, 2016 г., 11-13 май. ФГБНУ “Прикаспийского НИИ аридного земледелия”, 2016. - С. 344-348
12. А.Б.Мирзамбетов, А.У.Ахмедов, Ж.Атамуратов, Н.Авезова, Н.Аймуратова. Орол денгизи қуриган туби муаммоли зонаси ҳудудларининг тупроқ мелиоратив ҳолати. // “Ўзбекистон кишлок хўжалиги” журналининг “Агро илм” иловаси. Тошкент, 2021. №6(77). 79-81 бетлар

Rezyume: Maqolada Orol dengizining g'arbiy qismi qurigan tubida, cho'llanish va sahroga aylanishi oqibatida degradatsiyaga uchragan tuproq-gruntlari tarkibida o'simliklar o'zlashtirib oladigan harakatchan fosfor o'rganilgan. 1960 yildan hozirgacha suvdan bo'shagan dengiz tubining tuproq-gruntlarida harakatchan fosfor moddasining tuproq profilida joylashganligi, miqdori va keng hududlarda tarqalganligi bayon etilgan.

Olingan dastlabki ma'lumotlarga ko'ra, tuproq profilining yuqori qatlamlariga nisbatan quyi qatlamlari tomon ular miqdorini ortib borishi qayd etilgan.

Резюме: В статье изучен подвижный фосфор, в деградированных почвах, поглощаемый растениями в условиях опустынивания обсохшего дна западной части Аральского моря. С 1960 г. по настоящее время описаны все ареалы, количество и распределение подвижного фосфорного вещества в почвенном профиле почвогрунтов осушенного морского дна.

По полученным предварительным данным отмечено увеличение их количества к нижнему слою, по сравнению с верхними слоями почвенного профиля.

Kalit so'zlar: Orol dengizi qurigan tubi, harakatchan fosfor, cho'llanish, tuproq-gruntlar, degradatsiya.

Ключевые слова: обсохшего дно Аральского моря, подвижный фосфор, опустынивание, почвы, деградация.

THE EFFECT OF DIFFERENT STIMULATORS ON THE GERMINATION AND GROWTH OF HALOPHYTIC PLANTS SEEDS

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Summary: Today, due to the drying up of the Aral Sea, the environment is being polluted with various salts and dust particles. In order to alleviate this situation, the growth of the seeds of various halophytic and xerophytic plants were determined under laboratory conditions.

Key words: Gumin, Aminomax, Master Power, Izabion, stimulant, soil, salt, halophyte, xerophyte.

The drying up of the Aral Sea has become one of the world's biggest environmental tragedies in human history. Salt, sand, and toxic fertilizers in the seabed, which has become a desert, have endangered human life and nature.

Stabilization of the ecological situation in the dried depth of the Aral Sea has become an important issue not only in our country, but also in the whole world.

Today, 5.5 million hectares of the dried depth of the island are without water, from which hundreds of millions of tons of salt and sand are released into the atmosphere every year. This is the reason for the increase of various diseases among the population in cities and villages. It is also causing salinization of lands suitable for agriculture.

In order to improve this situation, to ensure the implementation of the decision of the President of the Republic of Uzbekistan "On approval of the concept of the development of the forestry system in the Republic of Uzbekistan until 2030" dated October 6, 2022 No. 4850, the Cabinet of Ministers has adopted a decision [1] to establish "green covers" in the region near the Aral Sea.

At present, in some places in the depth of the Aral sea, plants planted from seeds do not grow, saxaul planted from cuttings, and roots of plant cuttings are rotting in other places. In order to study the lack of favorable conditions for the growth of plants, we have been conducting research since May 2022.

Table 4.4.1

Effect of stimulants in 1 liter of water on seed germination of drought-resistant non-traditional crops in laboratory conditions % (2022)

Variants	Names of the plants	Soaking period, hour	The amount of stimulants ml/gr	Gumin	Aminomaks	Master Power	Izabion
1	Krascheninnikovia ceratoides <u>Eurotia ceratoides</u>	12	0,5	1,2	1,9	4,2	5,8
		24	1,0	1,5	2,3	5,0	7,2
		36	1,5	1,1	1,6	3,8	5,2
2	Astragalus agamet (cotton headed) Astragalus (κ)	12	0,5	1,1	1,8	4,3	5,6
		24	1,0	1,4	2,2	4,8	6,8
		36	1,5	1,1	1,5	3,3	5,0
3	Kandym small-fruited <u>Calligonum microcarpum</u> (κ)	12	0,5	1,1	1,8	4,1	5,1
		24	1,0	1,3	1,9	4,6	6,0
		36	1,5	1,1	1,6	3,3	4,9
4	Common tumbleweed <i>Amaranthus albus</i> (δ)	12	0,5	1,9	2,8	5,5	6,7
		24	1,0	2,2	3,1	5,8	7,2
		36	1,5	1,6	1,9	4,4	6,1
5	Sub-shrub <i>Halothamnus subaphylla</i> Botsch	12	0,5	1,2	1,7	4,8	5,6
		24	1,0	1,4	2,0	5,1	6,6
		36	1,5	1,5	1,4	4,2	5,0
6	Sub-shrub <i>Halothamnus subaphylla</i> Botsch	12	0,5	1,4	1,7	4,8	4,8
		24	1,0	1,6	2,0	5,1	5,8

		36	1,5	1,3	1,6	4,2	5,1
7	Juzgun <i>Calligonum</i> sp. (κ)	12	0,5	1,2	1,8	4,2	5,8
		24	1,0	1,5	2,0	5,0	6,3
		36	1,5	1,1	2,0	3,8	5,2
8	Juzgun leafless <i>Calligonum alatum</i> (κ)	12	0,5	1,1	1,8	4,3	5,6
		24	1,0	1,4	2,2	4,8	6,7
		36	1,5	1,1	1,8	3,3	4,9
9	Solyanka Richter (Circassian) <i>Salsola richteri</i> (κ)	12	0,5	1,3	2,0	4,1	5,1
		24	1,0	1,7	2,1	4,6	5,3
		36	1,5	1,1	1,8	3,8	4,7
10	Sage	12	0,5	1,2	1,8	3,1	4,1
		24	1,0	1,9	2,6	5,1	5,6
		36	1,5	1,2	1,5	2,8	4,3
11	Sibearian wheatgrass <i>Agropyron fragile</i>	12	0,5	1,1	1,8	4,1	5,1
		24	1,0	1,3	1,9	4,6	5,5
		36	1,5	1,1	1,6	3,3	4,9
12	Prostrate shrub K. prostrata	12	0,5	1,2	1,8	3,1	4,1
		24	1,0	1,3	2,6	3,3	4,9
		36	1,5	1,2	1,5	2,8	4,3
13	Sorrel (б)	12	0,5	1,1	1,4	2,8	3,8
		24	1,0	1,7	2,4	3,4	4,2
		36	1,5	1,0	1,2	2,4	3,3
14	True sedge <i>Carex physodes</i> (1)	12	0,5	1,4	1,5	2,9	4,3
		24	1,0	1,5	2,6	4,8	5,1
		36	1,5	1,2	1,3	2,5	4,1
15	Dwarf shrub <i>Salsola rigida</i> (1)	12	0,5	1,5	2,7	3,8	4,6
		24	1,0	1,7	3,8	5,1	5,7
		36	1,5	1,4	2,2	3,3	4,2
16	Kashgar tamarisk <i>Tamarix hispida</i> (κ)	12	0,5	1,3	2,6	3,6	4,2
		24	1,0	1,7	3,7	4,3	5,3
		36	1,5	1,1	2,4	3,1	5,1
17	Mugwort <i>Artemisia</i> (κ)	12	0,5	1,6	2,8	4,1	5,4
		24	1,0	1,8	3,7	4,0	5,2
		36	1,5	1,4	3,4	3,8	5,1
18	Wormwood <i>Artemisia</i> (κ)	12	0,5	1,5	3,8	3,1	5,0
		24	1,0	1,5	4,0	4,3	5,4
		36	1,5	1,5	3,4	3,5	4,7
19	Solyanka treelike <i>Salsola dendoides</i> (κ)	12	0,5	1,7	2,6	4,8	5,6
		24	1,0	1,2	1,3	2,5	4,1
		36	1,5	1,4	2,7	3,8	4,6
20	Sainfoin <i>Onobrychis arenaria</i>	12	0,5	1,0	2,5	3,8	4,6
		24	1,0	1,3	3,5	5,1	5,9
		36	1,5	1,4	3,2	3,3	5,0
21	Arpogon	12	0,5	1,5	2,8	4,6	5,4
		24	1,0	1,5	3,6	4,8	6,1
		36	1,5	1,4	2,6	4,2	4,8
22	Rumeria (Turkistan)	12	0,5	1,6	2,7	3,8	4,6
		24	1,0	1,7	3,8	5,1	4,8
		36	1,5	1,5	2,2	3,3	4,0
23	Asafoetida (kyzylkum) <i>Ferula assa-foetida</i>	12	0,5	1,5	1,9	4,8	5,6
		24	1,0	1,3	2,3	5,1	5,6
		36	1,5	1,4	1,6	4,2	5,1
24	The Volga fescue <i>Festuca valesiaca</i>	12	0,5	1,0	2,5	3,5	4,6
		24	1,0	1,5	2,8	4,1	5,8
		36	1,5	1,3	2,3	3,3	5,2
25	Haloxylon aphyllum (Minkw.) Iljin Treelike shrub	12	0,5	1,6	2,7	3,5	4,6
		24	1,0	1,9	3,4	4,0	5,8
		36	1,5	1,4	2,5	4,3	4,2

26	<i>Ephedra</i> <u><i>Ephedra strobilacea</i></u>	12	0,5	1,7	3,2	4,8	5,5
		24	1,0	1,9	4,1	5,6	5,2
		36	1,5	1,5	2,8	4,5	4,8
27	<u><i>Calligonum arborescens</i></u>	12	0,5	1,4	3,1	3,7	4,8
		24	1,0	1,8	4,1	,5	5,0
		36	1,5	1,3	2,8	3,5	4,5
28	Brown headed	12	0,5	1,4	2,7	3,8	4,6
		24	1,0	1,7	3,0	4,1	5,8
		36	1,5	1,5	2,6	3,3	4,2
29	Kauir	12	0,5	1,6	2,5	3,8	4,6
		24	1,0	1,9	3,1	4,0	4,8
		36	1,5	1,4	2,9	3,3	4,2
30	Astragalus	12	0,5	1,6	2,7	4,3	4,0
		24	1,0	1,5	3,8	4,5	5,0
		36	1,5	1,0	2,2	3,3	4,7
31	Ammodendron (Ammodendron Karelini Fisch.et.Meu)	12	0,5	1,5	1,9	4,8	4,6
		24	1,0	1,9	2,3	5,1	5,6
		36	1,5	1,3	1,6	4,2	5,1

In this case, samples were taken from the soil of the experimental area for analysis and sowing of halophyte plant seeds in laboratory conditions.

Laboratory experiments were conducted at the Bioecological Scientific Research Laboratory and Greenhouse of Karakalpak State University named after Berdakh.

Studies on the germination of 10 seeds of drought- and salt-resistant plants brought to the soil under laboratory conditions. 0.5 ml, 1.0 and 1.5 ml of Gumin, Aminomax, Master Power, Izabion stimulators were added to 1 l of water, germination was observed after 12, 24, 36 hours. (Table 1).

According to the data obtained in laboratory conditions, higher values were observed with the Izabion stimulator compared to the control and other stimulators.

The highest fertility was observed when we used Izabion stimulants when we mixed 1 ml of stimulants in 1 liter of water and planted the seeds of non-traditional crops after freezing for 24 hours. When we used 1.0 and 1.5 mg/g, the highest values were 7.2% in *Krascheninnikovia ceratoides* *Eurotia ceratoides*, 7.8% in Common tumbleweed *Amaranthus albus* (b), 7.8% in *Astragalus agamet Astragalus* (k) 6.8%, Sub-shrub *Halothamnus subaphylla* Botsch 6.6%, *Arpogon* 6.1%, Juzgun small-seeded *Calligonum microcarpum* (k) 6.0%, in the Master Power stimulator it was 5.5-5.8, and 2.8-3.1% of seeds were germinated when Aminomax stimulator was used, and 1.9-2.2% of seeds were germinated with Gumin stimulator.

It was observed that these plants differ from each other in terms of germination. Fertilization of halophytic and xerophytic plant seeds is characterized by very low compared to cultivated plants.

It was found that the Izabion stimulator has a high rate of germination of the seeds of non-traditional crops resistant to drought in laboratory conditions, and the seeds of 32 different plants warmed with the stimulator were planted in the dried depth of the Aral Sea (zero point) in Muynoq district in June and August using mulching methods.

References:

1. Pankova E.I., Aydarov I.P., Yamnova I.A., Novikova A.F., Blagovolin N.S. Natural anthropogenic saline soils of the Aral Sea basin (geography, genesis, evolution) - Moscow, 1996. -p. 187.
2. "Methods of conducting field experiments". UzSRI, Tashkent, 2007.
3. <https://lex.uz/docs/5123920>

Rezyume: Bugungi kunda Orol dengizining qurishi tufayli atrof-muhit turli tuzlar va chang zarralari bilan ifloslanmoqda. Bu holatni yumshatish maqsadida turli galofit va kserofit o'simliklar urug'larining o'sishi laboratoriya sharoitida aniqlandi.

Резюме: На сегодняшний день из-за высыхания Аральского моря происходит загрязнение окружающей среды различными солями и пылевыми частицами. Чтобы

облегчить эту ситуацию, в лабораторных условиях определяли рост семян различных галофитных и ксерофитных растений.

Kalit so‘zlar: Gumin, Aminomaks, Master Power, Izabion, stimulyator, tuproq, tuz, galofit, kserofit.

Ключевые слова: Гумин, Аминомакс, Мастер Пауэр, Изабион, стимулятор, почва, соль, галофит, ксерофит.

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DIFFERENCE SCHEMES OF HIGHER ACCURACY FOR SOLVING PROBLEMS OF ELECTRODYNAMICS

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Summary: Numerical methods are proposed for solving two-dimensional non-stationary Maxwell equations. The transition to the problem for one sought-for vector function is conducted. The problem is considered in a parallelepiped with the simplest boundary conditions. For the numerical solution, three-parameter vector difference schemes of the finite element method of higher accuracy are used. Stability conditions are obtained and theorems on the convergence of the considered difference schemes in the class of smooth solutions to the original differential problem are proven.

Key words: Maxwell equation, boundary value problems, difference schemes, finite element method, finite difference method, approximation, stability, convergence, accuracy.

1. Introduction. Maxwell's system of equations, which describes the evolution of electromagnetic fields in material media, is widely used in practical applications. Analytical methods for solving this system of equations are quite limited. Therefore, in many applications, numerical methods are used to solve the system of Maxwell equations, mainly the finite difference method and the finite element method. Many scientific publications are devoted to the numerical solution of the system of Maxwell equations. Let us look at some of them. In [1], an algorithm of the second-order accuracy in time and space variables based on the introduction of mixed grids was proposed. Finite difference methods of the first and second orders of accuracy were constructed and studied in [2]–[5]. In [6], a numerical method based on the finite volume method was proposed for the system of Maxwell equations. The results of test calculations are presented, confirming the second order of convergence of the method for homogeneous media and close to the second order of convergence - for media with a dielectric permittivity that varies abruptly in space. In [7], additive difference schemes for the system of Maxwell equations based on the A.A. Samarskii alternating triangular method were proposed.

In this article, the authors consider a three-dimensional non-stationary system of Maxwell's equations. When passing to the problem for one sought-for vector function, they obtained a non-stationary problem with a non-standard operator in space variables. Then, the problem was approximated in space variables, while the resulting system of ordinary differential equations was solved by a three-parameter vector difference scheme of the finite element method, constructed and studied in [8]. Approximation errors were investigated, stability conditions were obtained, and a theorem on the convergence and accuracy of the considered schemes was proven.

1. Statement of the problem. Consider the following system of Maxwell equations [9] in the space-time domain $\bar{Q}_T = \{x = (x_1, x_2, x_3) \in \bar{\Omega}, t \in [0; T]\}$, where $\bar{\Omega} = \{0 \leq x_\lambda \leq l_\lambda, \lambda = 1, 2, 3\}$:

$$\varepsilon \frac{\partial E}{\partial t} = \text{rot} H - \sigma E, \quad \mu \frac{\partial H}{\partial t} = -\text{rot} E, \quad (x, t) \in Q_T = \{x \in \Omega, t \in (0, T]\}. \quad (1)$$

Here $E = (E_1, E_2, E_3)$, $H = (H_1, H_2, H_3)$ are the electric and magnetic field strength vectors, $\sigma = \sigma(x)$ is the conductivity of the medium, $\varepsilon = \varepsilon(x)$ is the dielectric permeability of the medium and $\mu = \mu(x)$ is the magnetic permeability of the medium, $\partial\bar{\Omega} = \partial\Omega \cup \Omega$. The medium is homogeneous and isotropic.

Generally, equations (1) are supplemented by the following relations:

$$\operatorname{div}(\mu H) = 0, \quad \operatorname{div}(\varepsilon E) = 4\pi\rho \quad (x, t) \in Q_T = \{x \in \Omega, t \in (0, T]\}. \quad (2)$$

If the medium is inhomogeneous, then the conjugation conditions should be added to the Maxwell equation. At the interface between two different media, the following conditions must be met

$$E_s^{(1)} = E_s^{(2)}, \quad H_s^{(1)} = H_s^{(2)} \quad (3)$$

(the continuity of the tangential components of vectors E and H , respectively). It is assumed that until $t = 0$ the electromagnetic field is absent, i.e.

$$E|_{t < 0} = 0, \quad H|_{t < 0} = 0. \quad (4)$$

In what follows, relations (2) are not considered since the first relation is a consequence of (1), (3), and (4), and the second relation can be considered as an independent equation for determining the charge density ρ .

The system of equations (1), together with the given parameters ε, μ, σ and some initial and boundary conditions makes it possible to uniquely determine the electromagnetic field.

Numerical methods for solving problems of electrodynamics are often based on the direct use of a system of first-order equations (1). In this case, explicit, implicit, and additive difference schemes are constructed, [2]–[5]. In this article, we use second-order equations. For example, eliminating the magnetic field strength from (1), we arrive at one equation for the electric field strength

$$\varepsilon \frac{\partial^2 E}{\partial t^2} + \sigma \frac{\partial E}{\partial t} + \operatorname{rot} \left(\frac{1}{\mu} \operatorname{rot} E \right) = 0. \quad (5)$$

For $\varepsilon = 0$ At (the case of a quasi-stationary electromagnetic field in a conductor), from (5) we obtain the following first-order evolution equation

$$\sigma \frac{\partial E}{\partial t} + \operatorname{rot} \left(\frac{1}{\mu} \operatorname{rot} E \right) = 0. \quad (6)$$

And if we choose $\sigma = 0$ (bad conductors), then from (5) we obtain a second-order evolution equation

$$\varepsilon \frac{\partial^2 E}{\partial t^2} + \operatorname{rot} \left(\frac{1}{\mu} \operatorname{rot} E \right) = 0. \quad (7)$$

Hereinafter, in the computational domain Ω in case of equation (6), the unknown vector function $u(x, t)$ will be defined as the solution to the following equation

$$\frac{\partial u}{\partial t} + \operatorname{rot} (k(x) \operatorname{rot} u) = 0, \quad x \in \Omega, \quad 0 < t \leq T > 0. \quad (8)$$

Likewise, in the case of equation (7) we have

$$\frac{\partial^2 u}{\partial t^2} + \operatorname{rot} (k(x) \operatorname{rot} u) = 0, \quad x \in \Omega, \quad 0 < t \leq T. \quad (9)$$

The initial condition for equation (8) is given as

$$u(x, 0) = u_0(x), \quad x \in \Omega, \quad (10)$$

and the initial conditions for equation (9) are given as

$$u(x, 0) = u_0(x), \quad \frac{\partial u}{\partial t} = u_1(x), \quad x \in \Omega. \quad (11)$$

For the original equation of electrodynamics (1), typical boundary conditions are problems with given tangential components of the electric and magnetic fields. Therefore, we consider equations (8), (9) with the following boundary condition

$$(u, n) = 0, \quad x \in \partial\Omega, \quad (12)$$

where $\vec{n}$ is the vector of the outer normal to the boundary of parallelepiped $\bar{\Omega}$.

For further study, we introduce Hilbert space $H = L_2(\Omega)$ with scalar product and norm

$$(u, \vartheta) = \int_{\Omega} u(x) \vartheta(x) dx, \quad \|u\| = \sqrt{(u, u)}.$$

For vector functions $u = (u_1, u_2, u_3)$, $v = (\vartheta_1, \vartheta_2, \vartheta_3)$ from H we assume

$$(u, v) = \sum_{\alpha=1}^3 (u_{\alpha}, \vartheta_{\alpha}), \quad \|u\| = \sqrt{(u, u)}.$$

Next, on the set of functions satisfying the boundary condition (12), we define the operator

$$Au = \text{rot}(k(x) \text{rot} u). \quad (13)$$

In coordinate notation, we have

$$\begin{aligned} (Au)_1 &= -\frac{\partial}{\partial x_2} \left(k \frac{\partial u_1}{\partial x_2} \right) - \frac{\partial}{\partial x_3} \left(k \frac{\partial u_1}{\partial x_3} \right) + \frac{\partial}{\partial x_2} \left(k \frac{\partial u_2}{\partial x_1} \right) + \frac{\partial}{\partial x_3} \left(k \frac{\partial u_3}{\partial x_1} \right), \\ (Au)_2 &= -\frac{\partial}{\partial x_1} \left(k \frac{\partial u_2}{\partial x_1} \right) - \frac{\partial}{\partial x_3} \left(k \frac{\partial u_2}{\partial x_3} \right) + \frac{\partial}{\partial x_1} \left(k \frac{\partial u_1}{\partial x_2} \right) + \frac{\partial}{\partial x_3} \left(k \frac{\partial u_3}{\partial x_2} \right), \\ (Au)_3 &= -\frac{\partial}{\partial x_1} \left(k \frac{\partial u_3}{\partial x_1} \right) - \frac{\partial}{\partial x_2} \left(k \frac{\partial u_3}{\partial x_2} \right) + \frac{\partial}{\partial x_1} \left(k \frac{\partial u_1}{\partial x_3} \right) + \frac{\partial}{\partial x_2} \left(k \frac{\partial u_2}{\partial x_3} \right). \end{aligned} \quad (14)$$

On sufficiently smooth functions satisfying condition (12), the operator A is self-adjoint and non-negative, i.e. $A = A^* \geq 0$ in H .

Taking into account (13), we write the initial-boundary value problem (8), (10), (12) in the form of the Cauchy problem for the first-order differential-operator equation

$$D \frac{du}{dt} + Au = 0, \quad 0 < t \leq T, \quad u(0) = u_0, \quad (15)$$

to determine $u(t) \in H$, and problem (9), (11), (12) is written as

$$D \frac{d^2 u}{dt^2} + Au = 0, \quad 0 < t \leq T, \quad u(0) = u_0, \quad \frac{du}{dt}(0) = u_1, \quad (16)$$

where $D = E$, E is the unity operator.

In [7], for solving problems (15) and (16) by the method of energy inequalities, a priori stability estimates were obtained from the initial data $\|u(t)\| \leq \|u_0\|$ and $\|u(t)\|_*^2 \leq \|u_1\|^2 + (Au_0, u_0)$ respectively, where $\|u(t)\|_*^2 = \|du/dt\|^2 + (Au, u)$.

Problem (5), (11), (12) is written as

$$D \frac{d^2 u}{dt^2} + B \frac{du}{dt} + Au = 0, \quad 0 < t \leq T, \quad u(0) = u_0, \quad \frac{du}{dt}(0) = u_1, \quad (17)$$

where

$$D = \varepsilon E, \quad B = \sigma E. \quad (18)$$

2. Approximation in space. Similarly to [7], we approximate problems (15) and (16) by the finite difference method. To do this, we introduce grid $\bar{\omega} = \bar{\omega}_1 \times \bar{\omega}_2 \times \bar{\omega}_3 = \{x: x = (x_1, x_2, x_3), x_{\lambda} \in \bar{\omega}_{\lambda}, \lambda = 1, 2, 3\}$ into Ω ,

where $\bar{\omega}_{\lambda} = \{x_{\lambda}: x_{\lambda} = i_{\lambda} h_{\lambda}, i_{\lambda} = \overline{0, N_{\lambda}}, N_{\lambda} h_{\lambda} = l_{\lambda}\}$ are the grids in separate directions $x_{\lambda}, \lambda = 1, 2, 3$.

In addition, we determine $\omega = \omega_1 \times \omega_2 \times \omega_3 = \{x: x = (x_1, x_2, x_3), x_{\lambda} \in \omega_{\lambda}, \lambda = 1, 2, 3\}$ where

$\omega_{\lambda} = \{x_{\lambda}: x_{\lambda} = i_{\lambda} h_{\lambda}, i_{\lambda} = \overline{1, N_{\lambda}-1}, N_{\lambda} h_{\lambda} = l_{\lambda}\}$. We will use the standard notation of the theory of

difference schemes [10], i.e., $w_x = w_x(x) = [w(x+h) - w(x)]/h$, $w_{\bar{x}} = w_{\bar{x}}(x) = [w(x) - w(x-h)]/h$.

The set of internal nodes will be denoted by ω , and the set of boundary nodes will be denoted by

$\partial\omega$. Let $y(x,t)$, $x \in \bar{\omega}$ approximate $u(x,t)$, $0 \leq x_\lambda \leq l_\lambda$, $0 < t \leq T$. Approximation (12) leads to the following boundary condition

$$(y \times n) = 0, \quad x \in \partial\omega, \quad (19)$$

which meets the conditions $y_\lambda(x) = 0$, $x_\theta = 0$, $x_\theta = l_\theta$, $\theta \neq \lambda$, $\lambda, \theta = 1, 2, 3$.

On the set of grid functions satisfying boundary conditions (19), we define the grid analog of operator A as given in [7]:

$$A = 0.5(A^+ + A^-), \quad (20)$$

where $A^+y = ((A^+y)_1, (A^+y)_2, (A^+y)_3)$, $A^-y = ((A^-y)_1, (A^-y)_2, (A^-y)_3)$. Hence, taking into account (14), we obtain

$$(A^+y)_1 = -(ky_{1x_2})_{\bar{x}_2} - (ky_{1x_3})_{\bar{x}_3} + (ky_{2x_1})_{\bar{x}_2} + (ky_{3x_1})_{\bar{x}_3},$$

$$(A^+y)_2 = -(ky_{2x_1})_{\bar{x}_1} - (ky_{2x_3})_{\bar{x}_3} + (ky_{1x_2})_{\bar{x}_1} + (ky_{3x_2})_{\bar{x}_3},$$

$$(A^+y)_3 = -(ky_{3x_1})_{\bar{x}_1} - (ky_{3x_2})_{\bar{x}_2} + (ky_{1x_3})_{\bar{x}_1} + (ky_{2x_3})_{\bar{x}_2},$$

$$(A^-y)_1 = -(ky_{1\bar{x}_2})_{x_2} - (ky_{1\bar{x}_3})_{x_3} + (ky_{2\bar{x}_1})_{x_2} + (ky_{3\bar{x}_1})_{x_3},$$

$$(A^-y)_2 = -(ky_{2\bar{x}_1})_{x_1} - (ky_{2\bar{x}_3})_{x_3} + (ky_{1\bar{x}_2})_{x_1} + (ky_{3\bar{x}_2})_{x_3},$$

$$(A^-y)_3 = -(ky_{3\bar{x}_1})_{x_1} - (ky_{3\bar{x}_2})_{x_2} + (ky_{1\bar{x}_3})_{x_1} + (ky_{2\bar{x}_3})_{x_2}.$$

All grid operators A^+ and A^- approximate differential operator A with first order in $|h| = \sqrt{h_1^2 + h_2^2 + h_3^2}$, and in total in $Au - Au = O(|h|^2)$.

Let us define for grid functions y Hilbert space $H_h = L_2(\omega)$ with scalar product $(y, w) = \sum_{x \in \omega} y(x)w(x)h_1h_2h_3$ and norm $\|y\| = \sqrt{(y, y)}$, and for vector functions we assume

$$(y, w) = \sum_{\lambda=1}^3 (y_\lambda, w_\lambda), \quad \|y\| = \sqrt{(y, y)}.$$

We have the following equations

$$((A^+y)_\lambda, w_\lambda) = (y_\lambda, (A^+w)_\lambda), \quad ((A^-y)_\lambda, w_\lambda) = (y_\lambda, (A^-w)_\lambda), \quad \lambda = 1, 2, 3,$$

which provide $A^+ = (A^+)^*$, $A^- = (A^-)^*$. Therefore, in H_h the grid operator A is self-adjoint and non-negative, i.e., $A = A^* \geq 0$.

4. Approximation in time. Problem (17) is approximated by the finite element method, which connects the values of $\dot{y}^{n+1}$, $\dot{y}^n$, y^{n+1} , y^n , approximating $\frac{du_h}{dt}(t_n + \tau)$, $\frac{du_h}{dt}(t_n)$, $u_h(t_n + \tau)$, $u_h(t_n)$, respectively. Such a scheme was constructed in [8], and it has the following form:

$$D_\gamma \dot{y}_t + B y_t + A y^{(0.5)} = 0, \quad D_\alpha y_t - (\tau^2 / 12) B \dot{y}_t - D_\beta \dot{y}^{(0.5)} = 0, \quad (21)$$

$$y^0 = u_0, \quad \dot{y}^0 = u_1.$$

Here $y = y^n = y(t_n)$, $\hat{y} = y^{n+1}$, $\dot{y} = \dot{y}^n = dy(t_n) / dt$, $n = 0, 1, \dots$, $y^n, \dot{y}^n \in H_h$,

$$D_\lambda = D - \lambda \tau^2 A, \quad \lambda = \alpha, \beta, \gamma, \quad y_t = (\hat{y} - y) / \tau, \quad \dot{y}_t = (\hat{\dot{y}} - \dot{y}) / \tau, \quad y^{(0.5)} = (\hat{y} + y) / 2,$$

$\dot{y}^{(0.5)} = (\hat{\dot{y}} + \dot{y}) / 2$. The operators D, B, A act from H_h into H_h and they have the form $D = D, B = B, A = A$ (see (18), (20)).

The parameters α, β, γ obey the condition of the fourth order of approximation

$$\alpha + \gamma = \beta + 1 / 6. \quad (22)$$

Note that if, in addition to (22), the following condition is met

$$\beta - 6\alpha\gamma + 1/40 = 0,$$

then scheme (21) has the sixth order of approximation.

Based on the calculated values of $\dot{y}^{n+1}, \dot{y}^n, y^{n+1}, y^n$, it is possible to restore the approximation to $u_h(t)$ for any $t \in [t_n, t_{n+1}]$, $n = 0, 1, \dots$ by the following formula:

$$y(t) = y^n \varphi_{00}^n(t) + \dot{y}^n \varphi_{10}^n(t) + y^{n+1} \varphi_{01}^n(t) + \dot{y}^{n+1} \varphi_{11}^n(t).$$

$$\text{Here } \varphi_{00}^n(t) = 2\xi^3 - 3\xi^2 + 1, \quad \varphi_{01}^n(t) = 3\xi^2 - 2\xi^3, \quad \varphi_{10}^n(t) = \tau(\xi^3 - 2\xi^2 + \xi), \\ \varphi_{11}^n(t) = \tau(\xi^3 - \xi^2), \quad \xi = (t - t_n) / \tau.$$

Problem (16) is approximated by the difference scheme (21) for $B=0$, and problem (15) is approximated by the difference scheme obtained in [8]:

$$D \frac{\hat{y} - y}{\tau} - \frac{\tau^2}{12} A \frac{\hat{\dot{y}} - \dot{y}}{\tau} + A \frac{\hat{y} + y}{2} = 0, \quad \gamma D \frac{\hat{\dot{y}} - \dot{y}}{\tau} + \alpha A \frac{\hat{y} - y}{\tau} - \beta A \frac{\hat{\dot{y}} + \dot{y}}{2} = 0, \quad (23)$$

$$y^0 = u_0, \quad \dot{y}^0 = \dot{u}_0,$$

$$\text{where } \dot{u}_0 = D^{-1}(f^0 - Au_0).$$

A necessary condition for the fourth-order approximation of the difference scheme (23) is the following relation

$$\alpha + \beta = \gamma, \quad \alpha, \beta, \gamma = O(\tau^2). \quad (24)$$

5. Stability and accuracy. Let us formulate a result on the stability and accuracy of scheme (21). In [8], to prove the convergence, it was written in the form of three-layer difference schemes separately for y and its derivative $\dot{y}$. Then, the accuracy estimate was obtained

$$\|u_h(t) - u(t)\|_A + \|\dot{u}_h(t) - \dot{u}(t)\|_B \leq M\tau^4,$$

under mutual commutability of operators A, B, D . They are commutative by construction (see (18) and (20)). The stability condition for scheme (21) has the following form

$$D_\omega = D - \omega\tau^2 A \geq \delta D, \quad 0 < \delta < 1. \quad (25)$$

By direct calculation, one can verify that (25) holds if the following condition is met

$$\tau^2 \leq \frac{\varepsilon(1-\delta)}{4\bar{\omega}} |h|^2, \quad \bar{\omega} = \max[\alpha, \beta, \gamma, 1/4]. \quad (26)$$

Further, similarly to [8], taking into account the mutual commutability of operators A, B, D , we will establish the validity of the following assertion.

Theorem 1. Under condition (26), the solution to difference scheme (21) converges to a sufficiently smooth solution to problem (17), (11), (12) and the following accuracy estimate holds

$$\|y(t) - u(t)\|_1 + \|\dot{y}(t) - \dot{u}(t)\|_1 \leq M(\tau^4 + |h|^2).$$

Let us now formulate a result on the stability and accuracy of scheme (23). In [8], the following accuracy estimate was obtained

$$\|y(t_n) - u(t_n)\|_{A^2} + \|\dot{y}(t_n) - \dot{u}(t_n)\|_{A^2} \leq M\tau^4 \max_t \left\| \frac{d^6 u}{dt^6}(t_n) \right\|_{A^2}, \quad (27)$$

i.e., the following assertion holds.

Theorem 2. Let conditions (24) and $\alpha > 0, \beta > 0, \gamma > 0$ be met. If $u(x, t) \in C^6[0, T]$, then scheme (23) converges to the solution of problem (15), (10), (12) and the accuracy estimate (27) holds for its solution.

6. Algorithm for the implementation of schemes. To implement scheme (21), it is necessary to solve the system of two equations for the unknowns $\hat{w}, \hat{\dot{w}}$

$$m_{11} \hat{\dot{y}} + m_{12} \hat{y} = \Phi_1, \quad m_{21} \hat{\dot{y}} + m_{22} \hat{y} = \Phi_2, \quad (28)$$

$$m_{11} = D - \tau^2 \gamma A, \quad m_{12} = B + \frac{\tau}{2} A, \quad m_{21} = -\left[\frac{\tau^2}{12} B + \frac{\tau}{2} (D - \beta \tau^2 A) \right], \quad m_{22} = D - \alpha \tau^2 A,$$

$$\Phi_1 = \left(B - \frac{\tau}{2} A \right) y + (D - \tau^2 \gamma A) \dot{y},$$

$$\Phi_2 = (D - \alpha \tau^2 A) y - \frac{\tau^2}{12} B \dot{y} + \frac{\tau}{2} (D - \beta \tau^2 A) \dot{y}.$$

Eliminating $\hat{\dot{y}}$ from (28), we obtain an equation to determine $\hat{y}$:

$$C \hat{y} = F, \quad (29)$$

where

$$C = m_{11} m_{22} - m_{21} m_{12} = D^2 - \left(\alpha - \frac{1}{6} \right) \tau^2 A D + \left(\alpha \gamma - \frac{\beta}{4} \right) \tau^4 A^2 + \\ + \tau^2 \gamma B^2 + \frac{\tau}{2} B D + \left(\frac{\gamma}{2} - \frac{\beta}{2} \right) \tau^3 A B, \quad F = m_{12} \Phi_2 - m_{22} \Phi_1. \quad (30)$$

The first algorithm for implementing scheme (28) consists in direct solution to equation (29), and calculation of $\hat{\dot{y}}$ from the following equation:

$$(D - \tau^2 \gamma A) \hat{\dot{y}} = \Phi_1 - \left(B + \frac{\tau}{2} A \right) \hat{y}. \quad (31)$$

The second algorithm is based on the factorization of operator C :

$$C = C_1 C_2 = (D - \omega_1 \tau^2 A + \nu_1 \tau B)(D - \omega_2 \tau^2 A + \nu_2 \tau B). \quad (32)$$

Comparing (30) with (32), we obtain the conditions relating the parameters

$$\omega_1, \omega_2, \nu_1, \nu_2, \alpha, \beta, \gamma: \quad \omega_1 + \omega_2 = \alpha - \frac{1}{6}, \quad \omega_1 \cdot \omega_2 = \alpha \gamma - \frac{\beta}{4}, \quad \nu_1 + \nu_2 = \frac{1}{2}, \quad \nu_1 \cdot \nu_2 = \gamma,$$

$\omega_1 \nu_2 + \omega_2 \nu_1 = \frac{\beta}{2} - \frac{\gamma}{2}$. These conditions are closed by the fourth-order approximation condition (14).

The solutions to this system are:

$$\omega_{1,2} = \frac{1}{24}(-1 \pm i\sqrt{3}), \quad \nu_{1,2} = \frac{1}{4}\left(1 \pm i\frac{\sqrt{3}}{3}\right), \quad \alpha = \frac{1}{12}, \quad \beta = 0, \quad \gamma = \frac{1}{12}.$$

As can be seen, parameters $\omega_1, \omega_2, \nu_1, \nu_2$ are complex ones. Equation (26) is implemented in two stages: first, we solve $C_1 g = F$ and then $C_2 \hat{w} = g$. After that, from equation (31) we find $\hat{\dot{y}}$.

To implement scheme (23), system (28) is solved, where

$$\varphi_1 = \left(D + \frac{\tau}{2} A \right) y - \frac{\tau^2}{12} A \dot{y}, \quad \varphi_2 = \alpha A y + \left(\gamma D + \frac{\tau}{2} \beta A \right) \dot{y},$$

$$m_{11} = D + \frac{\tau}{2} A, \quad m_{12} = -\frac{\tau^2}{12} A, \quad m_{21} = \alpha A, \quad m_{22} = \gamma D + \frac{\tau}{2} \beta A.$$

Taking into account the commutability of operators A and D , we eliminate $\hat{\dot{y}}$ from the system of equations (38):

$$C \hat{y} = F, \quad (33)$$

where $C = \gamma D^2 + \frac{\tau}{2} (\beta + \gamma) A D + \frac{\tau^2}{12} (3\beta + \alpha) A^2$, $F = m_{22} \varphi_1 - m_{12} \varphi_2$.

Equation (33) can be solved either directly by inverting operator C , or by factorizing it

$$C = \gamma C_1 C_2 = \gamma [D^2 - (x_1 + x_2)\tau AD + x_1 x_2 \tau^2 A^2], \quad C_k = (D - x_k \tau A), \quad k=1, 2.$$

Then, equation (33) is solved using the following algorithm:

$$\gamma_1 C_1 \bar{y} = F, \quad C_2 \hat{y} = \bar{y}. \quad (34)$$

After finding $\hat{y}$ from (34), the solution to $\hat{y}$ is calculated, for example, from equation

$$\left(\gamma D + \frac{\tau}{2} \beta A \right) \hat{y} = \varphi_2 - \alpha A \hat{y}.$$

7. Conclusions. In this article, numerical methods of higher accuracy were developed and investigated for solving a boundary value problem for the system of Maxwell equations. These methods are based on finite difference approximation in space and finite element approximation in time. Approximation conditions were obtained. Theorems on the stability and convergence of the constructed methods were proven, and, on their basis, accuracy estimates were obtained. Algorithms for the implementation of difference schemes were developed.

References:

1. Yee K.S. Numerical Solution of Initial Boundary Value Problems Involving Maxwell's Equations in Isotropic Media // IEEE Trans. Antennas and Propagation, 1966, v.17, p. 585-589.
2. Taflov A. Computational Electrodynamics. The Finite-Difference Time-Domain Method. Boston: Artech House, 1995.
3. Advances in Computational Electrodynamics. The Finite-Difference Time-Domain Method / By ed. A. Taflov. Boston: Artech House, 1998.
4. Taflov A., Hagness S.C. Computational Electrodynamics. The Finite-Difference Time-Domain Method. (Sec. ed). Boston: Artech House, 2000.
5. Sullivan D.M. Electromagnetic Simulation Using the FDTD Method. New York: IEEE Press, 2000.
6. Lebedev A.S., Fedoruk M.P., Shtyrina O.V. Finite-volume algorithm for solving non-stationary Maxwell equations on an unstructured grid // Journal of Computational Mathematics and Mathematical Physics, 2006, vol. 46, no. 7, pp. 1286-1301.
7. Vabishchevich P.N. Difference schemes for solving non-stationary vector problems // Differential Equations, 2004, vol. 40, no. 7, p. 936-943.
8. Moskalov M.N., Utebaev D. Numerical modeling of nonstationary processes in continuum mechanics. Tashkent: "Fan va technology", 2012.
9. Tikhonov A.N., Samarskii A.A. Equations of mathematical physics. M.: Nauka, 2004.
10. Samarskii A.A. The Theory of Difference Schemes. New York: Marcel Dekker, 2002.

Rezyume: Maksvellning ikki o'lchovli nostatsionar tenglamalarini echish uchun sonli usullar taklif etiladi. Bitta izlanaetgan vektor funktsiyasiga o'tish masalasi amalga oshiriladi. Masala parallelepipedda eng oddiy chegaraviy shartlar uchun ko'rib chiqiladi. Sonli echim uchun yuqori aniqlikdagi ayirmali elementlar usulining uch parametrlil vektorli ayirmali sxemalari qo'llaniladi. Turginlik shartlari olingan va dastlabki differentsial masalaning silliq echimlari sinfida ko'rib chiqilgan ayirmali sxemalarining yaqinlashuvi haqidagi teoremlar isbotlangan.

Резюме: Предлагаются численные методы для решения двумерных нестационарных уравнений Максвелла. Осуществляется переход к задаче для одной искомой векторной функции. Рассматривается задача в параллелепипеде с простейшими краевыми условиями. Для численного решения применяются трехпараметрические векторные разностные схемы метода конечных элементов повышенной точности. Получены условия устойчивости и доказаны теоремы о сходимости рассмотренных разностных схем в классе гладких решений исходной дифференциальной задачи.

Kalit so'zlar: Maksvell tenglamasi, chegaraviy masalalar, ayirmali sxemalar, chekli elementlar usuli, chekli ayirmalar usuli, approximiatiya, turginlik, yaqinlashish, aniqlik.

Ключевые слова: уравнение Максвелла, краевые задачи, разностные схемы, метод конечных элементов, метод конечных разностей, аппроксимация, устойчивость, сходимость, точность.

NUMERICAL SOLUTION OF THE PROBLEM OF INTEGRAL GEOMETRY ON THE FAMILY OF PARABOLAS

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Summary: We consider the numerical solution of the problem of integral geometry in a strip on a family of parabolic curves. An approximate solution is obtained using an explicit inversion formula for the Fourier image of the solution of the considered problem of integral geometry in the class of smooth finite functions.

Key words: integral geometry problems, Fourier transform, numerical solution, ill-posed problems.

Let $x \in \mathbb{R}^n$, $x = (x_1, \dots, x_n)$, $y \in \mathbb{R}^m$, $y = (y_1, \dots, y_m)$, $S(y)$ - a family of manifolds $\mathbb{R}^n$, depending on the parameter y of dimension m , $\dim S = p$. Further, let $u(x)$ - function defined in some domain $D \subset \mathbb{R}^n$, $\rho(x, y)$ - a function of variables x, y , $\omega(y)$ - measure on the manifold $S(y)$.

We consider the relation

$$\int_{S(y)} \rho(x, y) u(x) d\omega = f(y) \quad (1)$$

It is required to find $u(x)$ given $f(y)$, $\rho(x, y)$.

Integral geometry is a branch of mathematics that studies various relationships between the elements included in (1) [1].

Many applied problems, in particular, the problems of interpreting seismic data, transmission of physical media, and X-ray images, are reduced to problems of integral geometry.

In [2], the issues of uniqueness and stability of solving problems of integral geometry were studied in the case when the manifolds on which the integration is performed have the form of paraboloids, the weight functions and manifolds are invariant under the group of all motions along a fixed hyperplane.

In [3, 4], new formulations of weakly ill-posed problems of integral geometry on parabolic curves with special weight functions were considered. In [4], a sequence of approximate solutions for the exact solution of the problem was constructed based on the idea of A. N. Tikhonov on the regularization of ill-posed problems.

In [5-7], an analytical representation for the Fourier image in the first variable of the desired function was obtained, from which the statement about the strong ill-posedness of the solution of the problem follows.

In [8, 9], linear problems of integral geometry in a strip with a given weight function were considered. An analytic representation of the solution in the class of smooth finite functions is obtained, and uniqueness theorems for the solution of the problem are proved. An estimate of the stability of the solution in Sobolev spaces is given, from which weakly incorrectness follows.

In this paper, we study the numerical solution of the problem of integral geometry in a strip on a family of curves of parabolic type. An approximate solution is obtained using an explicit inversion formula for the Fourier image, the solution of the considered integral geometry problem in the class of smooth finite functions.

1. INVERSION FORMULA

We consider the following operator equation

$$\int_{\Upsilon(x,y)} g(x,\xi) u(\xi,\eta) d\xi = f(x,y), \quad (2)$$

where an arbitrary family curve is represented by the expression

$$\Upsilon(x,y) = \left\{ (\xi,\eta) : (x-\xi)^2 + \eta = y, 0 \leq \eta \leq y \leq H \right\}.$$

Theorem. Let the function $f(x,y) \in C_0^\infty$ be in the strip $\Omega = \{(x,y) : x \in R^1, 0 \leq y \leq H < \infty\}$, the weight function $g(x,\xi) \equiv 1$. Then the approximate solution of (2) has the representation

$$u^A(x,y) = \frac{1}{\pi} \frac{\partial}{\partial y} \int_0^y \sum_{k=0}^{\infty} \frac{(-1)^k}{(2k)!} \frac{\partial^{2k} f(x,\eta)}{\partial x^{2k}} \cdot \frac{1}{\sqrt{y-\eta}} d\eta$$

Proof. Equation (2) can be written as

$$\int_0^y (u(x-h,\eta) + u(x+h,\eta)) \frac{1}{h} d\eta = f(x,y), \quad (3)$$

where $h = \sqrt{y-\eta}$.

Now we apply the Fourier transform in the first variable to both parts of equation (3) and write it as follows:

$$\int_0^y \frac{\cos(\lambda\sqrt{y-\eta})}{\sqrt{y-\eta}} \cdot \hat{u}(\lambda,\eta) d\eta = \hat{f}(\lambda,y).$$

Let us apply to the last equation the Laplace transform with respect to the variable y :

$$\int_0^{+\infty} e^{-py} \hat{f}(\lambda,y) dy = \int_0^{+\infty} e^{-py} \int_0^y \frac{\cos(\lambda\sqrt{y-\eta})}{\sqrt{y-\eta}} \cdot \hat{u}(\lambda,\eta) d\eta dy$$

By making a substitution $t = y - \eta$, we have

$$\int_0^\infty e^{-p\eta} \hat{u}(\lambda,\eta) d\eta \int_0^\infty e^{-pt} \frac{\cos \lambda \sqrt{t}}{\sqrt{t}} dt = \int_0^\infty e^{-py} \hat{f}(\lambda,y) dy. \quad (4)$$

Thus, from equation (4) we obtain:

$$\tilde{\hat{u}}(\lambda,p) \cdot I(\lambda,p) = \tilde{\hat{f}}(\lambda,p), \quad (5)$$

where

$$I(\lambda,p) = \int_0^\infty e^{-pt} \frac{\cos \lambda \sqrt{t}}{\sqrt{t}} dt = \frac{\sqrt{\pi}}{\sqrt{p}} e^{-\frac{\lambda^2}{4p}}. \quad (6)$$

From equation (5), taking into account (6), we obtain

$$\tilde{\hat{u}}(\lambda,p) = \sqrt{\pi} p \cdot e^{\frac{\lambda^2}{4p}} \frac{\tilde{\hat{f}}(\lambda,p)}{\sqrt{p}}. \quad (7)$$

Taking into account the properties of the Laplace transform, we apply the inverse Laplace transform with respect to the variable p :

$$\hat{u}(\lambda,y) = \frac{1}{\pi} \frac{\partial}{\partial y} \int_0^y \frac{ch(\lambda\sqrt{y-\eta})}{\sqrt{y-\eta}} \cdot \hat{f}(\lambda,\eta) d\eta. \quad (8)$$

For the numerical solution of equation (8), we expand the function $ch(\lambda\sqrt{y-\eta})$ in the Maclaurin series with respect to the parameter λ :

$$ch(\lambda h) = \sum_{k=0}^{\infty} \frac{(\lambda h)^{2k}}{(2k)!}, \quad (9)$$

where $h = \sqrt{y - \eta}$.

Taking into account (9), we rewrite equation (8) in the form

$$\hat{u}(\lambda, y) = \frac{1}{\pi} \frac{\partial}{\partial y} \int_0^y \sum_{k=0}^{\infty} \frac{(\lambda h)^{2k}}{(2k)!} \cdot \frac{\eta \hat{f}(\lambda, \eta)}{\sqrt{y - \eta}} d\eta$$

Taking into account the Parseval equality

$$\int_{-\infty}^{+\infty} |\hat{f}(\lambda, y)|^2 d\lambda = \int_{-\infty}^{+\infty} |f(x, y)|^2 dx$$

as well as the properties of the Fourier transform, we apply the inverse Fourier transform with respect to the variable x :

$$u^A(x, y) = \frac{1}{\pi} \frac{\partial}{\partial y} \int_0^y \sum_{k=0}^{\infty} \frac{(-1)^k}{(2k)!} \frac{\partial^{2k} f(x, \eta)}{\partial x^{2k}} \cdot \frac{\eta}{\sqrt{y - \eta}} d\eta. \quad (10)$$

Next, we proceed to recovering the function $u(x, y)$ on a uniform grid in a rectangular area $D = [a, b] \times [c, d]$. We find approximate solutions to problem (10) on this rectangle.

Let us rewrite the resulting inversion formula (10) for $k = 1$.

$$u^A(x, y) = \frac{1}{\pi} \frac{\partial}{\partial y} \left[\int_0^y \frac{f(x, \eta)}{\sqrt{y - \eta}} d\eta - \frac{1}{2} \int_0^y \sqrt{y - \eta} \frac{\partial^2 f(x, \eta)}{\partial x^2} d\eta \right], \quad (11)$$

The scheme of the algorithm for solving the problem is as follows:

Let's split the segment $[a, b]$ on the Ox axis and $[c, d]$ on the Oy axis into $n_x - 1$ and $n_y - 1$ parts, respectively. $x_i = a + (i - 1)h_x$, $y_j = b + (j - 1)h_y$.

Approximations of functions $u(x_i, y_j)$ will be denoted by u_{ij}^A :

$$u_{ij}^A = \frac{1}{\pi} \left[\frac{\bar{F}_{ij+1} - \bar{F}_{ij-1}}{2h_y} - \frac{\bar{Q}_{ij+1} - \bar{Q}_{ij-1}}{2h_y} \right]$$

where $\bar{F}(x, y_j) = \int_0^{y_j} F(x, \eta) d\eta$, $F(x, \eta) = \frac{f(x, \eta)}{\sqrt{y - \eta}}$, $\bar{Q}(x, y_j) = \frac{1}{2} \int_0^{y_j} Q(x, \eta) d\eta$,

$$Q(x, \eta) = \sqrt{y - \eta} \frac{\partial^2 f(x, \eta)}{\partial x^2}.$$

To calculate the first integral, we use nonstandard quadrature formulas that explicitly take into account the nature of the singularity. We represent the integrand in the form $F(x, y) = \varphi(x, y) \cdot \rho(x, y)$. Where $\varphi(x, y)$ is bounded in y and $\rho(x, y)$ is positive and integrable on the segment. Then we can consider $\rho(x, y)$ as a weight function and apply Gauss-Christoffel quadrature formulas or non-standard quadrature formulas.

The value of the function $\bar{Q}(x, y)$ is calculated using the trapezoid formula

$$\bar{Q}(x, y_j) = \frac{1}{2} \int_0^{y_j} Q(x, y_j) d\eta = \frac{h_y}{4} \sum_{k=1}^j (Q(x, y_1) + 2S + Q(x, y_j))$$

$$\text{where } S = Q(x, y_2) + Q(x, y_3) + \dots + Q(x, y_{j-1}), \quad h = \frac{y_j}{N_h - 1}.$$

2. NUMERICAL EXPERIMENT

We consider the mathematical phantom

$$f(x, y) = \frac{x'^2}{a^2} + \frac{y'^2}{b^2}$$

$$\begin{aligned} x' &= (x - x_0) \cos \varphi + (y - y_0) \sin \varphi \\ \text{where} \quad y' &= (x - x_0) \sin \varphi + (y - y_0) \cos \varphi \end{aligned}$$

Ellipse	Center	major axis	minor axis	φ
1	(0,0)	0.69	0.92	0
2	(0,-0.0184)	0.6624	0.874	0
3	(0.22,0)	0.11	0.31	-18°
4	(-0.22,0)	0.16	0.41	18°
5	(0,0.35)	0.21	0.25	0
6	(0,0.1)	0.046	0.046	0
7	(0,-0.1)	0.046	0.046	0
8	(-0.08,-0.605)	0.046	0.023	0
9	(0,-0.605)	0.023	0.023	0
10	(0.06,-0.605)	0.023	0.046	0

On Fig. Figure 1 shows a test image and reconstruction in different values of n_x, n_y using the above algorithm.

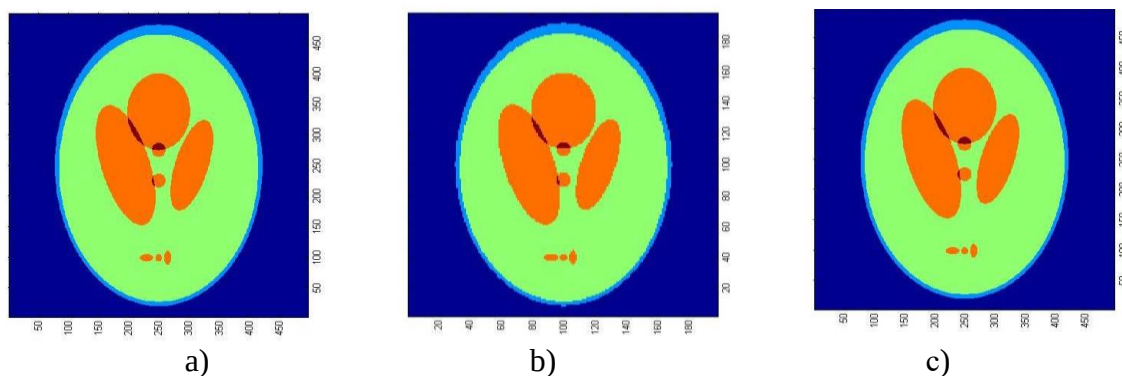


Fig.1 Test phantom recovery results. a) Original phantom b) Recovery when $n_x = n_y = 200$
c) Recovery when $n_x = n_y = 500$.

CONCLUSION

In this paper we consider the numerical solution of the problem of integral geometry in a strip on a family of curves of parabolic type, which is used in seismic exploration. An approximate solution is obtained using an explicit inversion formula for the Fourier image, the solution of the considered problem of integral geometry in the class of smooth finite functions.

References:

1. Lavrentiev M.M., Saveliev L.Ya. Operator theory and ill-posed problems. Institute of Mathematics. S.L. Sobolev. Novosibirsk. 2010. 912 p.
2. Romanov V.G. Some inverse problems for equations of hyperbolic type. Novosibirsk: Nauka, 1972. 164 p.
3. Begmatov A.Kh., Pirimbetov A.O., Seidullaev A.K. Problems of integral geometry in a strip on families of parabolic curves. Reports of the Academy of Sciences of the Higher School of the Russian Federation, 2012, Volume No. 2 (19), Pp. 6-15

4. Uteuliev N.U., Djaykov G.M., Seidullaev A.K. Inversion formula for the problem of integral geometry on families of parabolas. AIP Conference Proceedings 2365, 070004, 2021.
5. Begmatov A. Kh., Djaykov G. M. Reconstruction of a function from spherical means. // Reports of the Academy of Sciences of the Higher School of the Russian Federation. 2013. Vol.1. No. 20. Pp. 6-16.
6. Uteuliev N.U., Djaykov G.M., Yadgarov Sh.A. Modeling of Problem Reconstruction Function by its Integral Data on a Family of Circles. International Conference on Information Science and Communications Technologies: Applications, Trends and Opportunities, ICISCT 2021, Tashkent, Pages 1-4
7. Pirimbetov A.O., Uteuliev N.U., Djaykov G.M. Modeling the problem of integral geometry on a family of hyperbolic and spherical curves. Karakalpak Scientific Journal. Nukus, 2020, Volume 3, Issue 2, Pages 61-69.
8. Djaykov G.M., Arziev A.D. Analytical reconstruction of functions from their integral data on a family of straight line segments with a weight function in the form of polynomial. Science and Education. 2021, Volume 2, Pages 197-202.
9. Analytical and numerical reconstruction of internal structure of the objects in a family of straight-line segments. International Conference on Information Science and Communications Technologies: Applications, Trends and Opportunities, ICISCT 2019, Tashkent, Pages 1-4.
10. Tikhonov A.N., Arsenin V.Ya. Methods for solving ill-posed problems. M.: Nauka, 1979. 284 p.

Rezyume: *Parabolik egri chiziqlar turkumidagi chiziqdagi integral geometriya masalasining sonli yechimini ko'rib chiqamiz. Yassi chekli funksiyalar sinfida ko'rib chiqilayotgan integral geometriya masalasi yechimining Furiye tasviri uchun aniq inversiya formulasi yordamida taxminiy yechim olinadi.*

Резюме: *Рассматривается численное решение задачи интегральной геометрии в полосе на семействе параболических кривых. Приближенное решение получено с помощью явной формулы обращения образа Фурье решения рассматриваемой задачи интегральной геометрии в классе гладких конечных функций.*

Kalit so'zlar: *integral geometriya masalalari, Furiye konvertatsiyasi, sonli yechim, noto'g'ri qo'yilgan masalalar.*

Ключевые слова: *задачи интегральной геометрии, преобразование Фурье, численное решение, некорректные задачи.*

EFFECT OF COTTON FERTILIZER RATE ON SOIL AGROCHEMICAL PROPERTIES

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Summary: *Today, the productivity indicators of the irrigated soils of the Aral region are decreasing due to adverse ecological conditions, which are essential for plants. Fertilization norms of Chimboy-5018 and Sultan cotton varieties depending on soil fertility indicators and biological indicators of cotton varieties were developed.*

Key words: *soil, salinity, agrochemistry, humus, nitrogen, phosphorus, potassium, fertilizer.*

The agrochemical and chemical properties of the soil are important in making targeted decisions that allow for the organization of measures to increase the productivity and efficiency of the land used in agriculture. Agrochemical and chemical properties of soils are a set of chemical processes that determine the regime of nutrients in the soil and the conditions of plant nutrition, and are determined by the natural properties of soils and the state of cultivation [1].

As a result of the drying up of the Aral Sea, the increased amount of drought in this region leads to a sharp decrease in the nutrient areas that determine the productivity of irrigated agricultural soils. The amount and quality of the crop obtained from agriculture can be increased if the fertilizers are given to the soil on time. Before conducting the experiment, it is necessary to know the agrochemical, agrophysical, and mechanical properties of the soil and to carry out related agro-measures. Currently, one of the biggest problems in the agriculture of our republic is to restore, maintain and regularly increase soil fertility. In the maintenance of cultivated plants, it is necessary to analyze the changes in the agrochemical properties of the soil and ensure that the nutritional standards given to it are given in the norm. In our research, the agrochemical properties of the soil were determined during the maintenance of medium fiber cotton varieties. The amounts of total humus, gross nitrogen, phosphorus, active nitrogen, phosphorus and exchangeable potassium in the soil were studied.

The research work was carried out in the Republic of Karakalpakstan, Khojeli district, Kulap village of Karakalpakstan massif, office number 620 "Khojamurad Otambetov" farm.

When we analyzed the soil of the field agrochemically before conducting the research, it was found that the amount of humus in the soil was low, the active forms of nitrogen and phosphorus were moderately supplied in the soil layer, in the subsoil layer, and potassium was provided to a low level (Table 1).

Table 1

Agrochemical characteristics of the soil of the research area (at the beginning of the implementation period) (2022)

Soil layers, cm	General forms, %				Active forms		
	Humus	N	P	K	NO ₃	P ₂ O ₅	K ₂ O
0-30	0,775	0,068	0,142	1,70	2,8	21,4	130
30-50	0,580	0,052	0,120	1,48	2,2	18,8	122

The initial agrochemical details of the soil of the experimental field for the 2022 year were determined in the fall of 2021, and according to the results, the total humus content in the soil layer, i.e. 0-30 cm, is 0.775%, total nitrogen is 0.068% and phosphorus is 0.142%, and the soil under the soil layer, i.e. 30-50 in the cm layer, these indicators are proportionately 0.580; 0.052 and 0.120%.

The active forms of nutrients are 2.8 mg/kg of active nitrogen, 21.4 mg/kg of phosphorus, and 130 mg/kg of potassium in the tillage, i.e., 0-30 cm layer of the soil. It was found that active nitrogen is provided to a very low level, active phosphorus is provided to an average level in the

ploughing layer and to a low degree in the sub-ploughing layer, and exchangeable potassium is provided to a low level.

According to the average agrochemical results obtained from 5 points at the end of the season of the 2022 experiment for the 2023 experiment, the amount of total humus in the soil in the first option is 0.735% in the 0-30 cm layer, total nitrogen 0.060%, total phosphorus 0.127%, total humus in the 30-50 cm layer 0.466 %, total nitrogen was 0.041%, total phosphorus was 0.102%. The amount of active nitrogen in the soil is 3.90 mg/kg in the 0-30 cm layer, phosphorus 13.6 mg/kg, potassium 145 mg/kg, nitrogen from active forms in the 30-50 cm layer is 3.01 mg/kg, phosphorus 11.2 mg /kg, potassium 110 mg/kg, the amount of nutrients in the soil compared to other options, when the Sultan cotton variety feeding standard N₂₀₀P₁₄₀ K₁₀₀ is applied, the amount of humus is 0.741%, gross nitrogen 0.061, gross phosphorus 0.127, active nitrogen 4.10 mg/kg, phosphorus 13.8, potassium was 50 mg/kg, and in our variant, the amount of humus increased by 0.10%, total nitrogen by 0.1%, and total phosphorus by 0.1%, the amount of total phosphorus decreased by 0.02%, active nitrogen by 0.5 mg/kg, active phosphorus by 0.4 mg/kg, increased by 0.5% in the 0-30 cm layer compared to ezorate when the Sultan cotton variety was given in a ratio of 250:175:125, total phosphorus increased by 0.4 mg/kg, active nitrogen by 0.55, phosphorus by 0.4 mg/kg, and no change was noticed in potassium (Table 2).

From this, it can be concluded that the level of nitrogen supply of the soil of the research area is very low, phosphorus is average in the ploughing layer, and it is found in the low degree in the sub-ploughing layer and low in potassium.

Table 2

Agrochemical characteristics of the soil of the experimental field at the end of the period of operation

Variants	Cotton types	The norm of mineral fertilizer, kg/ga	Soil layer	Humus, %	General forms of NP, %		Active forms of NPK, mg/kg		
					N	P ₂ O ₅	NO ₃	P ₂ O ₅	K ₂ O
					%	%	mg/kg	mg/kg	mg/kg
1	Chimboy-5018	200:140:100	0-30	0,735	0,060	0,127	3,90	13,6	145
			30-50	0,466	0,041	0,102	3,01	11,2	110
2	Sulton	200:140:100	0-30	0,741	0,061	0,127	4,10	13,8	150
			30-50	0,473	0,043	0,103	2,90	11,8	116
3	Chimboy-5018	225:157,5:112,5	0-30	0,731	0,058	0,120	3,20	13,1	140
			30-50	0,470	0,040	0,101	2,61	10,8	105
4	Sulton	225:157,5:112,5	0-30	0,740	0,060	0,125	4,15	14,2	152
			30-50	0,473	0,042	0,100	3,38	12,1	120
5	Chimboy-5018	250:175:125	0-30	0,735	0,061	0,126	4,20	13,9	150
			30-50	0,465	0,041	0,102	3,45	12,0	122
6	Sulton	250:175:125	0-30	0,740	0,058	0,123	3,58	13,4	140
			30-50	0,473	0,039	0,101	2,70	11,0	110

From the obtained results, it can be concluded that the amount of nutrients in the soil was almost unchanged due to the annual use of mineral fertilizers, and the soil fertility did not decrease. In order to grow a high quality cotton crop, cotton requires a high amount of nitrogen, phosphorus and potassium fertilizers in these soils.

References:

1. Avliyokulov A.E. Prospects of the farming system of our country. Tashkent. "Navroz". 2013
2. Mambetnazarov B.S., Oteuliev J.B. Development of irrigation system of S-4727, Chimboy-5018 and Sultan cotton varieties in the conditions of meadow-alluvial soils of the Republic of Karakalpakstan/ Journal of science and education in Karakalpakstan. 2021 No. 1 (16). p.54-57
3. Saidova M.E. Modern approaches to the diagnosis of the ecological-biological condition of irrigated meadow-alluvial soils of the Aral Sea region (on the example of Amu Darya and Chimboy districts): Dissertation abstract of Doctor of Biological Sciences.- T.: 2019. p. 80

Rezyume: Bugungi kunda Orolbo'yi sug'oriladigan tuproqlarining hosildorlik ko'rsatkichlari o'simliklar uchun zarur bo'lgan noqulay ekologik sharoit tufayli pasayib bormoqda.

Chimboy-5018 va Sulton g'o'za navlarining tuproq unumdorlik ko'rsatkichlariga va g'o'za navlarining biologik ko'rsatkichlariga qarab o'g'itlash normalari ishlab chiqildi.

Резюме: *В настоящее время показатели продуктивности орошаемых почв Приаралья снижаются из-за неблагоприятных экологических условий, необходимых для растений. Разработаны нормы внесения удобрений сортов хлопчатника Чимбой-5018 и Султан в зависимости от показателей плодородия почвы и биологических показателей сортов хлопчатника.*

Kalit so'zlar: *tuproq, sho'rlanish, agrokimyo, chirindi, azot, fosfor, kaliy, o'g'it.*

Ключевые слова: *почва, засоление, агрохимия, гумус, азот, фосфор, калий, удобрение.*

ANALYTICAL AND NUMERICAL SOLUTION OF THE PROBLEM OF INTEGRAL GEOMETRY ON A FAMILY OF SEMICIRCLES AND PARABOLAS

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Summary: We consider problems of integral geometry in a strip on a family of curves of parabolic and spherical type. In the first part, a uniqueness theorem is proved and an explicit inversion formula for the Fourier image of the solution of the considered problem of integral geometry on a family of parabolas with a given weight function is obtained. In the second part, to solve the problem of integral geometry in a strip on a family of curves of spherical type, an algorithm based on Tikhonov's regularization is constructed.

Key words: problems of integral geometry, Fourier transform, Radon transform, uniqueness theorem.

Introduction

We denote $L_H = \{(x, y) : x \in R^1, 0 \leq y \leq H\}$.

Let us consider in the strip L_H the restoration of a function of two variables $u(x, y)$ if the integrals of it over the curves of the family $\{\Upsilon(x, y)\}$, where an arbitrary family curve is represented by the expression $\Upsilon(x, y) = \{(\xi, \eta) : (x - \xi)^2 + \eta = y, 0 \leq \eta \leq y \leq H\}$

$$\int_{\Upsilon(x, y)} g(x, \xi) u(\xi, \eta) d\xi = f(x, y), \quad (1)$$

In [1], the uniqueness of the solution of strongly ill-posed problems of integral geometry in a strip was considered. For the problem of integral geometry over families of paraboloids, inversion formulas in a half-space were obtained in [1]. In [2], a uniqueness theorem for the solution of the problem of integral geometry in a strip on parabolas with a weight function was proved using the technique of scales of Banach spaces.

In [3, 4], the problem of integral geometry of Volterra type with respect to a family of parabolas with a weight function having a singularity is studied. Estimates of the stability of the solution of the problem in Sobolev spaces are obtained, which shows its weak ill-posedness, as well as the inversion formula.

In [5], problems of integral geometry on families of parabolas are considered and their applications to seismic exploration problems are studied. An inversion formula for the problem of integral geometry on families of parabolas is obtained. Based on the idea of A.N. Tikhonov on the regularization of ill-posed problems, a sequence of approximate solutions of the exact solution of the problem is constructed.

In this paper, we consider problems of integral geometry in a strip on a family of curves of parabolic and spherical type with a given weight function. An explicit formula for the Fourier image of the solution of the considered problem of integral geometry in the class of smooth finite functions is obtained. For the numerical solution of the problem posed, an algorithm was constructed and a numerical reconstruction of the function on a family of semicircles was carried out; numerical and graphical results of numerical experiments on the restoration of functions were presented

Proof of the uniqueness theorem for the problem under consideration

Lemma. Let the function $f(x, y)$ be known for all (x, y) from the strip L_H , the weight function $g(x, y, \xi, \eta) = \text{sign}(x - \xi) \cdot (y - \eta)$.

Then the solution of equation (1) in the class of twice continuously differentiable finite functions supported in the strip L_H is unique.

Proof. We rewrite equation (1) in the following form:

$$\int_0^y (u(x-h, \eta) + u(x+h, \eta)) h d\eta = f(x, y), \quad (2)$$

where $h = \sqrt{y - \eta}$.

Let us apply to both parts of equation (2) the Fourier transform with respect to the variable x :

$$\begin{aligned} \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{+\infty} e^{i\lambda x} f(x, y) dx &= \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{+\infty} e^{i\lambda x} \left[\int_0^y (u(x-h, \eta) + u(x+h, \eta)) h d\eta \right] dx = \\ &= \frac{1}{\sqrt{2\pi}} \int_0^y \int_{-\infty}^{+\infty} e^{i\lambda x} (u(x-h, \eta) + u(x+h, \eta)) dx d\eta, \\ \int_0^y \sqrt{y-\eta} \cos(\lambda \sqrt{y-\eta}) \hat{u}(\lambda, \eta) d\eta &= \hat{f}(\lambda, y). \end{aligned} \quad (3)$$

We differentiate both parts of equation (3) with respect to the variable y :

$$\int_0^y \frac{\cos(\lambda \sqrt{y-\eta}) + \lambda \sqrt{y-\eta} \sin(\lambda \sqrt{y-\eta})}{2\sqrt{y-\eta}} \hat{u}(\lambda, \eta) d\eta = \frac{\partial \hat{f}(\lambda, y)}{\partial y}$$

We have obtained the Volterra integral equation of the first kind with respect to the function $\hat{u}(\lambda, y)$

$$\int_0^y \hat{u}(\lambda, \eta) \cdot \frac{H(\lambda, y, \eta)}{\sqrt{y-\eta}} d\eta = \hat{f}_1(\lambda, y), \quad (1)$$

where $\hat{f}_1(\lambda, y) = \frac{\partial \hat{f}(\lambda, y)}{\partial y}$

$$H(\lambda, y, \eta) = \frac{1}{2} \cos(\lambda \sqrt{y-\eta}) + \frac{\lambda \sqrt{y-\eta}}{2} \sin(\lambda \sqrt{y-\eta}). \quad (2)$$

Here and everywhere below, $\hat{u}(\lambda, y)$ and $\hat{f}(\lambda, y)$ denote the Fourier transforms with respect to x of the functions $u(x, y)$ and $f(x, y)$, respectively. Equation (4) has an integrable singularity on the diagonal $y = \eta$. As can be seen from formula (5), the function $H(\lambda, y, \eta)$ is continuous in the region $0 < \eta \leq y < H$ and $H(\lambda, y, y) = \frac{1}{2} \neq 0$.

Using expression (5) for the function $H(\lambda, y, \eta)$ it is easy to show that the first-order partial derivative with respect to the variable y of this function has a weak singularity on the diagonal $y = \eta$:

$$H'_y(\lambda, y, \eta) = \frac{\lambda^2 \sqrt{y-\eta} \cos(\lambda \sqrt{y-\eta}) + \lambda \sin(\lambda \sqrt{y-\eta})}{8\sqrt{y-\eta}}.$$

We can reduce equation (4) to the Volterra equation of the second kind using the Abel trick [6]. To do this, we multiply equality (4) by $(t-y)^{-1/2}$ and integrate over y in the range from zero to t . Changing the order of integration in the resulting iterated integral, we find

$$\int_0^t \frac{\hat{f}_1(\lambda, y)}{\sqrt{t-y}} dy = \int_0^t \frac{dy}{\sqrt{t-y}} \int_0^y \hat{u}(\lambda, \eta) H(\lambda, y, \eta) \frac{d\eta}{\sqrt{y-\eta}} = \int_0^t \hat{u}(\lambda, \eta) \left[\int_\eta^t \frac{H(\lambda, y, \eta)}{\sqrt{t-y}\sqrt{y-\eta}} dy \right] d\eta \quad (6)$$

Here, under the integral in square brackets, the function

$$T(t, \eta, \lambda) = \int_\eta^t \frac{H(\lambda, y, \eta)}{\sqrt{t-y}\sqrt{y-\eta}} dy$$

has a finite non-zero value at $t = \eta$. To verify this, we make the change of variable

$$y = t \cos^2 \varphi + \eta \sin^2 \varphi.$$

Then the function $T(t, \eta, \lambda)$ will take the following form:

$$T(\lambda, t, \eta) = 2 \int_0^{\pi/2} H(\lambda, t \cos^2 \varphi + \eta \sin^2 \varphi, \eta) d\varphi, \quad (3)$$

where

$$H(\lambda, t \cos^2 \varphi + \eta \sin^2 \varphi, \eta) = \frac{1}{2} \cos(\lambda \sqrt{t-\eta} \cos \varphi) + \frac{\lambda \sqrt{t-\eta} \cos \varphi}{2} \sin(\lambda \sqrt{t-\eta} \cos \varphi).$$

Hence, setting $\eta = t$, we find

$$T(\lambda, t, t) = \frac{\pi}{4} \neq 0.$$

Using formula (7), it is also easy to verify that the function $T(\lambda, t, \eta)$ has a continuous derivative with respect to the variable t everywhere except for the diagonal $\eta = t$. On the diagonal, $T_t(\lambda, t, \eta)$ has an integrable singularity of the form $(t-\eta)^{-1/2}$. Differentiating equality (6) and dividing by $T(\lambda, t, t)$, we obtain for finding $\hat{u}(\lambda, t)$ for each fixed λ the Volterra integral equation of the second kind

$$\hat{u}(\lambda, t) + \int_0^t \hat{u}(\lambda, \eta) \frac{T_t(\lambda, t, t)}{T(\lambda, t, t)} d\eta = \frac{1}{T(\lambda, t, t)} \frac{\partial}{\partial t} \int_0^t \frac{\hat{f}_1(\lambda, y)}{\sqrt{t-y}} dy \quad (4)$$

with a kernel having an integrable singularity on the diagonal. As follows from the general theory, the solution of such equations is unique [6].

INVERSION FORMULA

Theorem. Let the function $f(x, y)$ be known in the strip $L_H = \{(x, y) : x \in R^1, 0 \leq y \leq H < \infty\}$, the weight function $g(x, y, \xi, \eta) = \text{sign}(x - \xi) \cdot (y - \eta)$. Then the solution of equation (1) in the class of twice continuously differentiable finite functions supported in the strip L_H is unique and the representation takes place

$$\hat{u}(\lambda, y) = \frac{1}{\pi} \frac{\partial^2}{\partial y^2} \int_0^y \int_0^\eta \frac{e^{\frac{\lambda^2}{2}(y-\eta)} \text{ch}(\lambda \sqrt{\eta-t})}{\sqrt{\eta-t}} \cdot \frac{\partial \hat{f}(\lambda, t)}{\partial t} dt d\eta$$

Proof. We write equation (1), as before, in the form

$$\int_0^y (u(x-h, \eta) + u(x+h, \eta)) h d\eta = f(x, y), \quad (9)$$

where $h = \sqrt{y-\eta}$.

Now apply to both parts of equation (9) the Fourier transform with respect to the variable x . Taking into account the calculations at the beginning of the proof of the proposition, we write:

$$\int_0^y \frac{\cos(\lambda\sqrt{y-\eta}) - \lambda\sqrt{y-\eta} \sin(\lambda\sqrt{y-\eta})}{2\sqrt{y-\eta}} \hat{u}(\lambda, \eta) d\eta = \hat{f}_1(\lambda, y). \quad (10)$$

where $\hat{f}_1(\lambda, y) = \frac{\partial \hat{f}(\lambda, y)}{\partial y}$.

We accept the Laplace transform with respect to the variable y :

$$\int_0^{+\infty} e^{-py} \hat{f}_1(\lambda, y) dy = \int_0^{+\infty} e^{-py} \int_0^y \frac{\cos(\lambda\sqrt{y-\eta}) - \lambda\sqrt{y-\eta} \sin(\lambda\sqrt{y-\eta})}{2\sqrt{y-\eta}} \hat{u}(\lambda, \eta) d\eta dy$$

By changing the order of integration and making the substitution $y - \eta = \tau$

$$\tilde{\hat{f}}(\lambda, p) = \int_0^{+\infty} e^{-p\tau} \frac{\cos(\lambda\sqrt{\tau}) - \lambda\sqrt{\tau} \sin(\lambda\sqrt{\tau})}{2\sqrt{\tau}} d\tau \int_0^{+\infty} e^{-p\eta} \hat{u}(\lambda, \eta) d\eta = I(\lambda, p) \cdot \tilde{\hat{u}}(\lambda, p) \quad (11)$$

where

$$I(\lambda, p) = \int_0^{+\infty} e^{-p\tau} \frac{\cos(\lambda\sqrt{\tau}) - \lambda\sqrt{\tau} \sin(\lambda\sqrt{\tau})}{2\sqrt{\tau}} d\tau = \frac{\sqrt{\pi} e^{-\frac{\lambda^2}{4p}} \left(p - \frac{\lambda^2}{2} \right)}{2p^{3/2}}$$

Taking into account the value of the last integral, we rewrite equation (11) in the following form

$$\tilde{\hat{u}}(\lambda, p) = \frac{2}{\sqrt{\pi}} p^2 \cdot \frac{1}{\sqrt{p}} \frac{\tilde{\hat{f}}(\lambda, p)}{p - \frac{\lambda^2}{2}}$$

Using the properties of the Laplace transform

$$L^{-1} \left[\frac{\tilde{\hat{f}}(\lambda, p)}{\sqrt{p}} \right] = \int_0^y \frac{\hat{f}(\lambda, \eta)}{\sqrt{y-\eta}} d\eta, \quad L^{-1} \left[\frac{\tilde{\hat{f}}(\lambda, p)}{p+a} \right] = e^{-ay} \int_0^y e^{a\eta} \hat{f}(\lambda, \eta) d\eta$$

We have

$$\hat{u}(\lambda, y) = \frac{1}{\pi} \frac{\partial^2}{\partial y^2} \int_0^y \int_0^\eta e^{\frac{\lambda^2}{2}(y-\eta)} \frac{\operatorname{ch}(\lambda\sqrt{\eta-t})}{\sqrt{\eta-t}} \cdot \frac{\partial \hat{f}(\lambda, t)}{\partial t} dt d\eta$$

Construction of approximate solutions on a family of semicircles

Problem 2. We consider in the strip L_H the restoration of a function of two variables $u(x, y)$ if the integrals of it over the curves of the family $\{\Upsilon_1(x, y)\}$ are known.

$$\int_{\Upsilon_1(x, y)} g(x, \xi) u(\xi, \eta) d\xi = f(x, y), \quad (12)$$

where an arbitrary family curve is represented by the expression

$$\Upsilon_1(x, y) = \left\{ (\xi, \eta) : (x - \xi)^2 + \eta^2 = y^2, 0 \leq \eta \leq y \leq H \right\}.$$

Similar results on the inversion of the spherical Radon transform are presented in [7-9].

In [7], the solution to equation (12) was obtained for the Fourier image in the class of smooth finite functions in the following form:

$$\hat{u}(\lambda, y) = \frac{1}{\pi y} \frac{\partial}{\partial y} \int_0^y \frac{\eta ch\left(\lambda \sqrt{y^2 - \eta^2}\right)}{\sqrt{y^2 - \eta^2}} \cdot \hat{f}(\lambda, \eta) d\eta. \quad (13)$$

In [8], a numerical solution of equation (13) was considered by expanding $ch\left(\lambda \sqrt{y^2 - \eta^2}\right)$ into a Taylor series and applying the inverse Fourier transform

In this paper, we consider the construction of an approximate solution to equation (12) based on the idea of A.N. Tikhonov on the regularization of ill-posed problems [10]. To reduce the high

frequencies λ from equation (13), we multiply the function $\frac{\eta ch\left(\lambda \sqrt{y^2 - \eta^2}\right)}{\sqrt{y^2 - \eta^2}}$ by the corresponding

multiplier $M(\lambda, \alpha)$ by the constitutive relation

$$M(\lambda, \alpha) = \begin{cases} 1, & |\lambda| \leq \lambda_0 \\ 0, & |\lambda| > \lambda_0 \end{cases}$$

Then the solution has the following form

$$u_1(x, y) = \frac{1}{\pi y} \frac{\partial}{\partial y} \int_0^y \int_{-\lambda_0}^{\lambda_0} \frac{\eta M(\lambda, \alpha) \cdot ch\left(\lambda \sqrt{y^2 - \eta^2}\right) \cdot e^{-i\lambda x}}{\sqrt{y^2 - \eta^2}} \cdot \hat{f}(\lambda, \eta) d\lambda d\eta$$

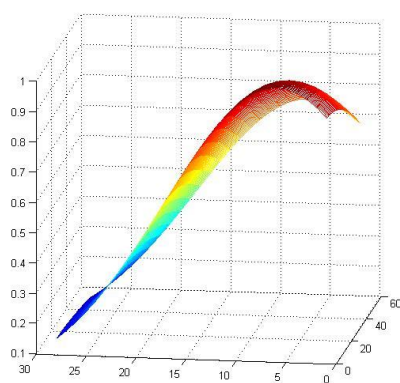
For the test function, we use the function

$$u = e^{-(x^2 + y^2)}$$

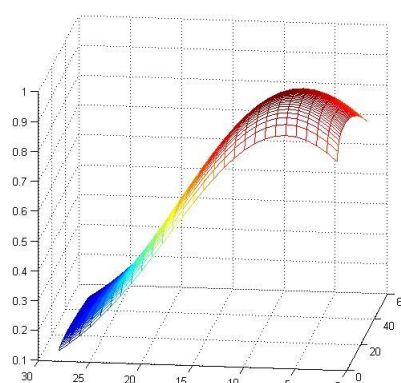
For a numerical experiment we divide the segment $[a, b]$ on the Ox axis and $[c, d]$ on the Oy axis into $n_x - 1$ and $n_y - 1$ parts, respectively. $x_i = a + (i-1)h_x$, $y_j = b + (j-1)h_y$.

For the inner integral we use the Discrete Fourier Transform, for the outer integral we use non-standard quadrature formulas that explicitly take into account the nature of the singularity.

We present the results in the following Fig.2 for $n_x = 32$, $n_y = 50$.



a) Exact solution



b) Approximate solution

Fig.2. Recovery results

References:

1. Romanov V.G. Some inverse problems for equations of hyperbolic type. Novosibirsk: Nauka, 1972. p. 164.
2. A. L. Bukhgeim, On some problems of integral geometry. Sib. mat. journal No. 1, 1972, Vol. 13.
3. Begmatov Akr. Kh. Two classes of weakly ill-posed problems of integral geometry on the plane. Sib. mat. journal 1995, Vol. 36, No. 2.
4. Begmatov A. Kh. On the uniqueness of the solution of the problem of integral geometry of Volterra type. Reports of the Academy of Sciences. 2009, Vol. 427, 4, pp. 439-441.

5. N.U. Uteuliev, G.M. Djaykov, A.K. Seidullev. Inversion formula for the problem of integral geometry on families of parabolas. AIP Conference Proceedings July 2021. 2365(1):070004. DOI:[10.1063/5.0056852](https://doi.org/10.1063/5.0056852)
6. Triкоми F. Integral Equations. - М.: Publishing house of foreign literature, 1960.
7. Begmatov A. Kh., Djaykov G. M. On the restoration of a function from spherical means. // Reports of the Academy of Sciences of the Higher School of the Russian Federation. 2013. Vol.1. No. 20. Pp. 6-16.
8. Pirimbetov A.O., Uteuliev N.U., Djaykov G.M. Modeling the problem of integral geometry on a family of hyperbolic and spherical curves. Karakalpak Scientific Journal. Nukus, 2020, Volume 3, Issue 2, Pages 61-69.
9. Uteuliev N.U., Djaykov G.M., Yadgarov Sh.A. Modeling of Problem Reconstruction Function by its Integral Data on a Family of Circles. International Conference on Information Science and Communications Technologies: Applications, Trends and Opportunities, ICISCT 2021, Tashkent, Pages 1-4.
10. Tikhonov A.N., Arsenin V.Ya. Methods for solving ill-posed problems. M.: Nauka, 1979. 284 p.

Rezyume: *Parabolik va sferik tipdagi egri chiziqlar turkumidagi chiziqdagi integral geometriya masalalarini ko'rib chiqamiz. Birinchi qismda yagonalik teoremasi isbotlangan va berilgan og'irlik funksiyali parabolalar turkumidagi ko'rib chiqilayotgan integral geometriya masalasi yechimining Furiye tasviri uchun aniq inversiya formulasi olingan. Ikkinchi qismda sferik tipdagi egri chiziqlar turkumidagi chiziqdagi integral geometriya masalasini yechish uchun Tixonovning regulizatsiyasiga asoslangan algoritm tuziladi.*

Резюме: *Рассматриваются задачи интегральной геометрии в полосе на семействе кривых параболического и сферического типа. В первой части доказана теорема единственности и получена явная формула обращения образа Фурье решения рассматриваемой задачи интегральной геометрии на семействе парабол с заданной весовой функцией. Во второй части для решения задачи интегральной геометрии в полосе на семействе кривых сферического типа строится алгоритм, основанный на регуляризации Тихонова.*

Kalit so'zlar: *integral geometriya masalalari, Furiye transformatsiyasi, Radon transformatsiyasi, yagonalik teoremasi.*

Ключевые слова: *задачи интегральной геометрии, преобразование Фурье, преобразование Радона, теорема единственности.*

UDK: 581.6

MEDICINAL PLANTS OF THE FABACEAE FAMILY IN THE FLORA OF KARAKALPAKSTAN

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Summary: The flora of Karakalpakstan consists about 1110 species [4] of vascular plants due to its biogeographical features, which make a center of medicinal plant diversity. About species of medicinal plants has been used in traditional medicine, but according to last research we can confirm that in Karakalpakstan there are medicinal 444 species growing [1].

Keywords: Karakalpakstan, medicinal plants, Fabaceae, life form, folk medicine.

INTRODUCTION OF RESULTS AND DISCUSSION

At the moment, the development of the pharmaceutical industry and the production of natural medicines based on medicinal plant materials is one of the urgent problems.

In the field of medical care, research on medicinal plants of traditional medicine and wild flora is of great importance in order to obtain new effective medicinal preparations or to identify new sources of known biologically active medicinal substances, since today a significant part of medicinal preparations is obtained or manufactured from plant materials. Of the number of official medicines, the share of medicines derived from plants accounts for more than 60%.

Many scientists conducted their scientific studies of the flora of Karakalpakstan, for example, in his work B. Sherbaev [4] provides information on 63 species from 19 genera of the *Fabaceae* family. According to Bakhiev A. et al.[2] information is provided on 22 species (Amu Darya delta 13 species, Kyzyl Kum 6 species, Ustyurt 4 species) belonging to 16 genera.

MATERIALS AND METHODS

In determining the Latin names of families, genera and species of medicinal plants distributed in the foothills of the Karakalpakstan: S.K. Cherepanov [7] also published the www.plantarium.ru [8], and The Plant List (www.theplantlist.org) [9]. In determining: Plants determiner of Central Asia [10], data were used.

RESULTS AND DISCUSSION

We found that in the territory of Karakalpakstan 444 species of medicinal plants grow, belonging to 241 genera from 69 families. As a result of the processing of available data, it was found that the leading family is *Fabaceae*, which includes 32 species from 17 genera[1].

When studying their life forms, therophytes include 6 families, 11 species from the *Fabaceae* family, hemicryptophytes include 8 families, 13 species, nano- and microfanerophytes include 5 families and 7 species, chamephytes - 1 family, 1 species.

The number of species and genera of the Fabaceae family growing in the regions of Karakalpakstan

№	Genera	Number of species	Herbarium
1.	Alhagi Garneb.	4	specimen voucher G.Abdiniyazova 30.06.2015
2.	Ammodendron Fisch	3	specimen voucher G.Abdiniyazova 26.06.2014
3.	Ammothamnus Bunge	1	specimen voucher G.Abdiniyazova 26.06.2014
4.	Amoria repens (L.) C.Presl	1	specimen voucher A.Baxiev,25.05.1978
5.	Astragalus L.	8	specimen voucher B.Saribayev 28.06.1988 specimen voucher G.Abdiniyazova 26.06.2014
6.	Caragana Lam.	1	specimen voucher B.Saribayev 28.06.1988
7.	Eremosparton Fisch. & C.A.Mey.	1	specimen voucher B.Saribayev 28.06.1988
8.	Glycyrrhiza L.	2	specimen voucher A.Baxiev,25.05.1978 specimen voucher G.Abdiniyazova 26.06.2015
9.	Halimodendron Fisch. ex DC.	1	specimen voucher A.Baxiev,25.05.1978

10.	<i>Lotus</i> L.	1	specimen voucher A.Baxiev,25.05.1978
11.	<i>Medicago</i> L.	2	specimen voucher A.Baxiev,25.05.1978
12.	<i>Melilotus</i> Mill.	2	specimen voucher A.Baxiev,25.05.1978
13.	<i>Meristotropis</i> Fisch. & C.A. Mey.	1	specimen voucher G.Abdiniyazova 26.06.2014
14.	<i>Pseudosophora</i> L.	1	specimen voucher G.Abdiniyazova 26.06.2014
15.	<i>Smirnowia</i> DC.	1	specimen voucher G.Abdiniyazova 26.06.2014
16.	<i>Sphaerophysa</i> DC.	1	specimen voucher A.Baxiev,25.05.1978
17.	<i>Vicia</i> L.	1	specimen voucher A.Baxiev,25.05.1978

In the general flora of the study area, 32 species of *Astragalus* L. from the Fabaceae family were found [4], of which 8 were medicinal plants[1].

According to the website "The Plant List" the genus contains more than 2480 types[9]. Basic life forms shrubs, semi-shrubs and herbs. They are rich in alkaloids and are used against bacteria, for skin diseases, as an antiemetic, as an expectorant, and for other diseases [1], [5,6]. Among them: *Astragalus chiwensis* - on rocky areas, Turan region, *Astragalus erioceras* - on sandy areas, Turan region, *Astragalus flexus* - on sandy, rocky, gypsum lands, Euro-Siberia to Central Asia, *Astragalus tribuloides* - on rocky areas, Iran- The Central Range of Asia, *Astragalus villosissimus* - grows in halophytic, sandy, rocky places and its range extends to the Ancient Mediterranean. *Astragalus* strengthens the immune system[5].

Alhagi pseudalhagi - (yantok - Uzbek, jantak - Karakalpak) is a perennial herb belonging to the legume family. In scientific sources [1;2;5;6], a decoction prepared from the aerial part of the plant was used as a cough remedy, an antiperspirant, and a decoction of the root was used for diseases of the bladder, urine, and bile. The doctor found that the flower of the plant works well when consumed as a tea for diabetes and anemia. In addition, other species of the alhagi family, *A. canescens*, *A. persarum*, are widely used in medicine.

Melilotus L. 2 species of this genus grow in our region. They are: *Melilotus albus* Medik., *Melilotus officinalis* (L.) Pall.[1].

Melilotus albus Medik. - for fever, catarrhal diseases, as a diuretic, wound healing, roots for thrombosis, infusion, decoction-lactogenic, for ascites. Shows activity against *Staphylococcus aureus*, *Escherichia coli*. Leaves, flowers. Ointment-wound healing[5;6].

Melilotus officinalis (L.) Pall.- as a medicinal plant aromatic, emollient, roots eaten raw and boiled. In folk medicine, laxative, included in emollient fees, for gynecological diseases, infusion, decoction - expectorant, sedative, antibacterial, for flatulence, diseases of the upper respiratory tract and lungs, hypertension. Outwardly infusion, decoction (baths, compresses, ointments, plasters), as an irritant, distracting anti-inflammatory, cleansing, articular rheumatism[5].

Ammodendron L.- Three species of the genus are used as medicinal plants in the region: *Ammodendron conollyi* Boiss, *A.eichwaldii* Ledeb., *A.karelinii* Fisch. & C.A.Mey.[1].

Glycyrrhiza glabra L. – (boyan– kk). Sem. *Fabaceae* is a perennial plant. A decoction, powder and extract of the roots in folk medicine are used as a diaphoretic and laxative, for coughs and pains in the chest and throat, for the treatment of the respiratory tract, whooping cough, also for gastrointestinal diseases, dysentery, diseases of the bladder, kidneys, as an expectorant and in other diseases. In scientific medicine, preparations of licorice root (dry and thick extracts, syrup, breast powder), as well as roots in the composition of various teas and complex powders, are used as a mild laxative, expectorant, emollient and diuretic, as well as a means of regulating water salt metabolism [3, 4, 5]. The roots and rhizomes of the plant contain glucose, fructose, sucrose, maltose, starch, organic acids, essential oils, glycyrrhizic acid, phenolcarboxylic acids and their derivatives, coumarins, tannins, flavonoids, higher aliphatic hydrocarbons and alcohols [6].

The distribution areas and resources of many of these species are quite substantial. The results of our research and field trips showed that in the conditions of Karakalpakstan it is possible to procure medicinal raw materials of plants of many species of this family.

References:

1. Abdiniyazova GJ. Medicinal plants of republic Karakalpakstan. Tashkent, Bayoz. 2017;168.

2. Bakhiev A. Butov KN, Dauletmuratov S. Medicinal plants of Karakalpakstan. Tashkent: Fan.- 1983.- 136 p.
3. Dauletmuratov S.D. Resources of medicinal plants of Karakalpakstan and their protection. Karakalpakstan: Nukus, 1991. - 179p.
4. Sherbaev B. Flora and vegetation of Karakalpakstan. Nukus: Karakalpakstan. 1988.- 304 p.
5. Plant resources of the USSR. - Leningrad: Nauka, 1984. Vol. 1. - P. 220-250
6. Khodzhimatov K.Kh., Khodzhimatov O.K., Sobirov U.A. Collection of rules for the use of objects of medicinal, food and technical plants. - Tashkent: Yangi asr avdodi, 2009. - 172 p.
7. Czerepanov SK. Vascular plants of Russia and Adjacent states (the former USSR). Sankt – Petersburg. Semya. 1995;95:812.
8. www.plantarium.ru
9. www.theplantlist.org
10. Plants determiner of Central Asia. Tashkent. Fan. 1968-1993;1–10.

Rezyume: *Ushbu maqolada Fabaceae oilasinga mansub Qoraqalpog'istonda o'sadigan tabiiy dorivor o'simliklarning tarqalish areallari, ishlatilishi keng mazmunda tahlil qilingan.*

Резюме: *В статье изложены результаты исследования по изучению ареалов распространения и использования лекарственных растений семейства Fabaceae в республике Каракалпакстан.*

Kalit so'zlar: *Qoraqalpog'iston, dorivor o'simliklar, Fabaceae, hayotiy shakllari, xalq tabobati.*

Ключевые слова: *Каракалпакстан, лекарственная растения, Fabaceae, жизненная форма, народная медицина*

**PESTS OF JERUSALEM ARTICHOKE (*HELIANTHUS TUBEROSUS*) AND CASSIA
SENNA (*CASSIA ACUTIFOLIA*) PLANTS**

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Summary: *This article provides information about insect pests collected from plantations of medicinal plants of the Republic of Karakalpakstan.*

Key words: *phytophage, agrocnosis, polyphage, epidermis, morphological, pupae, exhauster, entomophage, phytophage*

Actuality of the topic.

Climate change, soil degradation, desertification, the establishment of industrial zones around the city, the negative impact of anthropogenic factors on nature, especially the increase in the number of dangerous pests in agricultural crops, and the increasing impact on productivity are of concern to the world community [22]. In this regard, it is important to study the biology, life cycle and ecological characteristics of pests of medicinal plants (phytophages) and their entomophages.

In recent years, the diversity of species in agrocnoses has increased due to the introduction of invasive species spreading under the influence of natural and anthropogenic factors into our republic and their adaptation to crops [3; 12; 13; 19; 23]. As a result, the economic damage caused by pests is increasing, which is evident in the deterioration of the quality of biological products and its export. At this point, it is scientifically and practically important to determine the distribution of pests throughout the region, to determine the fauna of vegetable and fruit crops insects, to justify their ecology, and to further improve the methods of biological control against harmful species [14; 15; 20].

Medicinal plants are at risk of extinction due to serious pest insects, diseases, extensive cutting of plants by humans, reduction of forests, extensive use of natural resources, etc. [6; 7]. Therefore, it was necessary to carefully study the cultivation of medicinal plants. Information about pests of medicinal plants is poorly covered in the literature, including research on pests of medicinal plants in the north-western part of the republic has not been conducted. 40-45 major pests of medicinal plants have been recorded around the world, which destroy 50-60% of productivity [8; 9; 21; 23; 24].

Based on the needs of the population in our republic, based on pharmaceutical and market requirements, the cultivation of medicinal plants is growing year by year. In this regard, for example, in the territory of the Republic of Karakalpakstan, the cultivated areas of medicinal plants have expanded, and hundreds of new farms specializing in this field have been established. Based on these tasks, among other things, a comprehensive review of the species composition of pests in the regions of the republic where vegetable and fruit products are grown, revealing the geographical distribution and biological characteristics of invasive species, is considered one of the urgent tasks of today.

Researches were carried out within the framework of Law of the Republic of Uzbekistan "On Protection of Agricultural Plants from Pests, Diseases and Weeds" dated August 31, 2000, Decree of the President of the Republic of Uzbekistan dated October 24, 2016 "On Measures to Improve the System of Plant Protection and Agrochemical Services to Agriculture" No. 2640, the Decision of the Republic of Uzbekistan dated August 31, 2018 "On Plant Quarantine" [1; 2; 3].

Materials and methods of the research. During 2021-2022, our experimental research work was carried out in Bozatau District Aral Sea National Nature Park, Karakalpak State University "Qutli Makon Experimental Site" and various agrocnoses and natural landscapes. Our research work related to the collection of insects in determining the species composition of pests of

medicinal plants was carried out in the plantations of "Cassia senna (*Cassia acutifolia*)", "Jerusalem artichoke (*Helianthus tuberosus*)" and other plantations (Fig. 1).



Figure 1. Research object (Bozatau district Aral Sea National Nature Park)

Methods of A.N. Kirichenko (1957), G.N. Gornostaev, (1970), M.A. Kozlov and E.M. Ninburg (1971), I.K. Lopatin (1988), V.B. Golub and others (2012) were used in the collection and faunistic analysis of insects, as well as in the study of morphological aspects and ecological characteristics of phytophages and entomophages [4; 5; 10; 11; 16; 17; 18]. When identifying the types of insects, morphological characters (external structure, size, color, structure of the head, genital organ) were determined. We also used generally accepted traditional methods based on our technical and economic capabilities. An entomological net, an insect trap (illuminated, with a screen), a gauze insulator and an exhaustor were used to collect insects (Fig. 2).



Figure 2. Methods of collecting insects

A. Entomological trap	B. Exhaustor	C. Insect trap
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The climatic conditions of the north-western region of Uzbekistan are very favorable for the spread and development of phytophages of medicinal plants. Along with plantations of medicinal plants, vegetable crops are grown here. Taking this into account, the species composition of pests was collected from the plantations of cassia senna (*Cassia acutifolia*), Jerusalem artichoke (*Helianthus tuberosus*) during 2021. The following types of insects were recorded in the collected materials.

Group COLEOPTERA (Stiff-winged).

Family Curculionidae (long-nosed beetles).

Sciaphilus Schönherr, generation 1823;

Sciaphilus asperatus (Bonsdorff, 1785) (root gray long-nosed beetle) is 5-6 mm in size, black, covered with gray-yellow scales that mask the main color, mandible is convex, wings of the veil are not developed, so it cannot fly, legs and whiskers are pale. Eggs are 0.65 mm in size, yellowish white, shiny. The larva is 6-7 mm, yellowish, head yellow, legless. The length of the pupae is 5.5-6 mm, covered with white, sparse hairs. Only females develop parthenogenetically. In our study, ***Sciaphilus asperatus*** was active in the evening and hid in the soil on the plant base

during the day. It lays eggs in groups of 2-3 (60-70 pieces). It secretes mucus to its eggs, and it dries in the air and serves as a protective instrument. The egg-laying period of the root gray long-nosed beetle lasts up to two months. During this period, it lays about 400-500 eggs.

Hatched larvae enter the soil after 10-14 days and feed first on the roots of young seedlings and then on large roots. The main part of the larvae is located at a distance of 3-15 cm from the center of the plant at a depth of 4-6 cm. Larvae develop for a month and turn into pupae at the end of June. The incubation period lasts two weeks. A beetle emerges from the pupae in July. They can lay eggs. Hatched larvae migrate to soil for wintering. This is in September. Some of them can live for 2-3 years while maintaining the ability to lay eggs. Thus, the larvae of *Sciaphilus asperatus* damage the root of the plant, and the beetle damages the leaf.

Anthonomus GERMAR, generation 1817;

Anthonomus rubi HERBST, 1795 (flower-eating beetle). These beetles are called "safflower". Because their larvae are found in flower buds, seeds and fruits.

Family Chrysomelidae (Leaf Eaters);

***Chrysolina* MOTSCHULSKY, generation 1860**

Chrysolina herbacea (DUFTSCHMID, 1825) (green leaf-eating beetle). The size of the beetle is 10 mm green metallic. Beetles and larvae eat the edges of the leaves and pierce the leaf plate.

***Chaetocnema* Stephens, generation 1831**

Chaetocnema hortensis (Geoffroy 1880) is a small beetle, 1.6 mm long. It feeds on the leaves of plants and is one of the main pests.

Chaetocnema breviscula Fald. Length 1.5 mm. Females are slightly larger than males. The body has a short oval shape and is dark green in color. Adults emerge in early spring at 8-9°C well before beet germination and feed on weeds. It is active mainly during the hot period of the day. In the mornings and evenings are in sheltered places. The base of the legs and antennae is yellow-brown. Whiskers have 11 segments.

Before mating, the beetle settles on the beet plant and feeds on the underlying leaf tissue. They mate and lay eggs from the beginning of May. The larva is up to 4.4 mm in size, white, head and legs are brown-yellow. The pupae is white. The emergence of the first generation of beetles occurs in June-July, and the second in August-September. In autumn, after feeding, the beetles move to the forests for wintering, some of them remain to winter in the fields.

Tenebrionidae LATREILLE, 1802

Opatrum sabulosum (LINNAEUS, 1761) Sand beetle - brown soil color, body 8 cm long. Winters in the soil. It lays eggs in the surface layer of the soil in early spring. It causes great damage to medicinal plants.

Family Elateridae (Stagnant beetles);

generation *Aeloides*;

Aeloides crucifer F. - larvae of this species were found to damage underground parts of cabbage in soil samples. Their hard body can easily be distinguished from the larvae of other insect species. The length of the body reaches 10-45 mm.

Group HOMOPTERA (equal winged)

Family Aleyrodidae (white winged)

generation *Trialeurodes* Cockerell, 1902;

Trialeurodes vaporariorum Westw., 1856; (Greenhouse white winged) is a tropical, omnivorous species that has been reported to damage cassia and Jerusalem artichoke plants in winter in greenhouses and in open ground in summer.

Group LEPIDOPTERA

Family Tortricidae 1803

Archips Hubner, generation 1822;

Archips rosana (Linnaeus, 1758) is a reddish polyphage. The width of the wings is 15-24 mm. Butterflies fly from May to August. Larvae feed on twisted leaves. The pupae season lasts from April to May. It winters during the egg-laying period.

Family Noctuidae (Earworms).

Agrotis Ochsenheimer, generation 1816;

Agrotis segetum Den. et Schiff., 1775; (Autumn earworm) - a common species. It was noted that worms gnaw the stems and leaves of cabbage and cause serious damage to the seedlings.

Agrotis exclamations L., 1758; (Exclamation earworm) - slightly less common than autumn earworm. The nature of damage to cabbage is similar to the damage of autumn earworm.

Mamestra Schiffermüller, generation 1776;

Juvenile larvae of *Mamestra suasa* Schiffermüller, 1776 destroy the upper tissue of cabbage leaves, and its adult larvae puncture or grossly damage the leaves.

Phytometra Haworth, generation 1809;

Phytometra gamma L., 1758. (Gamma earworm) one-year-old worms damage the leaf by opening a "window", but do not touch the epidermis. Adult worms damage the leaf by piercing it, not touching only its thick veins.

Syngrapha Hübner, generation 1821;

Syngrapha circumflexa L., 1767; (Circumflex earworm) - was recorded as a serious pest of cabbage. Its damage is not determined only by reducing the yield, but it also reduces the marketability of cabbage and causes it to rot during storage.

Group ORTHOPTERA (Straight winged)

Family Gryllotalpidae (Cockchafer)

Gryllotalpa Latreille, generation 1802;

Gryllotalpa gryllotalpa L., 1758; (Ordinary cockchafer) - the size of the insect is up to 5 cm, it is brown, the front leg is digging type. It also damages medicinal plants. Their presence can be determined by holes and tracks in the soil. Larvae and adults severely damage planted plant seeds, young seedlings, and plant roots, especially in wet areas of the crop, in greenhouses.

Group HOMOPTERA (equal winged)

Family Aphididae (True lice)

Brevicoryne van der Goot, generation 1915;

Brevicoryne brassicae L., 1758; (Cabbage lice) - severe damage to cabbage, especially mid-ripening and late-ripening varieties, as a result of which the plant behind in growth, in some cases it dries up, and the product becomes unfit for consumption.

References:

1. Law of the Republic of Uzbekistan dated August 31, 2000 No. 116-II "On protection of agricultural plants from pests, diseases and weeds".
2. Resolution No. 2640 of the President of the Republic of Uzbekistan dated October 24, 2016 "On measures to improve the system of plant protection and provision of agrochemical services to agriculture".
3. Law of the Republic of Uzbekistan "On Plant Quarantine" dated August 31, 2018 (new edition).
4. Adashkevich B.P. Useful entomofauna of vegetable fields in Moldova. - ed. Kishinev. Shtiintsa. 1972. - p. 56-74.
5. Adashkevich B.P., Shukuraliev B.T. Cabbage pests and their entomophages in Uzbekistan. Biological method of pest control of vegetable crops Moscow. Agropromizdat, 1989. - p. 106 - 122.
6. Ahmadjonova S. Wireworms are crop pests // Agriculture of Uzbekistan. -Tashkent, 2011. -No. 3. -p. 23.
7. Ahmedov M.H., Akhmadjonova S.A. On the ecology of click beetles (Coleoptera, Elateridae) of the Ferghana Valley // PhD student and applicant. - Moscow, 2011. - No. 2 (62). -p. 71-73.
8. Bekbergenova Z.O. To the study of the fauna of rove beetles (Staphyliniud) of Karakalpakstan // Vestnik KKO ASrUz. - Nukus, 2000. - No. 5. - p. 38.
9. Vinokurov N.N., Kanyukova E.V., Golub V.B. Catalog of hemipteran insects (Heteroptera) of the Asian part of Russia. -Novosibirsk: SIF "Nauka", 2010. - p. 320.
10. Golub V.B., Tsurikov M.N., Prokin A.A. Collections of insects: collection, processing and storage of material. Moscow: Association of Scientific Publications KMK. 2012. p. 339.

11. Gornostaev G. N. Insects of the USSR. (Handbook-determinant of the geographer and traveler); - M.: Mysl, 1970.
12. Dushamov B.K., Matkarimova O. In the conditions of Khorezm, the white winged and the complex of coordinated struggle in controlling it // Scientific-practical conference abstracts. - Tashkent, 2001. - p. 89-90.
13. Zakirov I.I. Some information on the entomofauna of vegetable and vegetable crops of Central Fergana // Prospects of growing agricultural products in Central Fergana: Proceedings of the Republican Scientific and Practical Conference. -Fergana, November 28, 2017. -p. 64-67.
14. Kadyrbekov R.H. On the aphid fauna (Homoptera, Aphididae) of the Sogety Mountains (South-East Kazakhstan) // Selevinia: Zoological Yearbook of Kazakhstan and Central Asia. T. 21. -Alma-ata, 2013. -p. 75-81.
15. Kimsanbaev H., Rashidov M.I., Sulaymanov B.A. New in the tactics of using encarsia against the greenhouse whitefly // Protection and quarantine of plants. -Moscow, 2001. - #1. - p. 27.
16. Kirichenko A.I. Methods for collecting Hemiptera and studying local faunas. Publishing house of the Academy of Sciences of the USSR. Moscow, 1957
17. Kozlov M.A., Ninburg E.M. Your collection (collective zoological collection). M.: Prosveshchenie, 1971. — p.160.
18. Lopatin I.K. "Diversity of the animal world: past, present, problems of conservation" SOROSOV EDUCATIONAL JOURNAL, 1997, N 7, p. 34-39
19. Tilovov T. Pests of cucurbits and vegetable crops. - Tashkent: Labor, 1987. — p. 71.
20. Esonboev Sh. Olmasboeva R., Tanirqulova B. Citrus white winged //Agriculture of Uzbekistan. - Tashkent, 2002. - #2. -p. 52.
21. Shamuratova N.G. Entomocomplexes of agrobiocenosis of alfalfa crops: formation, functioning and biological bases of their regulation in the conditions of the Aral Sea.: Abstract of the thesis. dis. ... doc. agricultural Sciences. -Tashkent, 2007. - 45 p.
22. Stary P. Biology of aphid parasites (Hym., Aphidiidae) with respect to integration. The Hague, 1970, - p. 1-643.
23. Khamrayev A.Sh., Azimov J.A. Kuchkarova L.S., Daminova D.B., Mirzayeva G.S. Insect ecology. - Tashkent: Cholpon, 2014. — p. 389 .
24. Yujia Qin, Zhihong Li, Li Zhao, Glen Fowler, Yan Fang. The current and future potential geographical distribution of the Italian locust, *Calliptamus italicus* (Linnaeus) (Orthoptera: Acrididae) in China. Computer and Computing Technologies in Agriculture VI. 393: 2013. -p. 290-298.

Rezyume: *Ushbu maqolada Qoraqalpog'iston respublikasining dorivor o'simliklar plantatsiyalaridan yig'ilgan zararkunanda hasharotlar to'g'risidagi ma'lumotlar keltirilgan.*

Резюме: *В данной статье приведены сведения о насекомых-вредителях, собранных с плантаций лекарственных растений Республики Каракалпакстан.*

Kalit so'zlar: *fitofag, agrotsenoz, polifag, epidermis, morfologik, g'umbak, eksgauster, entomofag, fitofag*

Ключевые слова: *фитофаг, агроценоз, полифаг, эпидермис, морфологический, куколки, экзостер, энтомофаг, фитофаг*

FLOWERING AND FRUITING CHARACTERISTICS OF LYCIUM L. SPECIES INTRODUCED IN KARAKALPAKSTAN

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Summary: This article analyzes the flowering and fruiting of plants *Lycium barbarum*, *Lycium chinense* under the conditions of introduction, as well as the stages of flowering in summer and autumn.

Key words: Introduction, at the beginning of daily flowering, the general flowering period, in the ending flowering period, fruiting, temperature.

Decree of the President of the Republic of Uzbekistan on November 26, 2020 "On measures to expand the scope of scientific research on the cultivation and processing of medicinal plants, development of their seed production" - In the decision No. 4901, it was emphasized that the cultivation of naturally growing medicinal plants, the propagation and introduction of medicinal plants belonging to foreign flora from seeds in local conditions [1].

It is important to study the morphology, biology, diurnal and seasonal flowering dynamics, and seed productivity for the cultivation of imported medicinal and ornamental plants in local conditions.[3] It is known that it is important to study their flowering biology in the process of introduction of plants. Flowering and seed formation of introducers in new soil and climate conditions is an important indicator of adaptation [2]. The flowering biology of representatives of the genus *Lycium* L. under the conditions of introduction has not been studied.

Information on the flowering period of species of the genus *Lycium* L. is not given in the literature, therefore, we studied the flowering period of plants grown in the experimental field in the conditions of the Republic of Karakalpakstan. The study of flowering dynamics of *Lycium chinense* and *Lycium barbarum* plants, which are introduced *Lycium* L., was carried out under introduction conditions in the experimental plots which are belonged to "O'rmon" households, in the Nukus district of the Republic of Karakalpakstan.

The flowering phase of these plants lasts longer than other plants (July-November).

For the purpose of observation, opened flowers on plants were counted in every two hours from 8 AM to 12 PM in 10 designated plants.



In the *Lycium chinense* plant, the order of opening of individual flowers was realized as follows: **at the beginning of daily flowering** (12.VII.2021) at 8-9 AM in the morning, when the air temperature was +24 °C, the comparative humidity of the air was 24%, 2 flowers opened. At 10-11 AM, when the air temperature was 34°C, air humidity was 15%, 4 flowers opened. At 12:00-2:00 PM, when the air temperature was 35°C and the air humidity was 18%, the most flowering happened - 6 flowers opened. At 3-4 PM, 3 flowers opened. At that time, indicators of ecological factors were as follows: air temperature was 35°C, air humidity was 18%. By 6 PM, one flower opening was recorded. At that time, the indicators were as follows: air temperature was 36°C, air humidity was 19%. From 7 PM, the opening of the flowers was not recorded.

When we observed **the general flowering period** of the flowering phase (10.VIII.2021), it

gave the following appearance: at 8-9 AM in the morning, the air temperature was 21 °C, the relative air humidity was 28%, 2-3 flowers have opened. At 10 AM, the air temperature is 25°C, the relative humidity is 24%, and 5 flowers have opened. At 11-12 AM, the air temperature was 33 °C, the relative air humidity was 14%, and 6-7 flowers have opened. At 1-2 PM, 4-5 flowers have opened. At that time, the indicator of ecological factors was as follows: air temperature was 32-33 °C, air humidity was 14%. 3 flowers have opened at 3-4 PM and 3 flowers at 5-6 PM, at that time the air temperature was 34 °C, relative air humidity was 14%.

In the ending flowering period (October 11, 2021), the maximum number of flowers opened at 12 and 1 PM, and only 3-4 flowers have opened. During this period, the air temperature was +5°C, air humidity was 35%. Two flowers opened at 2-3 PM and one at 4 PM.

The daily flowering process of *Lycium chinense* in 2021 continued as follows: The plant planted on April 5 began to bloom in mid-July.

Daily flowering dynamics of *Lycium chinense* (Nukus, 2021 year)

Flowering period	flowering date	Opened flowers
The beginning	(12.VII.2021)	14
General	(10.VIII.2021)	44
Final	(11.X.2021)	16

When the **diurnal flowering dynamics** of *Lycium barbarum* was studied - at the beginning of flowering (17.VII.2021) at 8-9 AM, in the morning, when the air temperature was 27 °C, and the relative humidity of the air was 22%, 1 flower has opened. At 10 AM, the air temperature was 29 °C, air humidity was 22%, and 2-3 flowers have opened. At 12 AM, when the air temperature was 36 °C and air humidity was 12%, 4 more flowers have opened. From 1 PM to 3 PM, 3 flowers have opened every hour. At that time, the indicators were as follows: air temperature was 36 °C, air humidity was 14%. At 4-5 PM, 2 flowers have opened. By 6 PM, 1 more flower opening was recorded.

When this process was observed during the **general flowering period** (15. VIII.2021), it was as follows that is, at 8 AM, in the morning when the air temperature was 16 °C and the relative air humidity was 32%, 2 flowers have opened. At 9-10 AM, the air temperature was 18 °C, relative humidity was 30%, and 3 flowers have opened per hour. 4 flowers at 11 AM, from 12 PM to 2 PM when the air temperature was 28 °C and relative air humidity was 15%, the most flowering - 6 flowers have opened per hour. At 4 and 5 PM, 4 more flowers have opened. At this time, indicators of ecological factors were as follows: air temperature was 32 °C, air humidity was 14%. At 17:00, 2 flowers opened, and at 6 PM, 1 flower has opened. At that time, the air temperature was 30 °C, relative air humidity was 13%.

The **final flowering period** of this plant (October 20, 2021) lasts a long time. From 8 to 11 AM in the morning, 1-2 flowers, at 12 PM 2 flowers, at the most flowering hours - 1-3 PM 3 flowers, and 1 flower has opened at the following hours. At that time, the average air temperature was 17 °C.

Daily flowering dynamics of *Lycium barbarum* (Nukus, 2021)

Flowering period	flowering date	Opened flowers
The beginning	(17.VII.2021)	15
General	(15. VIII.2021)	40
Final	(20.X 2021)	13

It means that, the beginning of flowering of *Lycium barbarum* in 2021 was determined to start from July 17. The general flowering period lasted a long time, starting from the middle of July and ending in October.



We observed that *Lycium chinense* and *Lycium barbarum* plants produce fruit along with flowering.

It is known that the productivity of plants depends on its biological characteristics, adequate supply of nutrients and water during the growing season, soil fertility and agrotechnical measures [4].

Lycium chinense and *Lycium barbarum* plants begin to bear fruit in the second decade of July. By August, the number of fruits increased, and the length reached 3 meters. The fruit is red in color and contains 20-23 seeds. The length of the fruit is from 1.2 mm to 1.3 mm. By September, the number of fruits is 103-105 per stem, and the colour is reddish orange.

The fruits of *Lycium chinense* and *Lycium barbarum* plants are used in order to normalize blood pressure and in a number of chronic diseases, such as fever, diabetes, cough. The fruits of this plant are a medicinal and nutritious plant that is now popular in many countries, including Russia [5].

CONCLUSION

It should be mentioned that according to the results of our observations, the duration of the opening of flowers in 2021 was 4-4.5 months. Thus, the flowering process of these two species depends on weather conditions, and a number of opened flowers multiply by increasing air temperature and decreasing relative humidity.

Indicators of flowering biology of *Lycium chinense* and *Lycium barbarum* plants in the conditions of Republic of Karakalpakstan indicate that they were able to adapt well to environmental conditions.

References:

1. The order of the President of the Republic of Uzbekistan. PQ - 4901 Tashkent, 2020.-2 p.
2. Eshmuratov.R.A. Turli introduksiya sharoitlarida Stachys L. turkumi ayrim turlarining bioekologik xususiyatlari. Avtoref. dis. ... kand. biol. nauk. –Toshkent, 2012.- 58 page
3. Raximova N.K. Introduksiya sharoitlarida Crotalaria alata L. (fabaceae) va Guizotia abyssinica (L.f.) Cass. (asteraceae) ning bioekologik xususiyatlari. Avtoref. dis. ... kand. biol. nauk. –Toshkent, 2008.- 62 page
4. Annamuratova.D.R. Xorazm viloyati sharoitida istiqbolli soya navlarining bioekologik va morfofiziologik xususiyatlari. Avtoref. dis. ... kand. biol. nauk. –Toshkent, 2010.- 46 page
5. Sekinayeva M. A., Serebryanaya F. K., Denisenko O. N., Lyashenko S. S. «Izucheniye anatomicheskix priznakov travi derezi obiknovennoy (*Lycium barbarum* L.)» // Uspexi sovremennogo estestvoznaniya. 2015. №9-2. 231-235 page

Rezyume: Ushbu maqolada *Lycium barbarum*, *Lycium chinense* ning introduksiya sharoitida gullashi va mevalashi, ularning gullash bosqichlari tahlil qilingan. Ushbu bosqichlar yoz va kuz mavsumlarlarida tahlil qilindi.

Резюме: В данной статье анализируются цветение и плодоношение растений *Lycium barbarum*, *Lycium chinense* в условиях интродукции, а также стадии цветения летом и осенью.

Kalit soʻzlar: introduksiya, havoning nisbiy namligi, havo harorati, bosqich.

Ключевые слова: влажность воздуха, температура воздуха, босс.

UDK: 599.6/.73

**2021 ZOOLOGICAL RESEARCH MATERIALS CONDUCTED AT SOUTH USTYURT
NATIONAL PARK**

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Summary: *The article describes the materials collected on the zoological research conducted in the South Ustyurt National Nature Park in 2021. Zoological research was conducted by the authors in the South Ustyurt National Nature Park and rare animals were registered.*

Key words: *South Ustyurt National Nature Park, rare species included in the Red Book of the Republic of Uzbekistan, Transcaspien Urial, Goitered Gazelle, kulan.*

The Ustyurt Plateau is considered one of the oldest and largest deserts of Central Asia, and it differs from other deserts by its geographical location, relief, natural conditions, flora and fauna. Its total area is 21 mln. ha, of which the section belonging to Karakalpakstan is 7.1 mln. is ga. By the decision of the Cabinet of Ministers of the Republic of Uzbekistan No. 707 dated November 11, 2020, the Southern Ustyurt National Nature Park with an area of 1,447,143 sq. 934,584 ha of it is a reserve zone, 69,515 ha is a recreation zone, and 443,044 ha is reserved for economic purposes. This area is home to rare species included not only in the Red Book of the Republic of Uzbekistan (2019), but also in the Red List of the International Union for Conservation of Nature (IUCN). But until now, the geographical distribution, biology and ecology of the vertebrates of the Ustyurt plain have not been fully studied. For this reason, the comprehensive study of the vertebrates of this area is of great scientific and practical importance.

This article includes the results of zoological research conducted in South Ustyurt National Nature Park in 2021. Generally accepted zoological and ecological methods (Formozov, 1952; Novikov, 1953; Smirnov, 1964; William, 2006) were used in the scientific research work. Scientific research work was carried out in the spring, summer, autumn and winter (4 quarters) of 2021 in the South Ustyurt National Nature Park (surrounding Sarikamish Lake, Western Chink Road, Koychak, Dry Lake, Kaplonkyr, Asseke-Audan, Shakhpakhta). Including, I-quarter February 26, March 16-20, II-quarter April 5-9, April 27-29, May 1-7, 10-15, June 2-10 and June 19-30, III-quarter 3- It was held on July 15, 23-30, August 2-11, 16-24, September 7-17, 24, IV quarter 5-11, October 20-25, December 19-21. Observations were carried out on two continuous routes, and the length of the route was 452 km (Fig. 1). Area coordinates were determined using GPSMAP 64.

To date, a number of scientists have conducted zoological and ecological research in the Ustyurt Plain, including the South Ustyurt National Nature Park and its surroundings (Rustamov, 1951; Kolesnikov, 1952; Kostin, 1956; Mambetjumaev, 1993; Kashkarov, 2010; Aymuratov, Pirzhanova, Matekova, 2009, Bykova, Esipov, 2012; Marmazinskaya etc., 2012, 2016; Gritsyna, Marmazinskaya, Soldatov, 2016; Matekova, Ametov, Jumanov, 2017,2022;).



Picture 1. Scheme of zoological research conducted in South Ustyurt National Nature Park, blue line is route 1, red line is route 2.

In our research, 1 species of aquatic and terrestrial inhabitants, 2 species of reptiles, 31 species of birds and 10 species of mammals were registered (Table 1).

Table 1

Animal species registered in South Ustyurt National Nature Park in 2021

№	Animal species	Census period and number			
		1 st quarter	2 nd quarter	3 rd quarter	4 th quarter
Living in water and on land - Amphibia					
1	Green toad <i>Bufo viridis</i>		8	13	
Reptiles - Reptilia					
2	Horsfield's tourtoisess <i>Testudo horsfieldi</i>		12		
3	Steppe ribbon snake <i>Psammophis lineolatus</i>		4	7	
Birds- Aves					
4	Great Crested Grebe <i>Podiceps cristatus</i>		5	7	
5	Cormorant <i>Phalacrocorax carbo</i>	4	12	8	
6	Pygmy Cormorant <i>Phalacrocorax pygmaeus</i>		11	3	
7	Glossy Ibis <i>Plegadis falcinellus</i>	4		5	
8	Flamingo <i>Phoenicopterus roseus</i>		167	186	
9	Mute Swan <i>Cygnus olor</i>	10	31	28	20
10	Common Shelduck <i>Tadorna tadorna</i>		19	23	
11	Mallard <i>Anas platyrhynchos</i>	36	29		38
12	Northern Shoveler <i>Anas clypeata</i>		78	76	
13	Red-Nosed Pochard <i>Netta rufina</i>	59	67		100
14	Common Pochard <i>Aythya ferina</i>	42	38		
15	White-headed Duck <i>Oxyura leucocephala</i>				34
16	Tawny eagle <i>Aquila nipalensis</i>	1	10	9	
17	Golden Eagle <i>Aquila chrusaetos</i>		2	2	
18	Imperial Eagle <i>Aquila heliaca</i>	3			2
19	White-tailed Sea-eagle <i>Haliaetus albicilla</i>	2	5	2	10
20	Common Kestrel <i>Falco tinnunculus</i>		2	3	
21	Coot <i>Fulica atra</i>		53	62	800
22	Houbara Bustard <i>Chlamydotis undulate</i>		2	2	
23	Black-bellied Sandgrouse <i>Pterocles orientalis</i>	14	12		64
24	Pin-tailed Sandgrouse <i>Pterocles alchata</i>	2	1		
25	Rock Dove <i>Columba livia</i>		6	8	
26	Eagle Owl <i>Bubo bubo</i>		1	2	
27	Black-Headed Gull <i>Larus ridibundus</i>		28		
28	Common Tern <i>Sterna hirundo</i>		11	14	
29	Yellow-legged Gull <i>Larus cachinnans</i>	20		8	14
30	Common swift <i>Apus apus</i>		48		
31	Crested Lark <i>Galerida cristata</i>	12	35	17	

32	Pied Wagtail <i>Motacilla personata</i>		24	18	
33	Greenish Warbler <i>Phylloscopus trochiloides</i>		4	2	
34	Northern Wheatear <i>Oenanthe oenanthe</i>		23		14
Mammals					
35	Brandt's Hedgehog <i>Hemiechinus hypomelas</i>		2	2	
36	Tolai Hare <i>Lepus tolai</i>		9	5	13
37	Great Gerbil <i>Rhombomys opimus</i>		7	4	
38	Wolf <i>Canis lupus</i>	2	3		3
39	Fox <i>Vulpes vulpes</i>	2	5		8
40	Corsac Fox <i>Vulpes corsac</i>	2	3	1	2
41	Wild Boar <i>Sus scorfa</i>				6
42	Transcaspian (Ustyurt) Urial <i>Ovis vignei arkal Eversmann</i>		1	2	27
43	Goitered Gazelle <i>Gazella subgutturosa</i>	3	221	218	458
44	Kulan <i>Equus hemionus</i>	2	6	4	37

Among the recorded reptiles are the Horsfield's tortoise *Testudo horsfieldi*, from the birds the lesser Pygmy Cormorant *Phalacrocorax pygmaeus*, the Glossy Ibis *Plegadis falcinellus*, flamingo *Phoenicopterus roseus*, the Mute Swan *Cygnus olor*, the White-headed Duck *Oxyura leucocephala*, the Tawny eagle *Aquila nipalensis*, the Golden Eagle *Aquila chrysaetos*, the Imperial Eagle *Aquila heliaca*, the White-tailed Sea-eagle *Haliaeetus albicilla*, Houbara Bustard *Chlamydotis undulate*, Pin-tailed Sandgrouse *Pterocles alchata* and Brandt's Hedgehog *Hemiechinus hypomelas*, Transcaspian (Ustyurt) Urial *Ovis vignei arkal Eversmann*, Goitered Gazelle *Gazella subgutturosa*, kulan *Equus hemionus* are species included in the Red Book of the Republic of Uzbekistan (2019).

Below we will focus on some types of mammals:

Transcaspian Urial *Ovis vignei arkal Eversmann*, 1850. Poaching and predation by wolves have led to a decrease in their number. Included in the Red Book of the Republic of Uzbekistan (2019) 1 (CR) - with the status of a locally distributed subspecies on the verge of extinction. It is also included in the Red List of the International Union for Conservation of Nature [VU A2cde] and Annex II of the SITES Convention.

According to the data of 1978, the number of Transcaspian Urial in Uzbekistan was 330 individuals. Currently, the number of this rare species in the Uzbek section of the Kaplankir-Kazakhlyshor regions is 100 individuals (Marmazinskaya et al., 2016).

During our observations in 2021, we registered 1 individual of Transcaspian Urial in the 2nd quarter, 2 individuals in the 3rd quarter, and 27 individuals in the 4th quarter in the Dry Lake and Kaplankir areas of the Ustyurt plain. 12 individuals of the registered Transcaspian Urial were observed in Dry Lake, while 18 individuals were observed in the Kaplankir region. In the dry lake area, 1 individual was observed on May 12 (41.378272 N, 056.999522 E), 3 individuals on May 15, 2 individuals on June 7, and 5 individuals on October 7 (41.376853 N, 057.001514 E). On May 28, 1 individual fell into the photo trap set in Dry Lake (41.379285 N, 056.993214 E). On May 29, 6 people fell into the photo trap set in Kaplankir area (41.341515 N, 056.051451 E), 6 people on September 24, and 1 person on October 8. During the research conducted on December 20, 8 individuals were observed in this area.

Goitered Gazelle *Gazella subgutturosa*, 1780. In the 1950s, the number of gazelles in the Ustyurt Plain was 6,000 (Kostin, 1956). 30 individuals of gazelle were registered during the research conducted in 2009-2010 in the Uzbek part of the Ustyurt plain (Tashibaev, 2012).

In recent years, climate change, land acquisition and poaching have led to a decline in gazelle numbers. The goitered gazelle is included in the Red Book of the Republic of Uzbekistan (2019) with the status of 2(VU:D) weakly declining mosaic spread species. It is also included in the Red List of the International Union for Conservation of Nature. During our observations in 2021, it was constantly found in the vicinity of Lake Sarikamish, Dry kol, Kulon Takir, areas near Kaplankir and Aseke Audan of South Ustyurt National Nature Park. During the research period, 3 individuals of gazelle were registered in the first quarter, 221 individuals in the second quarter, 218 individuals in the third quarter, and 458 individuals in the fourth quarter (including traces of 95 individuals). If

we discuss distribution of goitered gazelles by territory, 446 individuals were found around Sarikamish Lake and Dry Kol, 320 individuals were found from Dry Lake to Kulon Takhir and Kaplankyr area, and 135 individuals were found from Kaplankyr to Aseke Audan area. 13 individuals of goitered gazelle in the dry lake area on March 16 (41.379285 N, 056.993214 E), 53 individuals on April 27 (41.379285 N, 056.993214 E), 25 individuals on June 19 (42.020029 N, 056.580668 E), 20 km south of Aseke Audan 24 individuals were observed in the western part of the lake on September 8 (42.234096 N, 057.623816 E), and on December 19 we met 112 individuals in the area near Sarikamish Lake. Also, 14 individuals were caught on September 7, 4 on October 25, and 17 individuals were caught on June 26, and 17 on July 25. The main reason for such a large distribution of goitered gazelles is probably related to the food base and water resources of the area. The reason is that the surroundings of Lake Sarikamish are rich in nutrients compared to other regions

Kulan *Equus hemionus*. It was often found in Ustyurt until the end of the 19th century. It completely disappeared by the 30s of the 20th century as a result of the development of habitats. In 1982-1983, about 100 kulans were restored in the Kaplankyr Reserve (Turkmenistan). Kulan 0 (EW) was included in the Red book of the Republic of Uzbekistan published in 2009 as a subspecies of Turan, which has disappeared in the nature of the country.

During scientific research conducted in 2012, it was found out that there are kolons in the southwestern part of Ustyurt of Uzbekistan and on the northern side of Lake Sarikamish (Marmazinskaya et al., 2012). According to the information of these scientists, the number of Kulans in Uzbekistan is 50-100.

Currently, kulan is included in the Red Book of the Republic of Uzbekistan (2019) 1 (CR) as a locally distributed subspecies on the verge of extinction. Also included in the IUCN Red List [NT].

During our observations in South Ustyurt National Nature Park in 2021, 2 individuals of kulan were registered in the first quarter, 6 individuals in the second quarter, 4 individuals in the third quarter, and 37 individuals (including traces of 9 individuals) in the fourth quarter. Kulans were observed mainly in the western side of Sarikamish Lake, places near Dry Lake and Kulontaqir region. On the western side of the Sarikamish tributary, 3 individuals were observed on March 18 (41.613211 N, 056.561091 E), 1 individual on April 20, and 2 individuals on October 20. On June 24, 2 individuals fell into a photo trap set near Sarikamish Lake (42.314918 N, 057.264783 E). Also, 6 individuals were observed in Kulontaqir during the census conducted on December 19-21. Drought caused by climate change is having a negative impact on the biodiversity of this land. Therefore, in order to create favorable conditions for animals and increase biodiversity, it is necessary to dig artesian wells and provide water to the area. We also believe that it is necessary to establish nurseries in order to restore the number of rare animals

References :

1. Aymuratov R.P., Pirzhanova R.K., Matekova G.A. Sostoyanie bioraznootvornosti ekosystem yuzhnogo podrayona plateau Ustyurt v usloviyakh tekhnogennoy i antropogennoy pressy. Vestnik KKO ANRUz, 2009. #3. -p. 48-51.
2. Ametov M.B. Ptitsy Karakalpakii i ix okhrana. - Nukus, izd. "Karakalpakstan", 1981. 138 p.
3. Bykova E.A., Esipov A.V. Sostoyanie redkix vidov kopytnykh plateau Ustyurt (Uzbekistan) i uroven ix nezakonnoy dobichi // Zoologicheskie i okhotovedcheskie issledovaniya v Kazakhstani i sopredelnykh stranax, Materialy Mejdunarodnoy nauchno-prakticheskoy konferentsii, 1-2 times, 2012. - Almaty, 2012. - S. 73-75.
4. Gritsyna M.A., Marmazinskaya N.V., Soldatov V.A. Opyt monitoringa ustyurtskogo barana (*Ovis vignei* arkal) s pomoshchyu fotolovushek na yuge Karakalpakskogo Ustyurta // Teriofauna Rossii i sopredelnykh stran. Materialy mejdunarodnogo soveshchaniya. - Moscow, 2016. - S. 94.
5. G A Matekova, K Turdibaev, N I Ametova, Ya I Ametov, M A Jumanov. Ecological features of the ornitofauna of the karakalpak part of the Ustyurt Plateau. International Journal of Entomology Research, Volume 7, Issue 12, 2022, Pages 25-28

6. Kashkarov R.D. Otsenka sostoyaniya ornitofauny Yuzhnoy chasti plateau Ustyurt letom 2010 g. // Otchet o provenii polevyx issledovaniy. Fauna & Flora International / Obshchestvo okhrany ptits Uzbekistana. - Tashkent, 2010.
7. Kolesnikov V.P. O pozvonochnyxivotnyx yujnogo Ust-Yurta i ix khozyaystvennom znacheniy // Trudy Sredneaziatskogo universiteta. Novaya series. - Tashkent, 1952. Vyp. 32. S.13-26.
8. Kostin V.P. Materialy po fauna mlekopitayushchikh levoberezhya nizovev Amudari i Ustyurta i essay raspredeleniya vidov pozvonochnyxivotnyx // Trudy In-ta zool. and parasitol. AN UzSSR. - Tashkent, 1956. Vyp. 8. - S. 5-77.
9. Kostin V.P. Zametki po ornitofaune levoberezhya Amudari i Ustyurta // Trudy In-ta zoo. and parasitol. AN UzSSR, -Tashkent. 1956. Vyp. 8. - S. 79-127.
10. Krasnaya kniga Republic of Uzbekistan. Volume II. Live. Tashkent, 2019.
11. Matekova G.A., Ametov Ya.I., Jumanov M.A. Ecological factors vozdeystvuyushchie na ptits plateau Ustyurt // Voprosy okhrany ptits Uzbekistana. Matt. Res. conf. - Tashkent, 2017. - P.76-80.
12. Mambetjumaev A.M. Ornitologicheskoe nablyudenie na Ustyurte i v Kyzylkumax// Sb. Ecology ptits and milk-producing valleys of Amudari, Ustyurta and Kyzylkumov. - Nukus, Izd-vo "Jurnalist", 1993. P.16-28.
13. Marmazinskaya N.V., Gritsyna M.A., Mitropolsky M.G. Novye dannye po redkim vidam mlekopitayushchikh yuga Karakalpakskogo Ustyurta i severa Sarykamyshskoy kotloviny (Uzbekistan) // Nazemnye pozvonochnyeivotnye aridnyx ecosystems. Materialy mejdunar. conference, posvyashchennoy pamyati N.A. Zarudnogo, g. Tashkent, October 24-27, 2012. -Tashkent, 2012.-S. 204-211.
14. Marmazinskaya N., Gritsyna M., Mitropolsky M., Murzakhanov R., Wunderlich Y. Rare kopytnye Tsentralnogo, Yuzhnogo Ustyurta i Sarykamyshskoy vpadiny: sovremennoe sostoyanie // Respub. science and practice conference "Contemporary problems of preservation of redkix, ischezayushchix and maloizuchennyxivotnyx in Uzbekistan". Tashkent, 2016. - S. 118-127.
15. Novikov G.A. Methodology of field research and environmental ecology. Moscow, 1953. - 501 p.
16. Rustamov A.K. Novye dannye po zoogeografii i avifauna Yuzhnogo Ustyurta // Izv. AN KazSSR. The series is zoological. Vyp. 10. - Alma-Ata, 1951. #105. P.61-71.
17. Tashibaev E.S. Chislennost i rasprostranenie dzheyranov v Yujnyx oblastyax Kazakhstan // Zoologicheskie i okhotovedcheskie issledovaniya v Kazakhstani i sopredelnyx stranax. Materialy Mejdun. Practical conference. Almaty, 1-2 times in 2012. - Almaty, 2012. - S. 184-188.
18. Smirnov B.C. Methody ucheta chislennosti mlekopitayushchix // Tr. in-ta biol. Ural. elephant. AN USSR. - Middle Uralsk: Kn. izd-vo, 1964. Vyp. 39.- S. 32-83.
19. Formozov A.N. Methody ucheta chislennosti i geograficheskogo raspredeleniya nazemnyx pozvonochnyx. - Moscow, 1952. - 392 p.19. William J. Ecological Census Technigues. – Sutherland: Cambridge, 2006. 432 p.
20. www.iucnredlist.org

Rezyume: Maqolada 2021 yildai Janubiy Ustyurt milliy tabiat bog'ida olib borilgan zoologik tadqiqotlar bo'yicha to'plangan materiallar bayon qilinadi. Mualliflar tomonidan Janubiy Ustyurt milliy tabiat bog'i hududida zoologik tadqiqotlar o'tkazilgan va noyov hayvonlar ro'yxatga olingan.

Резюме: В статье описываются материалы, собранные по зоологическим исследованиям, проведенным в Южно-Устыртском национальном природном парке в 2021 году. Зоологические исследования проводились авторами в Южно-Устыртском национальном природном парке и регистрировались редкие животные.

Kalit so'zlar: Janubiy Ustyurt milliy tabiat bog'i, O'zbekiston Respublikasi Qizil kitobiga kirgan noyov turlar, Ustyurt qo'yi, jayron, qulan.

Ключевые слова: Южно-Устыртский национальный природный парк, редкие виды, занесенные в Красную книгу Республики Узбекистан, Устыртский баран.уриал, джейран, кулан.

APPLICATION OF METALLURGICAL WASTE IN ROAD CONSTRUCTION

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Summary: Metallurgy wastes can harm the environment even if they are a long way from where they were created. This is because toxic substances are able to migrate in the natural environment over long distances. The amount of garbage accumulating in the area is increasing each day, because the waste storage site has entered a natural area.

Key words: metallurgy, asphalt, concrete roads, slag aggregates, deformation, resistance.

INTRODUCTION.

In recent years, waste disposal has become an increasingly urgent task on a global scale, since the protection of the environment and nature is the most important direction in the safety of life. In the process of smelting iron and steel, a large amount of waste accumulates. Further processing of such waste is relatively low (10-15% of the total mass). The danger of metallurgy waste is enhanced by the fact that they can harm the environment even at a distance of 200 kilometers from their localization. This is due to the ability of toxic substances to migrate in the natural environment over long distances. The volume is growing day by day, because of this place where the waste is stored has entered the natural area. One of the solutions for the use of waste from industrial enterprises is their use in construction, in particular in the construction of roads. Asphalt concrete roads with slag aggregates provide such properties as strength, abrasion resistance, and the absence of shear deformations.

From steel-smelting slag, a high-quality mineral powder is obtained, which is used as a structure-forming filler for asphalt concrete. In recent years, in many countries of the world, in particular in the USA, Germany, Italy, China, Japan and Russia, metallurgical waste is used in road construction. Hundreds of scientific studies have been devoted to the development of road surface compositions and methods of their application, as a result of which the strength of road surfaces has increased significantly, and production waste has found its application in this. For these purposes, it is effective to apply the technology of cold recycling, which is widely used in Germany and the USA. Perm National Research Polytechnic University at the road faculty, studies were carried out to study the possibility of using aggregate for concretes of the Chusovoy Metallurgical Plant and tested for corrosion resistance. The basis of slags is oxides Si O₂, Fe O, Mg O and Ca O. Studies have shown that the use of weak carbonate rocks, silty sands in the construction of road foundations greatly reduces the repair life of the road. To strengthen the road base, the best way is to use a slag binder. The optimal slag content in compositions ranges from 12-30% [1]. Scientists of the Voronezh State Technical University Pertsev V.T. and Kokodeeva N.E. It was found that samples of asphalt concrete mixtures with the addition of converter slags and coal-mineral sorbents are not inferior in terms of quality to the original asphalt concrete mixture of the classical composition [2]. In the studies of I.I. Romanenko, M.I. Romanenko and I.N. Petrovnina, the properties of increasing the binding properties of some components depending on the uniformity of the road surface were established [3]. This is presumably due to the fact that in addition to reducing the emission of hydrocarbons from bitumen, the carbon component of the coal-mineral sorbent interacts with the bitumen of the mineral part of the sorbent in the form of lime, which acts as an activated mineral powder in the asphalt concrete mixture. For this purpose, road complexes of road equipment have been developed that simultaneously destroy the uniformity of the base to a depth of up to 500 mm and a width of up to 2400 mm with the simultaneous introduction of a binder and aqueous solutions to achieve the optimal moisture content of the composite material. the results of studies were shown. The use of metallurgical slags of the Novokuznetsk Metallurgical Plant as a filler for slag-

asphalt concrete allows increasing its operational characteristics. It has been established that soils reinforced with slag-alkali binder have the maximum values of the bulk density of the skeleton and strength at optimal moisture content.



Figure-1 Metallurgical waste

For sands, the optimum moisture content is 10% -12%, for loam 16–18%. The amount of slag also affects the optimum moisture content. With an increase in the amount of ground slag introduced, the optimum moisture content increases in proportion to its content in the mixture. A change in the specific surface of the slag from 3200 to 4000 cm²/g, i.e., in the range that can be obtained under production conditions, does not affect the value of the optimal moisture content. At dosages of slag more than 24 %, the optimal moisture content does not change, but the strength of reinforced soils increases. It was found that the properties of the proposed composites are affected not only by the humidity of the mixture, but also by the density of the alkaline hardening activator. The study of the influence of the density of alkaline solutions was carried out on different types of soils at a dosage of ground slag with a specific surface area of 3200 cm²/g in the amount of 24%. When strengthening sands, an increase in the density of solutions of alkaline components to 1.20 g/cm³ leads to an increase in strength to 120–130 kgf/cm², a further increase in the density of solutions of alkaline components to 1.22 g/cm³ leads to a drop in strength by 5–7% . This is due to the reactivity of the silty component of the sands.

CONCLUSION

When strengthening sandy loam and loam, for which the content of clay particles is much higher, an increase in the density of alkaline solutions in the range from 1.2 to 1.22 g/cm³ leads to an increase in the strength of fortified soils, and the nature of the dependence of the strength of fortified soils on the density of the solution is close to rectilinear . Thus, an increase in the density of sandy loamy soils from 1.14 g/cm³ to 1.22 g/cm³ leads to an increase in strength from 39 kgf/cm² to 84 kgf/cm², i.e. twice. We found that the optimal slag content in the compositions varies from 12 to 30%, and this depends on the soil being reinforced [3,4].

References:

1. Абдурахманов Х.З., Камалов Ж.С., Турахужаева Ш.Н., Турсунов Т.Х. Тураходжаев Н.Д. Применение 3Д технологий для изготовления литейных моделей при литье изделий из алюминиевых сплавов. Международная научно-практическая интернет конференция студентов и магистрантов «Литьё и металлургия 2019». Минск, 16-17 октября 2019 г. С.-17-18.
2. Salokhiddin Nurmurodov, Alisher Rasulov, Nodir Turakhodjaev, Kudratkhon Bakhadirov, Lazizkhan Yakubov, Khusniddin Abdurakhmanov, Tokhir Tursunov. Development of New Structural Materials with Improved Mechanical Properties and High Quality of Structures through New Methods. Journal of Materials Science Research, Canada. Canadian Center of Science and Education. Vol.5, 2016. № 3. – S. 52-58.

Rezyume: Metallurgiya chiqindilari istiqomat joylaridan uzoqda bo'lsa ham, atrof-muhitga zarar etkazishi mumkin. Bu zaharli moddalarning tabiiy muhitda uzoq masofalarga ko'chishi mumkinligi bilan bog'liq. Chiqindilarni saqlash joyi tabiiy zonaga kirib kelgani sababli hududda to'planib borayotgan chiqindilar miqdori kundan-kunga ortib bormoqda.

Резюме: Отходы металлургии могут нанести вред окружающей среде, даже если они находятся далеко от места образования. Это связано с тем, что токсичные вещества способны мигрировать в природной среде на большие расстояния. Количество мусора, скапливающегося на территории, увеличивается с каждым днем, так как место хранения отходов вошло в природную зону.

Kalit so'zlar: metallurgiya, asfalt, beton yo'llar, shlakli agregatlar, deformatsiya, qarshilik.

Ключевые слова: металлургия, асфальт, бетонные дороги, шлаковые заполнители, деформация, сопротивление.

HISTORY AND STAGES OF THE EMERGENCE AND DEVELOPMENT OF PACKAGING

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Summary: *This article discusses the fact that almost everything that is used in life cannot be stored and transported without packaging at the initial stage of preparation.*

Key words: *packaging, paper bags, packaging containers, paper, development, cardboard packaging, cardboard.*

Where and when did packaging originate? Why have people at all times sought to invent a convenient and multifunctional container? The answer is pretty simple. Without packaging it is impossible to store and transport almost all products, substances and materials used in everyday life. The first container that mankind learned to make was earthenware. Ancient peoples first smeared various baskets with clay, which they then used to store and carry liquids.

In ancient times, clay was the main material for making containers for all settled peoples. At first, wicker baskets were coated with clay so that liquids could be stored in them. Clay containers themselves appeared in the Ancient East in the 4th-3rd millennium BC, when the potter's wheel was invented, as well as the furnace for firing ceramic products.

The oldest known clay container is considered to be a vessel that was found during excavations of the Sumerian civilization in Western Iran in 1922 during excavations of a settlement. The age of the find is at least 5 thousand years. Archaeologists suggest that this "packaging" was used by the Sumerians not only to store beer, but also to consume it. Drinking an amber drink 5000 years ago, as today, was done in a circle of friends - people sat around a large jug and, slowly, sipped beer through straws.

Sumerians used similar jugs to store wine. Only wine jugs, in contrast to beer jugs, which were installed vertically, lay "on their sides". To prevent the wine from sour, the jugs were corked with a piece of unbaked clay, which swelled like a cork and did not let air into the vessel. Symbolic images of the contents could be placed on the outer surface of the jars: a bunch of grapes on a vessel with wine, hops on a beer jug, fish on a jug with spices for salting seafood. By examining the remains at the bottom of the vessel, it was found that beer was stored in the vessel. By the way, the Sumerians are considered the inventors of this most popular alcoholic drink in the world.



The forerunners of modern bags in ancient times were various bags made of leather, cotton and jute. The first paper bags could appear only at the beginning of the 18th century, when the paper industry in Europe began to develop intensively.

In 1870, Luther Crowell patented a flat-bottom bag. Since then, paper packaging has become widespread and did not have an alternative until the 60s of the twentieth century, when the production of plastic bags was first established in America. Since then, paper bags have gradually started to disappear from the packaging market.

The inventor of cardboard packaging is considered to be the American Robert Geir, who managed to design the first folding cardboard box in 1879. He began to make boxes and very soon managed to increase their production to 7500 pieces per hour.

Until the end of the 17th century, paper for packaging was used extremely rarely, since it was made by hand and was a luxury item. For example, material evidence has survived to this day that at the end of the 16th century in the Netherlands, special bags were made from black-gray paper to pack and protect needles from rust. Around the same time, German shopkeepers began to pack their goods in paper bags folded from book pages. The fact is that German publishers were very rational and usually did not bind books until there was a buyer for them, while pages of unsold books at a reasonable price came true to shopkeepers.

Paper packaging is one of the most popular types of packaging products. Compared to packaging made from other materials, paper packaging has undeniable advantages:

- safety - ideal for food products;
- paper packaging extends the shelf life of certain product groups, prevents "sweating" and rotting of fresh fruits and vegetables, preserves their flavor and aroma properties;
- paper for packaging is a relatively cheap and available material, which also affects the cost of paper packaging;
- on the technological side, it is easier and easier to print on paper and perform various types of post-printing processing;
- environmental friendliness - easy to recycle, after which it can again be used for the manufacture of packaging, does not pollute the environment during disposal;
- hygiene;
- special style of your products.

Despite its apparent simplicity, in recent years the popularity of paper packaging is constantly growing, and the scope of its application is expanding.



Paper gift bags

Paper packaging today is considered by many to be more stylish and presentable than the usual packaging options! So, paper bags with the company logo are an integral element of the corporate identity of many expensive boutiques. Do not do without them in the field of fast food (paper bags, cups, substrates for cakes and pastries, napkins, etc.). Often on sale there are bakery products of expensive varieties packed in special paper. Many consumers have appreciated paper baking dishes. In retail, when selling bulk products such as tea, coffee, spices and others, paper bags are also widely used. As for confectionery products, in particular, sweets, chocolate, it is generally difficult to imagine packaging from other materials, rather than paper labels. They not only perform a protective function for the product, but are also a powerful marketing tool, because often purchases are made as a result of only evaluating the colorful appearance of the product. Of course, the increased demand for paper packaging entails a constant increase in the requirements for its quality and design. When developing packaging for products, it is necessary to consider:

- corporate identity of your company;

- features of your products and your wishes;
- consumer needs;
- results of marketing research in the packaging industry;
- technical innovations and subtleties of the production process.

The combination of materials and technologies, the combination of popular methods and our own design solutions, allow us to create the most original and interesting packaging options that will increase the sales of your products and increase your brand awareness.

There is a growing interest in the use of cardboard as a material for the production of decorative packaging.

Cardboard blanks were cut and folded by hand. The finished boxes were usually round or oval because this flexible material was easier to bend than to fold and square. Such boxes were ordered by jewelers, pharmacists and confectioners. However, when delivering boxes in assembled form, customers had problems with the storage of finished packaging, as empty boxes took up a lot of space in warehouses intended for finished products. The problem was partly solved when the first folding box appeared in 1850. The project was not very successful, as the seller had to make the box himself from the blank directly in the presence of the buyer, bending cardboard around a wooden mold.

Cardboard packaging is a light, reliable, environmentally friendly and cheap type of packaging material. Cardboard is a special type of high density hard paper. For packaging, corrugated cardboard is most often used, which is multi-layered, in which at least one layer is made in the form of corrugation. However, not all types of cardboard are used for packaging. Packaging cardboard must meet certain requirements:

- durability of connection of layers among themselves and a chalk overlay with a cardboard;
- the ability to easily fold into a foot;
- the ability to give in, provide good print quality, coloring and varnishing.

Packaging cardboard is designed for packaging various types of products. The scope of cardboard is very diverse:

- food packaging,
- pharmaceuticals,
- perfumery and cosmetic products,
- washing powders,
- a variety of children's games
- study guides

- and this is not a complete list of types of manufactured products from packaging cardboard.

Purpose of carton packaging:

- protection of products from external influences
- ease of transportation
- warehousing

Cardboard packaging is increasingly used to "advertise" the content; the better the packaging, the more protected the product from counterfeiting.

References:

1. Ефремов Н.Ф. , Васильев А.И., Хмелевский Г.К. Проектирование упаковочных производств. Часть 1: Учебное пособие. - М.: МГУП, 2004 – 396с.
4. Варепко Л.Г. Производство упаковки из бумаги, картона и гофрокартона: Уч. Пособие. - Омск: Изд-во ОГТУ, 2002. – 198 с.
5. Ефремов Н.Ф., Лемешко Т.В., Чуркин А.В. Конструирование и дизайн тары и упаковки: Учебник для вузов. – М.: МГУП, 2004. – 242 с.
6. Аксёнова Т.И., Ананьев Т.В., Дворецкая Н.М. и др.; под ред. Розанцева Э.Г. Технология упаковочного производства: Учебник для вузов. – М.: Колос, 2002. – 184с.
7. Ахмеджанова У.Б. ОСОБЕННОСТИ ПРОФЕССИИ ДИЗАЙНЕРА // Наука, образование и культура, 2019. № 6 (40). С. 62-64.

8. Ефремов Н.Ф., Готов А.С., Ефремов Д.Н., Сизов Е.В., Фирсова В.Ю., Кононюк Т.М. Автоматизированное проектирование упаковки: Учебное пособие. – М.: МГУП, 2005.

Rezyume: Ushbu maqolada tayorgarlikning dastlabki bosqishida hayotda ishlatiladigan deyarli hamma narsani qadoqlashsiz saqlash va tashish mumkin emas, haqida fikr muloqazalar bildirilgan.

Резюме: В данной статье рассматривается тот факт, что практически все, что используется в жизни, невозможно хранить и транспортировать без упаковки на начальном этапе подготовки.

Kalit so'zlar: qadoqlash, qog'oz qoplar, qadoqlash idishlari, qog'oz, rivojlanish, kartonli qadoqlash, karton.

Ключевые слова: упаковка, бумажные пакеты, упаковочные тары, бумага, развития, упаковка из картона, картон.

HISTORY OF THE FURNITURE INDUSTRY. ARTISTIC IMAGE IN DESIGN

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Summary: *This article examines a brief history of furniture in Europe, Asia and Central Asia, its origins and artistic expression in design. The role and importance of furniture in our society is explained in detail.*

Key words: *Upholstered furniture, chest, material, wood, guests, decorations, carving, furniture factories, chairs, bed, caskets, interior.*

Furniture is things that serve a person throughout his life, sometimes it happens that he himself changes from birth to old age, and good-quality high-quality headsets remain as new.

Chairs, dressing tables, wardrobes, sofas – these are all pieces of furniture. They are as diverse as styles and be as interesting and fascinating as the chronicle of mankind itself, since the word “furniture” stands for “movable property” (from the French meuble or the Latin “movable” – mobilis). How did our ancestors treat it? What was the “primitive” furniture? We can safely say that all the most developed civilization fashions in different eras. After all, for many centuries, a solid, roomy chest made of wood served as a familiar wardrobe for mankind. The history of furniture seems of the past had a hand in its origin.

The first furniture appeared in ancient Egypt. In the pyramids, archaeologists have found exquisite interior items carved from bone, ebony, and trimmed with precious stones, mother-of-pearl and gold. The Egyptians gave the world a variety of boxes, chests, caskets, chairs, beds, armchairs, benches, stools and tables (Fig.1).



Fig.1. The first furniture in ancient Egypt. 3400-2000 BC

However, the furniture was the property of rich and noble citizens, the rest slept on mats and kept things in simple chests. It turns out that the first furniture was a luxury available only to the nobility, and after death, precious interior items were sent to the afterlife along with the owners.

In ancient Greece, there was no cult of furniture and interior decoration; the Greeks invested all their passion in architecture. Furniture was made of marble, wood and bronze, and the most common pieces of furniture were chests for storing things and tables on three legs in the form of animal paws. But the ancient Romans, in addition to furniture made of stone, bronze and wood, made furnishings from wicker willow.

Roman furniture was distinguished by a large number of decorations and carvings. Inlay from other types of wood, carving, gold, silver and pieces of faience were used as decor. Marble

furniture with mosaic decorations was also popular with the nobility, which was part of the interior and served as a decoration of the house.

Upholstered furniture appeared in Europe in the Middle Ages. At first, chairs and stools were covered with fabric, and then the craftsmen came up with the idea of stuffing them with down and sheep's wool. Subsequently, foam rubber and synthetic winterize began to be used. The common people, both in Europe and in our country, were content with wooden benches and tables for many years to come.

Historical references indicate that ancient household items – decorated caskets, chests – were found during excavations of the tombs of Egyptian pharaohs (dating back to the third century BC). It is interesting to note the owners' concern for these items. These were products beautifully decorated in the art or craft technique characteristic of that era. It fell to the Egyptians to come up with the first chests for things, beds, chairs. It should be noted the ingenuity and “versatility” of the first furniture. After all, a simple in shape, but roomy drawer is already a place to sit, relax, sleep, store clothes or food.

Historical evidence shows that several thousand years ago, people used various materials to make furniture products, including stone, wood, and metals. Historical epigraphs from ancient times at Persepolis and on the Egyptian pyramids show a rich history of chair and furniture design in ancient societies.

The oldest stool in Western Asia was found during the archaeological excavations of the German archaeologist Erich Frederick Schmid in 1934-1936 in the Tappe Cheshm Ali region in the southeast of Tehran (Shar-e Rey). The history of this stool, created from a combination of clay, sand and straw, dates back to the second half of the 6th millennium BC (Fig.2).

Fig.2. The oldest stool in Western Asia. 6000 BC



In terms of strength and weight, this product has been designed to easily bear the weight of a person. The color of its main material and coating is red, and it is currently kept in the department of sights dating back to BC. at the National Museum of Iran.

In addition, in the famous tablet “Spinning Woman”, which is considered one of the most beautiful sights of the historical period of New Elam, you can see a stool, the legs of which look like lion's paws. On this tablet, created from bituminous paste, you can see the image of a woman sitting on a stool, holding a spindle in her hands. The stool with legs in the form of a lion's paw belongs to the chairs and sofas of the Achaemenid era (330 BC), which indicates the influence of the artistic products of Elam on the Achaemenids.

Another chair found during archeological excavations in Iran is a copper chair made in the second millennium BC. In the Amlash region in Gilan province in northern Iran. This copper chair, created in miniature in real size, consists of a square pallet with 4 simple legs and a rectangular seat, and is completely similar to modern chairs.

Although furniture factories are active in many Central Asian cities, such cities as Tehran, Qom, Malayer, Mashhad, Tabriz and Marand are considered the largest centers of this industry in the country. Products of the Central Asian furniture industry are produced in three types: office furniture, modern (comfortable) furniture and classic furniture, and these products are exported more in office and classic types. The nomadic way of life and the style of the traditional dwelling of the Kazakhs determined the use of affordable, environmentally friendly, light in weight and not fragile material – wood – as a raw material.

From it, the Kazakhs made a significant part of household items – from furniture, dishes to parts of weapons and vehicles until the second half of the 19th century. As a rule, larch was used for

furniture, poplar and birch, together with the root system, for dishes, and pine for the frame of the yurt. Local craftsmen have traditionally mastered sawing, engraving and carving.

Furniture in nomadic life was used in a minimal amount, but it was decorated with high quality and taste, giving it a special meaning. Most often, the furniture of nomads was collapsible and convenient for transportation. The nomads believed that new household items needed to be decorated with “magic” patterns. It was believed that then they would not only serve well, but also contribute to a favorable atmosphere in the house. In a traditional Kazakh yurt, a round-shaped table with low legs was installed in the center.

In agricultural areas, mainly rectangular tables were used, which in the 20th century began to be equipped with a drawer for cutlery. In the traditional life of the same time, there were whatnots that appeared as a result of the influence of Russian culture. Such types of furniture as a bed, large and small chests, food storage chests, cupboards were popular until the 1970s due to the scarcity and high cost of factory furniture.

Most of the traditional furniture had feet to keep things dry. The exception was chests, which were made of pine wood. Their nomads put in a place of honor – tor. Chests could be of different sizes and were intended to store items. Small chests were smoked with silver-plated metal, carved bone was used as inlay, and silver and mother-of-pearl were used for decoration. On the lid of a closed chest lay lint, pillows and textile bedspreads (Fig.3).

Fig.3. Kazakh chest. 19th century



Today the chests are handcrafted, decorated and passed down as part of a girl's dowry. In everyday life, nomads used collapsible beds, which could be laid out wide as needed. The beds of wealthy Kazakhs were distinguished by their large size and the high cost of finishing and decor. This system allowed the products to stay fresh longer. In everyday life, two types of boxes were used: one for storing meat, butter and dairy products, the other for storing perishable products. Chest freezers are still used in some settlements.

Such cabinets are of several types: on low legs and on high ones. The Kazakhs were engaged in inlay and applique of household items with bone. This technology was used mainly in the central and eastern parts of our country. To increase the strength of the bones, the masters boiled the bones in a special decoction with horse fat and left them there for a while. Then the bone was polished with sand, and the edges were turned with glass.

If new furniture appeared in the house, the hostess called close women for tea. Guests traditionally put their gifts in the chest. For example, cuts of fabrics, which could then be used in everyday life or presented to another. Also, the guests poured silver coins into the chest, saying: “Let the chest be constantly filled with silver”. Guests, in turn, received gifts from the hostess. The most generous could present a ram as a gift.

Today's time has put everything in its place: a wide variety of styles, workmanship (from handmade to flow), materials used, and, accordingly, a wide price range – this is the current state of the furniture market. The lifestyle has changed, and new types of furniture have appeared. Furniture for audio and video equipment, computer tables, convertible sofas, which have everything from folding tables to massagers and built-in speakers. Now everyone is guided in the choice of furniture by their own taste and designer's advice, limited only by a sense of proportion and solvency. Making furniture has become an art.

References:

1. Барташевич А. А., Адалова Н.И., Романовский А.М. *История интерьера и мебели* // Учебник, 2004. – 400 с.
2. Гарин В. А., Разиньков Е.М. *История мебели* // Учебник, 2006. – 254 с.
3. Уайт Э., Робертсон Б. *Мебель и другие предметы обстановки*. – М.: Астрель, 2005. – 109 с.

4. Глазычев В.Л. Архитектура. Энциклопедия. – М.: «Дизайн. Информаия. Картография». Астрель. АСТ, 2002. – 627 с.
5. Маслов В.Н. Пропорции и конфигурации в природе, архитектуре и дизайне. - Ухта: УГТУ, 2007. – 55 с.
6. Raxmanov J.M. Zamonaviy Mebel dizayn turlari va ularning tasniflanishi// Journal of Advanced Research and Stability. Vol. 2 №1.2022 . 22-28 с. <http://sciencebox.uz/index.php/jars/article/view/702/675>
<https://studfile.net/preview/2990794/>
<http://www.tgrt.ru/kazanmebel/5825125042/>
<https://dommino.ua/blog/vidy-mebeli>

Rezyume: Ushbu maqolada Evropa, Osiyo va Markaziy Osiyodagi mebellarning qisqacha tarixi, ular kelib chiqishi shuningdek, uning dizayndagi badiiy qiyofasi muhokama qilingan. Mebellarning jamiyaimizdagi tutgan o‘rni va ahamiyati batafsil yoritib berilgan.

Резюме: В этой статье рассматривается краткая история мебели в Европе, Азии и Центральной Азии, ее происхождение и художественное воплощение в дизайне. Подробно объясняется роль и значение мебели в нашем обществе.

Kalit so‘zlar: Yumshoq mebel, sandiq, material, yog‘och, mehmonlar, bezaklar, o‘ymalar, mebel fabrikalari, stullar, krovat, qutilar, interyer.

Ключевые слова: Мягкая мебель, сундук, материал, дерева, гости, украшения, резьба, мебельные фабрики, стулья, кровать, шкапулки, интерьер.

TECHNOLOGY DEVELOPMENT FOR OBTAINING COMPLICATED COMPLEX FERTILIZERS FROM LOW-GRADE PHOSPHORITES OF UZBEKISTAN

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Summary: A method for producing a complex fertilizer that includes the phosphate raw materials being acid-decomposed, neutralized, evaporated, ground, and cooled was suggested in this study. The ammoniated pulp is evaporated until it reaches a density of at least 1750 kg/m³, in which potassium salts are then added until the mass ratio of N:P₂O₅:K₂O varied to (0,5-1,5):1,0: (0,5-1,5), and the resulting melt is granulated in the presence of a retour and cooled. As raw materials for carbonized phosphate, washed dried concentrate, unenriched phosphorite ore, dust-like fraction, and mineralized mass are used. Before feeding the complex fertilizer melt to granulation, potassium additives such as chloride, sulfate, nitrate, phosphate, and carbonate potassium salts and their mixtures are also added.

Key words: fertilizers, phosphorite, pulp, melt, concentrate, decarbonization, granules, raw materials, nitrogen, potassium, acid, phosphorite flour, Kyzylkum

Introduction

The annual production and consumption of phosphate raw materials is expected to reach 70 million tons of P₂O₅ (220 million tons of raw materials) by 2050 [1-3].

Uzbekistan, like Russia and Kazakhstan, has developed its own mineral resource base to manufacture phosphorus-containing fertilizers. Phosphorite manifestations are found in many regions of Uzbekistan (Ferghana, Surkhandarya, Pritashkent, Navoi Central-Kyzylkum, Bukhara-Khiva, and Karakalpak [4-8], but the Central Kyzylkum region [5] was the most promising in terms of industrial development. To date, numerous manifestations and four deposits of granular phosphorites have been identified in the Central Kyzylkum.

During the enrichment of Central Kyzylkums phosphorites, the signs "mineralized mass," "washed dried concentrate," and "dust-like fraction" are formed. The washed dried concentrate is produced in a facility that includes scrubbing, desalination, phosphorite washing, and drying. Simultaneously, two types of washed dried concentrate are obtained:

- P₂O₅ content of 24.4% in grade 1, class -0.5 +0.22 mm;
- grade 2, class -5.0 +0.5 mm, P₂O₅ content 16.8%;
- thickening of sludge up to 35% solid, followed by pumping to sludge storage, and separation of solid waste (class +5.0 mm), followed by road transport to the warehouse of off-balance ore (mineralized mass) containing less than 13% P₂O₅.

The dust-like fraction is formed during the drying of washed dried concentrate, and it is used for exhaust gas purification in cyclones with the release of dust fraction [9].

The development of nearby (non-industrial) deposits is a key reserve for boosting the output of phosphoric fertilizers. There are numerous low-grade phosphorite deposits in Karakalpakstan (Khujakulsky, Sultan-Uizdagsky, Khojeylinsky, Nazarkhan, Chukai-Tukai, etc.), with a combined resource of more than 70 million tons. Their advantages include being close to the user, not requiring big investments, being quick to deploy, and having goods (raw-ground phosphorites) that are far less expensive than other phosphate products. In the form of phosphorite flour, they can be utilized as phosphorus fertilizers. The "soil phosphorization" strategy, which involves applying at least 1 t/ha, or 200 kg/ha, of P₂O₅ to the soil once and leaving it there for a long time (up to 5 years or more), produces the maximum effect of phosphorite powder [10; 11].

Table 1.2 contains a detailed chemical analysis of the used phosphorites.

Table 1
The original Kyzylkum phosphorites' composition

Types of phosphorites	P ₂ O ₅ , %	CaO, %	Al ₂ O ₃ , %	Fe ₂ O ₃ , %	MgO, %	F, %	CO ₂ , %	$\frac{CaO}{P_2O_5}$
Typical phosphorous flour	18,60	46,09	1,24	1,05	1,82	2,0	15,65	2,47
Washed concentrate	24,08	46,39	0,35	0,48	0,94	2,48	9,21	1,92
Dust fraction	18,54	44,72	0,95	0,80	0,80	2,22	14,80	2,41
Mineralized mass	14,71	41,52	1,17	1,37	0,53	1,85	15,61	2,82

Table 2
Chemical composition of phosphorite deposits of Karakalpakstan

Samples of the field	Content of components %										
	P ₂ O ₅	CaO	SiO ₂	CO ₂	MgO	F	Fe ₂ O ₃	Al ₂ O ₃	SO ₃	Na ₂ O	K ₂ O
Xojakól	18,05	33,50	26,45	10,45	0,30	1,27	3,25	2,71	1,38	0,98	0,54
Bes-tóbe	5,80	39,70	16,80	8,10	0,50	0,71	2,53	4,45	0,01	1,15	0,60
Sultan-wizdağ	19,99	20,40	39,70	7,70	0,35	2,05	2,09	2,60	1,23	0,86	0,40

The process of activating Central Kyzylkum and Guliob phosphorites was investigated [12–17] in the presence of their ammonium salts and at an incomplete rate of sulfuric and nitric acids in order to establish a method for generating complex fertilizers including phosphorus. The following row was revealed that urea nitrate > ammonium sulfate > monoammonium phosphate > ammonium nitrate > calcium nitrate > ammonium chloride > potassium chloride > urea, which were the most effective mineral salts for activating phosphorites.

The decomposition of phosphate raw materials is carried out with a 50-65% solution of nitric acid, followed by the removal of a portion of calcium nitrate by filtration, neutralization of the remaining extract with ammonia to pH = 6.0-7.5, evaporation of the resulting mass until the formation of a melt, drying and unloading of the dried dried product.

The following are the method's drawbacks:

According to the CaO-P₂O₅-NH₃-H₂O system's solubility diagram, only dicalcium phosphate, di-, and monoammonium phosphate are included in the complex fertilizer's composition when the pH is raised to 6.0–7.5. In saline and carbonate soils, fertilizers with this composition don't have good argochemical qualities;

-bigger containers and more complicated equipment are needed for the isolation of calcium nitrate;

- the pulp must be evaporated using evaporators with a specific design;

According to the literature, carbonized phosphorite is subjected to nitric acid breakdown in order to produce a complex fertilizer. Phosphorite decarbonization takes place concurrently with the breakdown process using nitric acid with a concentration of at least 45% and a norm of 25–100% of stoichiometry in terms of CaO. The resultant pulp is dried, granulated, evaporated, and ammonia-neutralized [19,20].

Calcium nitrate does not need to be frozen in the shell-and-tube heat exchanger, and it does not need to be separated at the filter unit or go through any additional stages of cooling or filtration.

It is also completely independent of sulfur sources, uses gypsum without issue, and can use a variety of phosphorus-containing ores.

The following are this approach's drawbacks:

- low level of raw material utilization;
- it is impossible to alter the mix of fertilizers to include different nutritional elements, particularly potassium;
- process drying and granulation technical challenges;
- it has very poor physical qualities, making it unsuitable for mechanical soil application and mixing. These include being highly hygroscopic, smeared, and poorly disseminated.

The aforementioned drawbacks show that the currently used technique for turning carbonized phosphorites into a complex fertilizer is neither technologically advanced nor cost-effective.

The goal of our research is to develop a technique that will enable complex fertilizers to have different compositions with superior physico-chemical properties across a wide range of nutrient component ratios.

The developed method for producing a complex fertilizer includes decarbonization and acid decomposition of phosphate raw materials at a rate of 25–100% of stoichiometry in terms of CaO simultaneously (in one apparatus), neutralization to a pH of at least 3.5, evaporation of pulp to a density of at least 1750 kg/m³, addition of potassium salts at mass the ratio N:P₂O₅:K₂O, equal to (0,5-1,5):

For the purpose of performing experiments, 100 kg of phosphate raw materials (the makeup of the castings is shown in Tables 1 and 2) are processed for 30 minutes at 40 °C in a cylindrical reactor with a stirrer using an estimated amount of 52.5% nitric acid. The resulting pulp is neutralized with ammonia to a pH of no higher than 3.5 before being heated to 150–170 °C and evaporated with flue gases in a bubble evaporator till a melt forms. The determined amount of potassium salts is introduced while actively stirring ($A_{HNO_3} : A_{f/c} : A_{\text{potassium salt}} = 0.797 : 1 : 0.1497$). A pre-made retour is added after the creation of a homogeneous mass to ensure that the product will be granulated in a drum granulator and cooled to a temperature below 70°C.

The following formula can be used to determine how much nitric acid and potassium salts are present in 100 kg of phosphorite at a specific mass ratio of N:P₂O₅:K₂O:

$$A_{HNO_3} = (C_{P_2O_5} * 63/14) * (100/C_{HNO_3}) * (P_N / P_{P_2O_5});$$

$$A_{f/c} = 100 * \Pi ;$$

$$A_{\text{potassium salt}} = 0,5 (C_{P_2O_5} * M_{\text{pot.salt}} / C_{K_2O}) * (P_{K_2O} / P_{P_2O_5});$$

where A_{HNO_3} , $A_{f/c}$, and $A_{\text{potassium salt}}$ represent, respectively, the quantities of nitric acid, phosphate raw materials, and potassium salts.

$C_{P_2O_5}$ and C_{K_2O} are both contained in phosphate raw materials, or P₂O₅, and potassium salt, or K₂O, respectively.

C_{HNO_3} is the concentration of nitric acid.

The mass fraction of N, P₂O₅, and K₂O in a specific ratio is denoted as, P_N , $P_{P_2O_5}$, and P_{K_2O} , respectively.

The results of fertilizer production were found to be small-hygroscopic; the chemical analysis was done using accepted techniques [21], and the results are shown in Table 3.

Sulfate, nitrate, phosphate, carbonate, chloride salts and their mixes are employed as potash additions, are one of the features of this procedure. As a result of using the suggested technique, the effectiveness of additions is, on a scale of 1 to 10, as follows:

Components	Scores (α)	Evaluation of hygroscopicity's quality
K ₂ SO ₄	>1	Almost non-hygroscopic
K ₂ HPO ₄ .	>1	Almost non-hygroscopic
K ₂ CO ₃	>1	Practically non-hygroscopic
KNO ₃	(3,23) 3-5	Hygroscopic
KCl	(3,62) 3-5	Hygroscopic

Potash salts are added to the mixer, which is also given the necessary amount of evaporated melt to keep the mass ratio of N:P₂O₅:K₂O at (0,5-1,5):1,0:1. (0,5-1,5). The moisture content in the mass must be kept at no more than 1-8% during the granulation process when there is a retour.

The discovered method can be used to produce a variety of **NPK** fertilizers, use less ammonia, increase the supply of raw materials for complicated fertilizer manufacture, decompose different types of phosphate raw materials, and employ different potassium salts as additives.

It came out that lowering the melting density to less than 1750 kg/m³ complicates the granulation procedure and worsens the characteristics of the resulting fertilizers due to a rise in their moisture content.

Additionally, as the mass ratio of the components falls to 0.5:1.0:0.5 increases the mass ratio of 1.5:1.0:1.5, but does not result in an increase in the rate of decomposition or the amount of P₂O_{5ass}. instead complicates the decomposition process and lowers the phosphorite decomposition coefficient. However, the use of nitric acid and, consequently, ammonia rises when used as a complex fertilizer.

The creation of a two-water form of calcium nitrate, Ca(NO₃)₂•4H₂O, in the composition of the product, as opposed to the four-water form of calcium nitrate, Ca(NO₃)₂•4H₂O, or at least its combination with the three-water form, are structural changes that occur during pulp cooling. There is less caking as a result of the salt's reduced hygroscopicity and moisture content. Additionally, stronger granules (no less than 4 kgf/sm²) are produced, which also aids in lowering caking.

The type of phosphate raw materials utilized, the quantity of nitric acid employed, and the quantity of potassium salts added all affect the composition of the final complex fertilizer. These variables can be changed to alter the fertilizer's nitrogen, phosphorus, and potassium contents. The ratio of the nutrient components in fertilizer (N: P₂O₅:K₂O) has a range of variation that is provided in Table 3 and is between (0,5-1,5):1,0: (0,5-1,5). The challenge of changing the content of a complicated fertilizer has been solved, according to experimental data.

The caking of the fertilizer is one of its primary physico-chemical characteristics and is dependent on its hygroscopicity. The traceability of the fertilizer increases with its hygroscopicity. Technical and economic calculations indicate the profitability of the proposed method. Saving is achieved by improving the quality of the product and using inexpensive highly carbonized phosphorites, which are hygroscopic and practically non-hygroscopic. Comparative data on the generally accepted characteristics of traceability show that the complex fertilizers obtained are neither hygroscopic nor non-hygroscopic (unenforced phosphate ore, mineralized mass, washed dried concentrate and powdered fraction).

№	Ratio N:P ₂ O ₅ :K ₂ O	Type of phosphate raw materials	Type of potassium salts	Normal, HNO ₃ ,%	ratio of mass among the initial elements, ANNO3: A potassium salt (AF/S).	Nutritional component total, %		Evaluation of hygroscopicity's quality
						N+P ₂ O ₅ + K ₂ O	N+P ₂ O ₅ + K ₂ O+CaO	
1	1:1:1	Washed dried concentrate	K ₂ SO ₄	103,5	192,9:100:77,59	26,51	43,70	Small - hygroscopic
2	1,5:1:1			160,0	298,3:100:77,59	25,52	39,60	Hygroscopic
3	1:1,5:1			103,5	192,9:150:77,59	25,50	46,17	Small - hygroscopic
4	1:1:1	Washed dried concentrate	KCl	103,5	192,9:100:56,86	28,50	45,99	Small - hygroscopic
5	1,5:1:1			160,0	298,3:100:56,86	27,04	42,08	Hygroscopic
6	1:1,5:1			103,5	192,9:150:56,86	27,03	49,16	Small - hygroscopic
7	1:1:1	Washed dried concentrate	K ₂ CO ₃	103,0	192,9:100:48,86	29,51	48,71	Hygroscopic
8	1,5:1:1			160,1	298,3:100:48,86	27,71	43,20	Hygroscopic
9	1:1,5:1			103,0	192,9:150:48,86	27,72	50,92	Small - hygroscopic
10	1:1:1	Powdered fraction	K ₂ SO ₄	79,0	148,8:100:59,74	22,86	41,38	Small - hygroscopic
11	1,5:1:1			119,0	223,47:100:59,74	22,79	38,67	Hygroscopic
12	1:1,5:1			79,0	1489,48:150:59,74	22,78	45,15	Small - hygroscopic
13	1:1:1	Powdered fraction	KCl	79,0	148,8:100:43,78	24,61	43,83	Small - hygroscopic
14	1,5:1:1			119,0	223,47:100: 43,78	24,13	40,42	Hygroscopic
15	1:1,5:1			79,0	1489,48:150:43,78	24,11	48,45	Small - hygroscopic
16	1:1:1	Washed dried concentrate	K ₂ HPO ₄	79,0	463,03:100:181,7	31,65	40,71	Almost non- ygroscopic
17	1:1:1	Washed dried concentrate	KNO ₃	79	144,94:100:51,75	33,33	54,73	Hygroscopic

Table 3

Technology-related factors' effects on the hygroscopicity and composition of fertilizers

References:

1. Беглов Б.М., Намазов Ш.С. Фосфориты Центральных Кызылкумов и их переработка. –Ташкент 2013. – 460 с.
2. Фосфор – «элемент жизни», его возрастающая роль для человечества //Фосфаты на рубеже XXI века. – Москва, Алматы, Жанатас, 1996. – 108с.
3. Ангелов А.И., Левин Б.В., Классен П.В. Мировое производство и потребление фосфатного сырья. // Горный журнал. – 2003. - №4-5. – С. 6-11.
4. Шаякубов Т.Ш., Ильяшенко В.Я., Бойко В.С., Кудряшёв Н.С., Туранов У.Т. Палеогеновые фосфориты Узбекистана // Советская геология.- 1982.- №7.- С. 3-12.
5. Шаякубов Т.Ш., Михайлов А.С., Бойко В.С., Кудряшёв Н.С., Журавлев Ю.П. Центральнокызылкумский фосфоритоносный район и его перспективы // Геол. методы поисков и разведки месторождений неметал. полезн. ископаемых. Обзор / ВНИИ экон. минер. сырья и геол.-развед. работ. - М.: ВИАМС, 1983. - 28 с.
6. Попов В.С., Конов Л.П. Фосфоритоносные бассейны Средней Азии // Тр. Среднеаз. НИИ геологии и минерального сырья. – Ташкент, 1981, Вып.3. С. 49-60.
7. Шаякубов Т.Ш., Малматин Г.И., Юлдашев А.З., Ильяшенко В.Я., Бойко В.С., Фатхуллаев Г.Ф. Фосфоритовые месторождения мезозоя и кайнозоя Узбекистана // Геологические проблемы фосфоритонакопления. - М.: Наука, 1987. С. 10-16.
8. Амирова А.М., Соколов С.И., Нарметова Н., Юсупова Ф.М. О вещественном составе зернисто-детритовых фосфоритов Центральных Кызылкумов. // Узб. хим. ж. 1981. №3. С. 8-13.
9. Исмаилов М.М. Кызылкумский фосфоритовый комплекс Навоийского ГКМ. Материалы Республиканской научно-технической конференции «Актуальные проблемы химической переработки фосфоритов Центральных Кызылкумов» Ташкент. -2006. –с.19-22.
10. Казахбаев С. А. и др. ИЗУЧЕНИЕ МИНЕРАЛОГИЧЕСКОГО СОСТАВА КОМПЛЕКСНОГО УДОБРЕНИЯ ИЗ НИЗКОСОРТНЫХ ФОСФОРИТОВ ЦЕНТРАЛЬНЫХ КЫЗЫЛКУМОВ //Universum: химия и биология. – 2021. – №. 10-2 (88). – С. 9-13. <https://cyberleninka.ru/article/n/izuchenie-mineralogicheskogo-sostava-kompleksnogo-udobreniya-iz-nizkosortnyh-fosforitov-tsentralnyh-kyzylkumov/viewer>
11. Войтович И.В., Сушеница Б.А., Капранов В.Н., Дышко В.Н. Применение промышленной фосфоритной муки и местных сыромолотых фосфоритов: Рекомендации. / Немчиновка (Московск.обл.): Изд-во НИИСХ ЦРНЗ, 2004. – 23с.
12. Горная энциклопедия. // <http://www.mining-enc.ru/b/bentonit/>
13. Шукурова С.С., Таджиев С.М. Переработка бедных фосфоритов Центральных Кызылкумов // Узб. хим. ж. – 2003. - №6. – С. 40-43.
14. Шукурова С.С., Таджиев С.М. Сложное удобрение на основе низкосортных фосфоритов Центральных Кызылкумов // Узб. хим. ж. – 2004. - №3. – С. 68-71.
15. Таджиев С.М., Акбарова М.Г., Шукурова С.С. Рациональная технология переработки низкосортных фосфоритов Узбекистана // Вестник ОшГУ. Серия естественные науки. – Ош, 2001. - №3. – С. 224-227.
16. Шукурова С.С. Разработка технологии получения фосфорсодержащих удобрений на основе низкосортных фосфоритов Центральных Кызылкумов и Гулиоба: Автореф. дис. ... канд. техн. наук. – Ташкент. 2005. – 24 с.
17. Динку И. Повышение эффективности фосфоритной муки путем её обработки небольшим количеством кислот: Автореф. дис. ... канд. с.-х. наук. М., 1958. – 17 с.
18. Ангелов А.И., Казак В.Г., Галина В.Н., Ангелова М.А., Альмухаметов И.А., Усманов Р.Т., Ярмухаметов Х.И., Габдуллина Ф.Г., Пашкова А.В., Сидоренкова Н.Г., Шарипов Т.В. Переработка региональных фосфоритов в квалифицированные фосфорные удобрения // Химическая промышленность. - 1996. - № 11. - С. 704-712.
18. Патент США N2948602 Кл.71-39. Производство фосфорных удобрений.//Official Gazette, №2, aug 9, 1960.
- 19.. Предварительный патент РУз IDP 05291.МКИ 7С 05В 13/06 .Способ получения сложного удобрения./ Эркаев А.У. Юсупбеков Н.Р. Артиков Г.О. и др. // Ихтиролар .Расмий ахборотнома. 2002 г. № 4.
20. Патент РУз № IAP 05335. Способ переработки высоко-карбонизированных фосфоритов / Эркаев А.У., Якубов Р.Я., Алламуратова А., Тоиров З.К. // Опубл. 04.01.2017. – Бюллетень №2.
21. Методы анализа фосфатного сырья, фосфорных и комплексных удобрений, кормовых фосфатов / М.М.Винник, Л.Н.Ербанова, П.М.Зайцев и др. - М.: Химия, 1975. – 218 с.

Rezyume: Ushbu tadqiqotda fosfat xom ashyosini kislota bilan parchalanadigan, neytrallangan, bug'langan, maydalangan va sovutilgan holda o'z ichiga olgan murakkab o'g'it ishlab chiqarish usuli taklif qilingan. Ammiaklangan pulpa kamida 1750 kg/m³ zichlikka yetguncha bug'lanadi, unga kaliy tuzlari N:P₂O₅:K₂O ning massa nisbati (0,5-1,5:1,0) ga o'zgarmaguncha qo'shiladi. : (0,5-1,5) va hosil bo'lgan eritma retur ishtirokida donadorlanadi va sovutiladi. Karbonlangan fosfat uchun xom ashyo sifatida yuvilgan quritilgan konsentrat, boyitilmagan fosforit rudasi, changga o'xshash fraksiya va minerallashgan massa ishlatiladi. Murakkab o'g'it eritmasini granulyatsiyaga berishdan oldin, shuningdek, xlorid, sulfat, nitrat, fosfat va karbonat kaliy tuzlari va ularning aralashmalari kabi kaliy qo'shimchalari qo'shiladi.

Резюме: В работе предложен способ получения комплексного удобрения, включающего кислотное разложение фосфатного сырья, нейтрализацию, выпаривание, измельчение и охлаждение. Аммонизированную пульпу упаривают до плотности не менее 1750 кг/м³, после чего добавляют соли калия до изменения массового соотношения N:P₂O₅:K₂O до (0,5-1,5):1,0. : (0,5-1,5), а полученный расплав гранулируют в присутствии ретур и охлаждают. В качестве сырья для карбонизированного фосфата используют промытый осушенный концентрат, небогатенную фосфоритную руду, пылевидную фракцию, минерализованную массу. Перед подачей расплава комплексного удобрения на грануляцию вносят также калийные добавки, такие как хлоридные, сульфатные, нитратные, фосфатные, карбонатные калийные соли и их смеси.

Kalit so'zlar: o'g'itlar, fosforit, pulpa, eritma, konsentrat, dekarbonizatsiya, granulalar, xomashyo, azot, kaliy, kislota, fosforit uni, Qizilqum

Ключевые слова: удобрения, фосфорит, жом, расплав, концентрат, обезуглероживание, гранулы, сырье, азот, калий, кислота, фосфоритная мука, Кызылкум.

APPLICATION OF POLYMER MATERIALS IN MECHANICAL ENGINEERING

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Summary: Overview of polymer materials used in the automotive industry. The effects of the body of a special bus made using composite materials on the stress-strain states of the frame are considered.

Key words: Polymer materials, fiberglass, stress-strain state, bus.

INTRODUCTION.

Analyzing the classification of polymer materials, we note that the vast majority of structural plastics are among composite materials. Their properties are determined by the composition of the polymer binder, the type of filler and the structure of the boundary layers responsible for the redistribution of external influences from the matrix to the filler particles. According to the composition, structure and physico-mechanical properties, most composite materials can be divided into three main groups: isotropic, transversally isotropic and orthotropic materials. The isotropic group of composite materials includes materials for the reinforcement of which a filler is used in the form of chopped short fibers commensurate with the diameter, solid and hollow spheres and microspheres, powders and other finely dispersed components. This component is randomly mixed with the binding matrix. The stress-strain state of such a material is similar to a homogeneous isotropic material. Thermally active and thermoplastic polymers, as well as metals with high adhesive properties to the filler, are used as a binding matrix. Isotropic composite materials are used in electrical engineering, radio engineering and electronics.

The group of transversally isotropic composite materials includes materials whose physical and mechanical properties are isotropic in the plane of the sheet and anisotropic in thickness. The stress-strain state of a transversally isotropic medium is described by five elastic constants. In an isotropic layer, the reinforcing substance can be films (glass, polymer, metallic), chopped fibers laid randomly, impregnated paper, glass wool. And in the anisotropic layer, veneer (wood, glass, made of metallic fibers, which is a layer of unidirectional reinforcing elements interconnected), fabric materials (satin, plain weave, and others) based on glass, cotton and polymer fibers are used as a reinforcing filler. These materials have been widely used in mechanical engineering, shipbuilding, electrical and radio engineering in particular, such as the glass-fiber anisotropic materials AG-4B, DSV-2R-2M, SVAM "star" structure and others. Transversal-isotropic composite materials are used for the manufacture of multilayer printed circuit boards and microelectronic devices, i.e. flat panels, as well as gears and dowels are made of them.

The orthotropic group of composite materials includes materials that have three mutually perpendicular axes of elastic symmetry. The stress-strain state of the orthotropic medium is determined by nine elastic constants. A characteristic feature of these materials is their high specific physical and mechanical properties in the specified directions. They are used to make hull structures, pipes, shells, tanks, propellers and various structural elements. They have received the greatest application in the design of critical load-bearing structural elements.

The values of specific strength of various materials given in the table clearly illustrate one of the advantages of using composite materials based on thermoplastics. The most widely used composite plastics intended for the manufacture of high-loaded products include anisotropic materials, such as fiberglass plastics, in which the reinforcing filler is a glass fiber.

Fiberglass is the most popular material in the automotive industry. The beginning of its history is considered to be the 40s of the last century. The first use of fiberglass was found in construction boats. The main advantage of plastics over other materials, in particular metals, is the relative ease of

obtaining products of various configurations from them without mechanical processing, with a reduced amount of waste. The fiberglass part is glued together in a mold, which dramatically reduces labor and material costs in production. Fiberglass is a fairly versatile material. They occupy an important place among synthetic materials, as they have high strength with low own weight, which significantly reduces the costs of transportation, loading and unloading operations and installation work. Fiberglass-based plastics have high weather resistance, chemical resistance, resistance to corrosion and rotting, resistance to decomposition and mechanical wear, and they also have high durability and reliability in operation at t° from -40°C to $+50^{\circ}\text{C}$. Even body parts of complex configuration can be made from fiberglass by simple means.

Specific strength of various materials

Material	Relative specific strength
Non-filled thermoplastics:	
polycarbonate	1,0
polystyrene	1,09
polyamide	1,24
styrene and acrylonitrile copolymer	1,48
Bronze (yellow injection molding)	1,52
Zinc alloys (injection-molded)	1,67
Glass fiber filled thermoplastics:	
polystyrene	1,71
polycarbonate	1,76
styrene and acrylonitrile copolymer	1,95
polyamide	2,62
Magnesium	2,19
Aluminum	2,52

No one believed that fiberglass is reliable, however, time has shown the opposite. There were precedents when, when a car collided with a body made of fiberglass, and a conventional the result of the "standard" car was not in favor of the latter, the iron car got much stronger. Therefore, when designing a special bus for transporting people with disabilities in wheelchairs, two calculation schemes were created: The first version of the scheme consisted of a frame made in the form of beam elements and a body covering consisting of plates and shells. The second variant of the scheme included a frame made of beam elements, the body and glass paneling of the bus, which are made in the form of plates and shells, but the roof covering in the car was replaced with steel plates with double-sided galvanized plates with plates made of structural fiberglass material AG-4-C. To design a model of the bus structure, a package of applied programs "ISKRA" designed for solving linear problems was used. ISKRA is not a separate program, but an interactive system of finite-elementary fully compatible programs for shaping, loading, calculating design details and analyzing results. When creating the model, discrete finite elements were used, which formed a grid covering the entire model. The optimal distribution of loads on the axles, both in working and in running condition, is 60/40% (front and rear axles). Distributing the load throughout the interior of the car, and concentrating it in the nodes of the structure, it was taken into account that the further the node is from the direct application of the passengers, the less it experiences loads. As a result, pictures of the stress state of the structural elements of the design models with metal sheathing and fiberglass sheathing were obtained, shown in Fig. 1 and 2.

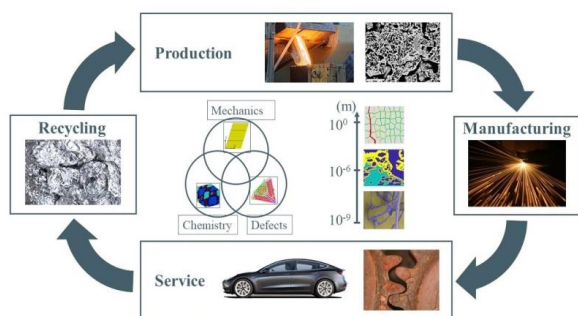


Fig. 1. Computational materials

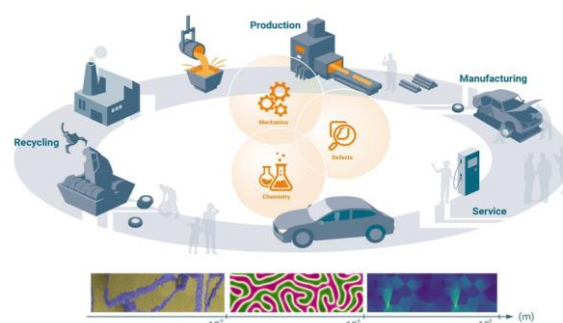


Fig. 2. Computational Sustainable Metallurgy

Conclusions:

1. Based on the analysis of the numerical experiment of the stress-strain state of the cladding of both variants, it gives reason to conclude that the different pattern of deformations occurring in the carcass with different cladding materials.
2. According to the research results, it was found that the use of fiberglass reduces deformation in the car frame.

Literature

1. Потапов А.И. Неразрушающий контроль конструкций из композиционных материалов / А.И. Потапов, Ф.П. Пеккер. Л.: Машиностроение, 1977. 192 с.
2. Папков С.П. Полимерные волокнистые материалы / С.П. Папков. М.: Химия, 1986. 224 с.
3. <http://rusautomaster.narod.ru/stekloplastik.html>
4. <http://www.autoshcool.ru/1238-texnologiya-izgotovleniya-stekloplastika-dlya-tyuninga-svoimi-rukami.html>
5. Промышленные полимерные композиционные материалы / пер. с англ. П.Г. Бабаевский, А.А. Грабельников, С.Г. Кулик; под ред. М. Ричардсона, П.Г. Бабаевского. М.: Химия, 1980. 472 с.
6. С.А. Черкасова, В.Е. Боровских Полимерные материалы в машиностроении и их опыт использования в корпусах автомобилей. Вестник СГТУ. 2011. № 3 (58) .

Rezyume: Avtomobil sanoatida ishlatiladigan polimer materiallariga umumiy nuqtai. Kompozit materiallardan foydalangan holda tayyorlangan maxsus avtobus korpusining ramkaning kuchlanish holatlariga ta'siri ko'rib chiqiladi.

Резюме: Рассмотрены металлургические процессы при сварочных операциях. Дано краткое описание применения термической обработки металлов при сварке и нормализации сварных соединений.

Kalit so'zlar: Polimer materiallari, fiberglass, stress-shtamm holati, avtobus..

Ключевые слова: Полимерные материалы, стекловолокно, напряженно-деформированное состояние, шина.

TECHNOLOGY OF MODERN FINISHING WORKS

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Summary: *This article describes the technology of finishing works of buildings and structures. Basically, these are surface plastering, types of building mixtures, high-quality plaster layers with certain sizes, as well as the technology for preparing surfaces for plastering.*

Key words: *finishing, plaster, high-quality plasters, strength, adhesion, layer, roll, industry.*

Finishing of buildings and structures is carried out in accordance with the working drawings allowed for the production of works, and is approved on the working drawings with the stamp of the technical supervision of the customer. Deviations from the working drawings and the nature of the finishing of non-standard buildings must be agreed upon by the customer with the design organization.

In order to minimize labor costs, it is advisable to widely use prefabricated structures, such as sheet and roll materials, and introduce industrial methods of finishing (plastering) work. General contracting (general construction) organizations are obliged to qualitatively prepare objects for finishing (plastering) works.

Plastering work must be carried out according to the "Project for the production of finishing works" previously tied to local conditions and agreed with the general construction organization (general contractor) and in accordance with the Building Regulations and Rules. KMK 3.03.06-99. "Preparation and application of mortars" [2.3].

Finishing work is carried out in a certain technological sequence: glass, plaster, cladding, painting and wallpaper. Finishing work is carried out by workers united in teams consisting of several links. The team is responsible for the quality of work, for the deadlines, for the economical use of materials. The rational staffing of teams and units, the correct organization of labor, and the qualifications of workers play an important role in raising labor productivity.

This written examination paper contains a description of the technology of tools, materials, methods of organizing work, safety rules for finishing the administration office (high-quality plastering of brick walls with openings, laying a tiled floor with a pattern, pasting walls with wallpaper).

Surface finishing technology. High-quality plastering of brick walls with openings in the administration office. Preparation of a brick surface for plastering.

Preparation of the base surface is carried out for a strong adhesion of the plaster to the base, which determines the quality of the plaster.

Before preparation, it is necessary to check the verticality and horizontality of the surface (plumb and level), the evenness of the surface (rule), the strength of the structures.

The preparation method and tools are selected depending on the base material:

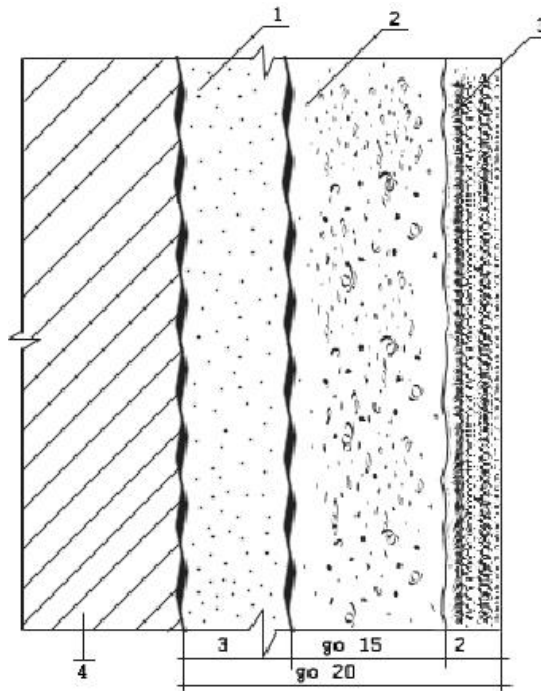
With thick plastering (more than 25 mm), the plaster is reinforced with a metal mesh.

The main task of preparing the surface for plastering and cladding is to clean it from dust and dirt and roughen it to ensure good adhesion of the mortar, glue or mastic to the base [1.38].

Before applying the plaster solution to the surface, it must be prepared - cleaned of dust and dirt, to create a roughness. Especially carefully it is necessary to prepare the surface under the beaten off or fallen off plaster. In these works, a trojan, cog or bush hammer is used.

Brick surfaces are thoroughly cleaned and seams are selected to a depth of at least 1 cm. In case of insufficient roughness, a notch is made with a stroke depth of 3-5 mm with the mentioned tools, moreover, so that there are at least 1000 strokes on 1 m² of the surface. Cleaning from dirt and dust is done with a steel brush.

Plaster does not lay down on wooden surfaces without preparation. In order for this procedure to become possible, they are stuffed with shreds or reinforced with wire mesh. Dran is a wooden torch 1-2m long. Before stuffing, the shredding is sorted into pro-style { of lower quality, at least 3 mm thick} and output { thicker and even 12-15 mm wide and 3-4 mm thick }.



**Pic. 1. Wall section with high quality plaster:
1-spray; 2-soil; 3-cover; 4-brick wall**

High-quality plaster - otherwise called "along the lighthouses", consists of three layers: spray, soil, coating, has a total thickness of up to 20mm.

Plastering rules. Rules for applying the solution:

1. The base must be properly prepared, i.e. strong, hard, clean, even, rough, dust-free, moist.
2. The solution is used before it sets.
3. The solution is applied in thin layers (5-7 mm thick or in accordance with the instructions).
4. Each next layer is applied after the previous layer has set.
5. The strength or grade of the solution of each next layer should be no more than the strength of the previously applied layers (i.e. the most durable layer).

Mortar leveling rules:

1. Leveling is performed immediately after application, before the mortar starts to set.
2. High-quality plaster is leveled with a rule or a small one according to the lighthouses and is called "by the lighthouses".

Rules for finishing plaster:

1. Start grouting after leveling, when the mortar has set and hardened a little.
2. When grouting, the plaster is moistened with water and compacted by pressing the grater to form a smooth crust.
3. Techniques for grouting high-quality plaster: first in a circle, and then in acceleration.
4. The best quality of plaster grouting will be obtained if you first work with a wooden or polyurethane grater, and then with felt.
5. Plaster smoothing is carried out immediately after leveling until the mortar sets and hardens (excluding gypsum plaster).
6. For high-quality painting, metal trowels are used to avoid or reduce surface puttying.

Characteristics of plaster layers.

Table 2

Layers	Layer thickness	Mobility (thickness) of the solution	Aggregate size	Purpose of the layer	Layer Processing
Spray	3-5 mm	Cone immersion depth 8-12cm, liquid solution	Sand size from 0.3mm to 2.5mm	For adhesion (adhesion) of plaster to the base, holding subsequent layers	sketching
Primer	5-7mm	7-9 cm	River sand of medium size from 0.3mm to 2.5mm	For leveling the surface, forming the required basic thickness of the plaster coating	Throwing, spreading, leveling, for simple plaster - grouting
Coating	2mm after grouting	Liquid solution 10-12 cm	Fine sand from 0.3mm to 1.2mm	Stucco finish	Throwing, spreading, leveling, grouting, smoothing

High quality plastering technology.

1. Preparation of the base surface for plastering.
2. Hanging the surface of the base.
3. Installation of beacons throughout the room after about 2m.
4. Spraying on the prepared base.
5. Application of the first layer of primer on the cured spray.
6. Leveling the first layer of soil.
7. Application of the second layer of primer on the set first layer of primer.
8. Leveling the second layer of soil "along the beacons".
9. Finishing corners (husks, mustaches, chamfers).
10. Ceiling rustication.
11. Coating the set layer.
12. Leveling and grouting of the finish coat.
13. Finishing window and door openings (slopes and plugs).
14. Checking the quality of plastering, operational self-control.

Requirements for the quality of plaster.

1. The accuracy of the plastering must meet the requirements of the City Planning Norms and Rules. Collection 61. Plastering work ShNK 4.02.61-07.

2. The plaster must adhere firmly to the surface, not peel off, have a well worn surface, without external defects.

3. Surface irregularities are detected by applying a rule or template 2 m long to the surface in different directions: vertically, horizontally, diagonally.

4. Verticality and horizontality of high-quality plaster hang, arrange marks and beacons.

5. If the deviations are greater than the norm, they are eliminated (the solution is cut off or additionally applied).

For high-quality plaster, the following deviations are allowed:

no more than two irregularities with a depth or height of up to 2 mm; deviation of the surface from the vertical - 1 mm per 1 m of height, but not more than 5 mm for the entire height of the room; from the horizontal - 1mm per 1m of length, but not more than 7mm for the entire length of the room; deviations of husks and mustaches from the vertical and horizontal - 1 mm per 1 m of height or length, but not more than 3 mm for the entire element [3.96].

References:

1. OA Korchagina, VG Odnolko Concrete and building mortars. Textbook Publishing house TSTU 2004.
2. Building codes and regulations. KMK 3.03.06-99. "Preparation and application of mortars".
3. IV Tsprianovich, A.Yu Starchenko Complete systems of dry construction. Textbook Moscow 2011.

Rezyume: Ushbu maqolada binolar va inshootlarni pardoqlash ishlari texnologiyasi tasvirlangan. Asosan, bular yuzalarni suboq qilish, qurilish aralashmalarining turlari, ma'lum o'lchamdagi yuqori sifatli suboq qatlamlari, shuningdek, suboq uchun yuzalarni tayyorlash texnologiyasi yo'llari ko'rsatib berilgan.

Резюме: В данной статье описана технология отделочных работ зданий и сооружений. В основном это оштукатуривание поверхностей, виды строительных смесей, качественные штукатурные слои с определенными размерами, а также технология подготовки поверхностей к оштукатуриванию.

Kalit so'zlar: pardoqlash, suboq, yuqori sifatli suboqlar, mustahkamlik, yopishqoqlik, qatlam, u'ram, sanoat.

Ключевые слова: отделка, штукатурка, высококачественные штукатурки, прочность, сцепления, слой, рулон, индустрия.

EXPERIMENTAL AND THEORETICAL STUDIES OF THE CONTACT INTERACTION OF CRACK BANKS IN EXPERIMENTAL DISK SAMPLES DURING SHEAR

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Summary: Tests of prototypes of the were carried out in a hydraulic press. To install the test sample into the press, without changing the value of the initial crack width obtained as a result of splitting, a special rigid frame made of metal corners was made during the sample turning.

Key words: hydraulic press, metal corners, result of splitting, sample turning, model.

INTRODUCTION

On one of the side faces, the sample placed in the frame, when splitting, rested against a steel plate, into the drilled sockets of which steel balls were placed, and on the other side rested against four screws, with which it was possible to adjust the initial width of the crack. The sample, together with the frame, was installed in a press, after which steel rod rods were superimposed and tightened on it, and the screws were loosened. During the test, at each stage of the load application, measurements were made of the mutual displacements of the banks and the elongation deformation of the rod rods restraining the dilatation crack opening.

MATERIALS AND METHODS

The results of the measurement processing showed that, in general, the initial width of the crack opening and the forces in the rods remained approximately constant throughout the loading. A slight increase in the stresses in the rods and an increase in the crack opening width was observed at the final stages of the load increment. Only in some cases, when the initial values of crack opening were large, and the stresses in the rods were small, these parameters changed significantly during loading. In the process of destruction of the samples, staining was observed along the entire plane of the crack with the manifestation of "inelastic" shear displacements.

In most of the samples of the first series, destruction occurred as a result of staining of filler and mortar particles, and only in two cases there was destruction from bending at the base of one of the sample consoles. This happened with samples that had a small initial crack opening width and a large number of clamps crossing it. During the testing of the samples of the first series, the mutual displacements of the sample halves, as well as the tensile stresses in the clamps, were measured at each stage of the load increment. In some samples of heavy concrete, a slight drop in the transmission of shear forces through the crack was recorded after reaching a certain peak as the shear displacements of the crack banks increased.

RESULTS AND DISCUSSION

The test results of samples with different numbers of clamps are shown in Fig. 1-4. As can be seen from the graphs, the rate of increase in crack opening was slower than the change in shear displacements as the load on the sample increased. Before testing each sample, the initial deformations in the clamps that appeared during splitting were measured. These deformations were subtracted from those measured later when loading the sample. The measured deformations were used to determine the normal shear stresses that occurred in the clamps. From the characteristics of the tested samples with cracks, it can be seen that when assessing their shear strength, the influence of such factors was studied: the crack opening width and forces normal to the crack plane.

The results of the study of shear strength and stiffness are shown in the graphs (Fig. 1-4) obtained as a result of testing the first two series of samples on a slice.

As can be seen from the graphs, the type of concrete affects not only the final value, but also the entire nature of the curves. The most distinct difference in the behavior of the samples of the first and second series can be seen if we compare the test results of all samples (heavy and light) in Fig. 1-

4. At low grades, the shear resistance of the samples decreases. In addition, it should be noted here that, unlike samples with R_b 20 MPa, samples with R_b 20 MPa have fracture of the crack bank surfaces after testing. The influence of the type and number of transverse fittings crossing cracks is very noticeable if we compare the graphs in Fig. 3 samples with a large number of clamps show greater strength and rigidity. In addition, Fig. 3 shows that the samples reinforced with reinforcement A-II have a greater tangential stress than similar ones from A-I. This asserts the influence of strength and deformative characteristics on the final value of τ . Figure 1 shows the graphs of the results of the second series of samples on the cut. According to the test data, with large values of crack opening, the resistance of the samples to the cut decreases. The magnitude of the stress difference on the shear displacement for both curves is almost an order of magnitude greater than this difference at 2 mm. In addition, it should be noted that despite the fact that the initial crack opening for heavy concrete is 0.35 mm, the first contact interaction was weaker than the second.

The experimental data obtained also indicate the important role played by the crack opening width and the "pseudo-elastic" behavior of the samples of the second series under load. This has been repeatedly pointed out in [1,2] due to the fact that the graphs of the dependencies " $\tau - \delta$ " obtained from experiments are difficult to interpret without having an idea of the magnitude of " a ". For samples with clamps, the work on the dependence " $\tau - \delta$ " concluded that the shear stiffness increases with the number of clamps, although the values " a " or " a ". were not measured.

Figure 3 shows a graph showing that samples with stronger reinforcement and greater crack opening show a smaller value of τ_s shear than samples with less crack opening and the number of clamps.

An equally important factor affecting the transmission of forces through the crack in samples of both types of concrete is the normal compression force σ . The analysis carried out for 4 samples of the first series can be illustrated by Fig. 5 and 6.

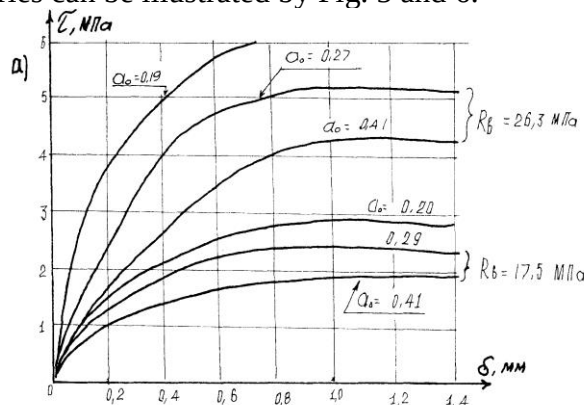


Fig. 1. Graphs of the dependence of tangential stresses (τ) on relative displacement (δ) at different initial crack opening widths

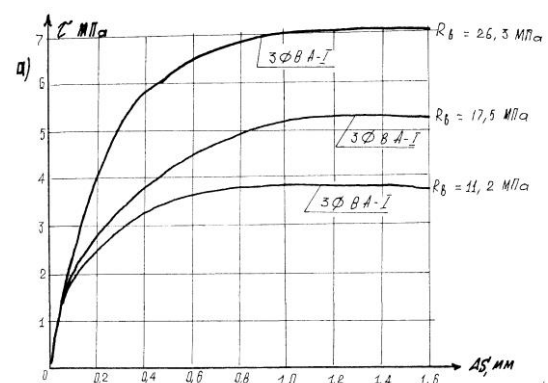


Fig. 2. Graphs of the relationship between tangential stresses and shifts of crack sides

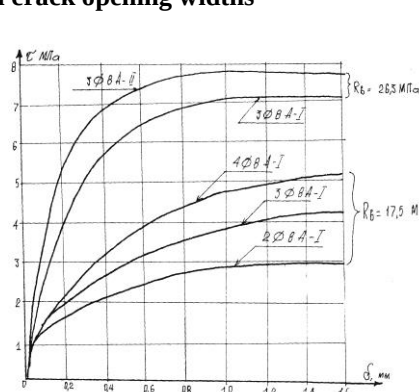


Fig. 3. Graphs of the relationship between

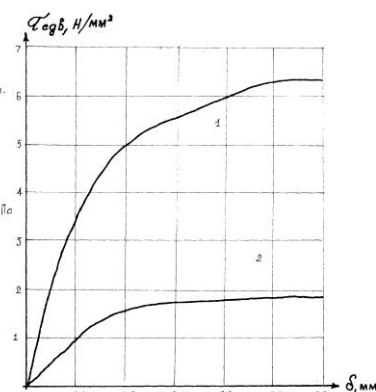


Fig. 4. Dependence « τ - δ » for

the tangential stresses τ and the displacement of the sides of cracks at

$$a_{cr} = 0,23 \text{ mm и } \sigma_s = 1,07 \text{ N/mm}^2$$

two samples of the first series with similar values

The graph shows that the sample with a large value of σ_s shift does not differ significantly in magnitude τ . Each pair of samples made of heavy concrete also has similar values of "a" and a relatively large difference in the values of σ_s . The graph " $\tau - \delta$ " for these samples clearly shows that, within the limits of its change, the value of σ_s shear has almost no effect on the shear stiffness of the samples, which is almost entirely determined by the width of the crack opening.

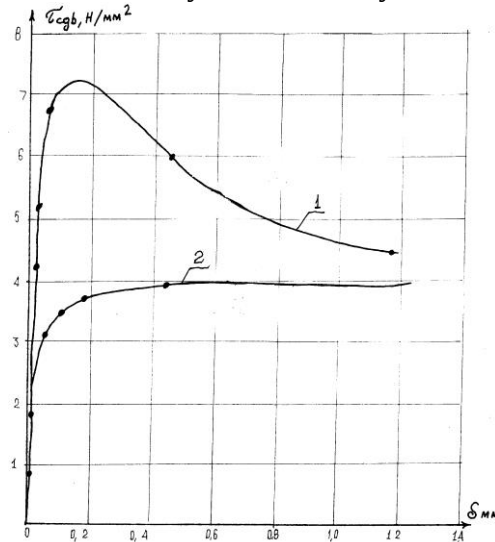


Fig. 5. Dependence for two samples of the second series with an equal number of clamps (4D8A-I at $a_0 = 0.26$ mm)

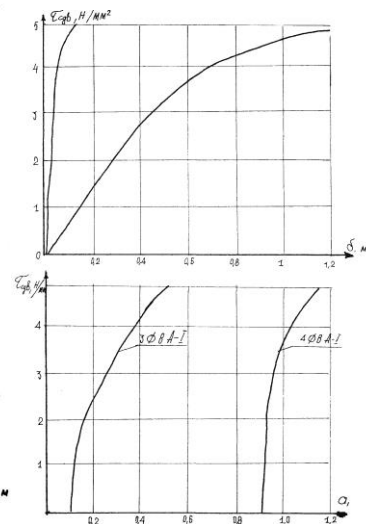


Fig. 6. Test results of two samples of the second series

Figures 7, 8 and 9 show the curves " $\tau - \delta$ ", " $\tau - a$ " and " $\tau - \varepsilon$ " according to the test results of the amplified and non-amplified disk samples. The results show that in reinforced samples, the shift displacement at each load increment is significantly less than in non-reinforced ones. A sudden increase in shear displacement at extreme load in reinforced special samples was observed due to the fact that the TCM tissue does not have a flow stage. The destruction of the reinforced special samples occurred with a loud sound. Direct shear tests of non-reinforced special samples show that the shear stress increases with an increase in the percentage of internal reinforcement. However, in special samples, the contribution of the TCM sheet to the resistance of the sample decreases with an increase in the percentage of internal transverse reinforcement. This behavior of the samples resembles the test results of T-beams. The shear bearing capacity of reinforced samples increased by 7...56% compared to non-reinforced ones.

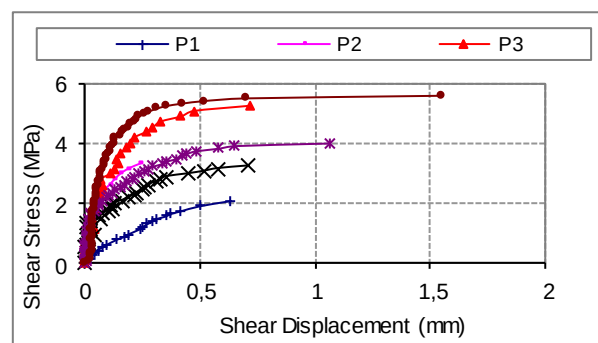


Fig. 7. Dependence " $\tau - \delta$ " for the P and PF series

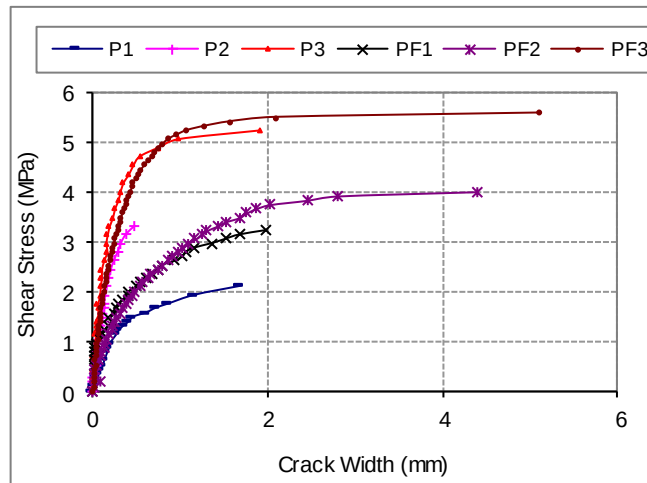


Fig. 8. Dependence " $\tau - a$ " for the P and PF series

The stiffness of the reinforced samples was higher than that of the non-reinforced ones, except for the PF2 sample. The stiffness of the P2 sample was higher than that of the PF2 sample, which is explained by a smaller initial crack opening width. It is obvious that the stiffness of the samples with a larger initial crack opening width was lower than in the samples with a smaller opening. With an increase in the percentage of internal reinforcement, there was no significant difference in the shear and normal displacements of samples P1 and P3 under destructive load. In reinforced samples, the contribution to shear stresses provided by external reinforcement from TCM decreased with an increase in the percentage of internal transverse reinforcement. The displacements δ and a in the reinforced samples were less than in the non-reinforced ones at the same load. Reinforced samples under destructive load showed higher values of δ and a than non-reinforced ones. An increase in the load leads to an increase in the displacements δ and a in the non-amplified samples, whereas in the amplified ones, the growth of displacements increased gradually until destruction.

As shown in Fig. 9, the dependence " $\tau - \delta$ " shows the same behavior for amplified and non-amplified samples. It was revealed that the deformations of the reinforcement in the samples reinforced with TCM, at the same load level, reached a lower value than in the non-reinforced ones, which is explained by the presence of external reinforcement from TCM. In the steel clamps of reinforced samples, under the breaking load, the desormalization reached a maximum and in the samples of the P series varied from $2447\mu\epsilon$ to $3052\mu\epsilon$, while in the PF series it increased from $2805\mu\epsilon$ to $7770\mu\epsilon$.

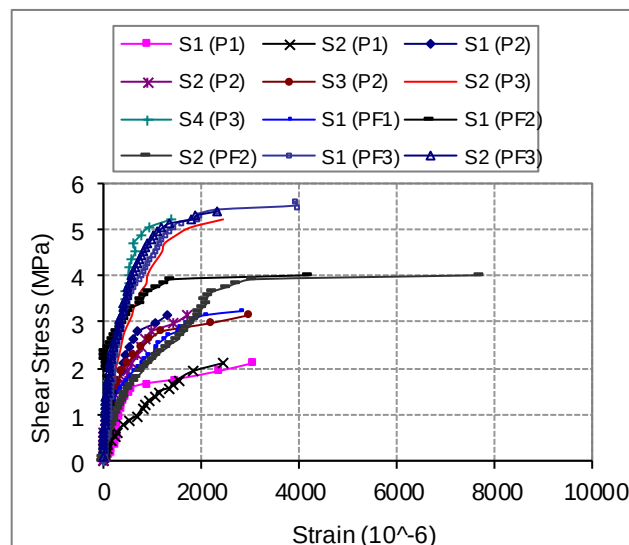


Fig. 9. Dependence " $\tau - \varepsilon$ " in steel clamps across the cut plane of reinforced (P series) and non-reinforced (PF series) special samples

As shown in Fig. 9, the dependence " $\tau - \delta$ " shows the same behavior for amplified and non-amplified samples. It was revealed that the deformations of the reinforcement in the samples reinforced with TCM, at the same load level, reached a lower value than in the non-reinforced ones, which is explained by the presence of external reinforcement from TCM. In the steel clamps of reinforced samples, deformations reached a maximum under destructive load and in the samples of the P series varied from $2447\mu\varepsilon$ to $3052\mu\varepsilon$, while in the PF series it increased from $2805\mu\varepsilon$ to $7770\mu\varepsilon$.

The increase in the load increased the values of the displacements δ and a in the reinforced samples. The deformation in the steel clamps did not exceed the limit value. In reinforced special samples, the crack banks were separated, leading to the fluidity of the clamps and the subsequent rupture of the sheets of T KM along the crack or to the break-off of the concrete layer. External reinforcement restrained both shear displacements and crack opening. As the load increased, samples PF1 and PF2 collapsed with a rupture of T KM along the crack, while sample PF3 collapsed with a breakaway of the surface layer of concrete.

The proposed theoretical model. In [4] and [5], equations for calculating the shear resistance of a special sample based on analogy with the theory of shear friction are proposed. The concrete surfaces of the crack are rough and irregular and when displacement occurs along the shear plane, its banks will move apart, which will lead to additional tensile stresses in the internal steel reinforcement crossing the crack and compressive stresses in the concrete. The compressive stress across the crack provides resistance to shear displacement due to friction between the rough surfaces of the crack. It is assumed that the crack opening can lead to the fluidity of the rods crossing the crack. Therefore, the value of $\tan \alpha$ represents the coefficient of friction between the crack surfaces. The shear stress for reinforced samples was determined by adding the contribution of external reinforcement from the TOPICS to expression. Thus, the total shear strength of reinforced samples was determined from the experiment.

In reinforced samples, the external reinforcement of T CM will resist normal and shear displacement in the crack. Fibers parallel to the horizontal axis of the internal reinforcement will be stressed as well as steel clamps. Horizontal displacement stresses the fibers of the TCM, which are oriented normally to the shear plane, developing compressive stresses in the concrete of the crack banks. Vertical fibers act as bonds that prevent the TCM sheet from peeling off the concrete. The proposed empirical expression was formulated by adding the contribution of external reinforcement from TCM to equation using regression analysis of experimental data. Shear stresses for reinforced samples can be expressed as follows:

The applicability of equation is limited by the cubic strength of concrete in the range of 30MPa – 40MPa. Table 1 shows a comparison of theoretical and experimental results of non-amplified and reinforced samples. From the table. 1 it can be seen that the proposed equation gives results close to the experimental values. The experimental results were compared with the proposed theoretical equation for calculating the shear strength of samples reinforced with TCM.

Table 1. Comparison of theoretical and experimental results of non-reinforced and reinforced disk samples

Sample Details	A_{sv} (mm ²)	f_y (MPa)	Cutoff voltage U_{uf}		$\frac{U_{uf,exp}}{U_{uf,the}}$
			theoretical (MPa)	experimental (MPa)	
P1	56.55	660.82	1.28	2.09	1.63
PF1	56.55	660.82	3.20	3.32	1.04
P2	113.09	660.82	2.56	3.30	1.28
PF2	113.09	660.82	4.34	4.10	0.95
P3	169.65	660.82	3.84	5.24	1.36
PF3	169.65	660.82	5.48	5.58	1.02

CONCLUSION

Based on experimental and theoretical studies of beams and special samples, the following conclusions were made.

The test results of the disk samples showed that orthotropic UPVM sheets increase their load-bearing capacity. At the same time:

- the bearing capacity when cutting reinforced special samples increased by 7-56% compared to non-reinforced ones;
- the contribution of the UPVM to the load-bearing capacity of the reinforced special sample decreases with an increase in the amount of internal reinforcement;
- the deformation curves of steel clamps of reinforced special samples are similar to the curves of non-reinforced special samples;
- the rigidity of reinforced samples-disks shows better performance than non-reinforced special samples due to the presence of external reinforcement by the UPVM fabric.

When studying the shear bearing capacity in non-reinforced and reinforced disk samples, internal reinforcement with clamps was chosen as a variable. Empirical formulas have been developed for the values of the bearing capacity when cutting reinforced disk samples. It is noted that there are no sufficient experimental or theoretical results of studying reinforced disk samples.

The tangential forces of engagement to cracks of concrete and reinforced concrete elements significantly depend on the width of the crack opening and the mutual shift of its shores. With a decrease in α_{crc} , the degree of nonlinearity of the dependence $\tau_{3ay}=f(\delta_{crc})$ increases.

When limiting the opening of cracks by imposing bonds in them, forces arise that act according to the norms to the crack, normal stresses depend on $\alpha/2$, and other factors, similarly to tangential engagement forces.

The increase in the shear stress of reinforced samples varies in the range of 7-56% compared to non-reinforced ones. The contribution of TCM decreases with an increase in the percentage of internal reinforcement. External reinforcement of T KM restrains shear displacements and the width of crack opening. The shear and normal displacement in the reinforced samples were smaller compared to the non-reinforced ones under the same load, however, when destroyed, the reinforced samples achieved greater shear and normal displacement compared to the non-reinforced ones. At extreme load, a sudden increase in shear and normal displacement was observed. The rigidity of the reinforced samples was higher than that of the non-reinforced ones.

Similarly, in reinforced disk samples, the deformation in steel clamps was less than in non-reinforced ones under the same load. However, at the stage of destruction, reinforced samples showed greater strain values than non-reinforced samples. The nature of the dependence " $\tau - \delta$ " of reinforced and non-reinforced disk samples is the same. The proposed theoretical expression for calculating the shear stress of reinforced disk samples can be used provided there is sufficient correlation with experimental results. For a wider application of the proposed equation, further research is needed.

References:

1. ACI-319-95 (1995). Building Code Requirements for Structural Concrete and Commentary. American Concrete Institute, Farmington Hills, Michigan, USA.
URL:<https://cyberleninka.ru/article/n-planirovaniya-prodolzhitelnosti-raboty>.
2. ACI Committee 445 on shear and Torsion (1998). Recent Approaches to shear design of structural concrete. Journal of structural Engineering Vol.124, No.12 URL:<https://doi.org/10.15802/tstt2018/150194>.
3. Adhikary, B. B., Mutsuyoshi, H., and Sano, M. (2000). Shear strengthening of reinforced concrete beams using steel plates bonded on beam web: experiments and analysis. Construction and Building Materials Vol. 14, pp 237-244.
4. S. Jumayev, S. Khudayberganov, O. Achilov, and M. Allamuratova, "Assessment criteria for optimization of parameters affecting to local wagon-flows at railway sites," in E3S Web of Conferences, Jun. 2021, vol. 264, p. 05022, doi: 10.1051/e3sconf/202126405022.
5. Ahlskog J. J. (1990). Bridge Management—the Answer to the challenge Bridge Evaluation. Bridge Evaluation, Repair and Rehabilitation, Editor: A.S. Nowak pp 3-10.

6. Sardor, A., Butunov, D., Tukhakhodjaeva, M., Buriev, S., & Khusenov, U. (2021). Administration of Technological Procedures at Intermediate Stations. Design Engineering, 14531-14540.
7. Chajes, M. J., Thomson, T. A., and Tarantino, B. (1995a). Reinforcement of concrete structures using externally bonded composite materials. Non-metallic (FRP) Reinforcement for Concrete Structures, ed. L. Taerwe, E & FN Spon, London, pp 501-508.
8. Chajes, M. J., Januszka, F., Mertz, D. R., Thomson, T. A., and Finch, W. W. (1995b). Shear strengthening of reinforced concrete beams using externally applied composite fabrics. ACI Structural Journal Vol. 9, No. 3, pp 295-303.
9. Fukuyama, H., Nakai, H., Tanigaki, M., and Uomoto, T. (1997). JCI state-of-the art on retrofitting by CFRM part1-Materials, Construction and Application. Non-Metallic (FRP) reinforcement for concrete structures, Proceedings of the Third Symposium, Japan, Vol. 1, pp 605-612.
10. Chaallal, O., Nollet, M. J., and Perraton, D. (1998). Strengthening of reinforced concrete beams with externally bonded fibre reinforced plastic plates: design guidelines for shear and flexure. Canadian Journal of Civil Engineering, Vol. 25, No. 4, pp 692-704.
11. GangaRao. H. V. S and Vijay. P. V. (1998). Bending behaviour of concrete beams wrapped with carbon fabrics. Journal of structural Engineering, vol. 124, No.1, pp-3-10.
12. J. Jayaprakash, Abdul Aziz A. A., Abang, A A. A., and Ashrafov, A. A. (2004a) External Shear Strengthening Strategies of RC Beams with Bi-Directional Carbon Fibre Reinforced Polymer Sheet. Proceedings of International Conference on Bridge and Hydraulic structures, pp 219-224.
13. <https://randomus.ru/quick?from=1&to=6&count=1&norepeat=1&sort=1>

Rezyume: Prototiplarning sinovlari gidravlik pressda o'tkazildi. Sinov namunasini matbuotga o'rnatish uchun parchalanish natijasida olingan dastlabki yoriq kengligining qiymatini o'zgartirmasdan, namunani egish jarayonida metall burchaklardan maxsus qattiq ramka qilingan.

Резюме: Испытания опытных образцов проводилось в гидравлическом прессе. Для установки в пресс испытываемого образца, не изменяя полученной в результате раскалывания величины начальной ширины трещины, в процессе кантования образца была изготовлена специальная жесткая рама из металлических уголков.

Kalit so'zlar: gidravlik press, metall burchaklar, chiqarish natijasi, namunaning aylanishi, model.

Ключевые слова: гидравлический пресс, металлические уголки, результат расщепления, поворот образца, модель.

**STUDY OF BASALT OF THE SHEIKH-JALIL DEPOSIT OF THE REPUBLIC OF
KARAKALPAKSTAN IN THE PRODUCTION OF PORTLAND CEMENT**

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Summary: *The article presents the results of X-ray diffraction analysis, semi-quantitative spectral analysis, chemical and mineralogical composition of basalt, selected from the Sheikh-Jalil deposit in the Karauzyak region of the Republic of Karakalpakstan. Based on the results of the analysis, the possibility of using basalt from the Sheikh-Jalil deposit as an active mineral additive for Portland cement was studied.*

Key words: *basalt, cement, activity, active mineral additive, inert mineral additive, diatomites, tripoli, flasks, ashes, tuffs, routes, volcanic slags, zeolite, gliezh.*

Introduction

With the intensive development of the construction complex in Uzbekistan in recent years, the demand for building materials is also growing rapidly. Portland cement is one of the main building materials. Especially in monolithic construction. Cement (Latin *caementum* - "crushed stone, broken stone") is an artificial inorganic binder.

The production of cement requires a large consumption of raw materials and energy costs. Therefore, reducing the consumption of natural resources and the cost of production of Portland cement by replacing mineral additives with production waste and secondary resources, improving its construction and technical characteristics.

In the Republic of Karakalpakstan, as a result of geological exploration, a sufficient amount of non-metallic raw materials has been explored and developed, which are used to a limited extent for the production of active mineral additives for cement. Among these mineral resources, igneous rocks of various origins (basalt, diatomite, diabase, crushed granite and vermiculite waste) are promising.

Materials and methods of research

Basalt from the Sheikh-Jalil deposit, which are located in the Karauzyak region in the Republic of Karakalpakstan, was used as active mineral additives to produce high-quality cement. The explored field has reserves of 2.6 million tons, which for many years can be used as active mineral additives for cement. For this, it is necessary to study the physicochemical and mineralogical properties of this mineral (basalt).

Results and discussion

Mineral additives are added to increase the activity of cement. The term mineral supplement has a broader meaning. There are mineral additives for cements. The corresponding definition is given in GOST 30515-2013 Cements.

Mineral additive - a material introduced into cement instead of a part of clinker in order to achieve certain quality indicators and save fuel and energy resources [1].

By activity, mineral additives are distinguished into active mineral additives (AMD) and inert mineral additives (IMD). According to GOST R 56196-2014 [2], active mineral additives for cements are divided into natural mineral additives and technogenic mineral additives.

Natural mineral additives include diatomites, tripoli, flasks, ashes, tuffs, trails, volcanic slag, zeolite and gliezh.

Technogenic mineral additives include blast-furnace granulated slag, fly ash, microsilica, burnt shale.

Inert mineral additives - fillers are finely ground or finely dispersed substances of natural origin or industrial waste, consisting of crystalline silica, alumina and other substances that do not have latent hydraulic activity.

The main requirements for the quality of mineral additives are set out in GOST R 56178-2014 [3], GOST R 56196-2014 and GOST R 56592-2015.

In this work, to increase the activity of cement, we take basalt from the Sheikh-Jalil deposit as a mineral additive. To obtain a mineral additive from basalt, we first crush it in a jaw crusher, then bring it to a powdery mass with a ball mill.

In this work, to increase the activity of cement, we take basalt from the Sheikh-Jalil deposit as a mineral additive. To obtain a mineral additive from basalt, we first crush it in a jaw crusher, then bring it to a powdery mass with a ball mill.

We have studied the chemical composition and X-ray diffraction analysis of powdered basalt from the Sheikh-Jalil deposit, mined naturally and fired at a temperature of 850°C for 1 hour.

Chemical analysis of minerals is carried out to determine their composition, origin, method of formation.

When studying the chemical composition of naturally crushed basalt and firing at a temperature of 850°C for one hour of the Sheikh-Jalil deposit, we obtained the data shown in Table 1.

Table 1

	1	2	3	4	5	6	7	8	9	10	11	12
Name	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	TiO ₂	P ₂ O ₅	MnO	II.II.II	Sum
	Mass fraction in %											
Basalt (regular crushed)	52,8	15,5	9,1	8,2	5,6	2,9	0,4	0,7	0,08	0,04	3,6	98,92
Basalt (crushed after firing 850 °C 1 hour)	56,5	16,9	9,1	5,9	6,1	2,3	0,7	1,0	0,09	0,04	0,9	99,23

X-ray diffraction analysis is a method for studying the structure of bodies using the phenomenon of X-ray diffraction, a method for studying the structure of a substance by distribution in space and the intensities of X-ray radiation scattered on the analyzed object.

In X-ray diffraction analysis of naturally crushed basalt at a temperature of 850°C for 1 hour, the data in Fig. 1 and 2 were obtained.

The results of X-ray diffraction analysis, naturally ground from basalt, from the Sheikh-Jalil deposit showed that the main rock-forming mineral is quartz.

On the X-ray photographs (Fig. 1) of the naturally crushed Sheikh-Jalil basalt, the presence of a line of diffraction maxima corresponding to quartz minerals is mainly observed - $d=0.332$; 0.317 ; 0.253 ; 0.227 ; 0.181 ; 0.165 ; 0.157 nm, oligoclase - $d=0.631$; 0.258 ; 0.163 ; 0.153 ; 0.150 ; 0.145 ; 0.143 nm; orthoclase - $d=0.421$; 0.384 ; 0.177 nm, albite - $d=0.496$; 0.374 ; 0.364 ; 0.351 ; 0.270 ; 0.201 nm, chlorite - $d=0.698$ nm, cordierite - $d=8.29$; $d=0.336$; 0.311 ; 0.238 ; 0.232 ; 0.187 nm, anorthite $d=0.467$; 0.292 ; 0.215 ; 0.211 nm, mica $d=0.399$ nm [6.7].

Firing, Sheikh-Jalil basalt at a temperature of 850°C for an hour, received the following X-ray diffraction analysis (Fig. 2).

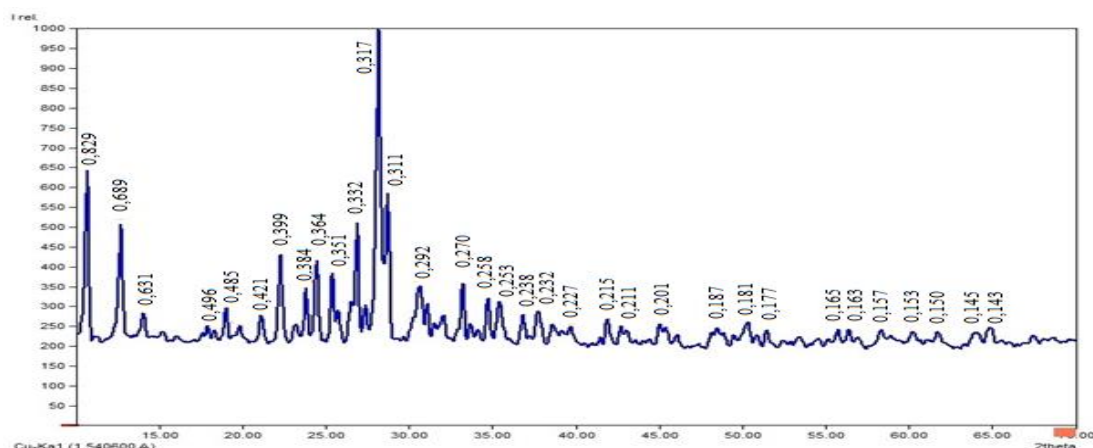


Fig. 1. X-ray diffraction analysis of naturally crushed basalt from the Sheikh-Jalil deposit

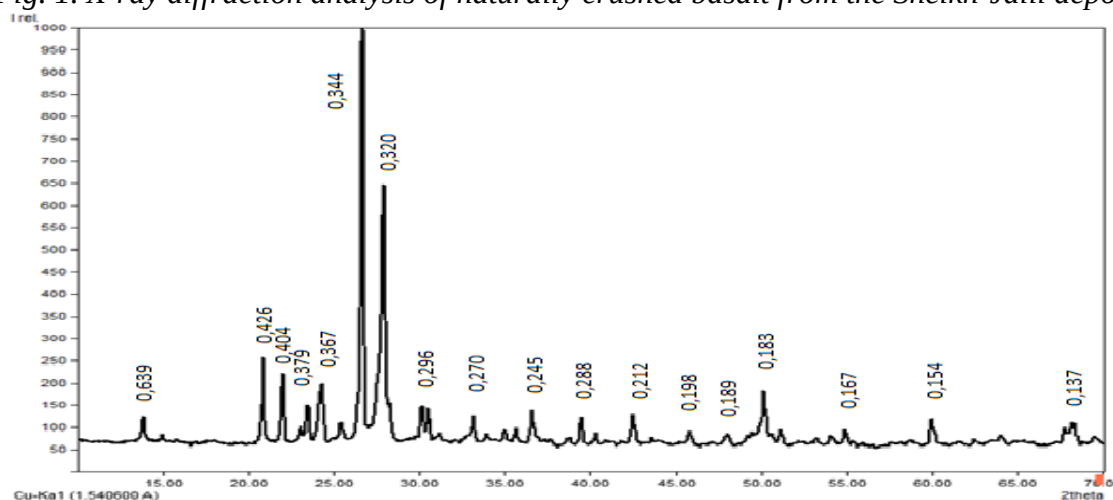


Fig. 2. X-ray diffraction analysis of basalt from the Sheikh-Jalil deposit after firing at 850°C for an hour

Basically, the presence of a line of diffraction maxima corresponding to quartz minerals $d=0.426$; 0.404 ; 0.334 ; 0.245 ; 0.228 ; 0.223 ; 0.212 ; 0.198 ; 0.182 ; 0.180 ; 0.167 ; 0.138 ; 0.137 nm, oligoclase - $d=0.639$; 0.367 ; 0.320 nm; orthoclase – 0.324 ; 0.293 nm, augite – 0.252 ; 0.212 nm, albite - $d=0.639$; 0.385 ; 0.350 ; 0.296 ; 0.256 ; 0.189 ; 0.185 ; 0.184 ; 0.183 ; 0.179 ; 0.154 ; 0.135 nm, chlorite – 0.169 ; 0.146 nm, cordierite – 0.385 ; 0.339 ; 0.315 ; 0.270 ; 0.264 nm, aragonite - $d=0.379$; 0.329 ; 0.287 ; 0.198 nm [6.7].

As a result of semi-quantitative spectral analysis of samples of natural Sheikh-Jalil basalt and firing at 850°C for an hour, the following chemical elements were determined, which are shown in tables 2 and 3. Of these elements, the main rock-forming elements are silicon, aluminum, calcium, sodium, potassium, iron, magnesium, other elements are present in small quantities.

Table 2

Results of natural semi-quantitative spectral analysis of experimental samples of Sheikh-Jalil basalt

Raw materials	The content of chemical elements, %							
	Si	Al	Ca	Na	K	Fe	Mg	P
Basalt	25	9	4	10	0,3	7	3	0,04
Raw materials	The content of chemical elements, %							
	Mn	V	Ti	Cr	Cu	Rb	Zn	Ni
Basalt	0,04	0,03	0,5	0,008	0,008	0,0003	0,003	0,0005

Table 3

The results of firing at 850°C for an hour of semi-quantitative spectral analysis of prototype samples of Sheikh-Jalil basalt

Raw materials	The content of chemical elements, %							
	Si	Al	Ca	Na	K	Fe	Mg	P
Basalt	25	9	0,6	12	0,6	5	4	0,04
Raw materials	The content of chemical elements, %							
	Mn	V	Ti	Cr	Cu	Rb	Zn	Ni
Basalt	0,04	0,03	0,6	0,004	0,008	0,0003	0,001	-

Conclusion. Thus, as a result of a comprehensive study of chemical and mineralogical compositions, X-ray phase and X-ray spectral analyzes, it was found that the studied basalt rocks of the Sheikh-Jalil deposit can be recommended as active mineral additives in the production of cement.

In addition, taking into account the favorable location and large reserves of basalt from the Sheikh-Jalil deposit, it will expand the raw material base for the production of various types of binders.

References:

1. GOST 30515-2013 Cements. General technical conditions, GOST dated June 11, 2014 No. 30515-2013. docs.cntd.ru. Retrieved 11 July 2018. Archived from the original on 2 July 2018.
2. National standard of the Russian Federation GOST R 56196-2014 "Active additives. Dokipedia. www.dokipedia.ru. Date of access: July 11, 2018. Archived on July 12, 2018.
3. GOST R 56178-2014 Organo-mineral modifiers type MB for concrete, mortars and dry mixes. Specifications, GOST R dated October 21, 2014 No. 56178-2014. docs.cntd.ru. Retrieved 12 July 2018. Archived from the original on 12 July 2018.
4. A.M. Ergeshov, L.I. Fimushkin. Geological and economic monitoring of the state and use of the mineral resource base of non-metallic raw materials in Uzbekistan. Tashkent, 2005. 161s.
5. F.M.Aripova, M.M.Miraslanov, M.M.Zakirov. The state of knowledge and assessment of the physical and mechanical properties of rocks of ore deposits in Uzbekistan. Mining Bulletin of Uzbekistan, 2006, No. 1 (24), pp. 7-12.
6. A.N. Winchell, G. Winchell. Optical properties of artificial minerals. Publishing house "MIR" Moscow 1967.
7. V.I.Mikheev. X-ray determinant of minerals. Moscow 1957.

Rezyume: Maqolada Qoraqolpogiston respublikasi Qorauzyak tumanidagi Sheyx-Jalil konidan olingan bazaltning rentgen difraksion tahlili, yarim miqdoriy spektral tahlili, kimyoviy va mineralogik tarkibini o'rganish natijalari keltirilgan. Tahlil natijalariga ko'ra portlandsement uchun Sheyx-Jalil konining bazaltini faol mineral qo'shimcha sifatida foydalanish mumkinligi o'rganilgan.

Резюме: В статье представлены результаты рентгеноструктурного анализа, полуколичественного спектрального анализа, химического и минералогического состава базальта, отобранного из Шейх-Джалильского месторождения в Караузякском районе Республики Каракалпакстан. По результатам анализа изучена возможность использования базальта Шейх-Джалильского месторождения в качестве активной минеральной добавки для портландцемента.

Kalit so'zlar: bazalt, sement, faollik, faol mineral qo'shimchalar, inert mineral qo'shimchalar, diatomitlar, treptellarlar, opokalar, kullar, tuflar, trasslar, vulqon shlaklari, seolit, glieji.

Ключевое слова: базальт, цемент, активность, активная минеральная добавка, инертная минеральная добавка, диатомиты, трепелы, опоки, неплы, туфы, трассы, вулканические шлаки, цеолит, глиежи.

PERFORMING WELDING WORK USING POLYMER COMPOSITE MATERIALS

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Summary: *Metallurgical processes during welding operations are considered. A brief description of the use of heat treatment of metals during welding and normalization of welded joints is given.*

Key words: *deformation, zone of thermal influence, crystallization, stress, tempering, pre-welding heating, weld.*

INTRODUCTION.

Welding is the process of obtaining permanent joints by establishing interatomic bonds between the welded parts when they are heated or plastic deformed, or the combined action of both [1, p. 3]. There are two types of welding: fusion welding and pressure welding. The essence of fusion welding is that the metal along the edges of the welded parts is melted under the action of the heat of the heating source. The source of heating can be an electric arc, gas flame, molten slag, plasma, laser beam energy. In all types of fusion welding, the resulting molten metal of one edge is combined and mixed with the molten metal of the other edge, creating a total volume of liquid metal, which is called a welding bath. After solidification of the welding bath, a weld is obtained. Let's take a closer look at the welding bath formed, for example, during arc or flame welding. When manually welding with thick-coated electrodes, the arc immersion depth is 3-4 mm. As the arc progresses in the tail part of the metal melting zone, intensive heat removal into the mass of cold metal occurs. The crystallites grow in a direction perpendicular to the surface of the heat sink. The crystallization of the seam metal, i.e. the transition from a liquid state to a solid state, proceeds with stops. After cooling of the first layer, there is some delay in crystallization due to the deterioration of the heat sink and the release of latent heat of crystallization of the first layer. After some delay, due to the incessant heat sink deep into the base metal, the second layer begins to crystallize, etc. Thus, crystallization occurs periodically along the entire longitudinal and transverse section of the seam metal. The thickness of the crystallization layers can vary from fractions of a millimeter to several millimeters. The crystallized metal of a single-pass seam has a columnar structure, this is due to the fact that crystals grow faster in the direction of heat removal (perpendicular to the melting boundary) than in other directions. The axis of each crystallite is usually not straight, it is slightly curved in the direction of the top of the seam [3, p. 219]. In the process of crystallization of the weld metal, an uneven distribution of the alloy components occurs. This is called liquation in metal science. Liquation is, first of all, heterogeneity in chemical composition. Zonal liquation is characterized by a difference in the chemical composition of the peripheral zone and the central part of the seam metal. Dendritic (intracrystalline) liquation is characterized by the heterogeneity of the chemical composition of individual crystals. The central part of the dendrites consists, as a rule, of a pure solid solution, and the boundary between the dendrites is most polluted with harmful impurities. Therefore, the destruction of the seam metal most often occurs along the grain boundaries. The properties of the welded joint, along with the chemical composition of the seam metal, are significantly influenced by the structure of the seam metal, as well as the structure of the zone of thermal influence of the near-seam zone. During the welding process, the base metal is heated and structural changes occur in it under the influence of high temperatures. The heating area is called the zone of thermal influence (ZTV). The temperature to which individual sections of the ZTV are heated is measured from the melting point to the ambient temperature. Depending on the heating temperature, structural and physico-mechanical changes in ZTV, the following areas are distinguished: incomplete melting; overheating; normalization; incomplete recrystallization;

recrystallization; blueness. The area of incomplete melting is transitional from the deposited metal to the main one, it is often called the transition zone. During the welding process, this section is in a solid-liquid state and therefore the transition zone differs in chemical the composition of both the base and the deposited metal. In most cases, the properties of this section have a decisive influence on the workability of the welded structure. At the overheating site, a coarse-grained structure is formed in the base, which significantly reduces the plasticity of the metal and increases its fragility. At the normalization site, the properties of the metal are usually higher than the properties of the base metal in its initial state. In the areas of incomplete recrystallization and recrystallization, grains of the source metal are present and some grain grinding is observed, which practically does not change the mechanical properties of the metal. The weld in combination with the ZTV contributes to the occurrence of its own stresses and deformations. Such stresses that arise without the application of external forces are called proper. Depending on the cause of occurrence , the following stresses are distinguished:

- thermal, arising due to uneven temperature distribution during welding;
- structural, appearing as a result of structural transformations similar to quenching.

Depending on the time of existence of their own stresses and deformations, they are divided into temporary and residual. Temporary stresses and deformations exist in the structure only at some point in time. If the resulting stress does not exceed the elastic limit, then temporary stresses and deformations disappear (are removed) after cooling the product. Residual – remain in the product after the disappearance of the cause that caused them.

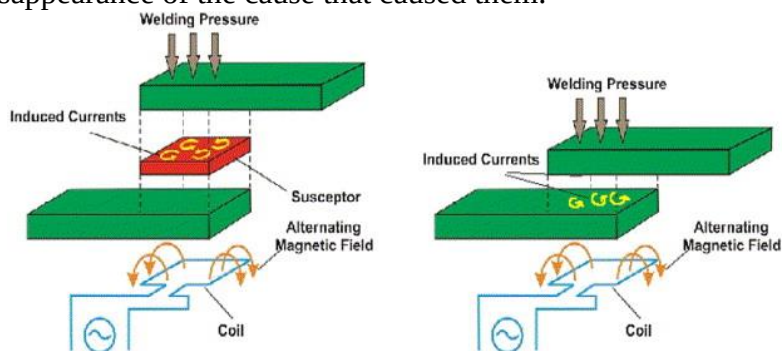


Figure 1. Induction welding of thermoplastic composites—an overview

These stresses and deformations also occur due to uneven heating, but they are too large and can lead to cracks or destruction of the welded joint. In some cases, destruction does not occur, but large deformations remove the welded structure from the specified dimensions. The whole range of measures to combat deformations and stresses from welding can be considered in two groups:

1. Measures preventing the possibility of stresses and deformations or reducing their impact;
2. Measures to ensure the subsequent correction of deformations and removal of residual stresses.

The first group includes such measures as the choice of the correct welding sequence of the product, rigid fastening of the product, preliminary reverse bending, concomitant heating, intensive cooling during welding, reducing the amount of welds, symmetrical arrangement of stiffeners, application of bent profiles. The second group includes: local forging of the seam metal or ZTV, correction under the influence of static load. Local heating and mechanical correction, heat treatment. To eliminate the above disadvantages of welded joints, to achieve the characteristics of the weld metal and ZTV, close to the characteristics of the base metal, some thermal works are used: heating of the welded metal, tempering. With preliminary or concomitant heating of the welded metal, the temperature difference between adjacent sections of the welded joint decreases and the stresses decrease somewhat. Such heating can be carried out by induction, gas flame or electric heaters. When welding steels heated to a temperature of 200 ° C, residual stresses are reduced by 30% compared to welding without heating. Both general and local accompanying

heating can be carried out. With local heating, a section with a width of 40...50 mm is heated on both sides of the seam. In the case of the manufacture of particularly critical structures made of low-carbon steels with a metal thickness of more than 40 mm, additional heating is carried out to a temperature of 100 ... 120 ° C with a metal thickness of more than 30 mm.

If during the welding process it is not possible to reduce stresses and deformations to a predetermined level, there is a need to eliminate them by means of a general high tempering (heating to 630 ... 650 ° C with holding at this temperature at the rate of 2...3 minutes per 1 mm of metal thickness). Cooling should be slow so that no voltage is generated again. Therefore, the part is cooled to a temperature of 300 °C with the oven, and then in the air. Relaxation (removal) of welding stresses at high start-up occurs due to a decrease in the yield strength of steel at a temperature of 600 ° C, as a result, the material practically does not resist plastic deformation [2, p. 115]. In some cases, it is possible to limit the high release of individual structural elements, and, usually, when welding steel products with a reduced carbon content and alloying elements, preliminary local or general heating without subsequent heat treatment is sufficient. Insufficiently high weldability of cast iron is associated with embrittlement of the weld seam and ZTV due to bleaching during cooling after welding, the formation of hot and cold cracks, porosity due to intense gas emission during welding and increased fluidity of cast iron, which makes it difficult to keep the welding bath from leaking. There are heated welding (hot) and non-heated (cold). Hot welding can be carried out with weak heating (up to a temperature of 300 ... 400 ° C) and with strong preheating (up to 600 ... 700 ° C). The technology of hot arc welding of cast iron includes the following operations: preparation for welding, preheating, welding and subsequent slow cooling of products.

CONCLUSION

When hot welding of cast iron, the following types of welding are used: manual arc welding and mechanized arc welding with powder wire. Heat treatment during welding operations in the welding laboratory of the Nizhny Novgorod State Engineering and Economic Institute can be carried out in several ways: in a forge with an acetylene-oxygen cutter or a propane burner manufactured at the Institute. The burner has the following characteristics: flame temperature 600 ° C, length - up to 300 mm, flame diameter – 50 mm, gas consumption at maximum power – 5 kg/h, weight – 1 kg, portable. The burner can be used to increase the cooling rate of the heated metal, consistently reducing the power of the flame. It is also suitable for welding work made of cast iron.

References:

1. ГОСТ 2601-84 Сварка металлов. Термины и определения основных понятий. М.: Изд-во стандартов. 1984. 57 с.
2. Маслов В. И. Сварочные работы: учебник для нач. проф. образования. 9-е изд., перераб. и доп. М.: Издательский центр «Академия». 2012. 288 с.
3. Чернышов Г. Г. Сварочное дело: Сварка и резка металлов: учебник для нач. проф. образования. 7-е изд. стер. М.: Издательский центр «Академия». 2013. 496 с.
4. В. В. КВПАЕВ Термическая обработка металлов при выполнении сварочных работ.

Rezyume: payvandlash ishlarida metallurgiya jarayonlari ko'rib chiqiladi. Payvandlash va payvandlangan bo'g'inlarni normalizatsiya qilishda metallarni issiqlik bilan ishlov berishdan foydalanishning qisqacha tavsifi berilgan.

Резюме: Рассмотрены металлургические процессы при сварочных операциях. Дано краткое описание применения термической обработки металлов при сварке и нормализации сварных соединений.

Kalit so'zlar: deformatsiya, issiqlik ta'sir zonasi, kristallanish, kuchlanish, chiniqish, oldindan payvandlash isitish, payvandlash.

Ключевые слова: деформация, зона термического воздействия, кристаллизация, напряжение, отпуск, предсварочный нагрев, сварной шов.

**THE IMPORTANCE OF THE FOUR ELEMENTS IN NATIONAL POTTERY AND THE
WONDERS OF CLAY ART**

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Summary: *The topics covered in the article are about the pottery art that has been passed down from our past and about the traditions of master apprentices. Our serious attention to the development of this art is aimed at training the young generation as talented personnel. The art of pottery not only inspires the hearts of our youth, but also helps them to become well-behaved people in the future. Ways to develop teachers and mentors, young artists while preserving the tradition of mentor-disciple are revealed.*

Key words: *Pottery art, traditions of apprentices, decorations, soil and clay, pottery wheel, work and effort, work, beauty, ceramics, creative youth.*

Pottery art has been developed in several regions of our country since ancient times. It is known from historical sources that since ancient times, the master potters of our people have created beautiful pottery items that amaze the people of the world. The works of art created by our ancestors are distinguished from the ceramics of other nations by their richness of decorations, originality and harmony of national spirit.

Since the soil is everywhere in the world, pottery is widespread, and initially women were engaged in this craft. After the invention of the pottery wheel at the beginning of the 3rd millennium BC, men began to do it.

Pottery is the most ancient example of art, which created miraculous beauty from clay, and it is certainly not for nothing, because generosity, honesty, well-being, abundance, sustenance and beauty are embodied in the soil. Pottery has traditions, form, content, creativity, process and unique style. There are several pottery schools and centers in our country. During the years of independence, Rishton, Samarkand, Khorezm and Shakhrisabz pottery schools, which are several hundred years old, developed further. There are many families who continue the work of famous potters in these places. The study of medieval pottery is the evolution of pottery techniques. The development of handicrafts is inextricably linked with the study of production relations and its social organization.

Pottery is a delicate profession, it requires high taste, diligence and patience from a person. It is a noble intention of young potters to continue the ancient traditions of making ceramic objects and giving them shape and color, as our ancestors did.

Every potter knows the clay from the moment he takes it in his hands. Mainly, the potters of our country use red clay called hoki surkh in the local language. The masters of each school created works of art that differ from each other with their own style, form and decoration. When looking at ceramics, both art experts and ordinary people can determine which one belongs to Rishton, Samarkand, Khorezm or Shakhrisabz pottery schools.

A good potting mix can be made by mixing regular red clay with 50% soil and 50% water. Of course, it should not contain excess elements (stones, plant roots and various types of raw material elements). Preparation of the soil in its natural state without excess components has been preserved to this day.

Reviving and developing the traditions of hand-making ceramic products of our ancestors, which are being forgotten, requires diligence, patience and meticulousness from the work of creating a work of art from ordinary clay. Because a seemingly simple ceramic item goes through a number of stages from clay preparation to baking in a special oven.

Different types of soil layers are found in clay quarries. Usually, the topsoil is removed and exposed to a layer of clean healthy sap-rich soil suitable for pottery. In some places, soil layers are dug up to a depth of 1.5-2 meters. Clay suitable for pottery is a clean and attractive raw material. It is considered a very dense solid layer of solid soil, and its removal requires a lot of work. There are types of soils: healthy soil, black soil, blue clay, and red clay. The clay used in pottery is divided into several groups depending on its characteristics and the product used.

The main raw material in pottery is clay, and the better it is baked, the better the ceramic products will be, and they will be distinguished by their unique appearance and shine. In the process of making clay, it is carefully turned several times, for example, it is called parrak, in which the air bubbles in the clay are removed during the processing, and the clay is collected again and processed with the help of hands. The more the clay is processed, the pores and air spaces in it are removed from the composition of the raw material. The clay is again and again divided into pieces and put together again to be processed, such actions serve to produce a high-quality and beautiful product.



The potter's wheel should not be melted when shaping the dishes, this complex process requires all imagination, skills and experience. The reason why masters teach more on the wheel is that a person's head, hands and feet work at the same time. In this case, he concentrates his thoughts, makes the shapes of the object to be made with the help of his hands, and his legs help. The person sitting on the wheel does not pay attention to the events around him, because the rotation of the machine takes his mind. Eyes, hands, and feet move in harmony with each other to create works of art.

There are two types of masters in pottery, one is a potter and the other is a painter. Their work is directly related to each other.

Kozagan works only with clay, first he finds the standard soil, prepares it as clay and cooks it thoroughly. He puts it on the workbench and gives it shape, gives the initial decorations and does all the work until it is removed from the wheel.

The painter's task begins with the drying and processing of the finished vessel. First, it begins with finding a compositional solution to the decorative pattern that matches the dish. The decoration that the craftsman painted on the surface of the item determines the value of this dish. The more delicate and beautiful the pattern, the faster it will find its buyer.

Before the drawing process, you need to think about which flower will fit this vessel. It is necessary to use pattern elements correctly, in this case, you can use Kumgon, knife, pomegranate, Islamic and Grix patterns. Of course, the size of the container is taken into account. It is necessary to match the composition of the drawn pattern decorations to the surface of the product. The products of labor, various household items, figurines of national heroes, candlesticks and pencil cases are finding their buyers. Dozens of apprentices have been trained based on the tradition of master-apprentice, and the skill of the master is worthy of praise. This field, which combines craft and art, is valuable not only materially, but also with its national, spiritual and educational significance.

Each profession is difficult and has its own secrets. From long ago, our ancestors taught the secrets and experiences of artistic ceramics only to their students, and did not teach them to other children. Our ancestors studied the secrets of pottery for centuries and paid special attention to the quality, artistry, ease of use and durability of each product. Therefore, the longevity of the tiles that decorate the oriental architecture, starting from the simple ceramic bowl they made, amazes the people of the world.

Our people have always appreciated and honored the work of flower artisans, who have been making a significant contribution to the development of the Uzbek pottery school by secreting the four elements of divinity: earth, water, air and fire. That's why the priceless craftsmanship honored by our grandfathers, passed down from grandfathers to children, from children to grandchildren, has been alive for centuries. Master potters perform the glazing process using traditional methods handed down from our ancestors. It is rarely used in today's modern secrets, they use the natural gifts of the plants that grow on the hills of cypress, rose and Ishlan. The density of liquefied glazes is very important. Most potters determine the mior by the degree to which the glaze drips. Dip a finger and drop it, if the number of drops is not at the required level, a small amount of water is added to it, mixed and brought to the desired state. Through these experiences, the art of glazing has developed in national pottery.

Glazed dishes are dried at room temperature and then placed in the oven. The cooking process itself is a particularly interesting process that determines the fate of the products. The temperature is raised with the help of a temperature indicator on the stove and special holes to monitor the internal condition. The products are brought to a ready state during the required temperature and time.

You will be amazed to see plates of different sizes hanging on the walls, and beautiful teapots and bowls on the shelves. You can feel the hard work, heartfelt love and skill of the master potters in creating these works of art. To bring ceramics to the level of art, you need to give love from the heart, because the work done from the heart always paid off. Products created with a combination of labor and love are beautiful, attract people's attention and find their buyer.

Master potters should give their advice in order to develop the creative activity of the youth of the new era, to show them the right way, to develop the craftsmanship that our generations have respected. If we get the youth of our time interested in ceramics, we can be sure that they will create high-level works of art, because our youth is a great force. We need to direct great forces towards great goals. Educating our youth in the spirit of our national values determines the development of our ancient craft.

Our people have widely used ceramic products since ancient times. This is clearly confirmed by the exhibits kept in our museums. With the honor of independence, this invaluable national craft was revived and polished.

There is a tourist who has come to a museum or a pottery workshop and can't help but enjoy the creations of the craftsman. We are amazed by the beauty of various pottery made of clay, which is the result of the potter's labor and love for his work. It is formed in the master-apprentice school in traditional pottery. Every mature potter matures in ten or twelve years, of course, he achieves this as a result of a lot of work and effort. During these years, the tenacity, patience and endurance of the future potter will be tested. The teacher gives assignments depending on the growth of the student's skills. The future potter achieves his goal by carefully completing tasks and assignments for years in order to develop his master's skills.

There is such a wonderful thing about the master-disciple tradition that a disciple must pass through a master. This means that when training apprentices, teachers should teach their skills, knowledge and the secrets of pottery art from the heart. The master's skills are reflected in the creations of the students, the beauty of the things they make pleases the eyes of the masters and instills a sense of pride in their hearts.

Thus, he worked for the society, made his personal contribution to its wealth, always glorified his profession, encouraged others to be happy, as Abdurahman Jami said, A person who enjoys the bubble is a happy person.

Today, from generation to generation, masters are teaching the secrets of pottery. Large vessels, plates, deep and shallow braids, milk jugs, unforgettable turquoise and ultramarine colors have made these national ceramic works famous at many international exhibitions, and they adorn the expositions of many museums around the world.

References:

1. М.К. Рахимов. Художественная керамика Узбекистан. Учебник. Ташкент. 1961. 249 с.
2. С.Булатов “Ўзбек халқ амалий безак санъати”. Тошкент “Меҳнат”1991йил 290-б.
3. “Керамическое производство средней Азии”. Отпечатано в типографии ТашГУ. Ташкент – 1980. ст- 31.
4. А.Хакимов. Прикладное искусство Узбекистана. Традиции и инновации. Ташкент. Юнеско. 2013. 211 б.
5. Изотова М. Л. Гончарные работы для дома и заработка. Ростов н/Д: Феникс, 2008. 252 с.
6. Поверин Александр Иванович. Гончарной дело. Москва. 2006. 169 с.
7. Добрынина, Г.Г. Художественная керамика Г.Г.Владивосток. 2013. 80 с
8. Федотов Г. Я. Глина и керамика. ЭКСМО-Пресс. Москва 2002. 160 с.
9. Джеки Эткин. Керамика для начинающих. АРТ – РОДНИК. Москва. 2006. 160 с.
10. Долорс Рос. Керамика.энциклопедия. Москва. 2003. 143 с
11. У.Мавлонов. “Болалар таълим-тарбияси ва миллий руҳни шакллантиришда амалий санъат турларининг ўрни ва аҳамияти”. “PEDAGOGS” international research journal.
12. К.К. Yuldashov. “Kulolchilik hunarmandchiligi tarixini organish – milliy qadriyatlarimizni e’zozlash mezonini sifatida”. Ta’lim va innovatsion tadqiqotlar jurnali. (2021 yil Maxsus son).
13. <https://fayllar.org/qadimgi-sopol-idishlar.html>
14. <http://interscience.uz>

Rezyume: Maqolada yoritilgan mavzular o‘tmishimizdan ardoqlanib kelayotgan kulolchilik san’atning haqida va ustoz shogird an’analari haqida so‘z boradi. Ushbu san’atni rivojiga jiddiy e’tibor berishimiz, yosh avlodni iste’dodli kadrlar qilib tayyorlashga qaratilgan. Kulolchilik san’ati yoshlarimiz qalbiga ezgilikni uyg‘otish bilan bir qatorda kelajakda go‘zal xulqli insonlar bo‘lib yetishishiga xizmat qiladi. Ustoz va murabbiylarni, yosh ijodkorlarni ustoz-shogird an’alarini saqlagan holda qanday rivojlantirish yo‘llari ochib berilgan.

Резюме: Темы затронутые в статье касаются гончарного искусства унаследованного от нашего прошлого, и традиций наставника-ученика. Наше серьезное внимание к развитию этого искусства направлено на воспитание молодого поколения как талантливых кадров. Гончарное искусство не только пробуждает сердце нашей молодежи, но и помогает им в будущем стать добродушными людьми. Темы затронутые в статье, касаются гончарного искусства, унаследованного от нашего прошлого, и традиций наставника-ученика.

Kalit so'zlar: Kulolchilik san’at, ustoz shogird an’analari, bezaklar, tuproq va loy, kulolchilik charxi, mehnat va mashaqqat, asar, go‘zallik, sopol buyumlari, ijodkor yoshlar.

Ключевые слова: Гончарное искусство, традиций наставника-ученика, орнаменты, земля и глина, гончарный круг, труд и тяжкий труд, произведение искусства, красота, керамические изделия, творческая молодежь.

**MODERN MEASUREMENT METHODS AND DEVICES IN MECHANICAL
ENGINEERING**

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Summary: *In order to increase the functional, useable, spatial, and aesthetic values of architectural items by valorisation—the act of quantifying and modeling them—the author tackles the subject in this article. Above all, the laser scanning method, which yields results in the form of a point cloud, enables the user to obtain a very detailed, three-dimensional computer image of the measured objects and to conduct a number of analyses and expert investigations.*

Key words: *3D scanner, signals, measuring machines, coordinate measuring machines.*

INTRODUCTION.

One of the most cutting-edge measurement techniques is used because a 3D scanner is used in many areas of the building industry, geodesy, and other industries. A 3D scanner-assisted measurement session produces a large number of points, allowing us to precisely represent the scanned object. Using a Leica ScanStation C10, which was employed in this work, which can register up to 500 000 points per second, this technology may provide scans very quickly that are incredibly accurate. A three-dimensional model of an object is created using a point cloud, which is an accurate representation of the scanned space and can be freely manipulated.

The results of the scanner are visually attractive and easily processed, hence the variety of their use in different spheres of life. Only in civil engineering and architecture, scanners are a universal tool useful for inventory, as well as plans and projects of buildings, preservation of historical buildings or analysis of deformations of building structures. Three-dimensional scanning can modernize and accelerate construction processes, in which it meets the expectations of the modern construction market.

Laser scanning is a cutting-edge measuring technology, which is still developing rapidly. This technology has an almost unlimited range of applications in many domains of contemporary engineering, where precision and high quality of performed work is of the utmost importance. Architecture and urban space studies are worth being distinguished among these disciplines, as they shape the space and ambient environment occupied by people, thereby having an immediate effect on their lives. Making measurements with a laser scanner is a more complex undertaking than with more traditional measurement implements, like a laser rangefinder or a measuring tape, and must adhere to a specific procedure, the aim of which is to obtain three-dimensional coordinates of buildings in their surrounding space. Accuracy, rapidness, safety and non-invasiveness are the principal advantages of this technology which appeal to attract building engineers, who use 3D laser scanner in practice, for both historic and contemporary architecture. Using laser scanning is particularly fitted for large-scale engineering objects, where application of traditional techniques would be much more cumbersome as well as time- and labour-consuming due to the presence of some hardly accessible areas and the geometric complexity.

Coordinate measuring machine (CMM) - a device for measuring the geometric dimensions of an object.

The machine can be controlled manually by an operator or automated by a computer. Measurements of the coordinates of the surface of an object are carried out by means of a sensor (probe) mounted on the moving part of the machine.

Measuring sensors differ in principle of operation (electro-contact, inductive, optical, capacitive, piezometric, tensometric), output signal (analog, discrete), measurement method (contact, non-contact), type of measurement (scanning, trigger) and others.

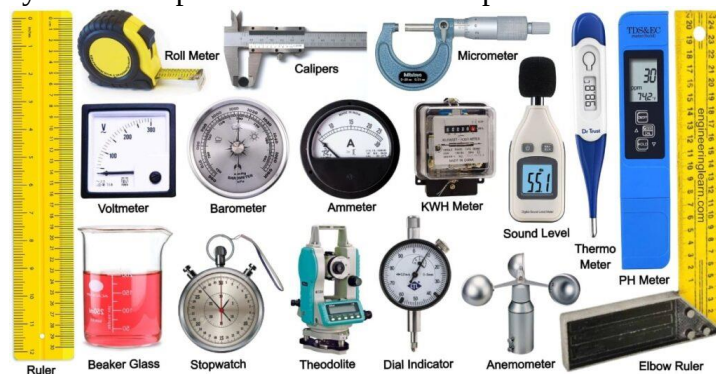
The classic model of a control and measuring machine (CMM) is represented by three axes - X, Y, Z. The axes are perpendicular to each other and form a typical three-dimensional coordinate system. The operator or computer instructs the coordinate measuring machine to read data from the sensor. Next, the machine determines the X, Y, Z coordinates of each of the given points. Based on the data of these points, all further calculations are made. [1].

Works performed with the help of a control and measuring machine:

- Measurements of geometric dimensions of parts;
- Measurements of the profile of parts;
- Measurement of deviations from the technical requirements of the drawing.

The quality manager has a responsible task: to check the quality and ensure that the manufactured parts meet customer requirements, specifications and tolerances. To do this, experts mainly rely on coordinate measuring machines (CMMs), which are the most accurate and reliable metrological equipment.

Due to their high accuracy, CMMs are widely used and are often overloaded with tasks. This can become a bottleneck that slows down the production process. There may not be available CMMs for important inspections, such as the inspection of the first product. In the worst case, this can lead to critical delays in the shipment of manufactured products to customers.



1. Figure. Measuring Instruments

Today, there are several alternatives in the metrology market that allow quality control professionals to offload CMMs and make accurate measurements in the manufacturing process directly on the shop floor - handheld 3D scanners and portable CMMs. In practice, the measurements made using these alternative solutions are insensitive to external interference and, most importantly, very accurate. [2].

In recent decades, market interest in high quality products has grown significantly. Manufacturers have to produce higher performance products to meet these expectations. To guarantee high consumer properties and product quality, it is necessary to check the quality of a larger number of parameters and do it better. Accordingly, technical control departments need more metrological equipment and, accordingly, more metrologists-operators.

The new tools in the metrology suite offer two important benefits:

1. The load on the CMM is reduced to an acceptable

This is relevant in cases where bottlenecks at the stage of control using CMM arose so often that important criteria had to be sacrificed - the representativeness of the sample and the frequency of inspections. Since adding the alternative of a handheld 3D scanner to your metrology toolbox offloads the CMM, you can return to the same quality control standards.

2. Working with 3D equipment does not require high qualifications

Portable solutions can be used by less skilled non-metrologists. This will greatly facilitate the task of QCD managers, since experienced metrology specialists are often hard to find. New employees will learn the ins and outs of the job faster, which reduces the risk associated with employee turnover, especially in large companies. Training new employees will be faster and

easier. Experienced metrologists will be able to devote themselves to equipment that requires more experience, such as CMMs. [3].

Coordinate measuring machines will always be at the forefront of metrology laboratories. This is by far the best and most accurate metrological equipment. That is why it should only be used for specific, important and precise inspections such as first product geometry inspection and final inspection of parts with tight tolerances. For such tasks, the CMM is the optimal measurement tool that cannot be replaced by another technology.

However, consideration should be given to reducing the load on CMMs by adding alternative solutions to the metrology kit - portable 3D scanners and CMMs. Since these technologies are specifically designed to eliminate external interference (they use optical components to do this), it is possible to increase the number of inspections in production areas. In addition, these gauges are easy to use and set up, and therefore accessible to less skilled workers. [4].

CONCLUSION

Finally, not only can quality control standards be restored, but more inspections can be carried out, which makes it possible to improve the process, increase productivity and obtain better quality products.

References:

5. ГОСТ 2601-84 Сварка металлов. Термины и определения основных понятий. М.: Изд-во стандартов. 1984. 57 с.
6. Маслов В. И. Сварочные работы: учебник для нач. проф. образования. 9-е изд., перераб. и доп. М.: Издательский центр «Академия». 2012. 288 с.
7. Чернышов Г. Г. Сварочное дело: Сварка и резка металлов: учебник для нач. проф. образования. 7-е изд. стер. М.: Издательский центр «Академия». 2013. 496 с.
8. В. В. КУПАЕВ Термическая обработка металлов при выполнении сварочных работ.

Rezyume: *Arxitektura ob'ektlarining funktsional, foydali, fazoviy va estetik qiymatini ularning qiymatini oshirish orqali oshirish uchun - ularni miqdoriy aniqlash va modellashtirish akti - muallif ushbu maqolada ushbu mavzuni ko'rib chiqadi. Avvalo, nuqta buluti ko'rinishida natijalarni beruvchi lazerli skanerlash usuli foydalanuvchiga o'lchangan ob'ektlarning juda batafsil uch o'lchovli kompyuter tasvirini olish va bir qator tahlillar va ekspert tadqiqotlarini o'tkazish imkonini beradi.*

Резюме: *Чтобы повысить функциональную, полезную, пространственную и эстетическую ценность архитектурных объектов путем повышения их ценности — акта их количественной оценки и моделирования — автор решает эту тему в этой статье. Прежде всего, метод лазерного сканирования, дающий результаты в виде облака точек, позволяет пользователю получить очень детальное.*

Kalit so'zlar: 3D skaner, signallar, o'lchash mashinalari, koordinata o'lchash mashinalari.

Ключевые слова: 3D-сканер, сигналы, измерительные машины, координатно-измерительные машины.

UDC 677.025

STUDY OF TECHNOLOGICAL PARAMETERS OF DOUBLE-LAYER KNITWEAR

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Summary: *The article presents the results of a study of technological parameters of new structures of double-layer knitwear.*

The investigated samples of double-layer knitwear were made from yarns of various compositions in various combinations of the type of yarn used on one and the other side of the fabric.

Analyzing the test results, it can be noted that the type of yarn used in the production of samples of double-layer knitwear affects its technological parameters, despite the fact that all samples are produced with the same weave.

Key words: *double-layer knitwear, structure, graphic recording, parameters, areal density, flat-fanged machine.*

Introduction. Currently, research is being carried out on the effective use of modern achievements of science and technology in the development of innovative methods and technologies for the textile and light industry, as well as on the improvement of existing ones. In this regard, special attention is paid to the development of the scientific foundations of the technology for the production of knitted products, the determination of optimal parameters affecting the technological processes of manufacturing products, the expansion of the range of competitive products, the development of scientific works on the effective use of local raw materials, the creation of resource-saving technologies and the quality assurance of clothing, which is considered important for - the knitwear industry.

In [1], the influence of the number of press loops on the physical and mechanical properties of elastic knitwear was investigated. The work is devoted to the design of new structures of knitted weaves of reduced material consumption and products from them.

In work [2], the properties of press-weave knitwear on the basis of a surface made of combed and compact yarns were investigated. It has been established that press weave knitted fabrics made of compact yarns have better properties.

The work [3] investigated the hygienic properties of press knitwear made from bioactive fibers.

Research [4] is devoted to the development of knitted fabrics based on a press weave, made from a mixture of woolen and polyamide fibers, and intended for winter outerwear.

In work [5], a new method of producing a lined two-layer knitted fabric is presented, where one layer of knitted fabric is worked out by weaving the satin stitch, and the other layer - by pressing weaving.

In work [6], a structure and method for obtaining a single cooler knitwear of press weaves of increased thickness and bulk was developed, which can be obtained if, in the knitwear structure, the branches of a group of sketches connecting the press loop with adjacent hinge posts will intersect and alternately be located one above the other in thickness knitwear.

In the presented work [7], in order to reduce the consumption of raw materials in the production of double-layer knitwear, it is proposed to include a weft thread in the knitted fabric structure. The inclusion of a weft thread in the structure of a double-layer knitted fabric leads to a change in the physical and mechanical properties of a double-layer knitted fabric. Comparing the bulk density of double-layer knitwear of various structures, one can make sure that the presence of a

weft thread in the structure of a double-layer knitted fabric not only reduces the bulk density, but also increases the dimensional stability of the knitted fabric.

In order to reduce the material consumption of double-layer knitwear, new structures have been developed with the inclusion of elements of press and incomplete weaves [8]. The analysis of the results obtained showed that with a change in the structure of the knitwear, it is possible to observe a change in the loop step and the width of the fabric. According to the results of the study of technological parameters, it can be noted: a comparison of knitted fabrics with each other in terms of surface density showed that knitted fabrics of incomplete weave have the lowest surface density, and a comparison of samples in terms of bulk density showed that press knitted fabrics have the lowest bulk density, because the thickness of the press knit is greater than that of the rest of the weaves. These double-layer knitwear require less raw material consumption. In addition, the appearance of the knitwear improves, the presence of elements of press and incomplete weaves in the knitted fabric structure gives the knitwear bulk, has high heat-shielding properties and form stability. A change in the structure of knitwear affects not only the technological parameters, but also leads to a change in the physical and mechanical properties of the knitwear.

In [9], new structures of double-layer knitwear with elements of press and incomplete weaves were developed, which allows to reduce the consumption of raw materials during its production, as well as to improve the dimensional stability of knitwear. Knitted press weaves are used not only to obtain patterned effects, but also to change the properties of the main weaves.

In [10], new versions of double-layer knitwear were developed, the structure of which includes a different number of press loops. The influence of press loops in the structure of double-layer knitwear on its parameters and physical and mechanical properties has been investigated. The presence of elongated loops and outlines in the structure of a double-layer jersey helps to reduce the stretch of jersey along its length. Double-layer knitwear, where elements of press and incomplete weaves are included in the structure of knitwear, have the lowest bulk density, have high heat-shielding properties and form stability.

Double-layer jersey of different structure has a common feature: each of its layers is an independent fabric of the main, derivative, patterned or combined single weave. The fabrics or layers are connected in the knitting process with the wrong sides by means of any elements of the loop structure so that by loosening one weave, you can save the other without breaking the loop ties. Thus, there are ample opportunities to expand the range of double-layer knitwear, not only by combining various weaves, but also by making it from various types of yarn.

Therefore, it is advisable to study the influence of press sketches in the structure of double-layer knitwear and the type of yarn on the parameters and properties of double-layer knitwear. This study allows us to expand the area of practical use of double-layer knitwear according to its properties.

Exeperement result and discussing. In this regard, 7 samples of double-layer knitwear with the same structure were produced on a flat-fanged machine of the KN-323B type from yarns of different types. As a base, a sample was produced by weaving an eraser 1 + 1 from cotton yarn with a linear density of 20 tex x 4.

The structure and graphic record of the investigated weave of double-layer knitwear are shown in Figure 1. The knitwear consists of elongated purl 1, front loops 2, outline 3, loops 4 of normal size and broaches 5.

When producing these samples of two-layer knitwear, the press method of joining was used.

Technological parameters of double-layer knitwear are determined by experimental methods, and the measurement results and filling data are given in the table.

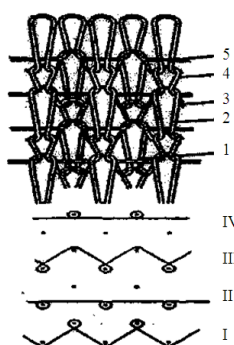


Fig. 1. Structure and graphic recording of two-layer knitwear

Analyzing the test results, it can be noted that the type of yarn used in the production of samples of double-layer knitwear affects its technological parameters, despite the fact that all samples are produced with the same weave.

The surface density of samples of double-layer knitwear varies from 289.5 (variant VII) to 531.95 g / m² (variant II).

The highest bulk density is in the II variant of double-layer knitwear. With an areal density of $M_s = 531.95 \text{ g / m}^2$ and a thickness $T=1.93 \text{ mm}$ is equal to 275.62 mg/cm^3 , and the bulk density of elastic knitwear (option 0) with an areal density of $M_s = 479.4 \text{ g / m}^2$ and a thickness $T = 1.67 \text{ mm}$, equal to 287.09 mg / cm^3 .

Table 1
Technological parameters of double-layer knitwear

Indicators		Variants							
		0	I	II	III	IV	V	VI	VII
Threading in the canvas	Seamy side	c / t 20 tex×4	c/t 20tex×3	c/t 20 tex x 4	PAN 61 tex x 1	PAN 81 tex x 1	c/t 20 tex x 3	c/t 20 tex x 4	c/t 20 tex x 3
	Front side	-	c/t 20 tex x 3	c/t 20 tex x 4	PAN 61 tex x 1	PAN 81 tex x 1	PAN 61 tex x 1	PAN 81 tex x 1	silk 31 tex x2
Web width, cm		52,32	62,44	53,84	63,14	57,67	69,52	65,72	61,72
Loop pitch A, mm		1,56	1,89	1,96	2	2,06	2,2	2,04	1,75
Loop row height B, mm		0,91	1,25	1,25	0,83	1,1	1	2,38	1,1
Horizontal density WG, loops		32	26	25	25	24	23	24	29
Vertical density PB, loops		55	40	40	60	45	50	21	45
Thread length in a loop l, mm	First row of rapport L1	4,86	5,18	5,48	4,68	5,06	4,76	5,6	4,97
	Second row of rapport L2	-	4,94	5,32	4,66	4,87	4,69	5,4	4,63
Surface density of knitted fabric MS, g / m ²		479,4	390,7	531,95	480,95	480,9	407,4	511,05	289,5
Thickness T, mm		1,67	1,88	1,93	1,97	2	1,8	1,89	1,8
Bulk density δ , mg / cm ³		287,09	207,82	275,62	244,14	240,45	226,33	270,4	160,8
Absolute volumetric relief $\Delta\delta$, mg / cm ³		-	79,3	11,5	43	47	61	17	126
Relative lightness θ , %		-	28	4	15	16	21	6	44

The absolute volumetric relief compared to the baseline is:

$$\Delta\delta = \delta_b - \delta = 287.09 - 275.62 = 11.5 \text{ mg / cm}^3;$$

$$\text{Relative relief is: } \theta = (1 - \delta / \delta_b) \times 100\% = (1 - 275.62 / 287.09) \times 100\% = 4\%.$$

Analyzing the results obtained, it should be concluded that Variant VII of two-layer knitwear can be recommended as a weave structure with the lowest consumption of raw materials in comparison with the basic version. The values of surface density, web thickness and bulk density of other options are given in the table. For samples made from PAN fibers, it is characteristic that with an increase in the linear density of the yarn, the density decreases vertically and horizontally. Due to this, the surface density with a change in the linear density of the yarn practically does not change.

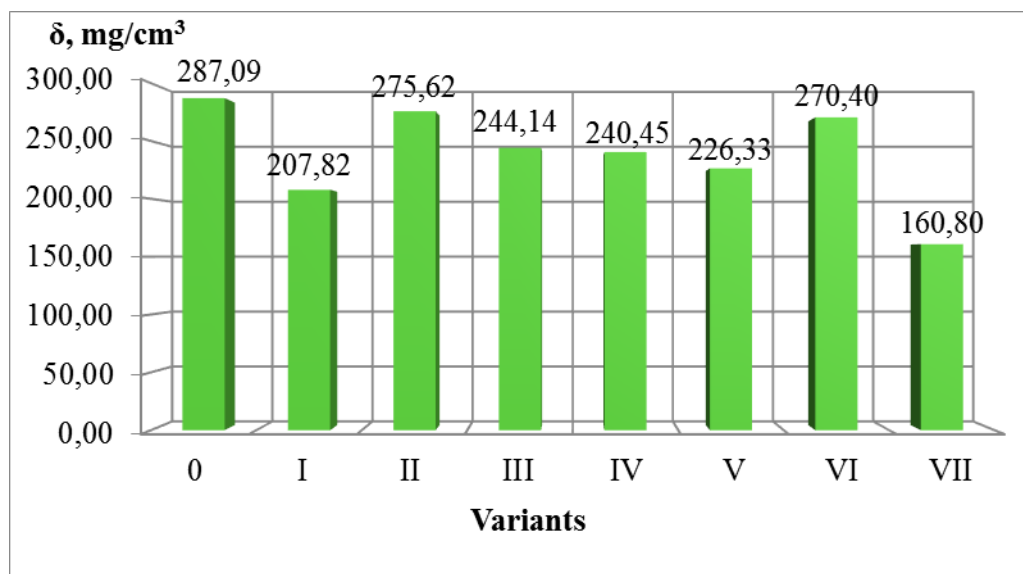


Fig. 2. Histogram of the dependence of the bulk density on the type of yarn

It can be noted how the surface density of canvases changes, both sides of which are made from the same yarn, if one of the sides is made from a different type of yarn.

Conclusion. Based on the analysis of technological parameters, it follows that the type of yarn from which a two-layer fabric is produced and the methods of its combination affect the parameters of knitwear. This means that it is possible to increase the assortment of double-layer knitwear and reduce the consumption of raw materials when producing it, not only by changing the weave, but also by choosing the right yarn for making knitwear. Thus it is possible to obtain a double-layer knitwear, which has better quality and less material consumption, even in comparison with double weaves.

References:

1. Mirxalikov J.U., Bayjanova S.B., Djanpaizova V.M., Sagitova G.F. Study of the influence of the number of press loops on the physical and mechanical properties of knitted fabrics. Proceedings of higher educational institutions. Textile industry technology. No. 1 (355). 2015. - s. 178.
2. C.D. Kane, U.J. Patil, P. Sudhakar. Studies on the Influence of Knit Structure and Stitch Length on Ring and Compact Yarn Single Jersey Fabric Properties. Textile Research Journal. Vol 77, Issue 8, 2007.
3. Elena Onofrei. The properties of knitted fabrics for bio-functional textiles. Bul. Inst. Polit. Iasi, t. LVI (LX), f. 2.2010. page 75-84 p.
4. Nergiz Emirhanova, Yasemin Kavusturan. Effects of Knit Structure on the Dimensional and Physical Properties of Winter Outerwear Knitted Fabrics. FIBERS & TEXTILES in Eastern Europe April/June 2008, Vol.16, No. 2 (67).
5. Usmonkulov SH., Abdulpattaev B., Allamuratova T.K., Mukimov M.M. Materials of the VII International Youth Scientific Conferences.
6. Komarova N, M., Fomina O. P., Pivkina S. I., Kolesnikova E. N. Regular press knit with crisscross patterns. // J. Izv. vuzov. Tekstil. prom-sti. 2017, no. 6, -s. 183-185.
7. Allamuratova T.K., Mukimov M.M. Investigation of technological parameters and physic-mechanical properties of an inlay knitted fabric on the base of double-layer stitch. // International Journal of Advanced Research in Science, Engineering and Technology», India. Vol. 5, Issue 2, February 2018. page. 5136-5141.
8. Allamuratova T.K., Gulyaeva G.Kh., Mukimov M.M. Research of technological parameters and physical and mechanical properties of double-layer knitwear with reduced material consumption. // Izvestiya vuzov. Light industry technology. Saint Petersburg State University of Industrial Technologies and Design. 2019.1 / 43. -With. 86-89.
9. Allamuratova T.K., Gulyaeva G.Kh., Mukimov M.M. New technology for producing double-layer knitwear. // Design. Materials. Technology. Saint Petersburg State University of Industrial Technologies and Design. 2018.1 [43]. -With. 72-75.
10. Allamuratova T.K., Gulyaeva G.Kh., Mukimov M.M. Investigation of double-layer knitwear with

reduced material consumption. // J. Problems of Textile. Tashkent. Ttesi. 2018. No. 2, -p. 56-63.

Rezyume: Maqolada yangi tuzilishdagi ikki qatlamli trikotaj to'qimasining texnologik ko'rsatkishlari tahlili natijalari keltirilgan.

Tajriba utkazilayotkan ikki qatlamli trikotaj to'qimasining ikki tomonlari tolali tarkibi har xil bulgan iplardan ishlab chiqarilgan.

Sinov natijalari tahlilidan ma'lum buldi, ikki qatlamli trikotaj to'qimalarini ishlab chiqarishda foydalanilayotgan ip turi, bir xil urilishda to'qilishidan qat'iy nazar, ularning texnologik ko'rsatkichlarining uzgarishiga olib keladi.

Резюме: В статье приведены результаты исследования технологических параметров новых структур двухслойного трикотажа.

Исследуемые образцы двухслойного трикотажа были выработаны из пряжи различного состава в различном сочетании используемого вида пряжи на одной и другой сторонах полотна.

Анализируя результаты испытаний можно отметить, что вид используемой пряжи при выработке образцов двухслойного трикотажа влияет на его технологические параметры, несмотря на то, что все образцы выработаны одинаковым переплетением.

Kalit so'zlar: ikki qatlamli trikotaj, tuzilish, grafik yozuv, kursatkichlar, yuza zichlik, tekis fang mashinasi.

Ключевые слова: двухслойный трикотаж, структура, графическая запись, параметры, поверхностная плотность, плоскофанговая машина.

SHORTEST PATH ALGORITHM COMPARISON AND ANALYSIS IN GRAPH THEORY

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Summary: Over the years, a wide range of algorithms have emerged as a result of the development of ideas derived from the general approach to addressing the shortest path problem. Studies on the most fundamental operation, which involves finding the shortest route between two points in a graph (or, more commonly, a network), have led to sophisticated solutions created for ever-demanding applications. These include looking for a shortest path tree or discovering the sets of paths having the smallest distances between all pairs of nodes. The shortest path problem is used to implement many innovative technologies, such as the road map system. The shortest path problem is a type of optimization technique [1] that has a wide range of uses. The purpose of this essay is to introduce the reader to the challenge of finding the shortest path and provide a thorough analysis of two sets of chosen algorithms created to address specific issues. In the study outlined below, various algorithms were evaluated for their effectiveness in operating in directed graphs of various types that were represented in a clear data format. The empirical simulation-based analysis demonstrates that the performance of the investigated algorithms varies, and it enables recommendations for which approaches should be used to address particular shortest path problem variants, as well as which algorithms should be avoided or used with caution.

Key words: shortest path; algorithms; route; performance; review; graph; node;

The term "shortest path problem" [2, 11] describes the computation of the most effective route between two points that is also the shortest path overall. Graph theory is typically used to represent shortest-path problems. Edges or groups of vertices can be found in graphs. Edges are the relationships between vertices in pairs. Additionally, some edges in a graph have a value attached to them known as weights. To determine the most effective shortest path from one source to the target, weight values are used. Graph theory [3] is widely used in practical applications, such as the representation of maps. To address this issue, numerous methods have been developed. In this study, we only covered a small number of the most significant and popular shortest-path algorithms. Johnson's Algorithm, Bellman-Ford Algorithm, Floyd-Warshall Algorithm, Search Algorithm, and Dijkstra's Algorithm are among the algorithms covered in this essay.

The shortest path problem is something that most people are aware of, but their understanding of it only extends to the shortest path between two points, A and B. The issue changes for computer scientists, though, as various techniques can be required to address various issues.

Because they are straightforward, shortest-path algorithms work with graphs, which are made up of vertices and the edges that connect them. A graph can be weighted, undirected, directed, or any combination of these. For particular graph types, these distinctions dictate which method will perform better than another.

The most well-known applications for shortest path algorithms are route planning tools like Google Maps and our own MyRouteOnline, which uses them to design your routes.

We've compiled the most significant shortest-path algorithms because there are numerous varieties and we want you to understand how they operate and which one is the best.

The study of path finding dates back to the 19th century, and it is regarded as one of the classic graph problems. In the context of "alternative routing," or finding a second smallest path if the first one is not accessible, it rose to popularity in the early 1950s. The shortest path is particularly important in many fields, including transportation. In various disciplines (such as computer science, geography, management science, and transportation, among others), the use of the shortest path algorithm, including its invention, successful implementation, and testing, remains a key research area. We have

several shortest-path algorithms thanks to extensive study, and they are quite effective for solving a wide range of issues.

Algorithm of Dijkstra

When all edges have positive weight values, this algorithm [4, 5] determines the shortest path between two nodes, one of which is the beginning node and the other of which is an isolated destination node, and all other nodes of the network. The beginning node for the algorithm is any of the nodes i . The method then creates a tree T that finally connects every vertex that can be reached from S_1 . Vertices are added to tree T in accordance with the distances, starting with S_1 and continuing with the vertex that is closest to S_1 and so on. The distance between each node is initially assumed to be infinite. The source node I is set as the current node at the start of the algorithm. The preliminary distances of all neighbor nodes that have not been visited and are connected by edges are estimated from this node. The current node is then designated as having been visited, and the following current node is chosen based on having the shortest possible tentative distance to the preceding current node. When every node has been visited and the list of unvisited nodes is empty, the algorithm is said to have finished. The simplest Dijkstra's algorithm has N nodes, and its complexity time is $O(N^2)$. Using various Dijkstra's algorithm variations can shorten this time. It entails the following actions:

- I. The starting node is 0, and the starting distance of all nodes is "infinite."
- II. Except for the initial node, whose distance is marked as permanent, other node distances are tagged as temporary.
- III. Start node is also designated as the active node.
- IV. Using the edges weights and the neighbor nodes or start node, all node temporary distances are determined.
- V. Adjust the distance and designate the current node as the predecessor if it is closer to the other node. The core idea of Dijkstra is this approach.

The algorithm employs a greedy strategy in that we look for the next effective solution in the hopes that the outcome will be the effective solution for the entire problem. Logistics Distribution Lines, Link-state Routing Protocols, Robot Path Planning, Intermediate System to Intermediate System, and Open Shortest Path First are a few of the different areas where Dijkstra's Algorithm interacts. The main drawbacks of the Dijkstra algorithm include time and resource waste because it uses blind search and is unable to compute negative edges, making it appear challenging to find the ideal shortest path.

Algorithm of Bellman and Ford

The Bellman-Ford algorithm searches the graph for the shortest path between a given node and every other node, much like Dijkstra's method does. Bellman-Ford makes up for its disadvantage with its versatility despite being slower than the first. Bellman-Ford can handle graphs when part of the edge weights are negative, unlike Dijkstra's algorithm.[7,8]

A different utilization of BF Algorithm are: Bellman distributed variant, Saving network resource, distance-vector routing protocols are based on Ford algorithm and Routing Information Protocol (RIP) [7,8]

There is no shortest or cheapest path if the graph contains a negative cycle, which occurs when the edges accumulate to a negative number. In other words, because the algorithm stops on a negative cycle, it is unable to identify the right path. Bellman-Ford can recognize destructive cycles and alert the public to their existence.

Floyd-Warshall Algorithm

The Floyd-Warshall algorithm is unique in that it is not a single-source algorithm, unlike the first two algorithms. This means that rather than only calculating from a single node, it determines the shortest distance between every pair of nodes in the graph. It functions by dividing the major problem into smaller ones, then combining the solutions to address the primary shortest-path problem.

Given that it determines the shortest path between all pertinent nodes, Floyd-Warshall is quite helpful when it comes to creating routes for multi-stop trips. This technique is used by many route planning programs since it will show you the best path from any given place. Therefore, Floyd-Warshall will find the quickest route to every other node on the graph, regardless of where you are right now.

Johnson's Formula

Given that its runtime is dependent on the number of edges, Johnson's technique performs best on sparse graphs—those with fewer edges. Thus, it will construct a route more quickly the fewer edges there are.

This approach differs from the others in that it uses two additional algorithms to find the shortest path. It starts by detecting negative cycles and removing any negative edges using Bellman-Ford. The shortest paths in the inputted original graph are then determined using this new graph and Dijkstra's algorithm.

The iterative, distance-based operation of the shortest path algorithms is based on assigning labels to certain vertices that are currently the optimal distances from the path's starting point. This is how the shortest path algorithms are distinguished from other similar algorithms. A set of legitimate vertices that can be taken into account is maintained while these algorithms are running. Depending on the algorithm used, different representational techniques may be appropriate for this set. The methods used to update the distance labels and the choice of a vertex predicted to depart from the stated set are where these algorithms diverge.

Most of the time, the appropriate algorithm to employ will rely on the kind of graph you are using and the shortest path problem you are trying to solve, rather than being up to you to choose. For instance, Bellman-Ford is used for issues with negative weight edges, whereas Dijkstra's technique is used for sparse graphs with no negative edges.

Conclusion

In the end, these algorithms have a lot of characteristics, but the distinctions become apparent when you consider their application and performance.

Which method is best, have to think about which one is appropriate for the kind of graph you're working with and the shortest path problem you're trying to solve. In many applications, including communications, graph theory, and electronics difficulties, the shortest path algorithm is a significant problem. Different SPA resolution algorithms, such as Dijkstra's, Bellman Ford, Floyd-Warshall method, and Johnson's, have been discussed along with their benefits and limitations. Dijkstra outperforms all other algorithms since the time complexities of each algorithm are also examined.

References:

- [1] On the Complexity of and Algorithms for Finding the Shortest Path With a Disjoint Counterpart. EURASIP Journal On Wireless Communications And Networking 2014:567416
- [2] Kairanbay Magzhan, Hajar Mat Jani, "A Review And Evaluations Of Shortest Path Algorithms". International Journal Of Scientific & Technology Research Volume 2, Issue 6, June 2015
- [3] S.G.Shirinivas, S.Vetrivel, Dr. N.M.Elango; APPLICATIONS OF GRAPH THEORY IN COMPUTER SCIENCE AN OVERVIEW. S.G. Shrinivas et. al. / International Journal of Engineering Science and Technology Vol. 2(9), 2015, 4610-4621
- [4] On Multicast Path Finding Algorithms. Ching-Hua Chow, vol. 1, 2012, pp.269-271.
- [5] Paige R, Kruskal C. Parallel algorithms for shorest path problem. IEEE Transactions on Computer, vol.C34, 1985, pp.14-20.
- [6] Ismail Chabini, Shan LAN. Adaptationd of the A* Alorithm for the Computation of Fastest Paths in Deterministic Discrete-Time Dynamic Network. IEEE Transations on Intelligent Transportion Systems, vol.4, 2010, pp.121-125.
- [7] Chabini I, Lan S. Adaptations of the A*algorithm for the computation of fastest paths in deterministic discrete-time dynamic networks, IEEE Transactions on intelligenttransportation systems, vol.3, 2013, pp.60-74.
- [8] Vaibhavi Patel, Prof.ChitraBaggar; A Survey Paper of Bellman-Ford Algorithm and Dijkstra Algorithm for Finding Shortest Path in GIS Application. International Journal of P2P Network Trends and Technology (IJPTT) – Volume 5 – February 2014 ISSN: 2249-2615

- [9] Stefan Hougardy , —The Floyd-Warshall Algorithm on Graphs with Negative Cycles —,Information Processing Letters 110 (2013), 279-281
[10] Shivani Sanan* 1, Leena Jain2: Bharti Kappor3Shortest Path AlgorithmIEEE Transl. J. Magn. Japan, Volume 2, Issue 7, July 2013
[11] M.Young, The Technical Writer's Handbook. Mill Valley, CA: University Science.

Rezyume: Yillar davomida eng qisqa yo'l muammosini hal qilishning umumiy yondashuvidan kelib chiqadigan g'oyalarning rivojlanishi natijasida algoritmlarning keng doirasi paydo bo'ldi. Grafikdagi ikkita nuqta (yoki, odatda, tarmoq) orasidagi eng qisqa yo'lni topishni o'z ichiga olgan eng fundamental operatsiya bo'yicha tadqiqotlar doimiy talab qilinadigan ilovalar uchun yaratilgan murakkab echimlarga olib keldi. Bularga eng qisqa yo'l daraxtini qidirish yoki barcha tugunlar juftlari orasidagi eng kichik masofaga ega bo'lgan yo'llar to'plamini topish kiradi. Eng qisqa yo'l muammosi yo'l xaritasi tizimi kabi ko'plab innovatsion texnologiyalarni amalga oshirish uchun ishlatiladi. Eng qisqa yo'l muammosi keng ko'lamli foydalanishga ega bo'lgan optimallashtirish texnikasining bir turi [1]. Ushbu inshoning maqsadi o'quvchini eng qisqa yo'lni topish muammosi bilan tanishtirish va tanlangan algoritmlarning ikkita to'plamini to'liq tahlil qilishdir. muayyan muammolarni hal qilish uchun yaratilgan. Quyida tavsiflangan tadqiqotda turli xil algoritmlar aniq ma'lumotlar formatida taqdim etilgan har xil turdagi yo'naltirilgan grafiklarda ishlash samaradorligi uchun baholandi. Empirik simulyatsiyaga asoslangan tahlil o'rganilayotgan algoritmlarning samaradorligi turlicha ekanligini ko'rsatadi va u eng qisqa yo'l muammosi variantlarini hal qilish uchun qaysi yondashuvlardan foydalanish kerakligi, shuningdek, qaysi algoritmlardan qochish yoki ehtiyotkorlik bilan foydalanish kerakligi haqida tavsiyalar beradi.

Резюме: За прошедшие годы в результате развития идей, вытекающих из общего подхода к решению задачи поиска кратчайшего пути, появилось множество алгоритмов. Исследования наиболее фундаментальной операции, включающей поиск кратчайшего маршрута между двумя точками на графе (или, чаще, в сети), привели к созданию сложных решений, созданных для постоянно требовательных приложений. К ним относятся поиск дерева кратчайших путей или обнаружение наборов путей с наименьшими расстояниями между всеми парами узлов. Задача поиска кратчайшего пути используется для реализации многих инновационных технологий, таких как система дорожных карт. Задача о кратчайшем пути — это тип метода оптимизации [1], который имеет широкий спектр применения. Цель этого эссе — познакомить читателя с проблемой поиска кратчайшего пути и предоставить тщательный анализ двух наборов выбранных алгоритмов, созданы для решения конкретных задач. В исследовании, изложенном ниже, различные алгоритмы оценивались на предмет их эффективности при работе с ориентированными графами различных типов, которые были представлены в четком формате данных. Эмпирический анализ, основанный на имитационном моделировании, показывает, что производительность исследованных алгоритмов различается, и дает рекомендации относительно того, какие подходы следует использовать для решения конкретных вариантов задачи поиска кратчайшего пути, а также какие алгоритмы следует избегать или использовать с осторожностью.

Kalit so'zlar: eng qisqa yo'l; algoritmlar; marshrut; ishlash; ko'rib chiqish; grafik; tugun;

Ключевые слова: кратчайший путь; алгоритмы; маршрут; спектакль; рассмотрение; график; узел;

CPE-K AS A HOLE TRANSPORT MATERIAL FOR ORGANIC SOLAR CELLS

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National University of Uzbekistan named after Mirzo Ulugbek

Summary: CPE-K is a conjugated copolymer has been synthesized by direct arylation method. It has been used as a hole transporting material in organic solar cells with a maximum PCE of 3,13%. It is found that the optimal thickness of the CPE-K HTL is 8-10 nm.

Key words: polymer synthesis, organic photovoltaics, solar cells.

Introduction

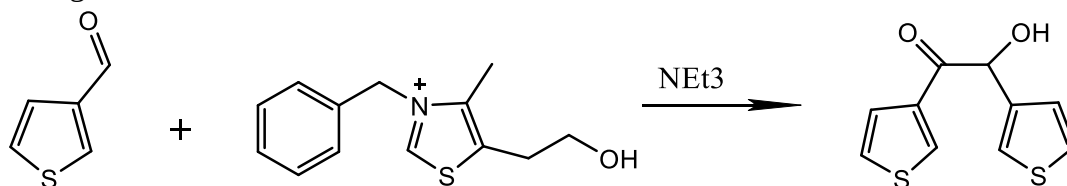
Organic bulk heterojunction (BHJ) solar cells become an attractive because of their low cost, light weight and flexibility [1-2]. They appeared as a powerful tool that converts solar light into electrical energy with an eco-friendly technic [3-4]. Material's design, morphology, interface engineering on BHJ quite important to reach high power conversion efficiency (PCE) and device stability [5-9]. Broader absorption and smaller band gap various donor-acceptor materials used in organic solar cells with the solar photon flux peaking around 700 nm [5-8]. Poly[2,6-(4,4-bis-(2-ethylhexyl)-4*H*-cyclopenta [2,1-*b*;3,4-*b'*]dithiophene)-*alt*-4,7(2,1,3-benzothiadiazole)] PCPDTBT was one of the first low band gap copolymer which used for OPV applications, giving power conversion efficiency more than 2.8% with fullerene acceptor [10]. Now it has become a popular among low bandgap materials. To increase the electrode's charge selectivity and minimize the energy barrier for charge extraction, a hole transport layer (HTL) with hole-blocking properties is inserted in the middle of cathode and BHJ active layer. One of most commonly used HTL material for BHJ solar cells is PEDOT:PSS. It has sufficient conductivity, solution processability, high optical transparency and work function. Nevertheless, the strong anisotropy in the electrical conduction in thin film PEDOT:PSS layers often limits the charge collection in the cells [11-12]. On top of that acidic and hygroscopic nature of this material leads to induce chemical instability between electrodes and active layer [13]. It has been used many types of materials like metal oxides, cross-linkable materials, graphene-based materials, conducting polymers to overcome above mentioned deficiencies [14-17]. In organic photovoltaics conjugated polyelectrolytes (CPEs) have received great attention because of improving the PCE through solution processing. The CPEs as a ETL has many advantages as modification of the electron extraction properties, increase of internal built-in voltage and reduction of the series resistance which resulted in the short-circuit current (J_{sc}) open-circuit voltage (V_{oc}) and fill factor (FF) can be selectively or even simultaneously enhanced on a single device [18-20].

In this work we demonstrate that organic BHJ solar cells successfully done when incorporating a water/alcohol soluble CPE HTL using solution processing. The neutral pH and conductive CPE potassium 4,4'-(2-methy-6-(7-methylbenzo[c][1,2,5]thiadazol-4-yl)-4*H*-cyclopenta[1,2-*b*:5,4-*b'*]dithiophene-4,4-diyl)bis(butane-1-sulfonate) comprised of a narrow band gap conjugated backbone with a hydrophilic sides chains of potassium butane sulfonates incorporated as the HTL in polymer:fullerene BHJ solar cell based on a low band gap donor material, [6,6]-phenyl C71-butyric acid methyl ester (PC₇₁BM) acceptor. CPE-K acts as an efficient HTL not only because of properties, but also due to intrinsic superiority in homogeneous conductivity and pH neutral property.

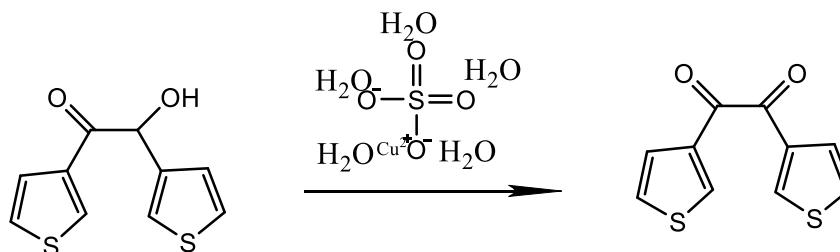
EXPERIMENTAL

Polymer synthesis. Reaction 1. In a 500 ml three-necked flask with reflux condenser and septum under Argon with thiophene-3-carbaldehyde (100 g, 892 mmol) and 3-benzyl-5-(2hydroxyethyl)-4-methylthiazol-3-ium chloride (6,01 g, 22,29 mmol) in 250 ml of ethanol submitted. After the addition of triethylamine (40,8 ml, 294 mmol) the reaction solution is heated at 100 °C for 2,5 hours under reflux condenser. The red-brownish reaction solution is poured to 1,5 L of ice water and removed the yellowish-beige precipitate washed with 50 ml of water. The dried crude product is

recrystallized in ethanol and filtrated. The product 2-hydroxy-1,2-di(thiophen-3-yl)ethenone dried overnight in high vacuum.

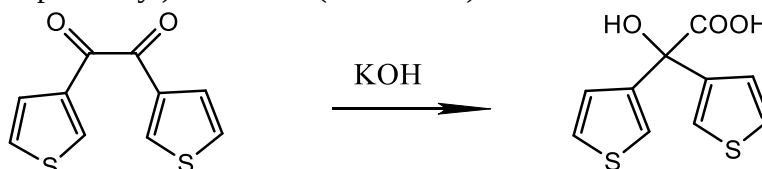


Reaction 2. In the three-neck flask equipped with a reflux condenser in a mixture of 108 ml of pyridine and 55 ml of water and copper (II) sulfate pentahydrate (65,6 g, 263 mmol) are dissolved and warmed to 60 °C. After encore of 2-hydroxy-1,2-di(thiophen-3-yl) ethenone (26,8 g, 119 mmol) the reaction solution is heated to 80°C for 1 hour and stirred at this temperature (solution turns dark green). Cooled till room temperature, 800 ml of 10% HCl was added, the resulting pyridinium hydrochloride sucked off and extracted with diethyl ether. The losung dried over magnesium sulfate and removed the solvent. The hot oil is treated with isopropanol to crystallize out the product. The product 1,2-di(thiophen-3-yl) ethane-1,2-dione dried overnight.

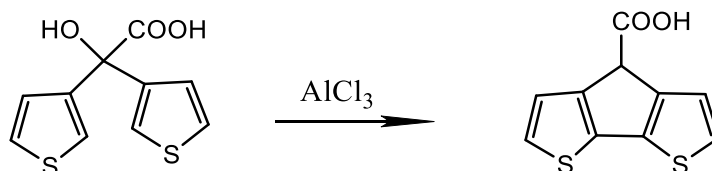


Reaction 3. In a 250-ml three-necked flask with reflux condenser potassium hydroxide (25,7 g, 459 mmol) is dissolved in 200 ml of a mixture of H₂O/ethanol (1:1). At room temperature 1,2-di(thiophen-3-yl) ethane-1,2-dione (30 g, 135 mmol) is added to this mixture. The flask is dipped into the preheated oil bath for circa 15 min (solution turns violet-black). The flask is removed and cooled in an ice bath to 0 °C.

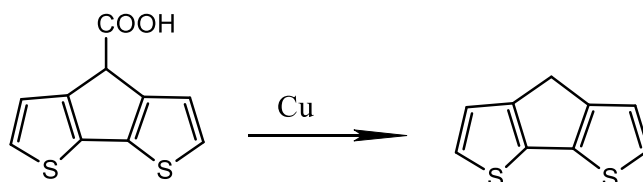
The solution is set to pH=1 by addition of conc. HCl (color changes). The ethanol is removed in vacuo and the aqueous phase extracted with 300 ml of diethylether for three times. The combined organic phases are extracted several times with saturated Na₂CO₃. The combined aqueous phases are collected in 2 big beakers (2 liters). 10% HCl is given carefully to the basic aqueous phase until a white solid is formed. The white solid is sucked off to dryness, dissolved in diethylether and washed three times with water to remove the rest of acid. After drying over magnesium sulfate the solvent is removed in vacuo and the solid dried in high vacuo by covering the flask with aluminum foil. Product is 2-hydroxy-2,2-di(thiophen-3-yl)acetic acid (C₁₀H₈O₃S₂).



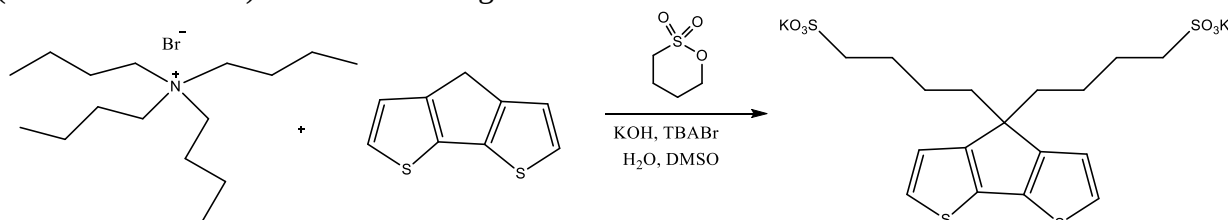
Reaction 4. In a 500 ml three-necked flask 2-hydroxy-2,2-di(thiophen-3-yl)acetic acid (C₁₀H₈O₃S₂) dissolved in 300 ml of benzene under argon atmosphere. The mixture is cooled to 0-4 °C before addition of freshly mortared aluminum chloride (AlCl₃) which molar ratio was 1:1 to starting material in an argon counter stream. After addition the reaction mixture is slowly warmed and refluxed for 30 minutes. After cooling to room temperature 100 ml water and 15 ml 4 N HCl acid are added and the solution extracted with diethyl ether. When solvent removed the crude product is recrystallised from diisopropylether. Product 4H-cyclopenta[1,2-b:5,4-b']dithiophene-4-carboxylic acid dried for 5 hours.



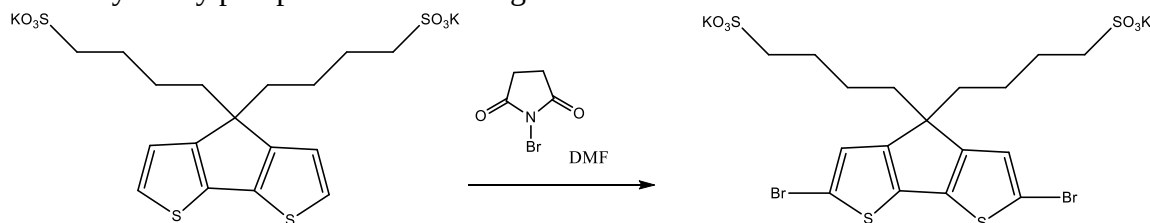
Reaction 5. In a 250 ml three-necked flask 4H-cyclopenta[1,2-b:5,4-b']dithiophene-4-carboxylic acid (1,035 g, 4,66 mmol) and elemental copper (0,222 g, 3,49 mmol) are placed and the flask is evacuated and flush for several times with argon. With syringe 30 ml of freshly distilled quionoline are added and by using metal block the mixture is heated to 245 °C for 45 minutes. The hot suspension is poured on a mixture of ice and concentrated hydrochloric acid. After addition of diethyl ether the organic phase is extracted with 10 % hydrochloric acid and saturated Na_2CO_3 , before drying with magnesium sulfate and removing the solvent. The crude product 4H-cyclopenta[1,2-b:5,4-b']dithiophene recrystallised from hexane.



Reaction 6. 4H-cyclopenta[1,2-b:5,4-b']dithiophene (510 mg, 2,86 mmol) (1,0 equiv.) and tetrabutylammonium bromide (4,61 mg, 0,014 mmol) (0,05 equiv.) were dissolved in anhydrous DMSO (14 ml), and the solution was degassed by sparging with Ar for 5 min. Then 50% KOH in H_2O (3,2 gr) was added via syringe, followed by the addition of 1,4-butanediol (0,7 ml, 6,68 mmol, 2,4 equiv.). After stirring at room temperature for 3 hours, the reaction mixture was poured into acetone (100 ml), and the yellowish precipitate was collected by filtration, and washed with acetone. The product potassium 4,4'-(4H-cyclopenta[1,2-b:5,4-b']dithiophene-4,4-diyl)bis(butane-1-sulfonate) was dried overnight.

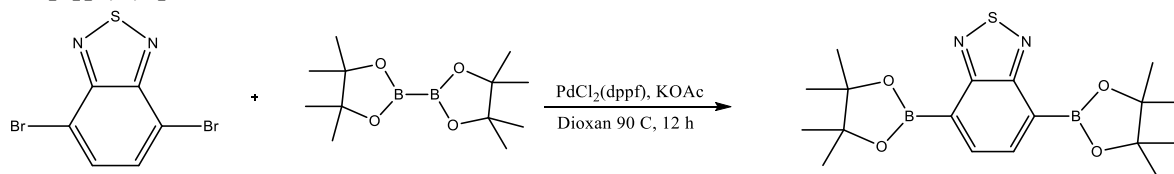


Reaction 7. The crude product 4,4'-(4H-cyclopenta[1,2-b:5,4-b']dithiophene-4,4-diyl)bis(butane-1-sulfonate) (1,768 g, 3,39 mmol) was suspended in DMF (18 ml), and H_2O (6 ml) was added while stirring until it was all dissolved. NBS (1,508 g, 8,48 mmol) was added in dark by shielding the flask with aluminum foil. The brown solution was stirred at room temperature for 1 hour and poured into acetone. The yellowish precipitate was collected by filtration and washed with acetone. Further purification was done by flash chromatography. The product 2,6-dibromo-4,4'-(4H-cyclopenta[1,2-b:5,4-b']dithiophene-4,4-diyl)bis(butane-1-sulfonate) was separated with solution by rotary pump and dried overnight.

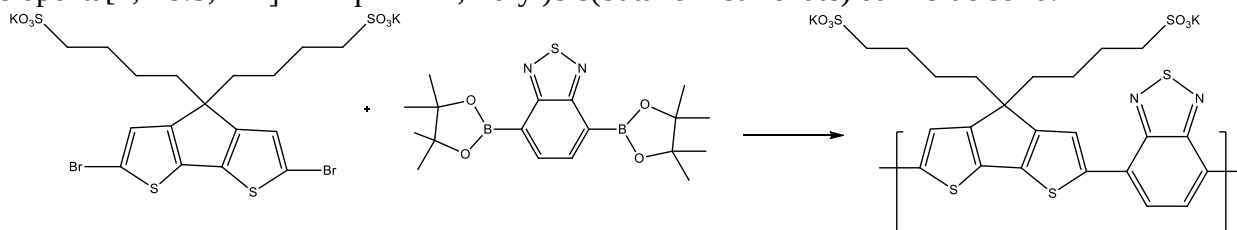


Reaction 8. A solution of 4,7-dibromobenzo[c][1,2,5]thiadiazole (3 g, 10,21 mmol), 4,4,4',4',5,5,5',5'-octamethyl-2,2'-bi(1,3,2-dioxaborolane) (5,70 g, 22,45 mmol), $\text{PdCl}_2(\text{dppf})$ (0,373 g, 0,510 mmol) and potassium acetate (4,21 g, 42,9 mmol) in dry dioxane (Volume: 60 ml) stirred

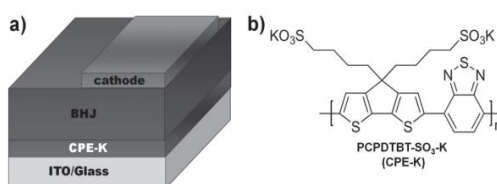
overnight at 90 °C under Argon. Subsequently the solvent removed in vacuum. The crude product is purified by column chromatography (flash chromatography Hex: EE 80:20-70:30) and recrystallized from ethanol twice. The product 4,7-bis(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)benzo[c][1,2,5]thiadiazole dried in vacuum.



Reaction 9. The 2,6-dibromo-4,4'-(4H-cyclopenta[1,2-b:5,4-b']dithiophene-4,4-diyl)bis(butane-1-sulfonate) (145 mg, 0,212 mmol), 4,7-bis(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)benzo[c][1,2,5]thiadiazole (82 mg, 0,212 mmol), potassium carbonate (146 mg, 1,053 mmol) and Pd(PPh₃)₄ (5,0 mg, 2 mol%) were combined in a microwave tube a stir bar in a glove box. The tube was sealed with a septum and taken out of glove box. A mixture of DMF (2 ml) and H₂O (0,5 ml) was degassed by sparging with Ar for 5 min and cannulated into the above microwave tube. The septum on the tube was removed quickly under positive pressure of Ar and the tube was resealed with a special cap for the microwave tubes. The brown suspension was placed into an oil bath and heated to 90 °C at which temperature the reaction mixture turned dark blue in about 15 minutes. The reaction was allowed to stir at 90 °C for 24 hours. Then reaction mixture poured into acetone (50 ml). The dark blue precipitate was collected by filtration and washed with copious amounts of acetone and MeOH until the filtrate was almost colorless. The precipitate was all dissolved in millipore H₂O (25 ml) and transferred into a dialysis tube (MWCO:3500-5000). The dialysis tube was placed in a large beaker with H₂O (2 L) stirring for 3 days by changing the H₂O every 12 hours. Evaporation of H₂O provided the title product as metallic-looking dark blue solid (117 mg, 84%) after drying under vacuum overnight. The product potassium 4,4'-(2-methy-6-(7-methylbenzo[c][1,2,5]thiadiazol-4-yl)-4H-cyclopenta[1,2-b:5,4-b']dithiophene-4,4-diyl)bis(butane-1-sulfonate) dark blue solid.



Device fabrication



Scheme 1. (a) Device structure of solar cells (b) Chemical structure of CPE-K

FTO/ITO glass cut by diamond pen. Softly pressed ITO structured glass plate with straightedge, one straight line is cut and broken it carefully along that line. Then measured width of the slide cut to 12.0 mm x 12.0 mm piece. Then, at first it is deep to deionized water and washed with brush then it is deep to acetone, acetic acid and afterwards procedure repeated with isopropanol. Dried by N₂ steam by pistol. Before using it is placed to oxygen plasma for 45 minutes.

As an electron extraction layer, it has been used Ca, in the thickness of 40nm. The HTL layer of the cells has been made as follows. The 4 mg of CPE-K is solved in 1 ml of CB in 80°C in a nitrogen filled glove box overnight than added 16mg of fullerene and stirred for another 2 hours. Dark

blue solution filtered with 5 μm PTFE filter. The solution spin cast on ITO glass in speed of 2000 rpm for 40 seconds and there is no post treatment.

RESULTS AND DISCUSSION

Detailed device parameters are summarized in **Table 1**. The evident fact is that the optimal thickness of the CPE-K hole transport layer is found to be 8 nm. The best devices with optimized CPE-K HTL layer shows PCE=3,138%. It is clearly illustrated that thickness of the layer playing a crucial role. By increasing the layer thickness from 4 nm PCE increasing till optimum layer thickness and showing best PCE in 8 and 10 nm. By becoming thicker HTL device PCE decreasing from 3,037% in 12 nm to 2,82 % in 20 nm. The open circuit voltage of the devices also showing the same improvement, except best parameters 0,69V seen in 10 nm CPE-K HTL.

CPE-K layer thickness	PCE [%]	V _{oc} [V]	J _{sc} [mA/cm ²]	FF [%]
4 nm	2,786	0,636	7,52	58,236
6 nm	2,876	0,677	7,216	58,907
8 nm	3,138	0,677	7,532	61,584
10 nm	3,123	0,69	7,574	59,762
12 nm	3,037	0,677	7,454	60,219
14 nm	2,946	0,65	7,45	60,867
16 nm	2,853	0,663	8,033	53,55
20 nm	2,82	0,677	7,39	56,396

Table 1. Cell characteristics (open circuit voltage (V_{oc}), short-circuit current density (J_{sc}) and fill factor (FF) of organic solar cells.

The performance of CPE-K HTL devices with a PCE=3,138% display a better FF=61,58% while device with 10 nm thickness shows FF=59,76%.

In conclusion, CPE-K as a conductive conjugated polyelectrolyte successfully incorporated in bulk heterojunction solar cells as a HTL by solution processing method. This work illustrates an application of water/alcohol-soluble conjugated polyelectrolytes to serve as efficient HTL for organic solar cells.

References:

- [1]. C.J.Brabec, S.Gowrisanker, J.J.M.Halls, D.Laird, S. J. Jia , S. P. Williams , Adv. Mater. **2010**, 22, 3839.
- [2]. B.C.Thompson, J. M. J. Fréchet , Angew. Chem. Int. Edit. **2008**, 47, 58 .
- [3] Espinosa, N.; Hosel, M.; Angmo, D.; Krebs, F. C. Energy Environ. Sci. 2012, 5, 5117-5132.
- [4] Kumar, P.; Chand, S. Prog. Photovoltaics 2012, 20, 377-415.
- [5] H. L. Yip, A. K. Y. Jen, Energ. Environ. Sci. 2012, 5, 5994.
- [6] J. Jo, S. I. Na, S. S. Kim, T. W. Lee, Y. Chung, S. J. Kang, D. Vak, D. Y. Kim, Adv. Funct. Mater. 2009, 19, 2398.
- [7] T. S. van der Poll, J. A. Love, T. Q. Nguyen, G. C. Bazan, Adv. Mater. 2012, 24, 3646.
- [8] B. Carsten, F. He, H. J. Son, T. Xu, L. P. Yu, Chem. Rev. 2011, 111, 1493.
- [9] Y. M. Sun, G. C. Welch, W. L. Leong, C. J. Takacs, G. C. Bazan, A. J. Heeger, Nat. Mater. 2012, 11, 44.
- [10] Muhlbacher, D.; Scharber, M.; Morana, M.; Zhu, Z.; Waller, D.; Gaudiana, R.; Brabec, C. Adv. Mater. 2006, 18, 2884-2889.
- [11] L.S.C.Pingree, B. A. MacLeod , D. S. Ginger , J. Phys. Chem. C. 2008 , 112 , 7922.
- [12] A. M. Nardes , M. Kemerink , R. A. J. Janssen , J. A. M. Bastiaansen , N. M. M. Kiggen , B. M. W. Langeveld , A. J. J. M. van Breemen , M. M. de Kok , Adv. Mater. 2007, 19, 1196
- [13] K. W. Wong, H. L. Yip , Y. Luo , K. Y. Wong , W. M. Lau , K. H. Low , H. F. Chow , Z. Q. Gao , W. L. Yeung , C. C. Chang , Appl. Phys. Lett. 2002 , 80 , 2788
- [14] J. E. Yoo , K. S. Lee , A. Garcia , J. Tarver , E. D. Gomez , K. Baldwin , Y. M. Sun , H. Meng , T. Q. Nguyen , Y. L. Loo , PNAS 2010 , 107 , 5712 .
- [15] A. Garcia , G. C. Welch , E. L. Ratcliff , D. S. Ginley , G. C. Bazan , D. C. Olson , Adv. Mater. 2012 , 24 , 5368 .
- [16] S. S. Li , K. H. Tu , C. C. Lin , C. W. Chen , M. Chhowalla , Acs Nano 2010 , 4 , 3169 .

- [17] A. W. Hains , J. Liu , A. B. F. Martinson , M. D. Irwin , T. J. Marks , Adv. Funct. Mater. 2010 , 20 , 595
- [18] Z. He , C. Zhong , S. Su , M. Xu , H. Wu , Y. Cao , Nat. Photonics. 2012 , 6 , 593
- [19] Z. Tang , L. M. Andersson , Z. George , K. Vandewal , K. Tvingstedt , P. Heriksson , R. Kroon , M. R. Andersson , O. Inganas , Adv. Mater. 2012 , 24 , 554
- [20] Y.-M. Chang , R. Zhu , E. Richard , C.-C. Chen , G. Li , Y. Yang , Adv. Funct. Mater. 2012 , 22 , 3284

Rezyume: CPE-K konjugatsiyalangan sopolimer bo'lib, to'g'ridan-to'g'ri arillash usuli bilan sintez qilingan. U organik quyosh batareykalarida tashuvchi material sifatida qo'llanildi va 3,13% effektivlikka erishildi. CPE-K tashuvchi material sifatida optimal qalinligi 8-10 nm ekanligi aniqlandi.

Резюме: Сопряженный сополимер CPE-K Синтезирован методом прямого арилирования. Он использовался в качестве материала для транспортировки дырок в органических солнечных элементах с максимальной эффективностью 3,13%. Установлено, что оптимальная толщина CPE-K как дырочно проводящий слой составляет 8-10 нм.

Kalit so'zlar: polimerlar sintezi, organik fotovoltaika, quyosh (batareykalari) elementlari.

Ключевые слова: синтез полимеров, органическая фотогальваника, солнечные батареи.

METHODS OF USE AND APPLICATION OF MODERN TECHNOLOGIES IN FOUNDRY

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Summary: *Production processes have evolved significantly in recent years, necessitating an increase in productivity alongside an increase in the accuracy of manufactured products. One of the ways in which modern casting production has evolved is the use of 3D printing to manufacture cast products or their models. 3D printing is one of the most.*

Key words: *3D printing, manufacturing, geometry, production process, computer aided design.*

INTRODUCTION.

The modern development of production processes, including the production of cast billets, requires an increase in production productivity in conjunction with an increase in the accuracy of manufactured products. One of the methods for the development of modern foundry production is the use of 3D printing for the manufacture of cast products or their models. Three-dimensional printing is one of the most promising innovations used in modern design technologies and small-scale production. A 3D printer is a device that creates a three-dimensional object based on a virtual 3D model. Unlike a conventional printer that prints information onto a sheet of paper, a 3D printer allows you to output three-dimensional information, i.e., create certain physical objects. The 3D printing technology is based on the principle of layer-by-layer creation (growing) of a solid model SLS or Selective Laser Sintering, an additive manufacturing technology based on layer-by-layer sintering of powder materials (polyamides, plastic) using a laser beam [1]. The preheated powder is briefly irradiated with a laser and sintered with the already hardened particles that are in the underlying layer. Controlling parameters. This process can achieve the desired residual porosity and density of the resulting part. The main advantage of SLS is the provision of excellent mechanical properties of finished products [2]. Products are extremely durable, with high detail and quality of surface construction. Another significant plus is that SLS printing is practically waste-free, since the powder not used for growing parts is partially mixed with new portions of the material and returned to work (this process is called "regeneration"), and partially - sent for processing.

Advantages:

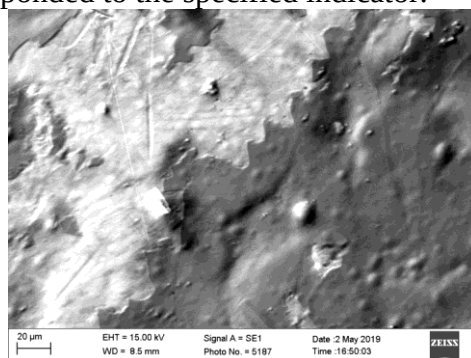
- Excellent mechanical properties of the finished product
- High performance - the laser melts only the surface of the powder particles, not the entire volume. This allows SLS machines to run much faster than other powder 3D printers.
- Does not require support materials - the powder itself in the working chamber supports the model until it is finished
- Allows you to print very large (up to 750 mm) objects, or a whole series of parts at a time - this is possible thanks to the volume chambers of building SLS printers

Flaws:

- High cost of consumables and the equipment itself
- Requires mandatory training of specialists in certified courses

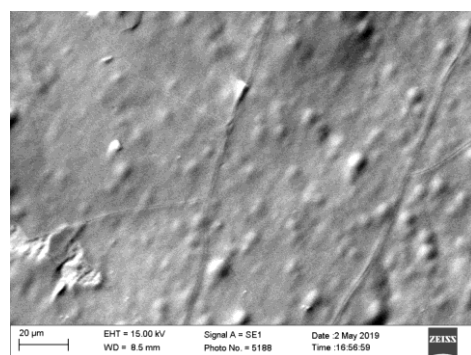
With additive manufacturing technology, it has become possible to print a complex mold in a short time. Entire costly steps can be eliminated as only one CAD dataset is needed to produce sand molds and cores [3]. The use of these CAD models, allows you to use all the richness of detail and accuracy, almost unlimited geometry, undercuts can be realized. To study the quality of the resulting castings using a model using the 3D technology, a charge of two types of steel and cast iron was taken. When studying the structure of steel castings, irregularities from traces of the material of the model were revealed on casting surfaces. Figure 1 shows traces of irregularities on the surface of steel

castings. Here, in spectra 23 - and 24 - samples were taken for chemical analysis, which showed that the surface of the castings corresponded to the specified indicator.



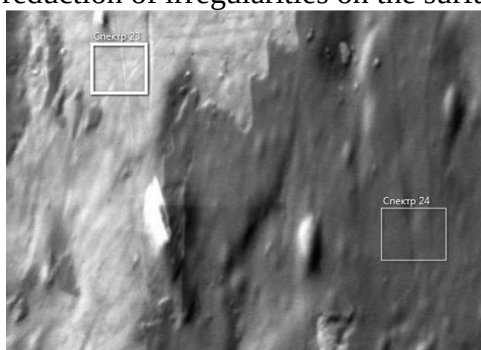
Picture . 1. The resulting irregularities on the surface of steel castings.

The formation of gas bubbles on the surface of the castings was observed. Figure 6 shows the structure of the part on the surface of which gas bubbles and bulges formed due to these gas inclusions [4].



Picture. 2. The structure of the part on the surface of which gas bubbles and bulges have formed due to these gas inclusions.

However, the number of these defects is 20-25% less than in parts obtained in disposable casting molds. Apparently, this is due to the release of combustion products of the model material and diffusion into the metal. Figure 3 shows the structure of the steel casting obtained after processing the model, which contributed to the reduction of irregularities on the surface of the castings.



Picture. 3. The structure of the steel casting obtained after processing the model.

CONCLUSION

As a result of the research, it was revealed that along with ensuring the high quality of castings when using 3D, the cost of production is reduced by 30-35%.

References:

1. Абдурахманов Х.З., Камалов Ж.С., Турахужаева Ш.Н., Турсунов Т.Х. Тураходжаев Н.Д. Применение 3Д технологий для изготовления литейных моделей при литье изделий из алюминиевых сплавов. Международная научно-практическая интернет конференция студентов и магистрантов «Литьё и металлургия 2019». Минск, 16-17 октября 2019 г. С.-17-18.

2. Salokhiddin Nurmurodov, Alisher Rasulov, Nodir Turakhodjaev, Kudratkhon Bakhadirov, Lazizkhan Yakubov, Khusniddin Abdurakhmanov, Tokhir Tursunov. Development of New Structural Materials with Improved Mechanical Properties and High Quality of Structures through New Methods. Journal of Materials Science Research, Canada. Canadian Center of Science and Education. Vol.5, 2016. № 3. – S. 52-58.

Rezyume: So'nggi yillarda ishlab chiqarish jarayonlari sezilarli darajada o'zgardi, bu ishlab chiqarilgan mahsulotlarning aniqligini oshirish bilan birga mahsuldorlikni oshirishni talab qiladi. Zamonaviy quyma ishlab chiqarishni rivojlantirish yo'nalishlaridan biri quyma mahsulotlar yoki ularning modellarini ishlab chiqarish uchun 3D bosib chiqarishdan foydalanish hisoblanadi. 3D bosib chiqarish zamonaviy dizayn va kichik hajmdagi ishlab chiqarish texnologiyalaridagi eng istiqbolli yangiliklardan biridir.

Резюме: Производственные процессы значительно изменились за последние годы, что требует повышения производительности наряду с повышением точности выпускаемой продукции. Одним из направлений развития современного литейного производства является использование 3D-печати для изготовления литых изделий или их моделей. 3D-печать — одно из самых перспективных нововведений в современных технологиях проектирования и мелкосерийного производства.

Kalit so'zlar: 3D bosib chiqarish, ishlab chiqarish, geometriya, ishlab chiqarish jarayoni, kompyuter yordamida dizayn.

Ключевые слова: 3D-печать, производство, геометрия, производственный процесс, автоматизированное проектирование.

HISTORY AND DEVELOPMENT OF THE WHEELCHAIR FOR PEOPLE WITH DISABILITIES

Kambarova O. S

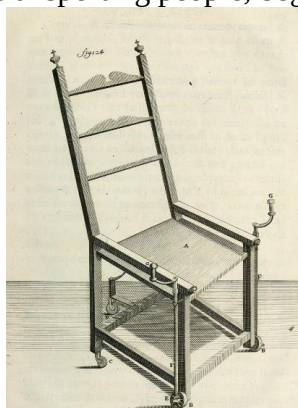
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Summary: *This article discusses the history and development, what types of wheelchairs are and for what situations certain types may be needed.*

Key words: *transportation of people, images, design, construction, efficient, propulsion mechanism, baby chair, portable throne, hand bike, lever drive, electric wheelchairs.*

The earliest records of furniture on wheels were found in China and Greece, with inscriptions on slate stone and an image on a Greek vase dating from the fourth and fifth centuries BC. The first records of "wheelchairs" used in the Celestial Empire to transport disabled people date back three centuries [8].

The Chinese used early prototypes of wheelchairs to transport people and weighty objects. These two functions were not shared for several hundred years, until in 525 BC images of "chairs on wheels", which were made directly for transporting people, began to appear in Chinese fine art.



Pic. 1. Chair on wheels made for King Philip II

Although European inventors eventually developed a similar design, such a method of transport was not used until 1595, when an unknown person from Spain built a similar chair for King Philip II. It had a rather complex design with armrests and footrests. The disadvantage was that there was no effective motor mechanism and therefore, without the help of another person, it could not be set in motion. This version of the chair was more like a modern child's chair or a portable throne for the wealthy, rather than a modern wheelchair [3].



Pic. 2. Stefan Farffler self-propelled chair

In 1655, Stefan Farffler, a watchmaker with paralysis, at the age of 22, developed the world's first self-propelled chair on a three-wheeled chassis using a system of connecting rods and gears. However, the design was more like a hand-held bicycle rather than a wheelchair, as the device used handles mounted on the front wheel.



Pic. 3. Wheelchair of Austrian Empress Elisabeth Christina Braunschweig-Wolfenbüttel, first half of the XVIII century

Despite all the improvements, the wheelchairs of the time were very bulky, heavy and hardly weighed less than those who used them. A new stage in the development of this technique came only a century later. The breakthrough invention was invented by the British John Dawson, who in 1783 created the Bath Chair, named after the inventor's hometown. It was a much lighter device with a sleek design and a swivel front wheel. The Bath Chairs quickly gained widespread popularity, allowing Dawson to develop a range of models that included both closed and open wheelchairs, many with the option of a harness. And since the horse with its speed of movement and speed was not suitable for this purpose, the owners of the "Bath-chairs" tucked into their individual "crews" much more peaceful and leisurely donkeys [4].



Pic. 4. John Dawson's Bath Chair

In the 19th century, the design of wheelchairs underwent another change and came to almost a modern look - now users of even lighter wheelchairs themselves drove them in motion, rotating their hands large rear wheels. But there was an inconvenience here - when driving through the streets, the hands of the person who was driving the chair inevitably got dirty in the mud that poured on the rims. The problem was solved towards the end of the century by adding a slightly smaller diameter outer rim to each wheel. It did not come into contact with the ground, and now it was possible to rotate it without a great risk of smearing his hands [6].

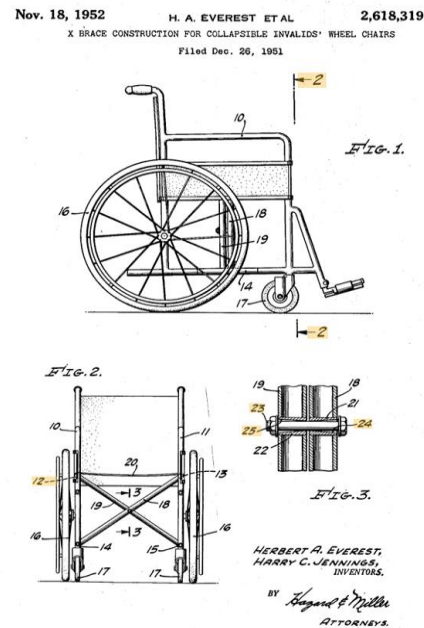


Pic. 5. Wheelchair in Atlantic City

In the late 19th century, "wheelchairs" appeared in Atlantic City and were introduced into the streets so that people with increased needs could rent them to enjoy the boardwalk. After a while, even healthy city guests rented decorated "wheelchairs" and hired servants to push them.



Pic. 6. Chair of Jennings and Everest.

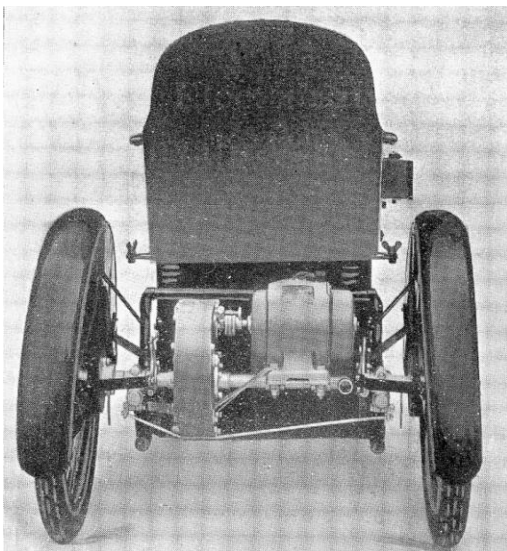


Pic. 7. X-brace Desig.

In 1933, engineers Harry S. Jennings Sr. and his friend Herbert Everest, a man with increased needs, designed and built the first portable wheelchair. It was light and foldable, and steel was used as the main metal in the structure.

Everest had broken his back in a mining accident earlier. The friends saw the invention as a commercial potential and decided to mass produce wheelchairs and supply them to the market.

The "X-brace" design they developed is still used by wheelchair manufacturers, albeit with modern materials and other improvements. The concept of the X-brace came to Harry through the folding stools/stools of the time, which turned 90 degrees, and were seen by Harry and Herbert outside and in the mines. [5].



Pic. 8. Battery-charged wheelchair with electric motor created by Canadian inventor George Klein. 1950s

Pic. 9. Wheelchair with electric motor Harding design. Britain, 1930s

After the end of World War II, wheelchairs evolved again. In addition to the classic models, specialized sports appeared on the market, which are used, in particular, Paralympians. First used at the beginning of the

century and then safely forgotten, by the end of the century electric drive with remote control became the most common addition, turning the pram into a comfortable maneuverable vehicle. And now, at the beginning of the 19th century, a wheelchair is often a very complex and accessible device that incorporates the most modern advances. Apparently, it's not far away from the day when people with disabilities will be able to use wheelchairs with neurocontrol and with the help of special devices that perceive the pulses of the brain to give commands to the computer that drives the wheel chair [1].

The modern, hand-operated wheelchair was invented by American Armenian Emik Avagyan. He was born a person with increased needs and developed devices that simplify the lives of people with disabilities. Among them, in addition to numerous improvements to wheelchairs, was a typewriter that allowed typing by breathing. In 1961, President John F. Kennedy honored him for his invaluable contributions to solving problems of global importance.



Pic. 10. Emik Avagyan

Thanks to these inventions, the desire of people with disabilities to move independently became attainable. Modern wheelchairs have spread around the world and help people with increased needs make life much easier.

Pic. 11. Modern wheelchair



Modern wheelchairs are not so much a vehicle as a way of expressing individuality. Modern technology allows you to give the stroller an individual style. This is due to their ultra-lightweight and varied accessories. That is, today, the choice of wheelchairs is not only based on functional capabilities, but also considering the individuality of each disabled person.

In the past two decades, wheelchair use for disabled persons has been developed extensively in technical terms. So today they are lighter, less vibrating, they have better performance, and now they easily adapt to individual needs [7].

In today's world, a wheelchair allows a person with special needs to feel in society on an equal footing with other people. As good as a wheelchair is without a special accessible environment, a disabled person will feel disadvantaged. This environment includes ramps, handrails and special public transport.



Pic. 12. The modern British Carbon black wheelchair, made entirely of carbon fibre

Today, there is a very wide variety of means of transportation for persons with disabilities. Modern strollers have different purposes. For example, there are models that have a lever drive. They are used to travel long distances outside buildings. There are models that move on flat, hard surfaces, that is, mainly in the premises. These models have cast tires. If the pram has pneumatic tyres, it can be used to move on the street. However, such tires require regular replacement, as they wear out over time.

Also modern types of strollers have the ability to remove the armrests, adjust the legs, the angle of the backrest and head restraint, which creates not only ease of use, but also comfort. Many wheelchairs have a folding frame. This function makes them convenient for transportation in transport as well as for storage.

There are active strollers, which are made of very light materials and easily withstand the most extreme loads. For example, going down stairs, driving on uneven roads, overcoming obstacles. Such strollers allow not only to move quickly, but even to engage in some sports, such as orienteering and dancing. That is, such strollers can create a sense of a full life.

There are also electric carols. They are reliable and very easy to operate, and they are absolutely safe [2].

In the modern world, many things have been invented for the disabled. And the example of wheelchairs proves that. But the main thing is to make the person with disabilities feel comfortable among other people. And to do that, we need to change our mindset to these people and see them as full-fledged people, not as disabled people.

References:

1. Sketching: Drawing Techniques For Product Designers - Koos Eissen, Roselien Steur and BIS Publishers, China, 2007. — 243 p.
2. Joser M. Garrofe. Structural packaging – Index book, — 476 p.
3. Семенов А.Ю. Колясочный маршрут.
4. Лин Майк В. Современный дизайн. Пошаговое руководство. М.: Изд. «Астрель, АСТ», 2010. — 202 с.
5. W. Ernst Eder Stanislav Hosnedl, DESIGN ENGINEERING A Manual for Enhanced Creativity, London – New York CRC 2008 y – 558 p.
6. Koosseissen and Roseliensteur. SKETCHING drawing techniques for product designers. Singapore 2007 y - 258 p.
7. Мунипов В.М., Зинченко В.П. «Эргономика». М. – Логос, 2001, -346с.
8. Папанек В. Дизайн для реального мира. Изд. Д.Аронов, 2004, -416с.

Rezyume: Ushbu maqolada tarix va rivojlanish, nogironlar aravachalarining qanday turlari va qaysi holatlar uchun ma'lum turlari kerak bo'lishi mumkinligi muhokama qilinadi

Резюме: В этой статье рассматривается история и развитие, какие бывают виды инвалидных колясок и для каких ситуаций могут понадобиться те или иные типы.

Kalit so'zlar: odamlarni tashish, tasvirlar, dizayn, qurilish, samarali, harakatlantiruvchi mexanizm, bolalar stuli, ko'chma taxt, qo'l velosipedi, tutqichli haydovchi, elektr nogironlar aravachalari.

Ключевые слова: транспортировка людей, изображения, дизайн, конструкция, эффективно, двигательный механизм, детский стульчик, переносной трон, ручной велосипед, рычажный привод, коляски с электроприводом.

UDK: 902.01

CONCERNING THE HISTORY OF KALTAMINAR CULTURE AND ITS RESEARCH IN RECENT YEARS

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Summary: *This article discusses about a special place in the material culture of the Neolithic period of Central Asia, from the initial study of the monuments of “Kaltaminar” culture monuments, as well as the history of the results of archeological research carried out in collaboration with scientists research conducted in recent years, especially in independence years.*

Key words: *Neolithic period, Kaltaminar culture, S.P. Tolstov, Khorezm archeological expedition, A.V. Vinogradov, Kyzylkum, Lower Zarafshan, Janbas-4, Ayakagitma.*

The culture of the historical and cultural communities of Kaltaminar has a special place in the study of the material culture of the Neolithic communities of Central Asia. This culture was discovered in the late 30th of the last century by the famous archeologist S.P. Tolstov, and has been studied in detail by A.V. Vinogradov for the recent years. The culture of Kaltaminar communities in the Lower Zarafshan oasis was studied by O. Islamov. These studies show that the Kaltaminar communities lived not only in the Akchadarya basin of the Amudarya, but also in neighboring Uzboy, the ancient valleys of the Zarafshan River, Ustyurt, the interior of the Kyzylkum, southwestern Kazakhstan, the Eastern Caspian, the Aral Sea, Balkhan, and Mangyshlak and created their own culture. The culture of the communities living in such a large area came to science under the common name - Kaltaminar, the culture of historical and cultural communities [1.173]. Studies have identified that this culture contains several local cultural variants. These are local cultural variants such as Akchadarya, Lower Zarafshan, Lavlakan [2.165]. It should be noted that if the first metallurgical culture (Eneolithic) was formed on the southern borders of Turkmenistan in the IV millennium BC on the basis of the culture of the Jayitun Neolithic communities, in the lowlands (now steppe) inhabited by Kaltaminar communities by the end of the III millennium BC the composition of the weapons (of course, over time, their appearance, size, method of processing) has been preserved, but in the life of these communities there are still self-employed areas of hunting, gathering and fishing. The reason is that the natural landscape in which they live, the ecological environment, the surroundings of freshwater lakes are rich in flora and fauna, which provided their daily food supply [3.147].

If we look at the history of the study of the material culture of the Kaltaminar Neolithic communities, we find that since the late 1930s, archeological expeditions (KHAE, EACST) with the participation of specialists in complex sciences began to be organized throughout Central Asia. During this period, the discovery of such monuments as Ayritam, Teshik-tash, Amir-Temur, Janbas-4 determined the prospects for the study of Stone Age monuments on the borders of our country [4.12-14]. In particular, in 1937, the Khorezm archeological expedition led by S. P. Tolstov studied ancient irrigation facilities in Shabboz and Turtkul districts of Karakalpakstan. In 1939, with the discovery of the Neolithic monument Janbas-4 by S.P. Tolstov, the study of Kaltaminar culture began on a large scale. In 1939-1940-1945, the staff of the Khorezm archeological expedition led by S.P. Tolstov studied a number of monuments related to the culture of Kaltaminar. During the large-scale archeological excavations carried out by the Amudarya group of the Khorezm archeological expedition in 1946 in the Karshi and Kanimex deserts, in the following years in the Akchadarya basin of the

Amudarya, Sarikamish, lower and upper basins of the Uzboy, Kyzylkum borders, more than 100 monuments of Kaltaminar Neolithic culture were found [5.170-177].

The collection of interesting stone tools acquired by N. I. Vakturskaya and E.D. Mamedov in 1965 led to the beginning of large-scale research of the culture of the Stone Age communities of the Kyzylkum region. These researches were carried out in collaboration with the Khorezm Archaeological Expedition (A.V. Vinogradov) and the Faculty of Geography of Tashkent State University (E.D. Mamedov) during the ten-year archeological season: -1965-1972, 1975-1978 inland areas of the Kyzylkum [6.256-275],; -1965-1966 Lavlakan; -1967-1968 East and West Ayakagitma; -1968-1969 in the river oases; extensive archeological work was carried out, hundreds of Stone Age monuments were mapped and researched [7.9-12]. Important data were obtained in the study of the material culture of Stone Age communities in the interior of the Kyzylkum and the Lower Zarafshan oasis in 1970-80. In particular, in 1970 Echkilisay was studied. In 1971, monuments belonging to the Neolithic period communities were found around Beshbulak and Mingbulak basins. In 1972, the area around Mingbulak and Bukantaw was surveyed and a number of Stone Age monuments were archaeologically mapped [8.8-13]. Tolstov's space was explored between 1976 and 1980. In 1978, the Chorbakti oasis, one of the ancient rivers of Lower Zarafshan, was discovered on the banks of the Mohandarya and Daryasay rivers. Between 1984 and 1986, about 60 Mesolithic and Neolithic monuments were found and studied in the oasis [9.161].

The study of monuments of Kaltaminar culture continued during the years of independence of the Republic. In particular, in 1995, the Uzbek-Polish International Archaeological Expedition carried out field research in the Lower Zarafshan oasis and mapped a number of sites. In particular, excavations have begun at the cultural stratum of Ayakagitma, which lasted until 2002. Specialists from Uzbek and Polish archeologists Muhiddin Khujanazarov, Karol Shimchak and Rizard Michniyak took part in the research. As a result of stratified samples studied from the monument, data on the periodic new chronology of the Ayakagitma space were obtained. According to him, the footprints of Ayakagitma are dated to 7180 ± 20 to 4460 ± 80 thousand years [10.1-100]. A.V. Vinogradov marked the first stage of Kaltaminar-Daryalisay stage in the VI-V-millennia BC, while the research of the international expedition in Ayakagitma dated this date to the middle of the VIII-VII millennia. Later, the Uzbek-French international archeological expedition was organized to study the culture of Kaltaminar in 2002. F. Brunet and H. Hoshimov conducted research on the technical typological study of the stone industry of the Ayakagitma space, stratigraphic analysis of the strata [11.38-44].

Thus, the study of the cultural history of the Kaltaminar Neolithic communities under study to date can be divided into the following stages:

The first stage (1939-1950). The study of the material culture of the Neolithic communities began in 1939 with the discovery of the Janbas-4 site by SP Tolstov. Based on the first archeological materials obtained, the Kaltaminar Neolithic culture was isolated and scientifically based. In 1939-1940-1945 and from 1946 a number of Neolithic monuments were studied in the Akchadarya basin of the Amudarya, Sariqkamish, lower and upper basins of the Uzboy.

The second stage (1960-1980). During this period, monuments belonging to the Kaltaminar communities were found and studied in the interior of the Kyzylkum and the Lower Zarafshan oasis. The research was carried out by the Khorezm Archaeological Expedition (S.P. Tolstov, A.V. Vinogradov), specialists of the Faculty of Geography of Tashkent State University (E.D. Mamedov), the staff (Ya. Gulomov, O. Islamov) of the Uzbek Archaeological Expedition of the Institute of History of the Academy of Sciences of Uzbekistan. In particular, Tolstov's space was studied in 1976-1980. In 1978, Mesolithic and Neolithic monuments were studied in the Chorbakti oasis, one of the ancient rivers of Lower Zarafshan.

The third stage (independence years of the Republic). During the independence years of the Republic, scientific cooperation has been established with major foreign archaeological research centers. In particular, international expeditions such as Uzbekistan-Poland, Uzbekistan-France have

studied the monuments of the Stone Age in the Kyzylkum and Lower Zarafshan oases. The Ayakagitma space was studied. Geological, paleobotanical, paleontological analysis, GIS technology, chemical analysis were used in the study of the Ayakagitma. Geological, paleobotanical, paleontological analysis, GIS technology, chemical analysis were used in the study of the footprint. These studies have provided insights into new aspects of the material culture of Kaltaminar Neolithic communities. The date of culture has been antiquated, information about the production economy, i.e., livestock, has been obtained.

References:

1. Tolstov S.P. Drevney Xorezm. – M.: Izdatel'stvo MGU, 1948. Vinogradov A.V. Neoliticheskie pamyatniki Xorezma - MEX, vip.8. – M.: Nauka, 1968; Vinogradov A.V. Drevnie oxotniki i ribolovi Sredneaziatskogo mejdurech'ya. – TXE, t. XIII. – M.: Nauka, 1981. 173 b.; Vinogradov A.V. Mamedov E.D. Pervobitniy Lyavlyakan. Etapi drevneyshego zaseleniya i osvoeniya Vnutrennix Kizilkumov - MEX, vip.10. – M.: Nauka, 1975; Gulyamov Ya.G., Islamov U., Askarov A. Pervobitnaya kul'tura i vzniknovenie oroshaemogo zemledeliya v nizov'yax Zarafshana. – Tashkent: Fan, 1966; Bijanov Ye.B. Neoliticheskie pamyatniki yugo-vostochnogo Ustyurta // Drevnyaya i srednevekovaya kul'tura yugo-vostochnogo Ustyurta. – Tashkent, Fan, 1978. 18-79-betlar; Bijanov Ye.B. Kamenniy vek Ustyurta. Avt.ref. na soiskanie uch.stepeni d.i.n. – Nukus, 1996. S.3-42.
2. Vinogradov A. V. O lokal'nix variantax neoliticheskoy kul'turi Kizilkumov.- KSIA, 1970, vip. 122. S.31-36; Vinogradov A.V. Ko'rsatilgan adabiyot. 1981, 165-betlar.
3. Vinogradov A.V. Ko'rsatilgan adabiyot. 1981, 147-betlar.
4. Djurakulov M.D. Istoriya izucheniya kamennogo veka Sredney Azii. Avtoreferat dissna soiskanie uch.step. k.i.n., - Samarkand, 1966. - S.12-14.
5. Nizov'ya Amudar'i, Sarikamish, Uzboy // Istoriya formirovaniya i zaseleniya. MXE, vip.3. – 1960. -S.170-177.
6. Vinogradov A.V., Mamedov E.D. Pervobitniy Lyavlyakan // Etapi drevneyshego zaseleniya i osvoeniya Vnutrennix Kizilkumov. - M., Nauka,1975.- S.256-275.
7. Vinogradov A.V. Drevnie oxotniki i ribolovi Sredneaziatskogo Mejdurech'ya. - M.,1981. - S.9-12.
8. Vinogradov A.V. Drevnie oxotniki i ribolovi Sredneaziatskogo Mejdurech'ya. - M.,1981. - S. 8-13.
9. Vinogradov A.V. Drevnie oxotniki i ribolovi Sredneaziatskogo Mejdurech'ya.- M.,1981. - S.59; Xolmatov N.U. Mezolit i neolit Nijnego Zarafshana. - Tashkent, 2007.161s.
10. Szymczak K., Khudzhanazarov M. Excavation in Ayakagytma the site, SE Kyzil-Kum, Uzbekistan. Season 1999. General Rapport. varsovie-Samarcande, 2004. R.1-100
11. Arxeologiya i istoriya Tsentral'noy Azii v trudax frantsuzskix uchenix. T.1. Samarkand. 2014. -S.38-44.

Rezyume: *Ushbu maqolada Markaziy Osiyo Neolit davri moddiy madaniyatida alohida o'z o'rniga ega bo'lgan Kaltaminar madaniyati yodgorliklari tadqiqotining dastlabki o'rganilish davridan boshlab, shu bilan birga keyingi yillarda olib borilgan tadqiqot ishlari, xususan mustaqillik yillarida chet ellik olimlar bilan hamkorlikda amalga oshirilgan arxeologik tadqiqot natijalari tarixi xususida so'z yuritiladi.*

Резюме: *В данной статье исследование памятников калтаминорской культуры, занимающих особое место в материальной культуре Среднеазиатского неолита, проводится с первого периода изучения, но в последние годы, особенно в годы независимости, в соавторстве с зарубежными учеными история результатов археологических исследований.*

Kalit so'zlar: *Neolit davri, Kaltaminar madaniyati, S.P.Tolstov, Xorazm arxeologik ekspeditsiyasi, A.V.Vinogradov, Qizilqum, Quyi Zarafshon, Jonbos-4, Oyoqog'itma*

Ключевые слова: *эпоха неолита, калтаминорская культура, С.П. Толстов, Хорезмская археологическая экспедиция, А.В. Виноградов, Кызылкумы, Нижний Заравшан, Джонбос-4, Айокогитма.*

IMPORTANCE OF DEVELOPMENT OF THE HOTEL SERVICE IN THE REPUBLIC OF KARAKALPAKSTAN

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Summary: *The article considers the peculiarities of the application of the concept of regional conditions in hotel service. Its essence is to improve continuously the business processes of the hotel to create additional value of services for the guest in terms of customer-centric service.*

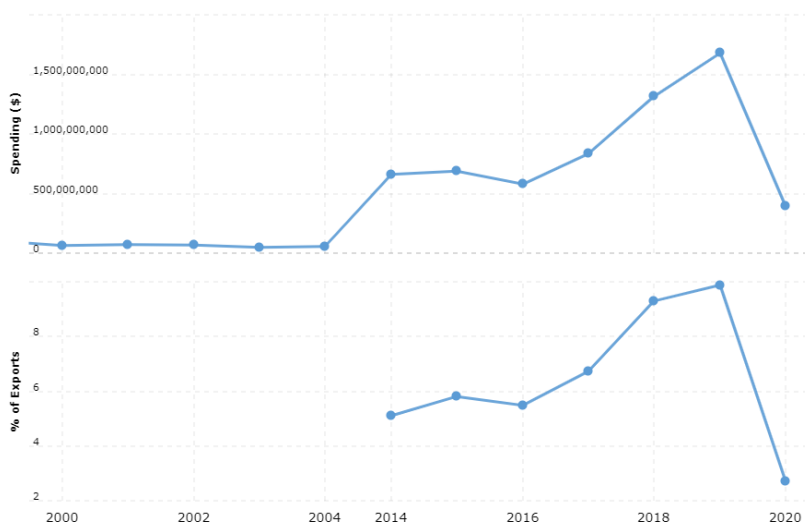
Key words: *hotel, Karakalpak tourism, hotel services, Jipek joly hotel, hotel business, agritourism industry, accommodation*

Abstract

The article considers the peculiarities of the application of the concept of regional conditions in hotel service. Its essence is to improve continuously the business processes of the hotel to create additional value of services for the guest in terms of customer-centric service. The main factors of influence and prerequisites for the traditional differences of karakalpaks in the hotel service are the material and technical base, service technology, staff with their professional skills and abilities, quality of services. The key elements of developing the hotel service in the conditions of traditional varieties of Karakalpakstan are the availability of ideas and suggestions for improving the service; team interaction; availability of service standards; effective staff motivation; quality circles, whose work is based on mass critical thinking and a creative approach to the organization of service processes in the hotel. As in many regions of Uzbekistan, there is a very big tourism potential, not only for the development of common tourism, but also for a kind of hotel business in the Republic of Karakalpakstan, the region which is located on the Great Silk Road was a trade route of the ancient times of strategic importance, and was the only land route between the Caspian and the Aral Sea. Now it is the territory, linking the north-west gate of Uzbekistan to the east and west. Located on a plateau Ustyurt road and railways are the arteries of the economy of Uzbekistan.

Introduction

Hospitality and tourism is an important industry that contributes at least 11 per cent of the world's GDP, employs over 1 of 11 people worldwide and represents 10 % of the global workforce (World Travel & Tourism Council, 2020). The industry makes a significant contribution to the economic development of many countries, with some countries reliant on tourism as a catalyst for growth and development. As the result of reforms directed at modernization, innovative development of economic sectors during the years of independence in the Republic of Uzbekistan, the tourism industry has also risen to a new level. The issue of the development of tourism is not without reason reflected in the priority areas of development and liberalization of the economy in the Strategy of the development of the Republic of Uzbekistan. In this regard, an urgent issue is the implementation of the research on methodological and practical aspects of determining the directions and prospects for the development of Hotel services. This is the case in Uzbekistan where the tourism industry has been hosting large numbers of tourists arriving for business or vacation purposes as well as travelling historical places of Uzbekistan. In 2019, the hospitality and tourism sector contributed was 1,679 million USD, a 27.78% increase from 2018. Unfortunately, in the conditions of Pandemics in 2020 was 395 million USD, a 76.47% declined from 2019. In the period of Pandemics in Uzbekistan was time to modernize infrastructure, prepare advertisements for the marketing process with new ideas. (pic.1)



Pic.1 International tourism receipts in the Republic of Uzbekistan (2000-2020)

Main part

Nowadays, history has become a source of activities directly or indirectly related to tourism; as a result, it is vital to improve tourist sites in order to alleviate the slowdown in the tourism sector. The construction of facilities such as guest houses, lodges, campgrounds, elegant hotels, youth hostels, as well as roads, restaurants, museums, and rental car companies, is one of the measures that aids the sector's resurrection. These enhancements allow for territorial growth and the diversification of the tourist offer and the shift from quantity to quality tourism: alternative tourism [1, p.3]. This last concept is meant to be an alternative to the typical mass tourism that prioritizes profit over everything else, sometimes at the expense of the regions visited. Alternative tourism appears to be a viable option in this regard, since it provides clients with a unique, individualized experience based on cultural interactions, experience sharing, discovery, and a sustainable environment. Furthermore, it provides a social and economic benefit to the local population throughout the project's implementation as well as during the operation of the activity [3, p.3]. Alternative tourism provides a more equitable distribution of the resources created by the tourism environment as well as a sector assessment. In this regard, the various actors have not stopped competing in innovation to give formulas, sites, and new kinds of lodging that include freshness, uniqueness, quality contribution, adaptation to needs, and indisputable assets to attract and maintain clients. Creating hotel business in developing regions, especially in rural areas, might count as a new direction for regional development.

Analysis of Jipek Joly hotel in the region

Jipek Joli Hotel is the first private enterprise in the Republic of Karakalpakstan to start a hotel business. Jipek Joli Hotel opened its doors to guests in 2004. It has two buildings with modern construction and national ornaments.

Hotel "Jipek Joli" is located in the very center of Nukus, It is located near the the world-famous Karakalpak State Art Museum named after I.V. Savitsky. Nevertheless, the hotel is located away from busy avenues, which allows guests to relax from the city noise.

The new modern hotel has 21 rooms, of which 3 are Standard, 8 are Junior Suites and 10 are comfortable Suites.

Jipek Joli Inn provides guests with 22 rooms, including 8 standards, 4 Junior Suites, and 10 Superior Suites.

In addition, Jipek Joli Inn has a comfortable conference hall for 30-40 people for conducting training, seminars, and conferences. The hall is equipped with the necessary furniture and equipment, including a media projector and a screen. If necessary, can organize meals for the participants: coffee break, lunch, and dinner.

The cozy courtyard of Jipek Joli Inn Hotel is a favorite place for many guests during the hot season. Here, you can eat dinner outside in the cool of the shade or just drink coffee and sit with a book to take a break from the heat.

Rooms at Jipek Joli Hotel are decorated in a soft European style. The interior of the rooms is decorated in muted pastel colors, which, combined with the warm lighting of the rooms, creates an excellent opportunity to relax and unwind after a long journey.

The hotel rooms are equipped with a winter-summer air conditioning system, as well as everything necessary for the guest: wireless Internet Wi-Fi, satellite TV channels, a telephone line, mini-bar. Personal hygiene products, hair dryer in the bathroom.

Competent and polite hotel staff are always ready to help in any matter.

You can follow the price of numbers in table 2.1.1 below. The fact that tourists can make a reservation on the hotel's website or Booking.com platform, and the fact that many hotels in the city do not have an online booking service ensures free movement in the tourism market.

Table 1

Price-list of Jipek Joli hotel

KINDS OF ROOMS	SGL (UZS)		DBL/TWN (UZS)		TRIPLE (UZS)	
	For the citizens of Uzbekistan	For international tourists	For the citizens of Uzbekistan	For international tourists	For the citizens of Uzbekistan	For international tourists
Luxury	350 000	450 000	550 000	650 000	700 000	850 000
Half-lux	300 000	350 000	450 000	580 000	600 000	750 000
Standard	250 000	300 000	380 000	500 000	500 000	80 USD*

Jipek Joli Hotel also includes the following services:

Breakfast (from 07:00 to 09:00)

Room cleaning (daily)

Provision of parking on the territory of the hotel

Use of equipment in the room

Wake up at the appointed time

Provide a first aid kit and call a doctor

Write a letter

Satellite television

Internet services (WI-FI)

Taxi call

Provision of iron and ironing board.

Many factors influence tourists' choice of this hotel:

The hotel's history, quality service to customers, presence of a website, activity in social networks, location in the city center, and most important thing is that the hotel also has a travel agency.

Most of the foreign tourists who come to the Republic of Karakalpakstan come to see the Aral Sea, and the main tourist routes are organized by the tourist company Ayimtour.

Potentials to create hotel business in the region

Karakalpakstan is the region where the 245 objects of historical and cultural heritage have been added to the state protection list. 46 of them are historical architectures, 118 of them are historical-architectural complex. [4,p.18]

Some of them are considered to have a state significance, such as “Mizdakkhon” and “Gavur castle” in the Khudjayli district, “Tuprokkala”, “Ayazkala”, “Ulkankabatkala”, “Guldursinkala”, “Korgasinkala”, “Kirkkizkala” in the Ellikkala district, “Djambaskala”, “Kuy kirilgankala”, “Yereskala”, “Shorakhankala”, “Kalandardagli” in the Turtkul district, “Kiyatkala”, “Pil kala”, “Kizilkala”, “Akshakhankala” (Kazakliyatkan) and the complex of “Sultan Uvays baba” in the Beruniy district,

“Shilpik” fortress in the Amudarya region, “Djampikkala” in the Karauzek district and “Kuyikkala” in the Shimbay district.

Several actions being implemented to develop the tourism infrastructure of the region, for instance, improvement of national legislation in this field, increasing the efficacy of using this in practice, improving the conditions of cultural, historical and archeological objects alluring tourists and those objects’ conservation and restoration, the creation of favorable conditions for tourists. Furthermore, cause of interests by tourists there are more potential to create hotel business near each historical places or natural recreations.

Discussions and proposals

There are many handicraft centers in Chimbay and other districts where is located in the northern part of the region. In Chimboy district national clothes, yurts, handicrafts are produced by a group of entrepreneurs. Tourists are interested in observing the process of making yurt and the handicrafts. Currently, tours are organized for one day or half a day. In this direction, it is possible to create new jobs by developing new tourism products which are reflecting the rural life and organizing hostels.

In our opinion, the development of new directions for tourism and hotel business in Karakalpakstan, Entrepreneurs must seek information and obtain expertise about creating projects in the agritourism industry after opting to create their own business.

Accommodation on farm is a popular activity, especially during the summer, accounting for up to 10-15% of overnight stays. Original and new offers, such as the "straw adventure" network offer, which is an accommodation offer on active farms that is quite unique in both content and organization, occur from time to time. Tourists can sleep in a straw-covered barn and experience peasant hospitality and breakfast. This service, which can be developed across Karakalpakstan, is unique, immersive, well-communicated, and reasonably priced, and hence has numerous advantages. Tourists may offer accommodation so that the visitor gets the most out of nature and enjoys agricultural activities.

Rural accommodation is another type of agritourism that has emerged in recent years. This type of agritourism, which is increasing and posing issues, has received little research. Furthermore, the success of various forms of rural tourism accommodation in Karakalpakstan, such as rural lodges and guest rooms, cannot be ignored among Karakalpakstan and foreign tourist clientele.

The future of this type of lodging, on the one hand, because of withdrawal movements observed here and there following a continuous increase in the number of rural lodgings, and on the other hand, because of a very sharp increase in the number of guest rooms, which could saturate demand [2,6]. The importance of rural tourism for rural development is widely established, and rural tourist accommodation, in its most particular forms, plays a vital role in the offer of rural tourism. We assess the strategic importance of having a detailed understanding of the processes at work inside the tourist accommodation park, as well as a forward-looking attitude, to inform and guide rural tourism entrepreneurs, professionals, and decision-makers in their decisions and activities. Currently, a company's success will be determined by the availability of high-quality products and services, competitive enterprises, and highly qualified entrepreneurs. It has to be examined whether any of these principles are representative of rural tourism conditions and actionable.

We believe that these will be useful to create new business, as well as hotel or hostel in the rural areas and development of tourism infrastructure in the Republic of Karakalpakstan, and increase in the attractiveness of tourism in the region.

References:

1. Gilbert, D., & Tsao, J. (2000). Exploring Chinese cultural influences and hospitality marketing relationships. *International Journal of Contemporary Hospitality Management*.
2. Khazami, N.; Nefzi, A. (2021): The effect of social capital on the development of the social identity of agritourist entrepreneur: A qualitative approach, 18th and 19th edition of Tunisian Association of Marketing (ATM) conference, In Marketing of art and valuation of heritage- Post COVID 19

3. Zumrad, U., & Alimov, A. (2020). Problems of the Development of Tourism and Recreational Services in Uzbekistan in the Context of a Global Pandemic. *International Journal of Future Generation Communication and Networking*, 13(4), 815-821.

4. Alimov, A. (2018). Main directions and prospects of development of ecological tourism in the Republic of Karakalpakstan. *Praca doktorska. Nukus, Uzbekistan: Karakalpak State University*.

Rezyume: Maqolada mehmonxona xizmatida mintaqaviy shartlar kontseptsiyasini qo'llash xususiyatlari ko'rib chiqiladi. Uning mohiyati mehmonxona biznes-jarayonlarini doimiy ravishda takomillashtirishda, mijozga xizmat ko'rsatish nuqtai nazaridan mehmon uchun qo'shimcha qiymat yaratishda yotadi.

Резюме: В статье рассматриваются особенности применения понятия региональных условий в гостиничном сервисе. Суть ее заключается в постоянном совершенствовании бизнес-процессов отеля для создания дополнительной ценности услуг для гостя с точки зрения клиентоориентированного обслуживания.

Kalit so'zlar: mehmonxona, Qoraqalpog'iston turizmi, mehmonxona xizmatlari, Jipek joli mehmonxonasi, mehmonxona biznesi, agroturizm sanoati, turar joy

Ключевые слова: гостиница, каракалпакский туризм, гостиничные услуги, гостиница «Жипек жолы», гостиничный бизнес, агротуризм, жилье

THE PECULARITIES OF USING TROPES IN THE MOTIVES OF HEROES' GROWING UP IN KARAKALPAK HEROIC EPOSES

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Summary: *this article discusses the problem of active applications and artistic functions of epithets, hyperbole and comparison in the creating the motive for the rapid growth of the hero in the Karakalpak heroic epic ("Alpamysh", "Edige", "Qaraman").*

Key words: *heroic epic, epic tradition, the motive for the rapid growth of the hero, images, epithets, hyperbole, comparison, visual tools.*

In the narrations of Karakalpak epic poems bards or verse-tellers make a special focus on heroes' growing up period. The motive of the growing up period of heroes were masterfully presented with mythological plots and hyperbolic images in those epic poems by bards. The motive being same or similar, nevertheless, its depiction styles may vary from epos to epos. Every bard or verse-teller would have his own style of narration and depiction. In some cases the professional usage of tropes would show the talent and improvization skills of a certain bard. This type of usage of tropes to depict the growing up period of a hero in epic poems adds emotional impact and value to the content.

"In international folkloric materials bards created heroic images that represented common people, e.g. a shepherd whose mother was a hard-working woman yet with the noble origin, ancestors being related to king or having roots with tribe chiefs, a hero concerned with the fate of all people. He is a strong, clever, leading a group of young boys, famous for resolving conflicts with justice and wisdom. The ballad of "King and Bishop" represents this motive. In this plot a shepherd appears in the bishop's clothes to replace him and solves the riddles of the king, thus the appeased king rewards the shepherd and spares the bishop. Similarly, in the Karakalpak heroic epic poem "Edige", Edige is also a young shepherd who resolves conflicts among boys with wisdom and justice, thus he gains fame and respect among the young boys who claimed him as their king. According to N.A Veselovskiy these plots "were well-known in ancient times in the East, later they were imported from the East to the Russian folklore". They can similarly be found in the Indian folklore stories about the noble king Vikramaditya, Mongolian folklore stories of "Ardji-Bordjii", Hebrew stories about "Judgements of King Solomon". King Solomon also appears in the image of a shepherd in some verses. He also is famous for resolving conflicts among boys with justice and wisdom" [1].

For example, in the heroic epic poem of "Edige" the motive of the hero's growing period represents him as someone close to the common people, a shepherd, yet his origin is linked with peri, an exquisite winged spirit renowned for her beauty, in other versions his origin may be versed as his father being an emir. These heroes encounter with kings and are challenged to solve difficult riddles, accomplish special missions. In the epic poem "Edige" a young shepherd and famous among his fellows for his conflict resolution skills, would often be called as "our king". This, of course, makes the king wary of him and for this reason the king would often send Edige to remote dangerous places to accomplish challenging missions.

In this epos the motive of the growth of the hero takes its own space, its depiction is permeated with mythological content and stylistic artistic devices. The motive of the growth of the hero can often be found in international folklore materials. For example, in the epic poem of "Shakhsnameh" by Ferdawsi the hero Rustem as a newly born baby was deserted in a remote mountain top where the mystical simurgh (phoenix) makes her home. The simurgh takes pity on the infant and raises him with her other fledglings. We can also find similar plots in ancient Greek myths, fairy tales of "a thousand and one nights". In a number of Greek legends Paris, the son of

King Priam of Troja, on the day of his birth was also deserted in a forest where he spends 20 years [2]. Similar plots about heroes' growing up period can also be found in "The Jungle book" by Rudyard Kipling (1865-1936), a European writer of a capitalistic period. The main hero being a boy named Maugli grows up amidst animals and predators as a courageous, fast-witted boy.

In the Karakalpak epic poem "Alpamis" a special focus is on the growing up period of Alpamis. Alpamis already manifests traits of a hero at the age of seven. He grows up as a naughty boy who likes to fight with elder boys, "steals either an axe or a hoe of passers-by", annoys the whole village and so on. For example, the version of the verse teller Qurbanbay Tajibayev:

Бир жасында бирленди, (гипербола)	At the age of one, he united (hyperbole)
Еки жаста түрленди, (гипербола)	When he started to run at the age of one (hyperbole)
Үш жасына келгенде	
Дүбирлеп кирди ортаға, (гипербола)	He shaped out at the age of two (hyperbole)
Способным воевать врагами,	He became a warrior at the age of three
Төрт жасында төредей ... (теңеу)	Capable to fight with enemies (hyperbole)
Сегиз жасында омырауы есиктей, (гипербола)	At the age of four he was like a wise chief (comparison)
Аяқлары бесиктей, (гипербола)	At the age of eight he became a man with a chest as wide as strong gates (hyperbole)
Жауырынлары қақпактай, (гипербола)	Legs are like cradles
Билеклери тоқпактай, (гипербола)	Wrists are like clubs (hyperbole)
Аузы-мурны оймақтай» (литота)	His words are as soft as cream
Сөйлеген сөзи қаймақтай ... [3]. (теңеу)	His words are as sweet as honey [3]. (comparison)

Alpamis is illustrated with high-impact comparisons, hyperboles and litotes. In general, the heroes' childhood and adolescent period is depicted with similar motives, however, the verse-tellers or bards depict their heroes' disintiguishing features through using various tropes and improvisation skills in an amplified manner. For example, from the artistic perspective the motive of the hero's growing up in the epic poem of "Edige" is quite important. In the version of the verse-teller Jumabay the childhood of Edige takes an important place and is depicted artistically with tropes:

Words of the wife of Tohtamiskhan:

Елдир-елдир ел есер,	The clouds cover the sun
Жер қобаған жел есер,	Sadness covers the human's mood
Күннің жүзин булт басар,	When you breed a lean cattle
Адамның кеулин ғам басар,	Later it gives you fat meat
Арық малды сақласаң,	If you grow a lean person
Аузы мурның май етер,	<u>Will cover the liver with blood</u>
Арық адамды сақласаң,	The orphan that you have educated
<u>Қара бауырыңды қан етер</u> , (метафора)	Is already 14 years old
<u>Асыранды жетимін</u> , (эпитет)	But everyone calls him "our chief Edige"
- Мине, он үш-он төртте,	
Еки-үш айдың шамасы,	
" <u>Едиге төре</u> " атанды; - (эпитет)	

At the same time, there are verses containing the tropes that were used to illustrate the conflict resolution skills of Edige with wisdom and justice:

Нар қамыстың бөкенегин, (эпитет)	He takes out his sword out of its sheath His hair at its end like huge needles (hyperbolic comparison),
Тәрези қылып соғады,	
Қылышын қынаптан суұырып,	He attacks his prey like a lion.
Хәр түгі тебендей шаншылып, (гипербола)	His brows are stretched out as a palm (hyperbole)
Алатуғын шердей шабынып, (теңеу)	

Қабағы қарс жабылып [4],...

(Edige)

In the abovegiven verses the tropes were skillfully used by the verse-teller to portray Edige's conflict resolution skills among the boys. In other words, the description of his heroic behavior and just attitude paves a way for the narration of his further heroic deeds.

While depicting the physical abilities of their heroes in their growing up period by using hyperboles, the verse-tellers express their heroes' emotional and psychological experiences by using hyperbolic comparisons. This type of use of tropes can be traced, for example, in the epic poem of "Qaraman".

There are a number of publications on the epic poem of "Qaraman". For example, J. Khoshniyazov, Dr. of Philology, compared this epic poem with another epic poem "Oguznama" and focused on the totemic nature of the applied artistic literary devices [5].

Additionally, the repertoire of the verse-teller Qayratdinov Qiyas does not illustrate the growth of the hero of the epic poem "Qaraman" with totemic characteristics but rather depicts him as a child with extraordinary physical abilities.

An example from the epic poem of "Karaman"

«Үш күнде бала отырып,
Жети күнде жүреді,
Он төрт күнде тили шығып,
Өз-өзинен күледі,
Жаңа қырқы толғанда,
Адамға бас бермейді.
Сол кеткеннен кетеді,
Аспан менен таласқан,
Бәлент тауға жетеді,
Садақ атып, аң аұлап,
Өзинше мәслик етеді»[6].

"A three-day old child got up and walked
On the seventh day he walked and ran
On the fortnight he spoke and laughed
On the 40th day he was strong and did not
obey anyone
He aspires to reach up high mountains
Jumps as high as to the sky
Shoots from his bows and hunts for food
And lives happily ever after"[6].

In the abovegiven verse of the epic poem the verse-teller uses artistic stylistic devices by using hyperbole.

In the epic poem of "Qaraman" the hero climbs the Mountain Qubays at the age of eight. He has the strength of 40 lions, the earth shakes under his feet, he storms the lake and desert. At the age of eight he falls into his seven-day sleep:

Турпатын көрсен балқандай,
Қулақтары қалқандай,
Қарсыласқан қалайық,
Қорқып естен талғандай.
Маңлайында жалғыз көз,
Жүрегинді жарғандай,
Балтырының хәр түгі,
Сегіз тынлы арқандай.
Қәхәр менен қараса,
Шаншылар түгі бақандай,...
Байқас етсең хәр мушын,
Мысалы жүз батпандай,
Тамашаға түйени,
Ылақтырар сақпандай» [7].

His body is as big as a wall
His ears are as big as shields
Whoever encounters him
Gets scared out of his wits
His only eye on his forehead
Frightens you to death
Each hair on his legs
Is as thick as eight-fiber roper
When he looks with anger
His eyelashes are like arrows
His fists are as heavy as a hundred pounds
He makes fun of camels
By tossing them around like stones" [7].

The above presented verses from the epic poem of "Qaraman" reflect the verse-tellers' attempts to use hyperboles, similes, and comparisons to create a high-impact image of a growing up

hero, bestowing him with extraordinary physical abilities and represent him as someone in the future to serve his community and tribe.

References:

1. Жирмунский В.М. Тюркский героический эпос. – Ленинград: «Наука», 1974. – с. 379.
2. Кун Н.А. Әйемги Греция мифлери ҳам легендалары. – Нөкис: «Қарақалпақстан», 1994.
3. Қарақалпақ фольклоры 3-том. «Алпамыс» дәстаны. – Нөкис: «Қарақалпақстан», 2007. – б. 267.
4. Қарақалпақ фольклоры 12-том. «Едиге» дәстаны. – Ташкент: «Манавият», 2009. – бб. 305-308.
5. Хошаниязов Ж.Х. Оғузнама. Қарақалпақ қаһарманлық дәстанлары – миллий қәдириятлар дәрегі. Нөкис, «Илим», 2017-ж., 47-бет.; Хошаниязов Ж. Значение «Огузнаме» в формировании и развитии каракалпакских героических дастанов. Вестник Бурятского государственного университета 10/ 2012, стр.165-169.
6. Қараман. Қарақалпақ фольклоры (көп томлық) XIX том. Нөкис, «Қарақалпақстан», 1989, 310-бет.
7. Қарақалпақ фольклоры. «Қараман» дәстаны. 21 том. Нөкис, «Илим», 2010, 345-346 б.б. (Қыяс жырауы вар.)

Резюме: в данной статье рассматриваются проблемы активного применения и художественной функции эпитетов, гиперболы и сравнения в создании мотиве быстрый рост героя в каракалпакском героическом эпосе (на примере анализа дастанов «Алпамыс», «Едиге», «Қараман»).

Rezyume: Ushbu maqolada qoraqalpoq qahramonlik eposida qahramonning tez o'sib borishi motivini yaratishda epitetlarning faol qo'llanishi va badiiy vazifasi, giperbola va qiyoslash muammolari («Alpomish», «Edige», «Qoraman» dostonlari tahlili misolida) ko'rib chiqildi.

Ключевые слова: героический эпос, эпическая традиция, мотив быстрый рост героя, образы, эпитеты, гиперболы, сравнения, литотические сравнения, изобразительные средства.

Kalit so'zlar: qahramonlik epos, epik an'ana, qahramonning tez o'sishi motivi, obrazlar, epitetlar, giperbola, qiyoslash, litotik taqqoslar, tasviriy vositalar

**ADVANTAGES AND DISADVANTAGES OF TRADITIONAL AND VIRTUAL
LABORATORY (SIMULATION LABORATORY) IN TECHNICAL HIGHER
EDUCATION**

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Summary: *In this article, in the organization of traditional and virtual laboratory work in conducting educational activities in accordance with the modern requirements of the higher education system, the methods of teaching in both cases were analyzed and the necessary results were summarized, and the peculiarities of each method, i.e. advantages and disadvantages, were discussed. Including, as a result of considering the positive and negative aspects of the use of simulated virtual laboratory work in the transition of technical sciences, it has been proven that it is the most effective tool today.*

Key words: *Higher education, simulation, technical direction, traditional teaching, virtual laboratory, illustration, demonstration*

INTRODUCTION.

Today, it is an important task for every teacher to prepare electronic information-educational resources with the help of practical software tools and to use them effectively in the teaching process.

Preparation of educational materials taught in the higher education system with the help of modern software tools and organization of teaching using which expands the opportunities of students [1].

It is important to use virtual laboratory work in educational processes in technical higher educational institutions. Virtual laboratories are crucial for deep understanding of knowledge, learning theory and solving various computational, qualitative and experimental problems. If the student gets acquainted with theoretical questions in lectures, then the theory is applied in laboratory exercises, and in addition, practical skills are formed in conducting physical measurements, processing and presenting results.

Traditional teaching methods have one common goal: to give the student new knowledge and convey relevant information on any subject. The implementation of such methods is based on the informative and illustrative activity of the teacher, as well as the reproductive activity of the student.

The student gets acquainted with previously unknown information about the subject he is learning, uses new ways of thinking and acting in the process of understanding. Then, by solving the relevant problems, he applies the acquired knowledge in practice. Associative memory is mainly involved in this process - it is related to the presentation of knowledge in a ready form.

In this article, we do not intend to criticize or reject traditional teaching methods, because this question is very broad and controversial in many ways, but we will only consider these methods and show their characteristics, because their effectiveness has already passed the test of time.

Among the traditional teaching methods, as a rule, there are lectures, stories, explanations, conversations, educational discussions, working with books, demonstrations, exercises, mutual learning, laboratory work, practice and independent work. Let's discuss demonstration (demonstration) and laboratory work from the mentioned traditional teaching methods.

The demonstration method is also called the display method. It is designed to create a visual example of an object, process or phenomenon studied by students directly during a lesson. Due to the content of the studied subject and the students' methods of action, variety of options of the demonstration are used:

- Individual demonstration of the studied process or technique;
- Demonstration with the help of students with special skills;
- Show real objects: tools, materials, equipment, etc.;
- Display means of visual display;
- Presentation of video materials.

The following didactic principle should always be taken into account when different options of demonstration are used: visibility should be used in an optimal amount, and the means of demonstration should be shown in a certain sequence. The effectiveness of the demonstration process also depends on the correct choice of objects and the ability of the teacher to focus students' attention on the main points of what is being shown.

Conditions for effective demonstration:

- Students must be able to clearly see what is being shown to them;
- Students, if possible, should perceive what is shown not only with their eyes, but also with the help of other senses;
- The most important features of the indicated object or event should make a maximum impression on students and attract their attention;
- During the demonstration, students should have the opportunity to independently study the exhibition and evaluate it;

The method of demonstration is closely related to the method of illustration, although it is traditionally considered independent for conventional didactics.

Illustration - representation of events, processes and objects, as well as their perception in a symbolic form. This is done through pictures, reproductions, diagrams, graphs, drawings, photographs, maps, posters, etc.

These two methods are used in conjunction with each other, which not only complement each other, but also strengthen each other's action. If the topic of the demonstration should be perceived by students in a holistic picture, then it is customary to use a real demonstration.

It should also be said that as a result of the introduction of more and more new sources of visual presentation of information, such as computers, projectors, etc., into pedagogical activities, it became possible to distinguish one relatively independently. This method of teaching is called video method. It is designed to present information and to control, systematize, generalize, repeat and consolidate it.

The video method allows you to effectively solve many problems of the educational process, including:

- Providing new knowledge about processes and phenomena that cannot be seen with ordinary vision, for example, the passage of electric current through conductors or lines of force of magnetic induction;
- Ability to obtain calculation graphs in the process itself. That is, researching the graphs of electrical loads of industrial enterprises from the monitor;
- Presentation of video documents in the classroom on any subjects and subjects;
- Organization of tests;
- Carrying out educational work and exercises, performing simulations and measurements, etc.;
- Creation of databases necessary for the implementation of research and educational activities;
- Implementation of a simulation approach in the organization of the pedagogical process;
- By improving the quality of pedagogical methods, rationalization of the educational process, increasing its productivity, ensuring the optimal amount and assimilation of incoming information.

The effectiveness of the video method is influenced by the quality of the video materials and the equipment used in the process of the method implementation. In addition, the video method is much more demanding in organizing pedagogical activity than other methods - it should be more appropriate, thought out and more specific.

The question of what is the difference between virtual laboratory work and laboratory work performed in a laboratory room has been discussed several times among pedagogues. In the process of analysis, it was considered to what extent the variety of lessons affects the student's learning rate.

The basis of the laboratory work method is based on the students' independent research and experiments. This method is mainly used in the process of studying natural sciences and technical sciences. Laboratory work can be individual and group.

Through the laboratory method, students will have the opportunity to acquire skills and competences in working with tools. Also, this method guarantees an optimal environment in which important practical skills are formed, such as choosing learning methods, checking and processing results, calculating, measuring, etc.

The main disadvantage of traditional teaching methods is that the student receives knowledge templates, firstly, they are easily forgotten, and secondly, they cannot be applied to other types of problems and tasks.

Proper use of the laboratory method in traditional education requires special equipment, teacher and student training, and sufficient time and energy resources.

American philosopher and educational reformer John Dewey said, "If we teach our children as we taught them yesterday, we will rob them of their future." it depends on the level of the teacher's use of modern information and communication technologies in work and teaching. In other words, education in the digital age must be revised and the educational paradigm changed, because students no longer want to study in a traditional way, and teachers do not need to continue teaching in such a conventional way [2].

Recently, computer simulation of various physical and technical experiments has become an integral part of the virtual learning environment. Natural and technical sciences have provided all their extensive and fundamental materials for processing with the help of computer technologies and for testing these technologies. Virtual demonstration of technical processes and events, computer simulation of laboratory work is widespread in the software market.

Demonstrations of phenomena in laboratory equipment are less often used in higher educational institutions of our country for a number of reasons (outdated and not modernized due to lack of material resources, insufficiently developed experimental skills of modern teachers, etc.). Various aspects of it are being actively discussed by teachers, psychologists, experts in the field of information technology in our country and abroad [3].

The purpose of our research is to analyze the advantages and problematic aspects of using simulated virtual laboratory work in the educational process of training future engineers, as well as to approve experiments in this direction. It seems appropriate to consider various aspects of the use of simulated virtual experiences in the educational process and to divide them into two opposing groups. This analytical breakdown is presented in the table below.

Comparison of the opposite aspects of the use of simulated virtual experiences in the educational process

Positive sides		Negative sides
1.	Low cost of simulations compared to the real device	Releasing to a certain extent in order to focus on the modern equipment market
2.	More flexibility is provided when upgrading virtual hardware compared to	Rapid changes in computer technology, software obsolescence

	real hardware	
3.	The presence of a simulation virtual laboratory eliminates the need for additional infrastructure	Weakening of perceptions of actual device maintenance and related infrastructure requirements
4.	Safe against harmful physical factors. It is not necessary to provide protection against their influence	There is a general effect of negative physiological and psychological factors caused by working with a computer, but not very much
5.	Regulating the time of the experiment, significantly reducing it by the decision of the experimenter	Leaving the real-time mode, weakening the ideas about it
6.	Significantly reduce the complexity of the usual procedures for processing measurement results, increase the speed of calculations	Weakening of the ability to evaluate the numerical result without the use of modern computing tools, as well as the ability to adequately perceive the obtained numerical values.
7.	Unlimited options for remote work in any mode (online and offline)	Impaired perception of the real laboratory research environment
8.	Development of students' skills in using computer technologies and working with various electronic resources	Limiting opportunities to develop skills in conducting real research experiments
9.	Increasing interest in work, increasing the level of motivation to learn science and its experimental methods	The lack of attributes of scientific and research activity that requires regular work helps to develop a decent attitude towards it. Risk of increasing computer addiction

As it is seen from the table, each positive aspect of using simulated virtual laboratories in the educational process is associated with a certain negative aspect. Significantly reducing the complexity of the usual procedures for processing measurement results, increasing the speed of calculations increases the speed of students' preparation of reports [4].

The unlimited possibilities of remote work in any mode create conditions for assigning laboratory work for independent work [5].

Thus, virtual laboratories are understood as two types of software and hardware systems:

- setting up a laboratory with the possibility of remote access - we call such complexes remote laboratories;

- software that allows simulation of laboratory experiments - virtual laboratories.

When choosing labs for simulation virtual lab work, these advantages and disadvantages need to be weighed to achieve the best balance. A real experiment in a virtual case is very simple, convenient and visual, does not require modern expensive equipment and is carried out in a short time. Therefore, virtual preparation of relevant laboratory work is envisaged in the educational courses of all universities, and this has led to the spread of computer simulations in the next step. The use of simulated virtual laboratories is fully justified not only in full-time education, but also for distance education.

In higher education, a student who gains knowledge with the use of educational simulators not only at the place of study, but also in production enterprises, acquires knowledge in his field and strengthens it in practice (Fig. 1).

Scheme of connection of training simulator with training and practice process

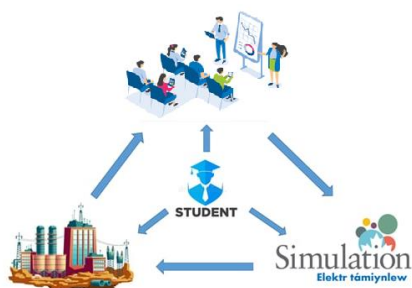


Figure 1.

laboratory work in the relevant lesson, where the student determines the level of knowledge and competence in laboratory work in a direct interview.

CONCLUSION.

The use of a set of simulated virtual laboratory works has many positive aspects, while it is recognized as a complete alternative to any real laboratory equipment, but only real experimental work fully activates all areas of interaction of students with objects of learning in natural and technical sciences.

Visual implementation of laboratory work creates a safe learning environment. Most of the computer simulators of various measuring instruments and virtual simulators of more complex technical devices, created with the help of simulation programs, meet these safety requirements.

All of the above-mentioned possibilities can be implemented in the activity of using a simulation online textbook created on the basis of a simulation approach within the framework of scientific work (<https://eltaminas.herokuapp.com>). Virtual reality helps to gamify the educational process, and in this way of presenting information, the student will have many opportunities to strengthen the acquired knowledge, conduct practical exercises and more. At the same time, as described in our research, in a number of cases, the virtual model and the work based on it is a very effective tool to achieve the educational goals. The experience of applying the simulated laboratory works created on the basis of the proposed simulation approach in the educational process is effective and can be used in various educational institutions.

References:

1. Suropov B.M. Improvement of methodical support of information communication technology teaching in electronic educational environment. Pedagogical sciences, philosophy science.doc.dis. 13.00.06. - Tashkent, 2019, 75 p.
2. The concept of adapting the higher education system to the digital generation // Tashkent - 2019 with the support of the European Union Erasmus+ program // <https://hiedtec.ecs.uni-ruse.bg>
3. Zakirova E.I. Ispolzovanie virtualnyx laboratoriy praktikumov v obrazovatelnom protsesse tekhnicheskogo vuza // Discussion. - 2015. – T. 59. - No. 7. - S. 122-126
4. Franklin R., Smith Ju. Practical assessment on the run—iPads as an effective mobile and paperless tool in physical education and teaching. Research in Learning Technology, 2015, vol. 23: 27986
5. Holovko M.V. Virtual modeling of physical experiment for distance learning systems in the secondary and higher pedagogical schools / M.V. Holovko, S.Y. Kryzhanovskiy, V.M. Matsiuk // Information technology and teaching methods. - 2015. - T. 47. - No. 3. - S. 36-48
6. Stojko D.K. Question about the character of the labor force market and the system of modern higher education in Russia // Vestnik Severo-Osetinskogo gosudarstvennogo universiteta imeni Kosta Levonovicha Khetagurova. - 2016. - No. 3. - S. 188–192

Rezyume: Bu maqolada oliy ta'lim tizimida hozirgi zamon talabiga muvofiq o'quv faoliyatini olib borishda an'anaviy va virtual laboratoriya ishlarini tashkillashtirishda, har ikki holatdagi o'qitish usullari tahlil qilindi va kerakli natijaviy fikrlar umumlashtirilib, har bir usullarning o'ziga xosliklari ya'ni afzalligi va kamchiliklariga to'htalib o'tildi. Shu jumladan, texnik fanlarni o'tishda simulyatsion virtual laboratoriya ishlaridan foydalanishning ijobiy va salbiy tomonlari ko'rib chiqilishi natijasida, hozirgi kundagi eng samarali vosita ekanligi isbotlanib berilgan.

Резюме: В данной статье были проанализированы методы обучения и обобщены необходимые результаты, а также выявлены особенности каждого из этих методов., т. е. преимущества и недостатки, были обсуждены при организации традиционной и виртуальной лабораторной работы, при проведении образовательной деятельности в соответствии с современными требованиями системы высшего образования . В том числе, в результате рассмотрения положительных и отрицательных сторон использования имитации виртуальной лабораторной работы при переходе технических наук доказано, что она является наиболее эффективным инструментом на сегодняшний день.

Kalit so'zlar: Oliy ta'lim, simulyatsiya, texnika yo'nalishi, an'anaviy o'qitish, virtual laboratoriya, illyustratsiya, demonstratsiya.

Ключевые слова: Высшее образование, симуляция, техническое направление, традиционное обучение, виртуальная лаборатория, иллюстрация, демонстрация.

**DEVELOPMENT TENDENCIES OF ISLAMIC BANKS IN THE MODERN WORLD
FINANCIAL SYSTEM**

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Summary: *Analysis of the global financial services market shows that in the context of the global crisis, there is a growing interest and need to use non-traditional banking services that are not related to bank interest, not only in Islamic states, but also in the United States and European countries. The article examines the essence and significance of Islamic banking, the features of functioning and the basic principles of their activities. The process of integration of Islamic banking into the global financial system and trends in their development are analyzed, the indicators of global Islamic banking are analyzed. Also, the development of Islamic banking in the CIS countries and prospects for development in Uzbekistan are considered.*

Key words: *Islamic economics, Islamic banking, Islamic finance, principles, riba, interest, assets, Islamic financing.*

Currently, the Islamic financial services market is developing rapidly. For more than 50 years, the Islamic banking sector has proven itself as an advanced and viable financial system that is least affected by crisis events. The rapid growth of Islamic banks was due to the global financial crisis in 2008, as well as high oil prices in the countries where the majority of Islamic financial institutions are located. Also, principles such as the principle of profit and loss sharing, the prohibition of interest and ethical lending are considered to be less risky, and therefore Islamic financial institutions have demonstrated their stability against the crisis.

Islamic banking is banking activity, which is an alternative type of financial services that conforms to the principles of Shariah. The main feature of financial services in an Islamic bank is the rejection of loan interest, high-risk transactions and uncertainty transactions.

It should be noted that regardless of the religion on which Islamic banking is founded, factors such as economic structure and regulation, historical background, degree of liberalization, and interpretation of social norms and religious guidelines differ between regions. Therefore, to fully understand the principles of Islamic banking, it is of interest to consider a regional perspective when analyzing this industry.

Also, in the conditions of global financial and geopolitical instability, the constant uncontrolled flow of capital between financial markets caused by speculative actions, factors that hinder the development of the national and world economy, such as price instability, high cost of debt funds, ineffective redistribution of monetary resources, appear. To solve this problem, it is necessary to diversify national markets by introducing new and effective principles and tools of the Islamic banking system.

Today, there are areas of Islamic banking that are under-explored, for example, according to experts, the use of financial technology in Islamic banking can bring huge changes to the world of Islamic finance. In addition, some such institutions may appear in Uzbekistan in the coming years, so local banks and other financial and credit organizations, state authorities and the population should be ready for such a development and be aware of the impact of this trend on the country's economy.

Analysis of literature on the topic

To date, there is no consensus among scholars on the definition of Islamic economics. Local and foreign scholars interpret the meaning of the term "Islamic economy" differently.

Saudi economist Muhammad Omar Chapra (2011) "What is Islamic Economics?" In his book, he writes: "Islamic economics is a field of knowledge that helps people achieve prosperity by

distributing unique resources in accordance with Islamic teachings, without violating personal freedoms and creating long-term macroeconomic and environmental imbalances." [1]

According to Al Azzawi (2016), the Islamic financial system is often described as a financial system that does not involve the charging of interest. Islamic banking is based on Sharia - a set of rules and laws related to economic management, social, political and cultural aspects of Islamic society. Islamic banks are an important element of the Islamic financial system. They perform the same functions as traditional banks, that is, they ensure the operation of the national payment system and act as financial intermediaries. According to the norms of Islamic ethics, it is customary to recognize wealth obtained through honest work, as well as inheritance or gift. [2]

A. Yu. According to Juravlev (2017), Islamic economics is "a system of views of Muslims regarding the principles and mechanisms of organizing the economic life of society." The moral component in this definition is the religious duties of Muslims: careful management of resources, prevention of exploitation in society, and justice. [4]

R.I. Bekkin A.Yu. Taking into account the definition given by Zhuravlev, he introduces some explanations. He emphasizes that Muslim views do not always correspond to Islamic ideas about economic life, so it is more appropriate to speak not about a system of views, but about the entire Muslim religion: "a system of governance according to the norms and principles of Muslim law." In addition, Beckin calls the Islamic economy the "third way" economy, the "alternative economy". [5]

Having studied the scientific works and thoughts of the above scientists, it should be noted that we need to understand what is moral economy. We can define it as a unique doctrine that balances economic factors with moral standards in order to achieve social justice. However, it should be noted that the Islamic economy, based on the principle of justice, is a symbol of moral economy. So, we can assume that the Islamic economy is an example of the practical application of the principles of moral economy.

Research methodology

In the course of the scientific research, the integration of Islamic banking into the global financial system and its importance in the scientific observation, using methods based on the principles of abstract-logical, systematic analysis, analysis and synthesis, as well as analytical analysis, comparative analysis, and statistical data analysis, are identified as problems and as a solution to the problems. scientifically based suggestions are given. In this, publications of international organizations (Islamic Development Bank, International Monetary Fund) to analyze the development trends of the Islamic banking system; Annual reports of central banks, as well as analytical materials and studies of international rating agencies (Ernst&Young, Thompson Reuters, Blossom, etc.) served as sources.

Analysis and discussion of results.

Before starting the analysis of Islamic banking, it is necessary to first determine the principles on which the Islamic banking model is built. According to the norms of Islamic ethics, the principles of justice and honesty are at the center of the organization of the bank. However, do not forget that the main task of the bank is to make a profit through financial intermediation, because its vital activity directly depends on the funds of others. If we look at this issue from the perspective of Islamic economics, it should be noted that in Islam there is a clear division into "bad" and "good" (halal) money. In particular, the sale or purchase of tobacco, alcohol, weapons, as well as the distribution of pornography, and profit from commercial operations related to the development of gambling are prohibited. Therefore, this goal should be achieved through financial services that are considered halal businesses that comply with Sharia principles.

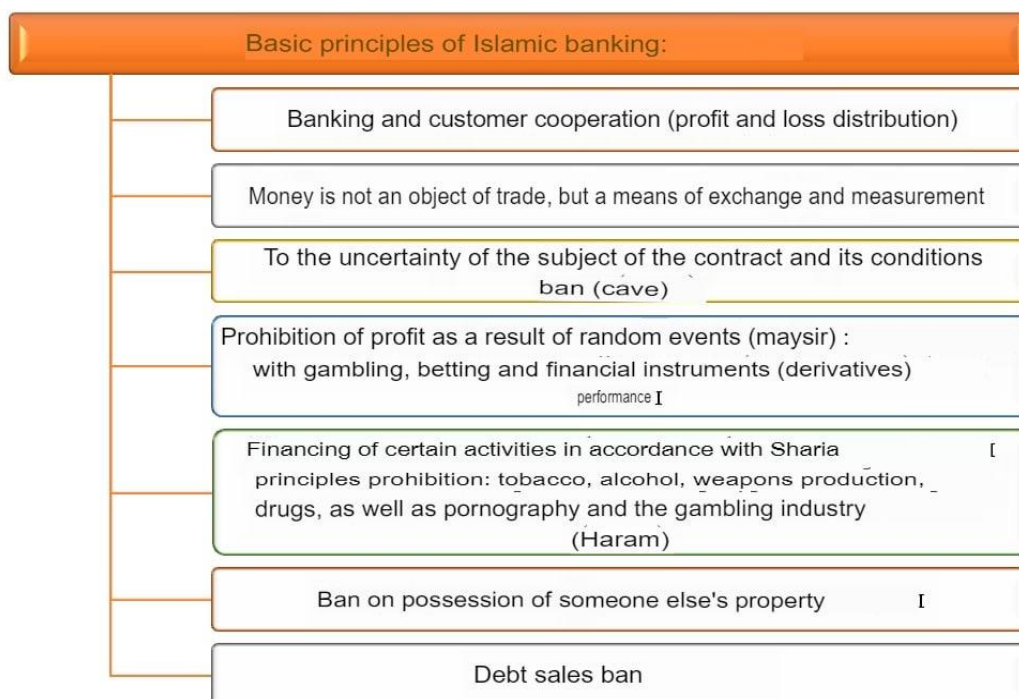
Another major difference is the absence of reward in the form of interest payment known as ``riba" in the Islamic banking model. When this element is present, a financial institution, in our case a bank, cannot be considered an Islamic financial institution. It should also be clarified that the

ban is not on taking profit, but on taking a predetermined amount of profit, regardless of the results of the activity. Unlike the conventional banking model, in Islamic banking, the reward of the equity holder should not be in the form of payment of a predetermined amount. If the bank itself is a participant in the financed project, it can make a profit or participate in the sale, and receive income depending on the margin between the cost of the product and its selling price. In such cases, there is a sharing of profits and risks between the bank and the enterprise (recipient of capital), which is the main difference from the Western system, where all risks are borne by the financed party.

Returning to the Islamic foundations of financing, it should be noted that "riba" means usury. However, "riba" has a wider meaning than just the prohibition of charging interest. In fact, "ribo" refers to any illegal or unjust profit derived from a monetary equivalent that is inconsistent in amount. Money - loan interest or usury (i.e. trading money for money) is only one of the forms of riba. The prohibition of riba, which is the main rule of the system, literally means "excess" and is interpreted as "any unjustified increase of capital, whether in the form of sale or debt." The general view among Islamic scholars is that riba includes not only usury, but also unjust calculation of income, which is widely used in practice.[3]

1-picture Basic Principles of Islamic Banking

It should also be noted that the formation of Islamic financial institutions in countries with a large proportion of the Muslim population who are not ready to trust their funds to traditional banks, as well as a large number of Muslim entrepreneurs who do not use the services of traditional banks, allows to increase the efficiency of the financial market and accelerate its development.



Currently, more than 500 Islamic banking institutions are operating in 72 countries of the world. Their largest concentration is located in the historically conditional region of the Middle East and Southeast Asia (the largest centers are Bahrain and Malaysia), as well as in Europe and the United States.

Islamic banking institutions should be considered Islamic not by the geographical origin of their capital, but primarily by the principles of their operational and investment activities. They conduct operations in strict accordance with Islamic principles.

The creation of the global Islamic financial system begins with the establishment of the first Islamic banks in a number of countries of the Middle East and Malaysia in the 1960s and 1970s, as well as the establishment of the international Islamic Development Bank. The Islamic

Development Bank (IDB) was established on December 18, 1973 at a meeting of the finance ministers of the Organization of the Islamic Conference (OIC) and began its operations in October 1975. ITB is headquartered in Jeddah, Saudi Arabia. At the same time, the bank has 11 representative offices and 4 regional offices in Rabat (Morocco), Kuala Lumpur (Malaysia), Almaty (Kazakhstan) and Dakar (Senegal).

There are a number of other organizations involved in the development of Shariah-compliant Islamic banking standards. These include Accounting and Auditing Organizations of Islamic Financial Institutions (AAOIFI), Islamic Financial Services Board (IFSB), International Islamic Financial Market, Council for Islamic Banks and Financial Institutions (CIBAFI), "For Islamic Financial Institutions arbitration and reconciliation center (Arbitration and Reconciliation Center for Islamic Financial Institutions). In addition, the International Center for Liquidity Management is engaged in the development of the secondary market of Islamic securities and the development of new financial instruments of Islamic financing, and the International Islamic Rating Agency is engaged in the development of the Islamic financial market, is engaged in developing international standards of Islamic banks and rating Islamic financial organizations.

The Accounting and Auditing Organizations of Islamic Financial Institutions (AAOIFI) was established in 1995. The purpose of its activity is to develop uniform methods of accounting of financial and economic operations of Islamic banks and to present them in the form of appropriate standards of a recommendatory nature. A number of Central Banks of Muslim countries have adopted these standards to regulate the activities of Islamic financial institutions that report to them. One of the goals of organizations such as the Islamic Financial Services Board (IFSB), the International Islamic Rating Agency, the Council of Islamic Banking and Financial Institutions (CIBAFI), and others is to create an infrastructure that enables the issuance of Islamic bonds (sukuk).

To date, the field of Islamic financial services has grown significantly. If, in the mid-1990s, the assets of Islamic banks amounted to 150 billion. amounted to 2.7 trillion dollars in 2020. dollar, and their annual growth rate increased from 15 percent to 25 percent.

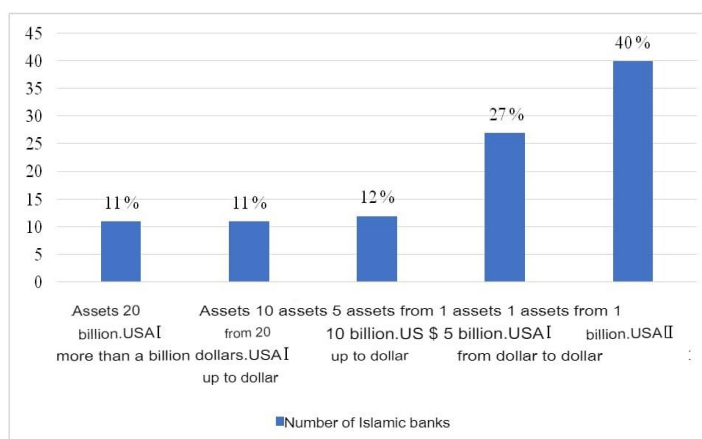
In 2021, there are 526 Islamic banking institutions in the world, of which approximately 69% are fully Islamic "autonomous" banks, and the remaining 31% are conventional banks that offer Islamic services through "Islamic windows". In recent years, Islamic banks have intensified their external expansion, seeking to expand their influence in host countries and adapt to the modern transnational banking structure, playing an important role in the international banking capital market and in the field of international investment flows.

Currently, the first 3 countries with the best organized Islamic finance account for 66% of the world market. These are:

- Saudi Arabia
- Iran
- Malaysia

According to the data in Figure 1 above, the share of Islamic banking in relation to the assets of conventional banks in Kuwait is 51.9 percent, in Qatar - 28.3 percent, in Bangladesh - 26.3 percent, in Malaysia - 31.5 percent, and in Saudi Arabia - 72.2 percent. did Also, in Bahrain, Jordan, Pakistan, Egypt, Oman, Turkey, Indonesia and other countries, the share of Islamic banks in the assets of the entire banking system is less than 25 percent. In only two Islamic countries, the share of Islamic banks in the entire banking system is 100 percent (Sudan and Iran).

To date, the dominant "players" in the field of Islamic banking are the countries of the Persian Gulf and Iran. South and Southeast Asia is the second largest Islamic banking region in the world with a market share of 15%.



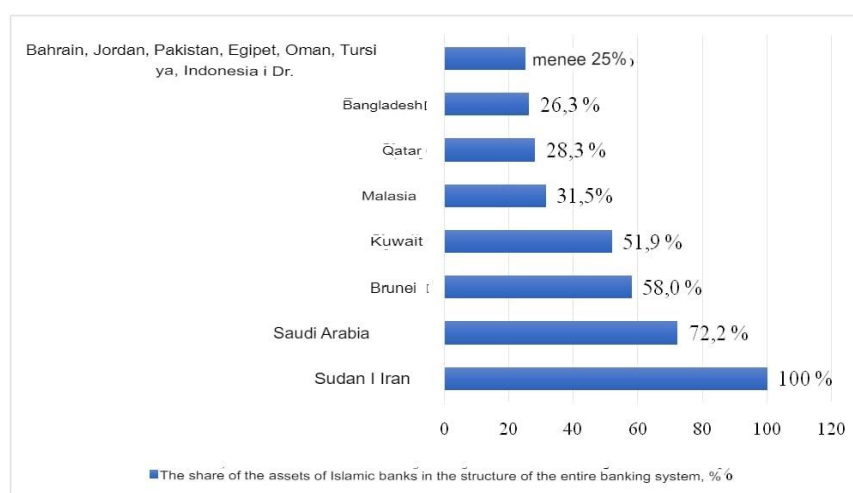
2-picture. The share of assets of Islamic banks in the entire banking system, (in percent).

This region includes the countries of Brunei and Malaysia, and includes the largest Islamic economies in the region (in terms of Sharia-compliant financial services), as well as Indonesia (the country with the largest Muslim population in the world). Despite the fact that Pakistan and Bangladesh are among the most populous countries in the region, their share of the global Islamic financial services market does not exceed 2 percent. In general, there is great potential for the development of Islamic banking, given the rapid growth of population and income in Islamic countries. This is especially true of Islamic countries where Islamic banking is underdeveloped but has a large Muslim population.

The capital adequacy ratio of Islamic banks is also usually significantly higher than the regulatory requirements. In particular, Islamic banks in the UK, Turkey, Africa, the Persian Gulf and Iran met the highest capital adequacy requirements. For example, in 2020, the capital adequacy ratio for Islamic banks in these countries was 33, 32, 26, and 19 percent, respectively, which is much higher than the minimum 8% requirement for bank capital adequacy under Basel III. [7].

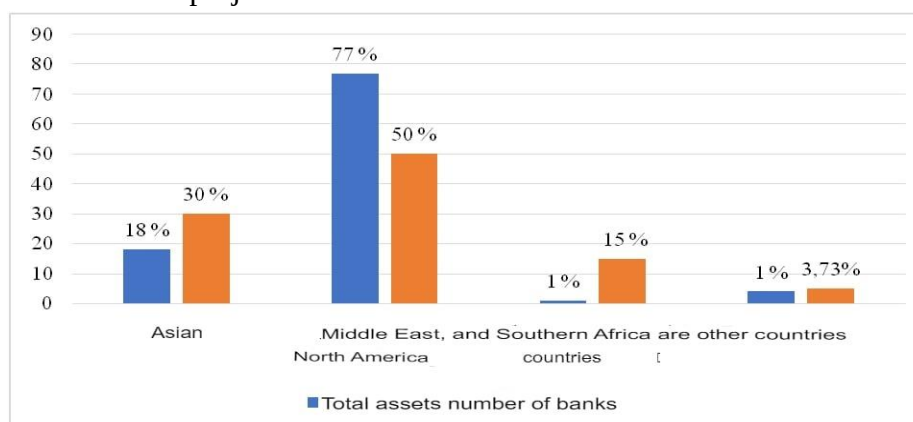
Most Islamic banks are relatively small. Despite their small size of assets, Islamic banks are generally well capitalized and liquid, and the level of liquidity varies by region and their market share.

2-picture The number of Islamic banks by the amount of assets, (in percent) [7].



According to the data in Figure 2 above, the number of Islamic banks with assets over \$20 billion is 11% of total, and 11% with assets over \$20 billion is \$10-20 billion. 12% of banks have assets of 5 to 10 billion dollars, 27% have assets from 1 to 5 billion US dollars, and the remaining 40% have assets of less than 1 billion dollars.

The return on assets of Islamic banks is also positive: banks operating in Africa, the Persian Gulf countries, Iran and Asia generate more income than banks in other regions. One reason for this is that some banks in these regions are state-owned banks that mainly finance state-owned enterprises and state-owned projects.



3-picture The number and composition of assets of Islamic banks by region, (in percent).

According to Figure 3 above, the majority of Islamic banks' assets (77%) are in the Middle East and North Africa, followed by Asia (18%), Europe (3.73%) and Sub-Saharan Africa (less than 1%). The same distribution is typical of the number of Islamic banks located in different regions of the world: 50% of Islamic banks are located in the Middle East and North Africa, 30% - in Asia, and 15% - in southern African countries.

Today, Islamic banking is actively entering the economy of developing countries that are in serious need of financing from external sources. This trend is especially characteristic of countries where banking services were previously underdeveloped. The development of Islamic banking in CIS countries, which believe in Islam, is limited by the underdevelopment of financial infrastructure, low level of economic knowledge and weak views on Islamic financial services.

Kazakhstan became the first CIS country to introduce legislation in the field of Islamic financing: in 2009, the Law "On Amendments and Additions to Certain Legislative Documents of the Republic of Kazakhstan on the Organization and Activity of Islamic Banks and Organization of Islamic Financing" was adopted. Nevertheless, Islamic banking in the country is still at the initial stage of development. The share of Islamic banking assets is less than 1% (total 0.08%) of the total assets of the banking sector. However, according to the concept of development of the financial sector of the Republic of Kazakhstan by 2030, this indicator should be reached at 3-5%. Today, only one bank operates in the Islamic banking sector of Kazakhstan - Al Hilal Islamic Bank, registered in 2010 (head office of this bank is located in Abu Dhabi). Member of the National Islamic Financial Services Council, Accounting and Auditing Organization of Islamic Financial Institutions and International Islamic Financial Markets Organization.

Today, there are 16 regulatory documents regulating Islamic banking in Kyrgyzstan. Since 2008, JSC "Ekoislamikbank" has been operating in the country on the principles of Islamic financing.

There have been at least three attempts to establish Islamic banks in Russia, but they have failed. Thus, the Islamic banks opened in Kemerovo in 1992 and in Makhachkal in 1996 ceased to operate. In 1997, the attempt to establish the Islamic Badr Bank was quite successful, but in December 2006, the license to carry out banking operations issued by the Bank of Russia was revoked. Today, the lack of special legislation and tax regulation of Islamic banks in Russia hinders their development. According to the Civil Code of the Russian Federation, the contract between the borrower and the bank is interpreted as interest-only, and the Federal Law "On Banks and Banking Activities" also provides for the principle of only interest payments when paying for a loan. In short, the operation of Islamic banks is impossible under the current legislation of Russia.

Nevertheless, some authors suggest that it is possible to establish Islamic banks in Russia and use the organizational and legal form of a religious (faith) partnership as a legal model of Islamic banks. [6].

Unfortunately, such services are not available in Islamic banks or local banks in Uzbekistan. However, due to the high interest of the population of Uzbekistan in Islamic financial services and interest-free banking, a number of works are being carried out in our country to form a system of providing Islamic financial services. In particular, in paragraph 2 of the decision of the President of the Republic of Uzbekistan "On measures to further expand and deepen partnership with the funds of the Islamic Development Bank Group and the Arab Coordination Group" dated 05.03.2019 No. PQ-4224, the Islamic Development Bank Group of the Republic of Uzbekistan and the Arab Coordination Group As one of the main directions and tasks of long-term partnership with [9].

Islamic banking and financial infrastructure may be created in Uzbekistan in the near future. Currently, 14 banks of our republic are working on the establishment of Islamic windows, as well as a draft law on Islamic finance has been developed and the law on non-bank credit organizations, which includes the concept of Islamic finance, is planned to be adopted. First, microfinance organizations and then commercial banks will be given the right to carry out Islamic finance operations. It is intended to expand the range of financial services provided by non-banking organizations [9].

Conclusions and suggestions

Understanding the principles of Islamic banking is essential to ensure the country's financial stability. First, Islamic banks are becoming increasingly important in developing and expanding cooperation with traditional banks. Second, the lack of hedging instruments creates a concentration of risks in Islamic financial institutions. As a result, the unregulated development of Islamic financial institutions within the framework of the traditional financial system may lead to a decrease in their stability and an increase in financial instability.

Today, the slow development of Islamic financial institutions in Uzbekistan is explained by three main factors: firstly, the rapid growth of the Islamic financial industry is hindered by legislation that does not provide for the operation of such organizations in the Republic of Uzbekistan. Second, it is almost impossible for such institutions to function successfully without the creation of a special body that provides a conclusion (or gives an opinion) on the compliance of various financial products with Sharia. Finally, a serious obstacle to the development of Islamic banking in the Republic of Uzbekistan is the current practice of applying legislation on combating terrorism and money laundering. In solving these problems, it is necessary to establish close relations with international financial organizations designed to support the government and develop standards related to the activities of Islamic banks.

References:

1. Chapra M.U. What is Islamic Economics? — Jeddah, 2001. — 200 c.
2. Al-Azzawi A.A. The characteristics and modern problems of islamic banks. Vestnik Universiteta. 2016; (7-8):5-11.
3. Zamir Iqbal, Abbas Mirakhor. An introduction to islamic finance: theory and practice. Singapore: John Wiley & Sons (Asia), 2011.
4. Исламский банкинг / Журавлёв А.Ю., научн. ред. А.О. Филоник.»: Садра; Москва; 2017.
5. Беккин Р. И. Исламская экономика. Краткий курс. М.: АСТ Восток–Запад, 2008. 288 с.
6. Манбаа: Информационно-аналитический портал «Islamic-Finance» - <http://islamic-finance.ru/index/0-2>
7. Манбаа: Islamic Financial Services Industry Stability Report 2022 -<https://ifsb.org/download.php>
8. Манбаа: DinarStandard & Ellipses — Глобальный отчет об исламских финансовых технологиях за 2022 год - <https://www.salaamgateway.com/specialcoverage/islamic-fintech-2022>
9. Манбаа: Ўзбекистон Республикаси Қонун ҳужжатлари маълумотлари миллий базаси - www.lex.uz
10. Манбаа: Ўзбекистон Республикаси Марказий банки сайти маълумотлари - www.cbu.uz

Rezyume: Jahon moliya xizmatlari bozorining tahlili shundan dalolat beradiki, global inqiroz sharoitida nafaqat islomiy davlatlarda balki AQSh va Yevropa davlatlarida ham bank foizlari bilan bog'liq bo'lmagan noan'naviy bank xizmatlaridan foydalanishga bo'lgan qiziqishlari va ehtiyojlari ortib bormoqda. Maqolada islomiy bankchilikning mohiyati va ahamiyati, ularning faoliyati xususiyatlari va asosiy tamoyillari ko'rib chiqilgan. Islom banklarining jahon moliya tizimiga integratsiyalashuvi jarayoni va ularning rivojlanish tendentsiyalari, global islomiy banklarning ko'rsatkichlari tahlil qilingan. Shuningdek, MDH davlatlarida islomiy banklarning rivojlanishi hamda O'zbekistonda rivojlantirish istiqbollari ko'rib chiqilgan.

Резюме: Анализ мирового рынка финансовых услуг показывает, что в условиях глобального кризиса растет интерес и потребность в использовании нетрадиционных банковских услуг, не связанных с банковским процентом, не только в исламских государствах, но и в США и европейских странах. В статье рассмотрено сущность и значение исламского банкинга, особенности функционирования и основные принципы их деятельности. Анализируется процесс интеграции исламского банкинга в мировую финансовую систему и тенденции их развития, проанализированы показатели мирового исламского банкинга. А также, рассмотрена развитие исламского банкинга в странах СНГ и перспективы развития в Узбекистане.

Kalit so'zlar: islom iqtisodiyoti, islomiy banking, islomiy moliya, tamoyillar, ribo, foizlar, aktivlar, islomiy moliyalashtirish.

Ключевые слова: исламская экономика, исламский банкинг; исламские финансы; принципы, ribo, процент, активы, исламское финансирование.

**ANALYSIS OF THE PROVISION OF INFORMATION SERVICES IN THE CONTEXT OF
DIGITALIZATION OF THE ECONOMY**

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Summary: *In the article, the role of information services in increasing the efficiency of the digital economy was discussed. The digital economy is an umbrella term used to describe markets focused on digital technologies. They are usually related to the sale of information services through the Internet and e-commerce.*

Key words: *digital economy, e-commerce, Internet, information and communication technologies, mobile communications.*

Increasing the effectiveness of the digital economy in the world is achieved by the use of digital technologies in the national economy, which helps to reduce the cost of resources in complex and long chains of information services. It is important to emphasize the importance of the digital economy, which has a systemic impact on all subjects and requires their change, thus requiring a revision of the approaches to the enterprise resource management system. In this regard, scientific justification of approaches to making effective management decisions is of great importance. The digital economy uses these technologies individually and collectively to recycle traditional technologies and create new ones. To compete, organizations—whether enterprises, service-oriented businesses like health systems, nonprofits, and government agencies—all need employees who can develop and use digital technologies. The digital economy is an umbrella term used to describe markets focused on digital technologies. They are usually related to the sale of information services through the Internet and e-commerce. The digital economy is a vital area of critical growth. The impact of a digital economy affects other sectors of the economy through information services, the lifestyle of the population, and the activities of economic organizations. In particular, the development of mobile devices has led to the expansion of the provision of information services in society. Consequently, it is becoming increasingly important in the competitive issues that arise in the digital economy. Competition in digital markets has its characteristics. Competition in major digital markets often takes a unique form. First, competition between business models or platforms is usually more important than competition within a business model.

In other words, dominance or even monopoly of Internet platforms almost always brings business success.

Second, digital markets are often characterized by strong networks and economies of scale, which reinforce this competitive nature through this advantage.

Third, many digital markets are two-way, so at least two groups of users benefit from using a digital platform. For example, search engines are used by individuals to access both information on the Internet and audiences by advertisers.

Fourth, digital markets are characterized by a high rate of investment and innovation, which leads to rapid technological advances in the field. Competition in digital markets has historically been cyclical. A successful firm may have significant bargaining power, but this advantage may be vulnerable to subsequent innovation cycles. The digital economy affects all aspects of society, including how people interact, the economic landscape, and the adoption of the skills needed to find a good job. A growing digital economy has the potential to create new scientific research and breakthroughs, and boost jobs and economic growth.

Some scholars distinguish three main components of the digital economy:

Developed by the author based on information from the Internet.

The number of cellular mobile communication base stations in the region

Analysis of public telephone network telephone sets in a cross-sectional area

The number of public telephone network telephone sets in a cross-section of territories

The number of public telephone network telephone sets per 100 inhabitants

Analysis of indicators of ICT use in the economy

Personal computer analysis in enterprises

Personal computer share in enterprises

Analysis of computers connected to a local network in enterprises

Share of enterprises with local network

Internet-connected computer analysis in enterprises

Analysis of Internet-connected enterprises

For 2019, the number of enterprises by types of Internet connection in the cross-section of regions

Analysis of investment in the field of ICT in the cross-section of regions

Investments in fixed capital by types of economic activity

Foreign investments and loans to fixed capital by types of economic activity

Export and import of goods in the ICT sector

7. Analysis of the main indicators of ICT sector development in the Republic of Karakalpakstan

7.1. Analysis of indicators of information services in the Republic of Karakalpakstan in the context of the transition to the digital economy

7.2. Analysis of indicators of mobile communication network development in the Republic of Karakalpakstan

Based on the analysis of the above-mentioned indicators, an opportunity will be created to study the local situation of the indicators of information services in the Republic of Karakalpakstan and to determine the prospects for its development.

We begin the analysis by examining the number of employees working in the ICT sector and the average monthly salary paid to them.

The analysis of the number of employees working in the ICT sector is presented in Table 1.

Table 1

The number of employees working in the ICT sector, people

No	Provinces	2015	2016	2017	2018	2019	2020
1	Sirdarya	683	620	623	209	717	825
2	Jizzakh	465	553	636	731	1 012	1164
3	Surkhandarya	725	736	850	850	1 038	1194
4	Khorezm	921	856	1 003	1 004	1 126	1295
5	Kashkadarya	858	750	850	913	1 132	1302
6	Navoi	1 059	1 002	1 112	1 218	1 171	1347
7	Republic of Karakalpakstan	1 040	1 049	1 131	1 028	1 230	1415
8	Namangan	1 024	942	1 079	1 231	1 297	1492
9	Andijan	1 412	1 276	1 401	1 384	1 549	1782
10	Samarkand	1 216	1 132	1 359	1 497	1 582	1820
11	Bukhara	1 307	1 413	1 419	1 497	1 686	1939
12	Tashkent	1 512	1 447	1 735	1 852	1 906	2192
13	Ferghana	2 296	2 638	1 936	2 319	2 402	2762
14	Tashkent city	18,700	19,818	22 597	24 163	29,400	33810
	Uzbekistan	33 218	34 232	37 731	39,896	47 248	54335

According to the analysis of the number of employees working in the ICT sector presented in Table 1, according to the results of 2020, a total of 54,335 people worked in the ICT sector in Uzbekistan, which is 0.14% of the total population of the republic. In the context of the introduction and development of the digital economy, this indicator is considered very low. In the case of the Republic of Karakalpakstan, this indicator is 0.65% higher than the indicator for the republic, but this indicator is also considered low. Conclusion It is desirable to positively solve the issue of fully satisfying the demand for qualified personnel first of all to introduce and develop the digital economy in the republic and to improve the provision of information services.

One of the main requirements for providing qualified personnel is to provide them with suitable wages. Analysis of the average monthly salary of employees working in the ICT sector in the region is presented in Table 2.

Table 2**Average monthly salary of employees working in the ICT sector, thousand soums**

No	Provinces	2015	2016	2017	2018	2019	2020
1	Samarkand	943	1 063	1 304	1 558	1 895	2180
2	Sirdarya	1 217	1 265	1 528	1 354	2005	2306
3	Jizzakh	1 164	1 235	1 482	1 897	2 023	2326
4	Navoi	1 110	1 169	1 447	1 870	2 069	2379
5	Khorezm	992	1 100	1 376	1 780	2 076	2387
6	Andijan	1 005	1 029	1 294	1 779	2 139	2460
7	Kashkadarya	1 032	1 117	1 392	1 794	2 195	2524
8	Surkhandarya	1 054	1 124	1 426	1 896	2 208	2539
9	Tashkent	1 106	1 261	1 770	2 273	2 215	2547
10	Bukhara	1 117	1 135	1 406	1 820	2 217	2550
11	Ferghana	1 020	1 102	1 474	1 895	2 233	2568
12	Republic of Karakalpakstan	1 133	1 277	1 553	1949	2 322	2670
13	Namangan	1 032	1 164	1 395	1 935	2 398	2758
14	Tashkent city	2 256	2 651	3 182	4 213	4 953	5696
	Uzbekistan	1 156	1 264	1 573	2001	2 353	2706

According to the analysis of the average monthly salary of employees working in the ICT sector in the section of the territories listed in Table 2, the average salary in the Republic of Uzbekistan at the end of 2020 was 2,706.0 thousand soums. The analysis shows that the average monthly salary of employees working in the ICT sector in the case of the Republic of Karakalpakstan has increased to the same level as the average salary in the Republic of Uzbekistan. For example, at the end of 2020, the average monthly salary of employees working in the ICT sector in the country was 2,706,000 soums, while in the case of the Republic of Karakalpakstan, this indicator was equal to 2,670,000 soums. In general, the Republic of Karakalpakstan ranks first in the country in terms of the average monthly salary of employees working in the ICT sector. This indicator once again shows the high demand for skilled workers in the field of ICT.

Within the framework of the Presidential Decree of March 2, 2020, the Ministry of Information Technology and Communications Development issued a decree of the President of the Republic of Uzbekistan "On the State Program for the Implementation of the Action Strategy for the Five Priority Areas of the Development of the Republic of Uzbekistan in 2017-2021 in the Year of Development of Science, Enlightenment and Digital Economy" several works are planned to be implemented. These works include the creation of broadband Internet ports and the laying of optical fiber communication lines. Covering production and service provision with digital technologies, and training intellectual potential personnel with a deep understanding of modern knowledge in this regard will serve to create an environment of "informed society" in the country.

To date, it has been estimated that the digital economy in the world is worth 2 trillion US dollars in 20 developed countries. Great Britain, the world leader in the development of the digital economy, has already reached 12% of the national gross domestic product. The digital economy implies the digitization of technological and business processes, production, logistics, and trade of finished products. In our country, in 2020, the full digitalization of such fields as transport, geology, education, and archives has been set, and work in this regard is being carried out rapidly. "IT parks" with modern infrastructure are proof of our opinion.

To further develop forms of non-contact communication of citizens and business entities with state bodies, the launch of the new version of the Unified interactive state services portal, the virtual lobby of the Prime Minister for reviewing businessmen's appeals, the "business.gov.uz" portal are important steps in the development of the digital economy.

According to the analysis of indicators of information services in the Republic of Karakalpakstan, given in table 3, in the conditions of transition to the digital economy, a positive change has occurred in all directions.

But in the conditions of the development of the digital economy, it is not enough to provide information services, for example, by the end of 2020, the level of provision of technical means was - 80%, the coverage of Wi-Fi zones -43%, the coverage of ICT teachers -84%.

will be possible to achieve the desired goals based on increasing the indicators of information services and increasing the level of ICT provision in the Republic of Karakalpakstan in the conditions of transition to the digital economy.

Another group of indicators that ensure the provision of information services in the context of the transition to the digital economy in the Republic of Karakalpakstan is indicators of the development of the mobile communication network in the Republic of Karakalpakstan. In developed countries, the role of mobile communication in the provision of information services is great. Because many information services are provided to consumers through mobile applications.

In the course of our research, the mobile communication network in the Republic of Karakalpakstan was studied, and divided into the main groups according to the development indicators:

- Mobile communication coverage;
- Number of mobile Internet users;
- Mobile broadband coverage;
- The number of mobile users.

According to the results of the conducted research, the following results were obtained on the analysis of the development indicators of the mobile communication network in the Republic of Karakalpakstan by the end of 2020.

Mobile communication coverage was 98.1%.

The number of mobile Internet users was equal to 1,100,420 people. This is 58% of the total population.

If mobile broadband coverage was equal to 86.1%,

The number of mobile users was equal to 1,349,700 people. This means 76% of the total population.

To make a general conclusion, it is appropriate to organize practical work in the directions set by the Republic of Karakalpakstan to ensure the provision of quality information services to the population and economic entities in the conditions of the transition to the digital economy;

Development and implementation of a rating system for monitoring the level of digital development of regions ;

Increasing the number of employees working in the ICT sector in the region and bringing it up to the level of demand;

Providing employees working in the ICT sector with an acceptable monthly salary;

Taking measures to increase the number of subscribers connected to the Internet in the territory;

Providing all areas of the territory with optical fiber communication lines;

Increasing the level of popularity of the sites of local authorities;

Increasing the number of subscribers connected to the mobile communication system in the regions;

Increasing the number of mobile base stations in the regions;

Increasing the number of personal computers in enterprises in the regions;

Increasing the share of computers connected to the local network in enterprises in the regions;

Increasing the share of enterprises with a local network in the regions;

Increasing the share of computers connected to the Internet in enterprises in the regions;

Conduct measures to increase the share of the ICT sector in investments in fixed capital by types of economic activity;

Increasing the share of foreign investments and loans in fixed capital by types of economic activity;

Increase the share of goods exported in the ICT sector in the regions;

Increasing the indicators of information services in the Republic of Karakalpakstan in the context of the transition to the digital economy;

Increasing indicators of development of the mobile communication network in the Republic of Karakalpakstan;

Creation of a platform providing information services on the example of the Republic of Karakalpakstan;

Implementation of the above-mentioned works will directly create the basis for providing quality information services to the population and business entities in the conditions of the transition to the digital economy in the Republic of Karakalpakstan.

Table 3

**Information services in the Republic of Karakalpakstan in the context of the transition to the digital economy
analysis of indicators**

Indicator name	Unit of measure	2015	2016	2017	2018	2019	2020
Percentage of organizations with a website	%	51	54	59	61	79	86
Percentage of organizations with online services	%	50	50	58	61	78	81
The level of providing the population with technical means (ShK, tablet, laptop, smartphone)	%	55	54	61	62	76	80
Wi-Fi zones coverage	%	8	11	14	25	31	43
Number of Internet users	Person	16,581	20 320	22 538	27,520	66,069	72 521
Online activity on the Internet	Person	15	19	24	33	51	65
Coverage of teachers teaching ICT	%	49	55	59	63	76	84
The level of ICT literacy of the population	%	48	51	52	56	71	78
Number of ICT graduates	Person	1 418	1 629	1 828	2 024	2220	2 518
Including women	Person	366	411	481	519	594	683
Number of users of IPTV services	Person	499	513	591	664	793	1 180

Table 4

Analysis of indicators of mobile communication network development in the Republic of Karakalpakstan

Indicator name	Unit of measure	2015	2016	2017	2018	2019	2020
Mobile coverage	%	48.9	61	73.1	84.5	97.4	98.1
Number of mobile Internet users	Person	510 500	579,000	748 400	834,000	1 020 500	1 100 420
Mobile broadband coverage	%	36.6	40.3	49.5	59.3	74.5	86.1
2G coverage	%	51.3	55.7	62.1	76.5	97.2	98.2
3G coverage	%	19.4	21.5	23.5	29.6	36.5	85.2
4G coverage	%	6.8	7.5	8.3	10.1	34.2	72.8
Preparing for 5G	%	0	0	0	0	0	0.1
Number of mobile users	Person	733 600	842,500	1 019 400	1 112 300	1 225 400	1 349 700
In the section of mobile communication companies							
Uzmobile	Person	112,900	143,800	162 200	191 300	203 400	299,000
Beeline	Person	285 300	304,500	382 100	414,600	459,800	461 100
Ucell	Person	254,900	296,600	368,900	393 600	424,500	432,000
Mobius	Person	80,500	97,600	106 200	112,800	132,500	149 300
Humans						5 200	8 300

References:

1. www.stat.uz.
2. Presidential Decree dated March 2, 2020, of the President of the Republic of Uzbekistan on the implementation of the state program in the "Year of Science, Enlightenment and Digital Economy Development". [www . Lex . uz](http://www.lex.uz)
3. Atamuratova, N., Kудaybergenov, A., & Alimov, A. (2022). ECOTOURISM DEVELOPMENT IN THE REPUBLIC OF KARAKALPAKSTAN. *Karakalpak Scientific Journal*, 5(1), 47-52.
4. Атамуратова, Н. Б. (2020). Влияние информационных технологий на развитие туризма Узбекистана. *Бюллетень науки и практики*, 6(12), 297-305.
5. Атамуратова, Н. Б. (2021). ФАКТОРЫ И УСЛОВИЯ РАЗВИТИЯ ИНФОРМАЦИОННЫХ УСЛУГ В УСЛОВИЯХ ПЕРЕХОДА К ЦИФРОВОЙ ЭКОНОМИКЕ. *Бюллетень науки и практики*, 7(10), 296-310.
6. Islamovna, U. Z., & Kerimbergenovich, A. A. (2022). Modern Features of Development of Tourist and Recreational Services in Uzbekistan. *European Journal of Life Safety and Stability* (2660-9630), 15, 148-153.
7. Alimov, A. (2018). Main directions and prospects of development of ecological tourism in the Republic of Karakalpakstan. *Praca doktorska. Nukus, Uzbekistan: Karakalpak State University*.

Rezyume: Maqolada raqamli iqtisodiyot samaradorligini oshirishda axborot xizmatlarining roli muhokama qilindi. Raqamli iqtisodiyot - bu raqamli texnologiyalarga yo'naltirilgan bozorlarni tavsiflash uchun ishlatiladigan so'zdir. Ular odatda Internet va elektron tijorat orqali axborot xizmatlarini sotish bilan bog'liq.

Резюме: В статье рассмотрена роль информационных сервисов в повышении эффективности цифровой экономики. Цифровая экономика — это общий термин, используемый для описания рынков, ориентированных на цифровые технологии. Как правило, они связаны с продажей информационных услуг через Интернет и электронной коммерцией.

Kalit so'zlar: raqamli iqtisodiyot, elektron tijorat, Internet, axborot-kommunikatsiya texnologiyalari, mobil aloqa

Ключевые слова: цифровая экономика, электронная коммерция, Интернет, информационно-коммуникационные технологии, мобильная связь.

STRUCTURAL SHIFTS IN THE FOOD INDUSTRY

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Summary: *The article considers structural shifts in the food industry of the Republic of Karakalpakstan and the problem of state development associated with the modernization of production, which aims to strengthen the competitive position of enterprises in the domestic market.*

Keywords: *food industry, modernization, production, economic growth, strategy, industry.*

The food industry in the world is a vital sector of the economy for every country, the state and development of which determines the provision of the population with all the necessary food products in volumes and assortment sufficient to meet human needs. In this regard, the socially significant food industry and the level of its development are of great scientific and practical importance, as a factor directly affecting the level of food self-sufficiency of the country and its food independence.

One of the urgent problems of the development of the economy and society in the world is to provide the population with safe food. The size of food production depends on the standard of living of the population and the economic development of the region. Therefore, to ensure the development of the food industry, a new approach is needed based on traditional resources, primarily technological innovation, modernization and technical re-equipment of production, the introduction of new technologies and a high-quality management system, as well as the production of new products.

Recently, the food industry has been one of the most dynamically developing sectors of the economy in the Republic of Uzbekistan. A preliminary assessment of the modernization of the economy of the food industry confirms that many problems cannot be solved within the existing paradigm of managing the economic structure of the food industry. More and more necessary is the transition to a new control algorithm, which involves the formation of a qualitatively new infrastructure of systems and management models, which, in turn, ensure the development of the economy and social sphere of the region, and allow meeting the needs of the population in food products.

In this regard, it becomes necessary to study the regional characteristics of the food industry in the Republic of Karakalpakstan, develop recommendations for improving the structure of the food industry in the context of economic modernization.

The economic growth of the food industry is a problem of the development of the state, associated with the modernization of production and aimed at strengthening the competitive position of enterprises in the domestic market. The formation of competitive advantages and increasing the competitiveness of food industries largely depend on the solution of the problem of economic growth.

The strategy of long-term and sustainable economic growth requires an answer to the question of the factors of economic growth, their interrelation, and the sources of a new quality of economic development. Of particular importance is the study of the possibilities of using the internal potential of the food industry and external factors of economic growth.

From the point of view of economic development, the Republic of Karakalpakstan is distinguished by a poorly developed industry, the predominance of extractive industries, with a high level of depreciation of fixed assets, and the remoteness of most territories from transport hubs and centers. Also, the drying up of the Aral Sea has a strong impact on the development of the region, and Karakalpakstan is a zone of ecological disaster.

The main source of food industry growth in the Republic of Karakalpakstan is the expansion of domestic consumption.

The analysis showed that in recent years (2010-2020) there has been an increase in the indicators of such food products as canned fruits and vegetables (by 128.4%), meat and meat products (by 164.9%), sausages (by 163.4%), dairy products (by 103.1%), bakery products (by 148.7%), pasta (185.8%).

The strategic direction of development is, first of all, the introduction into the production of functional food products aimed at preventing diseases, which have the largest share in the total share of diseases, the number of which is constantly growing, with the subsequent entry of these products into the regional market and expanding the range available to all strata. population.

The existing significant differences in territorial development and distribution of productive forces, the presence of developed and relatively developed regions in the republic create a certain imbalance in the development of the region.

Industrial production in Karakalpakstan is concentrated in several cities and districts, and they account for about 70% of the total industrial production.

The analysis showed that the industrial production of the city of Nukus accounts for 32.7%, the share of Khodjeyli, Muynak, Beruni and Amudarya regions, in total, accounts for 35.1% of the entire industry of the region. The share of Nukus, Chimbay, Kanlykul, Karauzyak, Takhtakupyr and Shumanai regions, taken together, accounts for only 5.6% of the total industrial output of the region.

The share of districts such as Kanlykul 0.6%, Takhtakupyr 0.3% and Shumanai 0.3% in the industry does not even make up one percent. All these indicators testify to a significant level of disproportion in the development and distribution of industry in the region, which already has the lowest level of industrial development among all regions of the republic.

Despite the negative indicators in the socio-economic and industrial development, the natural resource potential of this region can become the most important factor in the development of industry in the region.

Large reserves of mineral resources have been explored in the republic: natural gas, building materials, rare earth metals, and mineral salts. The forecast potential of the oil and gas sector of Ustyurt is estimated at 1.685 trillion tons of liquid hydrocarbons. Currently, more than 20-25 wells are being operated on the territory of Ustyurt gas condensate fields.

At the moment, the food industry is one of the most dynamically developing sectors of the economy of the Republic of Uzbekistan.

Uzbekistan has created a sufficient margin of safety and the necessary resource base in order to ensure the stable and indisputable operation of the financial, economic, budgetary, banking and credit system, as well as enterprises and sectors of the real economy. In the economy of each country, special attention is paid to the development of areas that affect the well-being of the people and the effective use of the potential of all resources. The economic strengthening of the independence of the Republic of Uzbekistan is largely due to the effective development of the food industry.

At present, the needs of the population of the republic in food products are mainly satisfied through local production, i.e., the activities of small businesses and private entrepreneurship. Providing the population of the country with a wide range of consumer food products, such as high-quality flour, cereals, bread and pasta, confectionery, oil and fat products, meat and dairy products, food concentrates, is recognized as the most important task of the national economy. Its implementation is associated with the expansion of production, improvement of transport communications, storage conditions and processing of consumer products.

The implementation of reform programs, structural reforms and diversification of industries, strengthening the material and technical base contributed to the development of the industry of the republic. Despite the decline in industrial production in 1995 by 1990 by 0.2%, since 2020 there has been an increase of 1.2 times (compared to 1990).

It should be noted that in 2020 the volume of industrial production of the republic was formed mainly due to the city of Tashkent (21.0%), Tashkent (15.1%), Navoi (9.5%), Kashkadarya

(8.6%), Ferghana (7.2%), Andijan (7.1%) and Samarkand (6.7%) regions, an insignificant share falls on Jizzakh (1.8%), Surkhandarya (2.0%) and Khorezm (2.5%) area.

If in 2020 the share of the manufacturing industry in the total production volume was 73.8%, then in 2021 it increased to 80.3%. In the total volume of industrial production, the output of products with high added value increased: food products, textile, chemical, pharmaceutical preparations, etc.

In 2020 alone, the increase in production by 2021 was in the manufacturing industry - 6.4%, including the production of basic pharmaceutical products and preparations - 40.3%, chemical products, rubber and plastic products - 34.4%, other non-metal mineral products - 20.9%, food - 10.8%, textiles, clothing, leather products - 9.0%.

References:

1. Tleuov N.R., Iniyatov A. Strategy for the development of the food industry in the Republic of Karakalpakstan. Monograph. – Germany: LAP LAMBERT Academic publishing, 2016. -73p. (ISBN: 978-3-659-89099-4)
2. Tleuov N.R. Prospects for the economic growth of the food industry in the Republic of Karakalpakstan// Iktisodiyot va ta'lim. -Tashkent, 2012. -№ 5. -P. 53-55.
3. Tleuov N.R. Study of the dynamics of industrial development in the Republic of Karakalpakstan// Iktisodiyot va ta'lim. – Tashkent, 2013. -№. 6. -P. 38-39.

Rezyume: *Maqolada Qoraqalpog'iston Respublikasi oziq-ovqat sanoatidagi tarkibiy o'zgarishlar va korxonalarning ichki bozorda raqobatbardosh mavqeini mustahkamlashga qaratilgan ishlab chiqarishni modernizatsiya qilish bilan bog'liq davlatni rivojlantirish muammosi ko'rib chiqiladi.*

Резюме: *В статье рассмотрены структурные сдвиги в пищевой промышленности Республики Каракалпакстан и проблема государственного развития, связанная с модернизацией производства, которая направлена на усиление конкурентных позиций предприятий на внутреннем рынке.*

Kalit so'zlar: *oziq-ovqat sanoati, modernizatsiya, ishlab chiqarish, iqtisodiy o'sish, strategiya, sanoat*

Ключевые слова: *пищевая промышленность, модернизация, производство, экономический рост, стратегия, отрасль.*

UDC: 628.18

LONG-TERM RESEARCH ON THE USE OF COLLECTOR-DRAINAGE WATER FOR IRRIGATION IN KARAKALPAKSTAN

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Summary: *The article discusses long-term changes in the average annual water discharge in the basin of the Amudarya River, the use of land and water resources of this territory and the quality of return waters and their re-use for irrigation of salt-tolerant crops in the conditions of the Republic of Karakalpakstan. Practical and scientific recommendations for solving these problems have been offered.*

Key words: *the basin of the Amudarya River, water discharge, the area of irrigated land, magistral collectors, quality of return flow.*

Introduction. According to the statistical data in the Republic of Karakalpakstan, the area of irrigated land has increased from 13806 hectares to 177352 hectares since 1965, in 1987 the rice sowing area increased from 62706 hectares to 97865 hectares. Including the total rice harvest increased from 14079 to 316712 tons. In subsequent years, starting from 1987-1989 in connection with the decline in water availability in the region and in the Republic of Karakalpakstan, there is a significant reduction in sowing areas and including rice sowings.

The reclamation of large massif for rice sowings at that time demanded the construction of engineering rice systems with all the structures of large collectors as CN (collector network), CN-3, CN-4, CN-1 and their major allocations that have an intereconomic importance. As a result, the level of groundwater level began with an increase in the area of irrigated land. So, for example, in the 1960s, the groundwater level in the Shumanay district was 665 cm from the ground surface, and by 1985 this value reached 197 cm.

Starting from 1982-1985 there is a gradual decrease in both total water intake from 7436 million m³ in 1990, up to 3594.7 million m³, and from 1985-1990 sowing rice in the region practically ceased and in some critically low-water years, the area of sowing rice as a whole in the Republic of Karakalpakstan decreased to 4.0 thousand hectares.

In recent years, after the acquisition of independence, the area of seeding wheat has significantly increased; by 2010 its area had been 65.9 thousand hectares.

Many years of research on the use of collector-drainage waters for irrigation of some salt-resistant cultures at the drained bottom of the Aral Sea were held by the specialists of The Scientific Research Institute of Irrigation and Water Problems and Karakalpak State University named after Berdakh, which fully comply with the tasks provided for in the Resolution of the President of the Republic of Uzbekistan PR-4947 dated to February 7, 2017 "On Strategy of Action for the Further Development of the Republic of Uzbekistan". In section 3.3 of which it is indicated: a further improvement in the reclamation state of irrigated land, the development of a network of reclamation and irrigation facilities, the wide introduction of intensive methods in agricultural production, primarily modern water and resource-saving agrotechnologies.

Currently, 38-40 km³ return collector-drainage water are formed on a huge irrigated area in Central Asia, which is 1/3 part of the existing surface resources of this territory. In the Republic of Uzbekistan, 20-22 km³ of collector-drainage waters are formed in all administrative areas.

According to many irrigators, this water can be reused for various salt-resistant crops [1-12].

Therefore, during 2015-2018 the field researches on the cultivation of salt-resistant crops were carried out by us (The Scientific Research Institute of Irrigation and Water Problems and KSU

named after Berdakh): Sorghum, Sorghum-Sudan herb, the African millet in areas located the drained bottom of the Aral Sea.

The main purpose of the research. To carry out perennial watering with mineralized collector-drainage water of various salt-resistant crops at the drained bottom of the Aral Sea.

The research objects. The experienced portion of the old Saxaul forest reserve is located in the Kazakhdarya farm near the drained lake “Togiz Torah” in the Muynak district of the Southern Aral Sea basin, on the final section of the CN-1 collector.

Due to the relevance and important practical importance of the use of mineralized water for irrigation of various forage crops, training sections were organized, where studies were conducted on the cultivation of feed crops using mineralized collector-drainage water. Sorghum (Grade Uzbekiston-18), Sorghum-Sudan herb (Grade Chimbay-8) and African millet (Grade Khashaki-1) were sown and the total area occupied by each culture was equal to 0.27 hectares. For the sowing of feed crops, the water came from the collector CN-1 which is closely located.

Research methodology. The studies were carried out on generally accepted hydrological, hydro chemical and hydrometric methods. The soil salinization was determined by the laboratory method.

When conducting these studies, the mineralization, the chemical composition of collector water, the dynamics of soil moisture, the cycle of phenological observations for the growth and development of grown crops, including the flow of water, the dynamics of the level and mineralization of groundwater were also determined.

The mathematical development of research results and economic efficiency was carried out by generally accepted statistical methods and using computer equipment and the program ACCES.

During the experiments, the mineralization of collector water changed from 2.02 g/l to 2.66 g/l. The chemical composition of the water was Chloride-Sulfate-Magnesium-Sodium (CS-MS).

Depending on the irrigation culture, it was carried out from three to five irrigations, while the magnitude of the irrigation rate of water was changed from 2100 to 4000 m³/ha.

The soils of experienced sites are composed of heavy soils: loam and clay predominate to a depth of 2.5-3.0 m. The value of the density of soil depending on the mechanical composition ranges in the range of 1.4-1.6 g/cm³.

The analysis of soil samples selected on experienced sites showed that in general the content of nutrient elements in the soil is not enough: the maximum amount of humus not exceeding 0.98% is concentrated in the upper layer (0.20-0.40 m), and with the depth it is sharply reduced to 0.35-0.27%. The level of ground waters in the experimental fields during the vegetative period fluctuated from 180 to 295 cm. The mineralization of ground waters fluctuated from 7,58 to 11,02 g/l, their prevailing chemical composition was Chloride-Sulfatic-Magnesium-Sodium (CS-MS).

Despite the higher mineralization of collector water compared with the irrigation the average of the sorghum yield, Sorghum-Sudan herb and the African millet in the experimental site of the farm “Kazakhdarya” differed slightly: when irrigating by collector water in the range of 30-37 centners/ha; when irrigating Sorghum with fresh water, the yield changed within 32-40 centners/ha, and during irrigation of Sorghum-Sudan herb with fresh water the yield changed within 32-42 centners/hectares, with irrigation with collector water it was changed in the range of 25-40 centners/hectares.

As a result, the following conclusion was made: in conditions of a shortage of irrigation water, collector waters serve as an additional source for irrigation and can be used to irrigate salt-tolerant fodder crops (Corn, Sorghum, etc.). Since Sorghum is a more salt-resistant crop compared to Corn, its cultivation for forage lands under irrigation with collector water is more expedient than growing grain crops. After harvesting, it is necessary to carry out preventive leaching of those soils for which it is also necessary to use collector water.

Data on the salinity and chemical composition of irrigation and collector-drainage water during irrigation of the experimental site were given in tabular form.

At the end of the research, the calculations of their economic efficiency and the amount of net profit received from 1 hectare of cultivated crops (Sorghum, Sorghum-Sudan herb, African millet) were carried out, for example, the expected net profit per hectare of Sorghum (Grade Uzbekistan-18) amounted to 1320.0 thousand soum.

Recommendations for production: in conditions of shortage of fresh water in the Muynak region in the Kazakhdyra farm of the Republic of Karakalpakstan, the applied research “Development of technology for cultivating seeds of forage crops in the extreme conditions of the Southern Aral Sea region” was carried out using collector-drainage waters for irrigation of forage crops, as well as for estuary irrigation wild forage crops (reed, etc.) on the lands located along the collectors CN-1, CN-3, etc.

Such studies should be continued at the end sections of the CN-1, CN-3, KCO (Kungrad Collector Outlet), MSC (Main Southern Collector) collectors, etc., but for this it is necessary to attract investments not only from national, but also from foreign specialists. This will make it possible to make a significant contribution to overcoming the consequences of the Aral Sea crisis and improving the life of the population of the Southern Aral Sea region.

The soils of the experimental site are old-irrigated, meadow, characterized by an exceptional variegation of the lithological structure, both along the profile and along the territory.

The mechanical composition of the soils of the experimental-production site “Oybek” mainly covers loam, sandy loam and sand interlayers (Tables 1, 2).

Table 1. The mechanical composition of the soils of the experimental-production site “Oybek”

Horizon	Weight of fraction						Name of soils according to Kachinsky
	0,25	0,25-0,10	0,10-0,05	0,05-0,01	0,01-0,005	0,005-0,001	
0-5	0,96	0,60	31,96	41,16	8,02	13,06	light loam
5-20	0,55	0,36	25,33	48,8	6,80	12,04	light loam
20-40	0,46	0,23	24,99	63,40	5,40	3,72	clay sand
40-60	2,22	0,31	13,03	67,80	10,26	3,14	clay sand
60-80	0,41	0,33	35,38	55,5	2,72	3,80	linking sand
80-100	0,22	0,82	72,58	23,4	0,88	1,80	loose sand

Table 2. Change in volume weight at the “Oybek” experimental site

Horizons	0-5	5-20	20-40	60-80	80-100
Volume weight	1,50	1,55	1,48	1,48	1,45

The groundwater level at the experimental site ranges from 90 to 200 cm above the ground surface.

In order to establish the regularity of changes in soil processes during leaching of highly saline lands, field experiments were carried out on the territory of the farm “Oybek”, where options were studied with mineralization of leaching water equal to 0.620 g/l (using river water) and using collector waters with mineralization of 4.00 and 8.0 g/l at the rate of one-time fractional rates of 2000 m³/ha. The initial content of salts before washing for the dense residue is 4.646% and 0.348% for chlorine - ion (Table 4). The salt maximum is concentrated on the upper soil horizon. By the type of salinity, the irrigation water is of the chloride-sulphate type. With an increase in the mineralization of irrigation water, the content of SO₄ and Na + K increases, while the content of Cl slightly decreases. After water supply at a rate of 2000 m³/ha, a significant washout of salts is observed along the entire profile. Further, desalination occurs only in the upper layer, while in the lower horizons, on the contrary, there is a significant accumulation of salts, which is clearly expressed in the first option, where leaching was carried out with flushing water with mineralization of 0.620 g/l. In the rest of the experiments, the same picture is observed (Table 3).

Table 3. Leaching and accumulation of salts (%) along the horizons at the “Oybek” site with different mineralization of irrigation water

Horizons	Leaching + accumulation of (-) salts% according to the options of the experiment on chlorine - ion with different mineralization of irrigation water.		
	M = 0,620 g/l	M = 3,804 g/l	M = 7,925 g/l
0 – 100	+94,38	86,32	82,55
100 – 200	-27,50	-19,60	+67,25
0 – 200	+61,4	+58,5	+76,43

This makes it possible to draw a certain conclusion that leaching with saline water gives high, effective results if it is applied on lands with a high initial salt content.

However, with a decrease in the value of the initial soil salinity, the consumption of water for the leaching of salts increases sharply. Therefore, it is necessary to establish a limit of applicability of the water used with different mineralization. In this case, it is necessary to suspend the leaching at the initial salinity of 1.45% solid residue when leaching with water with mineralization of 5.0 g/l and 1.90% at 10 g/l and then flush with irrigation water up to MPC (Maximum Permissible Concentration). Based on the actual definition of “ α ”, a formula was determined to establish the rate of leaching.

Mineralization of the water	Type of equation
0.620	$N = 10^4 \times 1.10 \lg \frac{S_n}{S_k}$
4.000	$N = 10^4 \times 1.56 \lg \frac{S_n}{S_k} + 10^4 \times 1.1 \lg \frac{S_n}{S_k}$
8.000	$N = 10^4 \times 1.78 \lg \frac{S_n}{S_k} + 10^4 \times 1.1 \lg \frac{S_n}{S_k}$

Where, N - leaching rates, S_n - initial soil salinization, S_k - final soil salinization. A prerequisite for this is that leaching with mineralized water is more effective if it is used on highly saline soils and salt marshes.

Use of collector water for irrigation of sorghum at the “Sadyk” field-experimental section in the Nukus region of the Republic of Karakalpakstan. On purpose of studying the effect of irrigation with collector-drainage waters on the growth and development of agricultural crops, an experiment was carried out to cultivate Sorghum of the Grade “Uzbekistan – 18” for silage on an experimental plot located on the territory of the farm “Sadyk” in the Nukus region of the Republic of Karakalpakstan

Mechanical composition and water-physical properties of soils of the FES (Field Experimental Section) of the farm “Sadyk”. The soil of the experimental site is of medium mechanical texture, at the 0 - 2 cm of horizon it is represented by light clay sand, 2 - 25 cm of heavy clay sand, 25 - 45 cm of medium loam, 45 - 70 cm of heavy loam and at a depth of 70 - 100 cm consists of clay.

The water-physical properties of the soil also differ, so the bulk density of 100 cm, depending on the depth, varies from 1.15 to 1.46 g/cm³, and the specific gravity from 2.60 to 2.73 g/cm³.

Salinization of soils at the FES of the farm “Sadyk”. The plots of the experiment are located on the territory of one field; therefore, the background soil salinity in this area has a slight difference and can be called practically the same.

Soil salinity was determined by conductometry. According to the readings of the device, the degree of soil salinity according to the FAO classification was established (Table 4)

Table 4. FAO soil salinity classification

ECe, $\mu\text{S}/\text{cm}$	Degree of Soil salinity	EC1:1 $\mu\text{S}/\text{cm}$
0-2	Not salted	0 - 0,6
2-4	Weak salted	0,61 – 1,15
4-8	Middle salted	1,16 – 2,30

8-16	Highly salted	2,31 – 4,70
More than 16	Salt marshes	> 4,70

Sampling was carried out in layers 0 - 20, 20 - 40, 40 - 60, 60 - 80, 80 - 100 cm. Samples were taken before sowing, before and after vegetative irrigation.

The analysis of the data obtained showed that the soil of the experimental field belongs to the categories of weakly and moderately saline. During the monitoring, a slight increase in salinity was observed on the upper soil layers up to 3.82 $\mu\text{S}/\text{cm}$, which stabilized after irrigation. Only during irrigation with collector water (option III) there was some salt accumulation observed along the entire observation profile. In options I and II, no significant changes in soil salinity were observed. During the entire observation period, soil salinity in the experimental plot of options I and II was within the MPC (Maximum Permissible Concentration), therefore, it can be stated that these irrigation technologies do not have a negative effect on the formation of the Sorghum yield. From the above, we can conclude that the problems with salinization at the pilot production site farm “Sadyk” does not exist, except for the area where collector water with mineralization of more than 4.0 g/l was used.

Results of monitoring the irrigation water supply to the experimental production site of the farm “Sadyk” in 2018.

According to the research program in 2018, all types of work envisaged in the work were performed for all 3 options of the experiment. 2018 was a dry year during the growing season; therefore the water appeared in irrigation canals with a great delay.

The precursor crop in this area was an early-ripening variety of potatoes, after its harvest, one water-charging irrigation was carried out, then, as the soil acquired the necessary condition, pre-sowing preparatory work was carried out. On the experimental field, plowing was carried out with a T-28 tractor, to a depth of 25 cm, and subsequently a full cycle of operations related to sowing was carried out. The sowing of sorghum was carried out in strips on plots with a size of 10 x 10 m²; in each option of the experiment, three plots were laid. Sowing of Sorghum was in order to obtain green mass for cattle fodder, sowing was carried out on June 24.

At the experimental site, three irrigations were carried out according to options: option I - control, option II - watering mixed with collector water up to 3 g/l and III option - watering with collector water more than 4 g/l. The quality of water used for irrigation of Sorghum in the experimental area is given in Table 5.

Table 5. Mineralization of water from the irrigation system and on-farm collector used for irrigation of Sorghum at the experimental section (%)

Date	Solid remainder (g/l)	HCO ₃ ⁻	Cl ⁻	SO ₄ ⁻	Ca ⁺⁺	Mg ⁺⁺	Na ⁺ , K ⁺
Fresh water							
20.07.18	0,976	0,035	0,013	0,597	0,236	0,012	0,014
05.08.18	0,756	0,037	0,256	0,188	0,056	0,008	0,191
20.08.18	0,648	0,025	0,305	0,074	0,031	0,076	0,538
Fresh + Collector water							
20.07.18	3,306	0,026	1,725	0,180	0,087	0,772	2,823
05.08.18	2,394	0,258	0,695	0,680	0,240	0,072	0,466
20.08.18	2,585	0,248	0,550	0,978	0,205	0,096	0,504
Collector water							
20.07.18	4,340	0,020	1,661	0,919	0,149	0,028	1,300
05.08.18	4,130	0,021	1,566	0,891	0,150	0,027	1,226
20.07.18	4,422	0,020	2,087	0,392	0,156	0,191	1,008

The influence of the quality of irrigation water on productivity is determined, first of all, by its influence on soil processes (increase in the concentration of soil solution, alkalization, salinization, deterioration of water-physical properties, etc.), through them, on the productivity of crops. The degree of influence on productivity depends on many factors: on the type and properties of soils, salinity and drainage of irrigated lands, salt tolerance of agricultural crops and the phase of their development, water supply rates and other conditions. With an increase in drainage, a lightening of soils in terms of texture and an increase in salt tolerance of crops, the degree of influence decreases and vice versa.

As noted above, the soil of the experimental plot is of medium texture and is also weakly and moderately saline. According to the monitoring of soil salinity according to options I and II, irrigation with collector waters of 3 g/l did not have a special effect on the soil salinity of the experimental plot, therefore, the yield of green mass in the experimental field for these irrigation options did not have much difference, however, with irrigation with collector waters, more than 4 g/l shows a significant loss in the yield of green mass.

Irrigation with collector water up to 3 g/l, the loss of green mass yield was about 13%, i.e. it can be considered that it did not have a particular effect on the yield of Sorghum green mass, however, during irrigating with collector water of more than 4 g/l, the yield loss was more than 30%.

The results of previous studies show that on the year 3-4, where irrigation was carried out with mineralized water, a decrease in crop yields may occur. This is due to the high rates of soil salinization when irrigated with mineralized water.

Also, long-term studies on irrigation of agricultural crops with collector water show that during the mineralization of irrigation water is more than 5 g/l, the plant (Sorghum, Alfalfa, Corn, etc.) dies. Thus, the analysis of the results of long-term research shows that regardless of the type of crops, when the mineralization of irrigation water exceeds 4 g/l, their growth and development slow down sharply and this has an extremely negative effect on their productivity. This can be explained by the high accumulation of toxic salts in the root layer of the soil.

Conclusion. In conditions of a shortage of fresh water in the Republic of Karakalpakstan, long-term (2015-2018) pilot-production work was carried out on the use of collector-drainage water for irrigation of salt-tolerant fodder, vegetables and melons, pasture and hayfields, as well as for estuary irrigation of wild fodder crops (reed, etc.) on lands located along various magistral collectors.

The above experiments were carried out on the territory of sites at the bottom of the drained Aral Sea, "Oybek" and "Sadyk", showed that collector-drainage water can be used for irrigation of agricultural crops with mineralization up to 3 g/l, as well as for washing highly saline lands during mineralization of collector water equal to 10 g/l.

When the mineralization of the collector-drainage water is up to 3.0 g/l, salt-tolerant fodder crops should be irrigated with such kind of water, only during 2-3 years, and vegetables - melons for 1-2 years, after that it is necessary to change the sowing place and conduct leaching of the irrigation lands with irrigation water. Then, for 3-6 years, use the crop rotation system and irrigate only with irrigation water.

The average annual mineralization in the considered reservoirs varied from 2.09 g/l to 5.57 g/l, the predominant chemical composition of the collector-drainage waters was Chloride-Sulfatic-Magnesium-Sodium (CS-MS), despite this their certain volume can be used for watering of salt-tolerant crops and leaching saline soils.

References:

1. Chembarisov E.I., Bakhritdinov B.A. Hydrochemistry of river and drainage waters of Central Asia. *Ukituvchi*, Tashkent, 1989, 232 p. [In Russian]
2. Chembarisov E.I., Khozhmuratova R.T. Collector-drainage waters of the Republic of Karakalpakstan. *"Bilim"*, Nukus, 2008, 56 p. [In Russian]

3. Chembarisov E.I., Lesnik T.Yu., Khozhamuratova R.T. Experience of using mineralized waters for irrigation of fodder crops in Uzbekistan. In the collection of the International Scientific and Practical Internet-Conference “*Directions of development of modern farming systems*” dedicated to Professor S.D.Lysogorova’s 110th anniversary, Kherson, State Higher Educational Institution “Kherson State Agrarian University”, Department of Agriculture, 2013, pp.387-392. [In Russian]
4. Kamilov O.K. Lower Amudarya River: how to deal with salinization. *Agriculture of Uzbekistan*, No.8, Tashkent, 1987, – pp.34-36. [In Russian]
5. Khozhamuratova R.T., Chembarisov E.I. The features of distribution of the mineralization and chemical compound of subsoil waters of the irrigated zones of the Republic of Karakalpakstan. *Economics and Society. Scientific and Practical Journal* – Russia, Issue No.4 (71), 2020, pp.44-52.
6. Khozhamuratova R.T., Kurbanbaev S.E., Chembarisov E.I. The quality of collector-drainage waters and the possibility of their reuse for irrigation of salt-tolerant crops in the conditions of the Republic of Karakalpakstan. *Economics and Society. Scientific and Practical Journal* – Russia, 2020, Issue No.4 (71), pp.58-64. [In Russian]

Rezyume: Maqolada Amudaryo havzasidagi o‘rtacha yillik suv oqimining uzoq muddatli o‘zgarishlari, ushbu hududning yer va suv resurslaridan foydalanish hamda qaytayotgan suvlarning sifati hamda sho‘rga chidamli yerlarni sug‘orishda qayta foydalanish masalalari muhokama qilinadi. Qoraqalpog‘iston Respublikasi sharoitida ekinlar. Ushbu muammolarni hal qilish uchun amaliy va ilmiy tavsiyalar berildi.

Резюме: В статье рассматриваются многолетние изменения среднегодового расхода воды в бассейне реки Амударья, использование земельных и водных ресурсов этой территории и качество возвратных вод и их повторное использование для орошения солеустойчивых посевов в условиях Республики Каракалпакстан. Предложены практические и научные рекомендации по решению этих проблем.

Tayanch so‘zlar: Amudaryo havzasi, suv oqimi, sug‘oriladigan yerlar maydoni, magistral kollektorlar, qaytib oqim sifati.

Ключевые слова: Бассейн реки Амударья, расход воды, площадь орошаемых земель, магистральные коллекторы, качество возвратного стока.

**THE BASIC PRINCIPLES OF THE FORMATION OF THE FOOD INDUSTRY THAT
DETERMINE THE STANDARD OF LIVING OF THE POPULATION**

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Summary: *The basic principles of the formation of the food industry that determine the standard of living of the population are discussed in the article*

Keywords: *food industry, modernization, production, economic growth, strategy, industry.*

The crisis processes taking place on the world market could not but affect the indicators of the development of our country's economy over the past period and may create great difficulties in ensuring the growth rates and efficiency of the economy of Uzbekistan envisaged for 2021. Serious problems arising on the world market in connection with an increasingly noticeable reduction in demand cannot but have a negative impact on the realization of our country's export opportunities and a decrease in foreign exchange earnings.

The systemic problem of the food industry is the gap between the development of the food industry and the needs of the population, the reasons for which are: physically and morally outdated production technologies 80%; low level of mechanization of labor (50%); low level of automation of production (8%); low labor productivity (2-3 times below the world level); high degree of wear fixed assets (up to 70%); low rates of equipment renewal (3% instead of the standard 10%), which results in poor product quality and determines a priori overspending of raw materials.

Quantitative values of the accessibility coefficient mean that the average working resident of the republic spends from 27 to 43% of final consumption expenses (income) on the purchase of products necessary to maintain life in extreme environmental conditions.

In this regard, there is a need to develop a system of limiting values of indicators characterizing the level of food security of the Republic of Karakalpakstan, located in the zone of extreme environmental situation.

According to the adopted Decree of the President of the Republic of Uzbekistan «On measures for the further development of the raw material base, deepening the processing of fruits and vegetables and meat and dairy products» [1] a list of investment projects for the modernization of existing enterprises, deeper processing of agricultural products, production of semi-finished products and finished food products in 2016-2020 has been developed.

Thus, in this list it is noted that three manufacturing enterprises in the Republic of Karakalpakstan are initiators of projects to expand capacities and modernize the production of the food industry.

Among them are in the Karauzyak district "Panaevfarm", in the Nukus district "KPS Nukus Herbal Technology" and in the Cimbai district "Lanextract".

Thus, the solution of the systemic problem and tasks that ensure the country's food security is possible only by implementing the scenario of innovative development of the food industry, the core of which is the innovative activity of food production enterprises, and its solution is possible only on the basis of a systematic approach using the methodology of system analysis due to the complexity, multidimensional and multidirectional goals.

It should be noted that for each option, consistent systems of elements of the economic mechanism should be considered, which allows creating economic conditions conducive to the formation of the desired states.

Based on the developed analytical complex within the framework of the dissertation research, the forecast changes in the volume of production and consumption of the main types of food industry products were calculated by the author (Table 1).

Table 1

Forecast values of production and consumption of basic foods products in the Republic of Karakalpakstan (for the period up to 2023) [2]

Types of production	Change in consumption volumes, in % to the original, at different levels of increase in real monetary income		Projected production volumes in farms of all categories, thousand tons.
	5% per year	10% per year	
Meat and meat products	113,2	118,1	60,7
Milk and dairy products	108,4	113,7	124,5
Canned fruit and vegetables	104,7	106,3	8,2
Bread and bakery products	105,1	106,9	115,3
Pasta	102,8	104,7	9,8

The production volumes projected from 2017 to 2023 are calculated by extrapolating the dynamic series over the past 10 years.

The developed modeled complex makes it possible to use variant forecasts of the economic development of the food industry, taking into account all conjuncture-forming factors to coordinate the interests of the subjects of the analyzed market.

The study has shown that in many food industry enterprises, when forming an optimal strategy for modernization development, modern modeling techniques and methods are used quite separately, the interrelationships of various elements of the system, the variant justification of various alternatives, and the continuous updating of the information base are not taken into account.

Innovative development is the most important condition for improving the competitiveness of the national economy. In addition, in recent years, the problem of food safety for consumers has become particularly acute, which is associated with an increase in the supply of low-quality, falsified and dangerous products to the food market.

Today, the enterprises of the food and processing industry face the following goals and objectives, the implementation of which is directly related to the provision of innovative activities at the enterprise: the introduction of technologies for the production of traditional food products, allowing them to preserve their value and ensure quality; the development of new biologically complete food products; the creation and introduction of technologies for the production of qualitatively new food products;

The development strategy of food industry enterprises consists of many elements that determine strategic prospects. The paper outlines the vision of determining the composition of the strategy elements inherent in the food industry enterprises of the Republic of Karakalpakstan.

Food enterprises in modern conditions have begun to pay more attention to the development of a commodity strategy, which reflects to a greater extent the policy of determining the assortment structure and contributes to an increase in the volume of commodity production and its presence in the domestic consumer market. It is they who determine the pricing policy and relationships with intermediaries, and also contribute, by virtue of their financial capabilities, to the introduction of progressive trade and information technologies.

Table 2

Forecast parameters of production of the main types of agricultural products for the development of the raw material base of the food industry in 2018-2023 years ^[3]

№	Name of the product	2018r. (thousands of tons)	as % of the previous year				Growth rate of 2023 to 2018 (%)
			2019 year	2020 year	2021 year	2023 year	
1.	Vegetables	10458,0	105,7	105,9	106,2	106,5	126,6
	Including: Onion	1317,7	106,2	106,5	106,8	107,2	129,4
	Cabbage	1119,0	106,0	106,2	106,5	106,8	128,0
	Tomatoes	2771,4	106,2	106,4	106,6	106,9	128,7
	Carrot	2039,3	106,1	106,3	106,5	106,7	128,1

	Cucumbers	753,0	106,0	106,2	106,5	106,8	128,0
	Other	2457,	104,3	104,6	104,8	105,1	120,2
2.	Potato	2833,0	106,3	106,5	106,7	106,9	129,1
3.	Melons	1980,0	106,1	106,2	106,2	106,3	127,1
4.	Fruits	2874,0	106,0	106,3	106,6	106,9	128,4
	Including:						
	Apricots	579,4	106,2	106,5	106,7	107,0	129,1
	Plums	127,4	105,6	105,9	106,2	106,4	126,4
	Peaches	314,2	106,1	106,3	106,5	106,7	128,2
	Cherries	130,5	106,2	106,5	106,8	107,2	129,5
	Apples	1161,9	106,1	106,4	106,7	107,1	129,0
	Pears	107,1	106,0	106,3	106,6	107,0	128,5
	Others	453,4	105,5	105,8	106,2	106,6	126,3
5.	Grapes	1601,0	105,7	106,0	106,3	106,6	127,0
6.	Meat (live weight)	2060,0	105,3	105,6	105,8	106,0	124,7
7.	Milk	9478,0	108,1	108,3	108,4	108,6	137,8
8.	Eggs	6200,0	111,3	112,0	112,7	113,4	159,3
9.	Fish	75,0	120,0	121,1	122,2	123,3	219,1
10.	Honey	11,0	118,2	119,2	120,3	121,3	205,6

It should be particularly noted that, if in the first years of independence of our country, the necessary food products, such as wheat, meat and meat products, dairy products, potatoes and other products for consumption were imported from other countries. Today, as a result of the accelerated development of production, not only the needs of the country's population are met, but these products are also exported to many foreign countries.

Over the period 2018-2022, the volume of per capita consumption of meat and meat products increased by 1.3 times, milk and dairy products by 1.7 times, eggs by 4.5 times, vegetables and melons by 2.2 times, potatoes by 1.6 times, sugar, including confectionery by 2 times, fruits and berries by 3.5 times, vegetable oil 2 times.

The general state of the industry of the Republic of Karakalpakstan for 2001-2018 can be presented on the basis of the following results of the analysis:

- the share of the gross regional product of the GRP of the region in the country's GDP decreased from 3.1% in 2001 to 2.3% in 2018, a similar picture is given by the change in the share of industrial production of the region in the gross production of the country over the same period – a decrease from 2.0 to 1.2%.

Despite the growth of the average permanent population of the republic for 2000-2018 by 29.2%, a dynamic increase in the incomes of the population over the past 16 years has been ensured, which contributed to strengthening financial capabilities and increasing the volume of consumption of basic types of food by the population. In particular, the consumption of vegetables per year amounted to 277.2 kg., fruits – 148.8 kg., eggs – 213.6 pcs., meat and meat products – 44.4 kg., milk and dairy products – 279.6 liters., potatoes - 56.4 kg., sugar – 32.4 kg., vegetable oil – 24.0 kg.

References:

1. Resolution of the President of the Republic of Uzbekistan PP-2505 dated March 5, 2016
2. Formulated by the author

3. Data of the State Statistics Committee of the Republic of Uzbekistan

4. Tleuov N.R., Iniyatov A. Food industry development strategy in the Republic of Karakalpakstan. Monograph. –Germany: LAP LAMBERT Academy publishing, 2016. –73 pages. (ISBN: 978-3-659-89099-4)

5. Tleuov N.R. Prospects of economic growth of the food industry in the Republic of Karakalpakstan// Economics and education.–Tashkent, 2012. -No. 5. -pp. 53-55.

6. Tleuov N.R. Study of the dynamics of industrial development in the Republic of Karakalpakstan// Economics and education.–Tashkent, 2013. - No. 6. - pp. 38-39.

Rezyume: Maqolada aholining turmush darajasini belgilovchi oziq-ovqat sanoatini shakllantirishning asosiy tamoyillari muhokama qilinadi.

Резюме: В статье рассмотрены основные принципы формирования пищевой промышленности, определяющие уровень жизни населения.

Kalit so'zlar: Oziq-ovqat sanoati, modernizatsiya, ishlab chiqarish, iqtisodiy o'sish, strategiya, sanoat

Ключевые слова: Пищевая промышленность, модернизация, производство, экономический рост, стратегия, отрасль.

LEGAL BASIS OF ORGANIZING A LEGAL CLINIC

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Legal technical school of the Republic of Karakalpakstan

Summary: *within the scope of this article, as an objective factor in the formation of a legal state and civil society in our country, increasing the role of the legal clinic service, the concept and essence, system, legal status, main directions of the activity of the legal service, the state and economic basis of the legal regulation of the legal service. in cooperation with administrative bodies, judicial and law enforcement bodies, legal profession and other organizations to ensure that students combine theoretical knowledge with practice; provide impartial legal assistance to individuals and legal entities, increase the level of professional training in the legal field by forming the skills of students to work with the appeals of legal entities and individuals, apply materials related to the clinic's activities to the educational process.*

Key words: *Legal clinic, appeal, citizens, students, lawyer, court, law enforcement agencies, professional protection, professional, guarantee, secret.*

Creating perfect legislation in all countries of the world, ensuring its unconditional implementation, improving the legal culture of the population and officials, clearly defining the rights and obligations of citizens, state authorities and administrative bodies are important directions. In this process, the legal service of state bodies and organizations, economic entities is of great importance. Legal service from the preparation of drafts of normative legal documents, legal expertise, from the process of acceptance to ensuring their execution; conclusion, amendment, cancellation and execution of business contracts; provision of property preservation by legal means; compliance with labor legislation and strengthening of labor discipline; protection of the rights and legal interests of relevant bodies and business entities in courts and other organizations; actively participates in legal education. In the large-scale reforms implemented in our country, special attention is paid to the radical improvement of the legal service of state bodies and organizations. In 2017-2021, the action strategy for the five priority areas of the development of the Republic of Uzbekistan states: "deepening democratic reforms aimed at improving the state and society, and developing the organizational and legal foundations of the state service in the modernization of the country, ensuring the rule of law" tasks such as "radical improvement of the quality of directed legal aid and legal services". This is a new theoretical-methodological approach to the legal regulation of the legal service system and activities, increasing the role of the legal service as an objective factor in the formation of the legal state and civil society in our country, the concept and essence of the legal service, its system, legal status, and the main purpose of its activity. directions, the historical development of the bases of legal regulation of legal service activities, the powers of justice authorities to coordinate, control and methodical provision of legal services, state bodies and non-governmental non-profit organizations to provide legal assistance to business entities competences, as well as the theoretical-legal aspects of the legal basis and specific characteristics of the legal service, based on the results of a systematic study, there are conclusions, suggestions and recommendations.

Law of the Republic of Uzbekistan "On Education" and Decree of the President of the Republic of Uzbekistan dated April 29, 2020 No. PF-5987 "Legal education in the Republic of Uzbekistan and determines the procedure for the operation of the legal clinic of legal technical schools in accordance with the decree "On additional measures for the fundamental improvement of the science".

The clinic is considered a structural unit of the technical school and performs activities related to ensuring the harmony of students' theoretical knowledge with practice, developing students' practical skills, and providing impartial legal advice to individuals and legal entities.

The clinic operates according to the laws of the Constitution of the Republic of Uzbekistan, the decisions of the Chambers of the Oliy Majlis of the Republic of Uzbekistan. Decrees, decisions and orders of the President of the Republic of Uzbekistan, decisions and orders of the Cabinet of Ministers of the Republic of Uzbekistan, decisions and orders of the Ministry of Justice of the Republic of Uzbekistan, the Ministry of Higher and Secondary Special Education, the Charter of the technical school, the decisions of the Council of the technical school. the orders of the director of the technical school and the regulation of the legal clinic.

Sections of public administration law, civil law, criminal law, international law and business law will be established in the clinic, and a head will be appointed from among the teaching staff. Apart from this, sections can be established in other areas of law.

To fulfill the tasks and functions of the clinic, its subsidiaries may be organized. Legal assistance provided to individuals at the clinic is provided free of charge. The principles of organization of the clinic are as follows:

- legality;
- impartiality of legal aid;
- impartiality;
- professional development of students;
- personal responsibility.

The main goal of the clinic is to form and develop students' practical skills and raise the legal consciousness of the population.

The main tasks of the clinic are to provide students with theoretical knowledge and practice in cooperation with state and economic management bodies, judicial and law enforcement bodies, legal profession and other organizations; in the legal field by providing impartial legal assistance to individuals and legal entities, forming the skills of students to work with appeals of legal entities and individuals increase the level of professional training; application of materials related to the activity of the clinic to the educational process.

The clinic performs the following functions to fulfill the tasks assigned to it:

a) in cooperation with state and economic management bodies, judicial and law enforcement bodies, bar associations and other organizations, to take organizational measures to organize students' activities in the clinic to ensure the harmony of students' theoretical knowledge with practice, on the recommendation of course deans to prepare a list of candidate pedagogic staff for working in the clinic and involve them in the clinic; To carry out cooperation with state and economic management bodies, courts and law enforcement bodies, legal professions and other organizations, and to involve practicing specialists in clinical activities, to ensure that students' theoretical knowledge is inextricably linked with practice. and attracting economic management bodies, courts and law enforcement bodies, bar associations and other organizations to familiarize themselves with their work; conducting contests among students working in the clinic and encouraging them;

b) regarding the provision of impartial legal assistance to individuals and legal entities: ensuring timely and high-quality consideration of requests for legal advice from individuals and legal entities, expanding the scope of providing legal assistance by organizing mobile legal advice for legal entities and individuals ;

depending on the nature and complexity of the appeals of individuals and legal entities, relevant state and economic management bodies to resolve them. make recommendations on the need to apply to the court, law enforcement bodies and advocacy structures;

providing them with legal advice as a result of examining the appeals of individuals and legal entities, and, if necessary, assisting in the formation of drafts of appeals to be submitted to state and economic management bodies, courts, law enforcement agencies and other organizations;

formation of expert groups consisting of pedagogues and other employees for the purpose of giving reasoned answers to the authors based on the nature of appeals in necessary cases; to regularly carry out advertising and promotional activities in order to increase the awareness of the population about the activities of the clinic;

c) to increase the level of professional training in the legal field by forming the skills of students to work with the appeals of legal entities and individuals:

The clinic has the following obligations during the performance of the tasks and functions assigned to it: to ensure the execution of the tasks assigned to the clinic by the decisions of the Technical College Council and the orders of the director;

Timely and high-quality execution of assignments given by the management of the Technical College, development of proposals for improving students' theoretical and practical skills; ensuring high efficiency in all areas of activity, timely and qualitative consideration of appeals of individuals and legal entities within the scope of authority, organization of personal receptions for representatives of individuals and legal entities in the prescribed manner, labor and executive discipline and compliance with duties, ensuring the implementation of annual work plans;

Compliance with the technical school's internal procedures and the technical school's rules of etiquette. Other obligations may be assigned to the clinic in accordance with the law.

References:

1. Civil Procedure Code of the Republic of Uzbekistan // National database of legal documents, 13.01.2021, No. 03/21/661/0011.
2. Civil procedure: study guide / M.M. Mamasiddikov. Tashkent: Bakteria press, 2014.-72b; 424 p.
3. Doniyorov. M. Participation of a lawyer in the trial of civil cases. Tutorial. Responsible editor: Ph.D., prof. Sh.Sh. Under the editorship of Shorakhmedov. - T.: TDYuI. 2007. 97 p.
4. Law of the Republic of Uzbekistan "On Appeals of Natural and Legal Entities", No. ÓRQ-445 of 12.09.2017

Rezyume: ushbu maqola doirasida mamlakatimizda huquqiy davlat va fuqarolik jamiyatini shakllantirishning ob'ektiv omili sifatida yuridik klinika xizmatining rolini oshirish, yuridik klinika xizmati tushunchasi va mohiyati, tizimi, huquqiy holati, asosiy yo'nalishlari. yuridik xizmat faoliyati, yuridik xizmat faoliyatini huquqiy tartibga solishning davlat-iqtisodiy asoslari. ma'muriy organlar, sud va huquqni muhofaza qiluvchi organlar, advokatlik va boshqa tashkilotlar bilan hamkorlikda talabalarning nazariy bilimlarini amaliyot bilan uyg'unlashtirishni ta'minlash; jismoniy va yuridik shaxslarga xolis yuridik yordam ko'rsatish, talabalarda yuridik va jismoniy shaxslarning murojaatlari bilan ishlash ko'nikmalarini shakllantirish orqali yuridik sohada kasbiy tayyorgarlik darajasini oshirish, klinika faoliyatiga oid materiallarni o'quv jarayoniga qo'llash.

Резюме: в рамках данной статьи, как объективный фактор формирования правового государства и гражданского общества в нашей стране, повышения роли службы юридической клиники, понятие и сущность, система, правовой статус, основные направления деятельности юридической службы, состояние и экономические основы правового регулирования юридической службы. во взаимодействии с административными органами, судебными и правоохранительными органами, адвокатурой и другими организациями обеспечить совмещение обучающимися теоретических знаний с практикой; оказывать беспристрастную юридическую помощь физическим и юридическим лицам, повышать уровень профессиональной подготовки в правовой сфере путем формирования у студентов навыков работы с обращениями юридических и физических лиц, применять в учебном процессе материалы, связанные с деятельностью клиники.

Kalit so'zlar: Yuridik klinika, murojaat, fuqarolar, talabalar, advokat, sud, huquqni muhofaza qilish organlari, kasbiy himoya, professional, kafolat, sir.

Ключевые слова: Юридическая клиника, обращение, граждане, студенты, адвокат, суд, правоохранительные органы, профессиональная защита, профессионал, гарантия, тайна.

**THE USE OF THE CATEGORY OF POSSESSIVENESS IN THE ENGLISH AND
KARAKALPAK LANGUAGES**

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Summary: *This article deals with the category of possessive case in English and Karakalpak languages, which is one of the important problems that needs for further investigation. The analysis of the category of possessiveness in above mentioned languages is related to the study typological system of languages. As a result of investigation similarities and differences have been revealed in languages.*

Key words: *possessiveness, grammatical category, English language, Karakalpak language, suffixes, affixes, similarities and differences.*

The category of possessiveness is a complex linguistic phenomenon studied in Linguistics, especially in a comparative way. Only several aspects of this problem have been investigated in the linguistic literature in the English and Karakalpak languages. Possessive affixes of nouns are an obvious example.

The views related to the problems of expressing the sense of possessiveness in the Karakalpak language have been explained in the works of N.A.Baskakov, A.Kydyrbaev, A.Bekbergenov and G.Patullaeva.

In the English language V.Y.Plotkina, G.Vorontsova, I.P.Ivanova, L.S.Barkhudarov, D.A.Shtelling, A.A.Kholodovich and several other scientists dedicated their works to the issues of possessiveness.

The present article is a piece of research determining the use of “the category of possessiveness” in different ways in the English and Karakalpak languages. This is the first step in determining the use of the category of possessiveness in the languages belonging to various systems.

The analysis of the category of possessiveness is related to the study of this categorial meaning in the languages being compared “Possessiveness” has been the object of the study and research of many foreign scientists and linguists.” “Possessiveness” conveys the certain general concept on all research”, however analysing and modelling principles, research methods can be different.

Looking at it from this point of view, the category of possessiveness is of interest not only to linguists but also to general scientific on public scholars.

The term “possessiveness” is derived from the Latin word “possessivus”, which means ownership, possessiveness. “Possessiveness” is one of the categories of the universal concept of the language, the main essence of which is to determine the name of the object in relation to another person or object. In terms of form and content, “possessiveness” is connected with categories such as determination, predicativity, attributive, locativity, semanticity and relativity [1:89].

The category of possessiveness is an interlanguage category, for it can be studied in all language systems being compared with, namely English, Karakalpak, Uzbek, Russian and others.

Why this category is called “interlanguage” is because it relies on the study of linguistic hierarchy of “possessiveness” in morphological, grammatical and lexical aspects. In the English and Karakalpak languages it is represented by morphological and syntactical methods.

The intercategorical feature of “possessiveness” is proved by its collocation with many lexical-grammatical associations of the word, in particular, a characteristic phenomenon for nouns, verbs, pronouns and adjectives. For example, the concept of “possessiveness” can be expressed in several ways – with the help of verbs, such as “have”, “belong”, “own”, “possess”, as well as with nouns “owner”, “possession”.

For example: They have a large garden.

To whom does this land belong?

He owns two motorcars.

The concept of “possessiveness” is also expressed by possessive pronouns: my, mine, our, ours, his, her, hers, its, your, yours, their, theirs.

For example: That is my notebook. That notebook is mine.

The concept of “possessiveness” can also be expressed by prepositional phrases with the preposition “of”: at the end of the page, at the foot of the mountain. Sometimes it is possible to use the attributive noun instead of these phrases: the legs of the table and the table leg, the City of New York and the New York City.

Possessive pronouns, possessive nouns and prepositional nouns with the preposition “of” can also indicate the concept of “possessiveness” with several other meanings.

In each expression of “possessiveness” several signs and indicators can be explained vividly.

Morphological expression of “possessiveness” includes the forms of nouns, verbs, pronouns etc. For instance, the linguist A.A.Kholodovich did research on “expressing possessiveness” in modern Slavic languages by the way of morphological method.

A.A.Kholodovich’s interest in the science of grammar resulted in his research on expressing “possessiveness” in different ways. At the first stage of his activities, he was interested in the aspect of phased semantics of grammatical aspects, and at the second stage of his creative work, he became interested in it as an aspect of grammatical typology. In the study of the category of possessiveness, these two aspects are still relevant today, scientists today use the scientific heritage of this particular scientist in their studies and research. [4:19].

A noted scientist N.S.Trubetsky mentioned that at one time certain languages had different forms of nouns denoting “possessiveness” [see: 2:78].

The possessive forms of words, in their turn, can be connected with categorical means-concepts; the category of “possessiveness” (In Uzbek, Karakalpak) and the category of number (In Karakalpak and English).

For example:

my book – I person, singular (китаб-ым)

my books – I person, plural (китаплар-ым)

his book – II person, singular (китаб-ы)

her book – II person, singular (китаб-ы)

their books – II person, plural (китаблар-ы)

One can see from the examples above, the particular affix “ым” is added to the root of the word in the first case and expresses first person, singular. In the second case, the affix “лар” which is plural, is added to the root of the word and then another affix “ым” is added to make plural form of possessive noun. The affix “ым” denotes that the object belongs to one person, and the affix “лар” and the affix “ым” together denotes plural noun belonging to one person. The form “their books” is similar to other its analogues, only the noun is in the second person, plural [3: 130].

Each aspect has its own means of expressing “possessiveness”. From the morphological point of view, the concept of “possessiveness” is expressed by suffixes, in the syntactical aspect it is expressed with the expressions, in the lexical aspect it is given with the help of words expressing “possessiveness”.

While studying the possessive category, we considered that the category of case is also important. The reason for this is that one of the main functions of possessive case” is to express possession.

In English, the case category has been studied far less than it was in other languages. This view is proved by the number of cases. There are six cases in the Karakalpak language, while English has only two cases. Linguists state that the reason why there are two cases in English is because the English language has by far the most preposition uses instead of case category.

Some functions of cases are thought to have been transferred to the use of prepositions.

Possessive case is one of the main cases in English. This phenomenon was used in the ancient written sources and today it is still being used and developed.

Possessive case is formed by adding “s” to the end of a noun. In some cases it is formed without suffix, just adding apostrophe that is, the symbol “'”. This depends on the plural form of a noun as well as the words ending in certain sounds: boys [bɔɪz]; Gus [gʌs]; Zones [zounz].

In English 's inflexion can be added to the roots of simple nouns, abbreviations, as well as compound nouns.

It is necessary to mention that in the Karakalpak language the suffixes of possessive case are sometimes added to the nouns and sometimes not. This phenomenon is called “izafet” in Turkic languages.

The morphological methods are effective in expressing the category of possessiveness in the Karakalpak language and the syntactical methods are effective in English.

When the category of possessiveness is expressed in the lexical way, it is considered acceptable to express affix and root morphemes, as well as compound nouns. These associations belong to different lexical-grammatical types of words; therefore, this category can also be called “inter” aspect category.

In English, suffixes -ed (black-haired), -y (a windy day), -en (golden medal), -ern (Eastern), -er (a Londoner), -tion (arrogation), -ing (holding), -ment (enjoyment), -or (heritor), in the Karakalpak language these suffixes are the following: -ли/лы (ақыллы, үйли); -лык/лик (ауыллык), -да+ғы/де+ги, -та+ғы/-те+ги (даладағы, үйдеги);

In English, certain verbs convey possessiveness: acquire, have, own, possess, property; in Karakalpak the meaning of possessiveness can be given with these verbs: “ийелеў”, “ийе болыў”, “алыў”, “өзиники етиў”, “өзлестириў”, “хожайын болыў”, “қараслы болыў”.

Roots can convey “possessiveness” implicitly, they take no markers of possessiveness.

The structure of compound words used to convey the meaning of possessiveness is also different. They are lexicological compounds made of different lexico-grammatical groups: ownership, free-tail; уйли-жайлы, баў-бақшалы etc.

It should be noted that the category of possessiveness is defined by the lexical-grammatical types of words such as nouns, adjectives, pronouns, verbs. However, their prevalence is different. This view can be found in the two languages.

References:

1. Axmanova O.S. Slovar lingvisticheskix terminov. M.: YPCC, 2004.
2. Blokh M.Ya. Sintaksicheskoye issledovaniya po angliyskomu yaziku. M., Nauka, 1981.
3. Hazirgi qaraqalpaq adebiy tilinin grammatikasi. Nokis, Bilim, 1994.
4. Kholodovich A.A. Lingvisticheskoye ensiklopedicheskiy slovar, M.: 1988.
- 5.

Rezyume: Ushbu maqolada ingliz va qoraqalpoq tillaridagi egalik kategoriyasi ko'rib chiqiladi, bu esa qo'shimcha tadqiq qilish uchun zarur bo'lgan muhim muammolardan biridir. Yuqorida aytib o'tilgan tillarda egalik kategoriyasini tahlil qilish tillarning tipologik tizimini o'rganish bilan bog'liq. Tadqiqot natijasida tillarda o'xshashlik va farqlar aniqlandi.

Резюме: В данной статье рассматривается категория притяжательного падежа в английском и каракалпакском языках, которая является одной из важных проблем, требующих дальнейшего изучения. Анализ категории притяжательности в вышеупомянутых языках связан с изучением типологической системы языков. В результате исследования были выявлены сходства и различия в языках.

Kalit so'zlar: egalik, grammatik kategoriya, ingliz tili, qoraqalpoq tili, qo'shimchalar, affikslar, o'xshashlik va farqlar.

Ключевые слова: притяжательность, грамматическая категория, английский язык, каракалпакский язык, суффиксы, аффиксы, сходства и различия.

SPECIFIC CHARACTERISTICS OF PROCEDURAL FORCING MEASURES IN THE DEVELOPED COUNTRIES OF THE WORLD

Asanov S.

Legal collage of the Republic of Karakalpakstan

Summary: *This article describes concepts such as "coercive measures in criminal proceedings", "system of coercive measures", "types of coercive measures", "fundamentals of coercive measures of detention", "arrest and house arrest", the basis of placing a person in a medical institution, procedure and devoted to the analysis of issues such as the application of precautionary measures, strengthening the role and role of the lawyer in the application of procedural coercive measures.*

Key words: *procedural coercive measures, arrest, detention, sanction, preliminary investigation, crime, accused, risk, surety.*

Peculiarities of the use of procedural coercive measures in the German Federation. Arrest in the preliminary investigation (Article 112 of the Code of Criminal Procedure of the Federal Republic of Germany) is the most serious criminal procedural coercion measure. This measure of legal influence is a case of limiting the fundamental rights of the accused; therefore, it is particularly detailed in criminal procedural law.

This measure of legal effect serves to ensure that the case is conducted on the merits of the criminal case. This legal measure is used as enforcement, deprivation of liberty, release from prison and security measures.

According to Article 112 (paragraph 1, sentence 1) of the Code of Criminal Procedure of the Federal Republic of Germany, in cases where the necessary conditions for the use of arrest exist and there is a strong suspicion of committing a criminal act, a coercive measure may be used to arrest a person. In addition, Article 112 of the Criminal Procedure Code of the Federal Republic of Germany clearly states that the principle of proportionality must be observed.

If a person's actions raise suspicions that he has committed or participated in a criminal act, the conditions for criminal prosecution are deemed to exist, and he is detained by representatives of the prosecuting authority, or he is insane or sane according to Article 126 of the Code of Criminal Procedure of the Federal Republic of Germany. In the case of incompetent defendants, temporary placement in a medical facility is carried out by the competent authority in order to correct it and apply security measures in isolation from society.

Grounds for applying the legal measure of detention and temporary detention. We can cite the following as conditions for pre-trial detention and grounds for applying a measure of temporary detention.

If there is a strong doubt that a person has committed this or that criminal act and there are grounds for using detention in prison, the order of pre-trial detention may be issued against the accused. However, if the application of this measure is disproportionate to the importance of the case and the expected punishment or security measure, this situation cannot be applied.

If there is a basis for detention against a person, this legal measure can be applied based on the following specific facts:

— when it is established that the accused does not have a place of residence on the territory of Germany or there is a possibility of absconding;

— if there is a danger, taking into account the circumstances of the specific case, and the accused refuses to participate in the process of solving the crime;

substantial doubt regarding the accused's behavior:

For example;

a) if there is a possibility of destroying, changing, removing, concealing or falsifying evidence;

b) if it is considered that there is a risk of bad influence on other defendants;

c) if there are cases of encouraging witnesses, experts or others to destroy evidence through the threat of adverse influence.

In addition to the above, precautionary measures are also applied in cases where there is a danger and in reality it complicates the situation of the case. The procedure for holding an accused person pending trial is also mentioned in paragraphs 6, 126(a) and 129(b) of the International Criminal Code.

In addition, the detained accused must be immediately informed about his rights in a written language that he understands. If written explanations to the accused are found to be insufficient, oral explanations should also be given to him in due course. The accused must confirm in writing that he has received an adequate explanation. If he refuses to approve, the relevant information about this should be included in the case.

Peculiarities of the use of procedural coercive measures in the People's Republic of China. People's courts, People's Procuratorate and public security authorities may, according to the circumstances of the case, issue a warrant requiring the presence of the suspect or defendant, require bail until the end of the trial, or place him under supervision at his place of residence.

People's courts, People's Procuratorates and public security authorities may release suspects on bail or allow them to be placed under supervision at their place of residence:

if they can be sentenced to community supervision, imprisonment or simply additional punishment;

they should be deprived of their freedom for a certain period and released on bail until the end of the process, or they should live under supervision in their place of residence, where they do not pose a threat to society.

Decisions on whether to release suspects or defendants on bail pending trial or place them under surveillance at their place of residence are made by state security authorities. The suspect or defendant in prison and his legal representatives or close relatives have the right to apply for release on bail until the case is over.

Decisions on whether to release suspects or defendants on bail pending trial or place them under surveillance at their place of residence are made by state security authorities. The suspect or defendant in prison and his legal representatives or close relatives have the right to apply for release on bail until the case is over.

The guarantor performs the following tasks: to ensure that the person under his guaranty complies with the provisions of Article 56 of this law, to notify the executive authorities in a timely manner, if the person under his guaranty has committed an act that violates the provisions of Article 56 of this law.

If the guarantor does not report on time that the person under his guarantor has committed an act that violates the provisions of Article 56 of this law, he shall be fined. If there is a crime in the case, then a criminal investigation will be conducted as provided by law.

A suspect, defendant, who is under bail until the end of the trial, must follow the following rules:

not to leave the city or district where he lives without the permission of the executive authorities;

must come to the court on time according to the agenda;

must not disturb the witness in any way during the testimony;

must not destroy or falsify evidence.

If the suspect or defendant is released on bail before the end of the trial, the money paid for the bail is returned.

In addition, depending on the specific circumstances, the suspect or the defendant will receive an order to express his remorse in writing, to obtain bail or surety, or to monitor the place of residence or to arrest him.

References:

1. Mirziyoev Shavkat Miromonovich. We will resolutely continue our path of national development and raise it to a new level. - Tashkent: "Uzbekistan" NMIU, 2017. - 592 p.
2. Mirziyoev Shavkat Miromonovich. We will build our great future together with our brave and noble people. - Tashkent: "Uzbekistan" NMIU, 2017.
3. Rustambaev M.H. Comments on the Criminal Code of the Republic of Uzbekistan. General part. - Tashkent: Ilm-ziyo, 2006. - B. 577-600
4. Usmonaliev M. Criminal law. General part. - Tashkent: New age generation, 2005. - B. 634-643
5. To'laganova G.Z. "Measures of procedural coercion in criminal proceedings" (Educational methodical manual) - T.: TDYuI, 2007. 86 pages
6. "On measures to further reform the judicial system, strengthen guarantees of reliable protection of rights and freedoms of citizens" No. PF-4850 21.10.2016, Collection of legal documents of the Republic of Uzbekistan, 2016, No. 43, 497 - article
7. Rakhmonova S.M. "Zaderjanie kak mera organicheniya prava neprikosновенности lichnosti//The right of a person to be protected by a court: problems of theory and practice. Proceedings of a conference held jointly with the Konrad Adenauer Foundation. - T.: TDYuI, 2003. P.38
8. https://gazeta.norma.uz/publish/doc/text112519_jinoyat-processual_qonunchiligida_yangi_ehtiet_chorasi

Rezyume: Mazkur maqola “jinoyat protsessida majburlov choralari”, “majburlov choralarining tizimi”, “majburlov choralarining turlari”, “ushlab turish majburlov chorasining asoslari”, “qamoqqa olish olish va uy qamog'i” kabi tushunchalarni, shaxsni tibbiy muassasaga joylashtirish asoslarini, tartibi va ehtiyot choralarini qo'llashni, advokatning protsessual majburlov choralarini qo'llashdagi o'rni va rolini kuchaytirish kabi masalalarni tahlil etishga bag'ishlangan.

Резюме: Данная статья посвящена анализу таких понятий, как “принудительные меры в уголовном процессе”, “система принудительных мер”, “виды принудительных мер”, “основания принудительного содержания под стражей”, “заключение под стражу и домашний арест”, основам помещения лица в медицинское учреждение, порядку и применению мер пресечения, усилению роли адвоката в применении процессуальных принудительных мер.

Kalit so'zlar: protsessual majburlov choralari, hibsga olish, ushlab turish, sanktsiya, dastlabki tergov, jinoyat, ayblanuvchi, xavf, kafillik.

Ключевые слова: меры процессуального принуждения, арест, задержание, санкция, предварительное следствие, преступление, обвиняемый, риск, поручительство.

**JUDICIAL AND LEGAL REFORMS: COMPARATIVE LEGAL ANALYSIS OF
DOMESTIC AND FOREIGN LEGISLATION**

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Summary: *The article scientifically analyzes the specific features and prospects of work to ensure the true independence of the judiciary, reliable protection of the rights and freedoms of citizens, increasing public confidence in the justice system during the period of comprehensive development of New Uzbekistan. A comprehensive study of reforms in the judicial and legal sphere, digitalization efforts and the methods of international positive experience in this area, opinions on introducing into the national system the positive aspects and advantages of the advanced modern mechanism for reforming the judicial system, and proposals and recommendations of both theoretical and practical importance are set out.*

Key words: *development strategy, digital technologies, judicial system, legal sphere, digitalization, integration, interactive electronic services, electronic appeal to the court, “respect”, “protect”, “put into practice”.*

INTRODUCTION

In today's globalized era, the basis of democratic development in the world is the highest blessing, one of the democratic values, glorification of human dignity, as one of the most acceptable, effective and perfect legal mechanisms for ensuring the rule of law in society, the question of the true independence of the judicial power and the achievement of justice is increasingly important and extremely important. remains a difficult task.

The reforms carried out in our country in recent years created the ground for democratization and liberalization of the judiciary, and for further increasing the role of the judiciary in reliably protecting the rights and legal interests of citizens and legal entities.

As stipulated in Article 44 of the Constitution of the Republic of Uzbekistan, every person is guaranteed the right to protect their rights and freedoms through the courts, to appeal to the courts against the illegal actions of state bodies, officials, and public associations [1].

Decree No. PF-4850 of the President of the Republic of Uzbekistan dated October 21, 2016 "On measures to further reform the judicial system and strengthen the guarantees of reliable protection of the rights and freedoms of citizens" qualitatively raises the state policy in this field to a new level and sets the main priorities determined.

Also, in the Strategy of Actions on the five priority directions of the development of the Republic of Uzbekistan in 2017-2021, it is recommended to expand the guarantees of reliable protection of the rights and freedoms of citizens, to increase the level of their access to justice, to increase the efficiency and quality of court proceedings, to further improve the system of selecting candidates and appointing them to judicial positions. strengthened as the most important directions of the reforms implemented in the field of law.

In particular, on February 21, 2017, the President of the Republic of Uzbekistan "Judicial system of the Republic of Uzbekistan Decree No. PF-4966 "On measures to radically improve the structure and increase the effectiveness of its activities" was adopted. This Decree is significant in that it is aimed at the gradual democratization of the judicial system and the strict observance of the constitutional principle of the independence of the judiciary, which reliably protects human rights and freedoms.

“In the process of establishing a new Uzbekistan, tasks aimed at "ensuring openness and transparency in the activities of judicial bodies, further increasing the confidence of citizens and

business entities in the judicial authority" [2] have been defined in our country. "Ensure that decision-making processes in all state bodies are open and only open" [3]. improvement of legal mechanisms for strengthening public control over the activities of state bodies is required. This is the development of effective legal mechanisms to increase citizens' trust in justice, in particular, the openness of the courts and the ability to conduct proceedings in court. In the judicial system of the countries of the world, special attention is paid to honesty, regulation of conflict of interests, ensuring the transparency of justice, as well as guaranteeing the real independence of courts in the implementation of justice by the state. Strengthening the guarantees of the rights of individuals to receive information about the activities of the courts, improving the organizational and legal mechanisms of the court's cooperation with the mass media, introducing modern information and communication technologies into the activities of the courts, adapting the national legislation to international standards on the transparency of justice and information transparency, legal documents and law finding a scientific solution to problems related to the practice of application is gaining relevance. The legal nature of transparency, the limits and guarantees of openness and transparency, as well as the development of organizational and legal bases of cooperation of the judicial authorities with mass media, create the need to research the prospects for the development of public control in the field" [4].

"It should also be noted that according to the analyzes of the world's leading international organizations, including the World Justice Project, today more than 1.5 billion people in the world do not have access to justice [5].

Ensuring the real independence of the judiciary in practice, making the judicial system transparent, and thus the WJP Rule of Law Index [6]. of the World Justice Project organization. One of the main goals of the new democratic society, the New Uzbekistan, is to improve the legal image of our country by further improving the position of the state in the direction of transparency of state agencies (Open Government).

In the Government Transparency Project, key laws and related information are publicly available, written in understandable language, and published in all languages spoken by that nation, as well as the quality and ease of access to information published by the government in print or online; based on criteria such as the timely publication of administrative regulations, draft laws and high court decisions.

For this reason, in his address to the Oliy Majlis of the Republic of Uzbekistan, the head of our country once again touched upon the activity of the courts: "The digitization of the judicial system will be further expanded, and an opportunity will be created for our citizens to apply online without having to come to the courthouse, and citizens will also be provided with remote monitoring of the process of reviewing their applications" [7], he noted" [8].

The 7 priority directions of the New Uzbekistan for 2022-2026, approved by the Decree of the President of the Republic of Uzbekistan dated January 28, 2022, PF-60. became the most important strategic document directly related to the future [9].

According to the 15th goal of the 2nd direction of this document, which is called to make the principles of justice and the rule of law the most basic and necessary condition of development in our country, one of the main priorities is to radically increase the level of access to justice for citizens and business entities by gradually digitizing the judicial system, eliminating bureaucratic confusion and obstacles. was defined as one [10].

"Undoubtedly, the fundamental changes implemented in the leadership of our state are an expression of practical work carried out in the interests of the people" [11].

"In this regard, every law and by-laws adopted by our country in the field of ensuring justice in our country is significant in that special attention is paid to legal relations in this area" [12].

"Any country renews its Constitutions in order to meet the modern needs of society, expand human rights, and consolidate guarantees for the implementation of various laws, and they regularly make changes to the constitutions and in some cases prepare completely new constitutions. One of the main goals of constitutional reforms is to promote, respect and protect human rights and fundamental freedoms. According to Socrates, freedom is the essence of democracy. It is as relevant today as it was 2,000 years ago. Also, a good Constitution can greatly contribute to the protection of these freedoms and create a basis for democratic governance." [13].

At the same time, the large-scale reforms implemented in the country create the need to further improve the mechanisms for ensuring human rights and freedoms, and to effectively implement international norms and standards in the field of human rights protection.

Human rights are a set of individual and collective rights defined in the constitutions of world states and international law [14].

"Currently, Uzbekistan has joined more than 80 international documents in the field of human rights, including 6 basic UN treaties and 4 optional protocols. National reports on their implementation are constantly submitted to the UN Human Rights Council and treaty committees.

A unique model of systematic and step-by-step implementation of international human rights standards into national legislation and law enforcement practice has been formed in Uzbekistan." [15].

At this point, if we pay attention to the substantive features of international documents, human rights are an invaluable value, and according to international legal treaties on human rights and international customary law, the following three comprehensive obligations are imposed on states: "to respect", "to protect" and "to practice". implementation". Although the balancing of these three obligations or duties arises from the nature of the rights in question, these obligations are in practice applies equally to all civil and political rights and economic, social and cultural rights. States are also responsible for ensuring that cases of human rights violations are dealt with at the national level.

At the same time, human rights are a whole field of international law regulated by all states, and the institution of human rights is one of the main principles of national law. The implementation of the basic principles of human rights determines the legal assessment of each state. Based on this, the role of human rights in the national legal system is very important. As a clear example of this, we can cite Article 18 of the Constitution of the Republic of Uzbekistan:

"In the Republic of Uzbekistan, all citizens have the same rights and freedoms and are equal before the law, regardless of gender, race, nationality, language, religion, social origin, belief, personality and social status" or we can also quote Article 19 "Republic of Uzbekistan citizens and the state are interrelated with their rights and duties towards each other. The rights and freedoms of citizens, enshrined in the Constitution and laws, are inviolable, and no one has the right to deprive them or limit them without a court decision" [16].

All this can show how important human rights have become and are becoming for Uzbekistan. "As one of the largest mechanisms of human rights in international law, we certainly think that we should mention the international documents called the Bill Complex for the Protection of Human Rights. These are: the Universal Declaration of Human Rights adopted on December 10, 1948, the 1966 Covenant on Human Rights, Civil and Political Rights, and the 1966 Covenants on Human, Economic, Social and Cultural Rights and their Protocols.

Covenants and Protocols attached to them. In addition, the UN Charter also contains provisions on human rights and fundamental freedoms. Generally speaking, in international law, we can say that human rights are a set of principles and norms that determine the legal status of a person in any modern society" [17].

It should be noted that today "in the process of large-scale reforms in our country, the weight of legislative documents is increasing. In the last five years, more than 300 laws, 535 decrees and 1446 decisions of the President, 3102 decisions of the Cabinet of Ministers were adopted. It is no secret that a certain part of them is not executed within the specified time limits or is not executed properly" [18].

"The main issue is to convey the essence of the laws to our people and the responsible executives on time, to properly organize their execution, and to ensure strict adherence to the requirements of the law. ...in order to ensure the rule of law, it is important to raise the legal culture and educate citizens in the spirit of respect for the law.

In order to ensure human interests, first of all, it is necessary to communicate with people, people, to know well their pains, worries, dreams, life problems and needs" [19].

"Constitutional-legal culture is an important component of the general legal culture of the society, it appears as its special form. The legal culture of the society is manifested in the direct relationship between the laws in force in it, especially the Constitution.

The head of our state paid special attention to the topic of legal culture and approved the "Concept of raising legal culture in society" with his decree dated January 9, 2019. Constitutional culture is not a simple sum of knowledge about compliance with the Constitution, constitutional values, human rights and freedoms, but a reaction to this knowledge. That is, have they become a regulator of life and activity or not?

It is possible to talk about the existence of a constitutional culture only when a positive attitude to this knowledge and spiritual wealth is formed. After all, this culture plays a creative and regulatory role in the life of a person and society. Its basis is a highly developed constitutional and legal consciousness. At the same time, certain constitutional thinking and worldview should be established in society members, state bodies, officials and civil society structures [29].

The formation of a positive constitutional culture in our country can be seen, on the one hand, in the activities of the bodies, officials, and social structures that apply the norms of our Basic Law, on the other hand, in the protection mechanisms of the Constitution and laws, and in the executive discipline of the authorities and individuals" [20].

In this matter, as noted, in order to form a positive constitutional legal culture in our country, in the period of new development of our country, it is proposed to adopt a constitutional draft law, to add more than 200 amendments and additions to 64 articles of our Constitution, and to add 6 new articles containing 16 norms [21]. These proposed norms serve to burden the constitutional legal culture of our people.

Also, "one of the problems of the organization of the judicial system and the functioning of the courts is the implementation of the principle of transparency, which has an important place in the system of state and legal values of the present time. The concept of transparency or transparency, openness usually covers all institutional and dynamic manifestations of a modern state body, including the court: from the establishment and establishment of the order of formation to the grounds and order of termination of activity, from the publication of the texts of laws to the publication of case law materials on their application, from the biographies of judges to disciplinary bodies to activity reports, etc" [22].

In the study of foreign practices and experiences, in particular, "The principles of operation of the Finnish judicial system are enshrined in the Finnish Constitution, as well as in a number of laws regulating court cases. The Finnish Constitution (Section 21) guarantees everyone the right to a fair and prompt hearing by a court or other public authority. The law "On compensation for the excessive length of the trial" provides compensation for the participants of the trial at the expense of state funds in case the trial is prolonged" [23].

At the same time, there is a Code of Judicial Procedure in Finland, according to which "the procedure for expanding the powers of judges is part of the system of judicial independence. A judge must be impartial. If there are grounds to reject the judge, he cannot consider the case and make a decision about it. In order to ensure the impartiality of the courts, the judge must review the case and make an impartial and free decision without any undue influence or outside interference in the implementation of law enforcement activities" [24].

Based on this, effective mechanisms for ensuring the transparency of courts have been included in our national legislation, and it is appropriate to strengthen the rules for further increasing the impartiality of judges in a separate Judicial Procedure Code. In the words of our head of state, "...unless the judicial system is independent, there will be no development in our society." Every person whose case comes to the court office should be sure that law and justice are the priority in this court [30].

In new Uzbekistan, a just solution to any controversial issue should be found only by a court of justice. Any interference in the work of judges will be severely punished, all necessary conditions will be created for their undisturbed work. no matter how hard We will certainly continue our reforms in the judicial system" [25].

In general, the constitutional reforms are a solid legal basis and a reliable guarantee for the long-term development strategies of our country, the prosperous life of our country and people in the future. creation of effective mechanisms of implementation, at the same time, will serve to further increase the development of the country, to strengthen its economic power and competitiveness in the world.

In conclusion, it should be noted that in the process of building a new Uzbekistan, one of the main goals and the most important strategic tasks of the large-scale and consistent judicial reforms implemented in our country is justice in society, the rule of law, in order to realize the idea of honoring human dignity, which is set as the highest value in our renewed constitution. , ensuring openness and transparency in the activities of judicial bodies,"...speedy implementation of the policy of digitization of the judicial system, thereby easing the burden of the population, eliminating unnecessary hassles and reducing bureaucracy and corruption" [26], "...adjusting the national legislation to international standards on the transparency of justice and information" [27, 5], is to fully strengthen the protection of human rights and freedoms.

Our new constitution, which is discussed and supported by our people. It is a solid legal basis and a reliable guarantee for the future prosperous life of our country and people, and serves as a reliable basis for firmly strengthening the confidence of our people in the judiciary [28]. After all, it is one of our sacred duties that the people of Uzbekistan understand the new norms and rules proposed to be included in the Constitution, take them to heart, and give them an impartial and truthful attitude.

References:

1. Ўзбекистон Республикаси Конституцияси. -Т.: "Adolat", 2021.
2. Ўзбекистон Республикаси Президентининг 2020 йил 24 июлдаги "Судлар фаолиятини янада такомиллаштириш ва одил судлов самарадорлигини оширишга доир қўшимча чора-тадбирлар ўғрисида" ПФ-6034-сон Фармони // Қонун ҳужжатлари маълумотлари миллий базаси, 24.07.2020 й., 6/20/6034/1103-сон; 21.01.2021 й., 06/21/6143/0052-сон.
3. Ўзбекистон Республикаси Президентининг 2020 йил 29 декабрдаги Олий Мажлисга Мурожаатномаси // "Халқ сўзи" газ. 2020 й. 30 дек. сони.
4. Сабилов Эркинжон Кучкарбаевич. Судлар фаолияти очиклигини таъминлашнинг ташкилий-ҳуқуқий асослари. Юридик фанлар бўйича фалсафа доктори (PhD) диссертацияси автореферати. Тошкент шаҳри – 2021. 5-6
5. <https://worldjusticeproject.org/our-work/research-and-data/global-insights-access-justice-2019>
6. <https://worldjusticeproject.org/rule-of-law-index/>

7. Ўзбекистон Республикаси Президенти Шавкат Мирзиёевнинг Олий Мажлисга Мурожаатномаси. 29-декабрь 2020-йил.
8. Kabulov, X. (2022). Ensuring justice and freedom of information in the activities of the courts is the most important strategic task for the development of New Uzbekistan. Science and Education in Karakalpakstan. 1/2 (23), 240-244.
9. Ўзбекистон Республикаси Президентининг 2022 йил 28 январдаги ПФ-60-сон Фармони “2022 - 2026-йилларга мўлжалланган Янги Ўзбекистоннинг тараққиёт стратегияси тўғрисида” // Қонунчилик маълумотлари миллий базаси, 29.01.2022 й., 06/22/60/0082-сон. (<https://lex.uz/uz/docs/-5841063>)
10. Ўзбекистон Республикаси Президентининг 2022 йил 28 январдаги ПФ-60-сон Фармонида 1-илова 2022-2026-йилларга мўлжалланган Янги Ўзбекистоннинг Тараққиёт стратегияси Дастури. (<https://lex.uz/uz/docs/-5841063>)
11. Kabulov, X. (2022). Ensuring justice and freedom of information in the activities of the courts is the most important strategic task for the development of New Uzbekistan. Science and Education in Karakalpakstan. 1/2 (23), 240-244.
12. Кабулов, Х. (2022). Суд хокимиятининг хакикий мустақиллигини таъминлаш ва одил судловга эришишда янги замонавий технологияларнинг роли ва аҳамияти. Ренессанс в парадигме новаций образования и технологий в XXI веке, (1), 245–248. <https://doi.org/10.47689/innovations-in-edu-vol-iss1-pp245-248>
13. https://www.ohchr.org/sites/default/files/Documents/Publications/ConstitutionMaking_RU.pdf
14. Инсон ҳуқуқлари [Матн]: Парламент аъзолари учун қўлланма. -Тошкент: Baktria press, 2019. - 23-б.
15. <https://uza.uz/posts/211979>
16. Ўзбекистон Республикасининг Конституцияси. <http://lex.uz//docs/20596>
17. <https://adolatmarkazi.uz/uzs/news/news/inson-hukuklari-eshonhujaev-makola>
18. Конституциявий маданият ва ижро интизоми // “Янги Ўзбекистон” ижтимоий-сиёсий газета, № 246 (502), 2021 йил 7 декабрь, 4-бет.
19. Шавкат Мирзиёевнинг Ўзбекистон Республикаси Конституцияси қабул қилинганининг 24 йиллигига бағишланган маросимдаги маърузаси. <https://www.gazeta.uz/uz/2016/12/07/speech/>
20. Янги Ўзбекистон № 246 (502), 2021 йил 7 декабрь, 4-б.
21. https://uza.uz/uz/posts/konstituciaviy-islohotlar-davom-etmoqda_387860
22. Е.Б. Абросимова (2009). Судебная власть: транспарентность или конфиденциальность?. Права человека: законодательство и судебная практика, (2009), 176-189.
23. Ситникова, И. И. (2012). Судебная система Финляндии. Электронное приложение к Российскому юридическому журналу, (5), 31-35.
24. Ситникова, И. И. (2012). Судебная система Финляндии. Электронное приложение к Российскому юридическому журналу, (5), 31-35.
25. <https://president.uz/uz/lists/view/5484>.
26. Кабулов, Х. (2022). Суд хокимиятининг хакикий мустақиллигини таъминлаш ва одил судловга эришишда янги замонавий технологияларнинг роли ва аҳамияти. Ренессанс в парадигме новаций образования и технологий в XXI веке, (1), 245–248. <https://doi.org/10.47689/innovations-in-edu-vol-iss1-pp245-248>
27. Сабиров Эркинжон Кучкарбаевич. Судлар фаолияти очиклигини таъминлашнинг ташкилий-ҳуқуқий асослари. Юридик фанлар бўйича фалсафа доктори (PhD) диссертацияси автореферати. Тошкент шаҳри – 2021. 5-б.
28. Kabulov, Kh.A. (2022). PROSPECTS OF EFFECTIVE PROTECTION AND PROVISION OF CONSTITUTIONAL RIGHTS AND FREEDOMS OF CITIZENS DURING THE NEW DEVELOPMENT OF UZBEKISTAN. Science and Education in Karakalpakstan, 3/1, 191-198.
29. Кабулов, Х.А. (2021). ҲУҚУҚИЙ ОНГ, БИЛИМ ВА ЮКСАК ҲУҚУҚИЙ МАДАНИЯТ ЖАМИЯТДА ҚОНУН УСТУВОРЛИГИНИ ТАЪМИНЛАШНИНГ КАФОЛАТИДИР. Вестник КГУ им. Бердаха, 4(53), 142-146.
30. Кабулов, Х.А. (2011). Ўзбекистонда фуқаролик жамиятини шакллантиришда суд хокимиятининг роли ва аҳамияти. Демократлаштириш ва инсон ҳуқуқлари, 1, 18-20.

Rezyume: Maqolada Yangi O'zbekistonni har tomonlama taraqqiy ettirish davrida islohotlarning dolzarb bo'g'ini bo'lgan sud hokimiyatining chinakam mustaqilligini, fuqarolar huquq va erkinliklarining ishonchli himoyasini ta'minlash, aholining odil sudlovga bo'lgan ishonchini oshirish va bu boradagi ishlarning o'ziga xos xususiyatlari hamda istiqbolllari ilmiy jihatdan tahlil qilingan. Sud-huquq sohasidagi islohotlar, raqamlashtirish yo'lida olib borilayotgan sa'y-harakatlar hamda soha bo'yicha xalqaro ijobiy tajriba uslublari atroflicha o'rganilib, sud

tizimini isloh qilishning ilg'or zamonaviy mexanizmining ijobiy va afzal tomonlarini milliy tizimga tadbiq etilishi yuzasidan fikr yuritilib, nazariy hamda amaliy ahamiyatga ega bo'lgan taklif va tavsiyalar bayon etilgan.

Резюме: В статье научно проанализированы специфические особенности и перспективы работы по обеспечению подлинной независимости судебной власти, надежной защиты прав и свобод граждан, повышения доверия населения к системе правосудия в период всестороннего развития Нового Узбекистана.

Всесторонне изучены реформы в судебно-правовой сфере, усилия по цифровизации и методы международного позитивного опыта в этой сфере, высказаны мнения по внедрению в национальную систему положительных сторон и преимуществ передового современного механизма реформирования судебной системы, изложены предложения и рекомендации, имеющие как теоретическое, так и практическое значение.

Kalit so'zlar: tarakkiyot strategiyasi, raqamli texnologiya, sud tizimi, huquqiy soha, raqamlashtirish, integratsiya, interaktiv elektron xizmatlar, sudga elektron murojaat qilish, hurmat qilish», «himoya qilish», «amalda tatbiq etish».

Ключевые слова: стратегия развития, цифровые технологии, судебная система, правовая сфера, цифровизация, интеграция, интерактивные электронные услуги, электронное обращение в суд, «уважать», «защищать», «применять на практике».

**WRITER'S SKILL TO RECYCLE THE WORK AND YOUR OWN STYLE
(ON THE EXAMPLE OF KARAKALPAK LITERATURE)**

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Summary: *This article widely analyzes the issue of writer's processing of the text of a work of art, as well as on the example of the works of K. Smamutov. When republishing one work of art, changes were made due to the life experience of the author. Based on this, the critical view of the writer was studied. It is highlighted that some writers published the work without changes in the reprint. At the same time, it was revealed that changes in the writer's laboratory also played an important role in the composition of the work of art.*

Key words: *writer, literary text, individuality, variant, composition.*

Introduction

In each of the writer's works, his unique character and individuality stand out. "Individual style is a prominent feature of the work of a real talent with a unique aesthetic sense and taste"[1; 617]. So, style is a process that reveals and illuminates the talent of each writer.

The main part

A writer's style is formed during the writing of each work. Kenes Smamutov (1939-2019) is a writer who wrote few but significant works of art in Karakalpak literature.

The famous writer Tulepbergen Kaiypbergenov said about him: "The story of his first voluminous work "Perzent" [The child] was published in 1966. "The year of birth of a writer should be determined not by the date of his birth, but by the year of publication of his first significant work. The story "Perzent" marks the birth of a new writer in our literature, - said academician Marat Nurmukhammedov, - Kenes Smamutov will become one of the most skillful writers in the future. Ibraim Yusupov, a famous poet of our people, says: "Reading his works is like reading a song"[2].

Among them, researcher P. Nurzhanov expresses his thoughts on the writer's work "Perzent" from a literary-critical point of view. No wonder such qualities are given to the writer. The reason is that K. Smamutov became famous in the Karakalpak literature for his meaningful works of art. In later years, he wrote the stories "The rich also cried", "Father of a stupid child", "Drops sparkling like morning dew", "The Lark", "Boy", "One word", novels. such as "I want to tell you ..." and the novel-essay have artistic and genre originality.

In particular, the writer skillfully used the possibilities of the short story genre to reflect real events taking place in society, and was able to reliably reveal the character of the hero.

The originality of the prose works of K. Smamutov is visible in the simplicity of his language. The author's works are based on such important topics as the modern way of life of people, everyday life, livelihood, mutual participation, family issues, and the upbringing of children.

In the writer's stories, such as "Remnants of old age", "Mother-in-law-atheist", "Lefty", "Uninvited guest", "Mother-in-law-drug", individuals who distort politics, social order and religion are sharply criticized.

The theme of the Motherland is expressed in a new way in the writer's story "The Lark". About this, Professor K. Jarimbetov said: "After the years of independence, time and society were renewed, people's understanding of the Motherland was also renewed. Therefore, hymns, songs, myths about the Motherland must be sung anew. Unfortunately, in many works of art, the glorification of the Motherland seems to be ignored. Most of the songs about the Motherland are filled with noisy meaningless words that have no effect. If I say that people get tired of such "duty" words and they stop talking about the Motherland, then perhaps I am telling the truth. However, when I recently read a story by the writer Kenes Smamutov, written on this topic, "The Lark", he made a different impression on me. For the first time this work of art was presented in the form of a

story in the magazine "Amu Darya" (issue 200) under the title "The soil of the native land". The author reproduced this work and published it as an elegy in the newspaper "Erkin Karakalpakstan" [Free Karakalpakstan] (January 16, 2018) under the title "The Lark". The literary critic Professor K. Jarimbetov wrote about the genre of this work in the article "Aymurat, a lark and a saxavul (plant) or a word about the homeland":

"However, elegy refers to works of art that evoke sad, melancholy, and melancholy feelings. Such feelings can be conveyed both by song and black words," he said, calling the work "an elegiac story". But, in our opinion, the name of this work "novell" [short story] corresponds to the characteristics of the genre. The reason is that today in Russian and Uzbek literary criticism the features of this genre are clearly shown from the scientific side [3].

K. Smamutov called "The Lark" a story in the book "I want to tell you ...". Calling such a work sometimes a short story, sometimes an elegy or a story indicates the existence of a differentiation of genres. The author made changes to the composition of the work, repeatedly replacing the original term "Soil of the native land" with "The Lark". In general, in "The Lark" we see that the sequence of events has been changed and some of the author's descriptions have been shortened. When republishing a short story [novell], the author's critical view of his work shows individuality.

The work can be reprinted in this way. However, if the author re-learns life over time, gains experience and approaches his work in a different way, the writer will definitely achieve mastery. When we compare the two options, we can see many differences in the composition of the work of art and the narration of the events. In the magazine version, the story of the scientists who came to the village to fill the Aral Sea is told in the first sections of the plot, while in the book version this episode is described after the death of Aymurat's sister Rayhon. Of course, the author's change of time and space in the novel seems to provide a logical connection.

The reason is that it can be seen that the series of events that have taken place, such as Aymurat reciting a poem at a large meeting, teacher Kudayar paying attention to her and speaking out against her father Aljan, are given in succession. In addition, we can witness that during the processing of the novella, the author removed unnecessary narrations in some places and added new episodes in some places in order to increase the drama. For example, in the magazine option:

"Aymurat walks around the village. Reeds stuck to the bottom of the lake due to lack of water... Herbaceous licorice swaying in the wind, thorns, bushes... Keep your heads down as if in mourning. The bright face of the sun was covered with a dirty cloth. Hang in the sky to the chirping of a little lark. He looked like a lost ambassador of livelihood.

Yesterday Aymurat read Maktimkuli's poem "Rain is oil, my sultan". A grassy wind of scorching heat blew from every row.

The poet calls to Allah. Rich people don't want wealth. The deserts are asked to send rain to the bled land. "O God, look upon us!" Spread your blessed light on the earth?! Make the world happy, let your dream come true. You are the dream of the sick ..." [4].

Book option: "Aymurat walks around the village. The reeds stuck to the bottom of the lakes that were bleeding from lack of water... grass swaying in the wind ... the sun whose bright face is sulphurous as if covered with dirty cloth ... the lark chirps and hangs in the sky ..." [5; 278].

Comparing the two versions of the short story, we see that the author revised his work and took into account the age of Aymurat. The reason is that the search for a great philosophical meaning in the poetic lines of Maktumkuli, presented in the magazine version, does not correspond to the range of thinking of a small child. In addition, in order to expand the scope of Aymurat and events in the book version, the author added new lines to the short stories.

For example, the following lines do not appear in the log option.

"They cannot say, 'We will soon turn the sea into muddy water,' like the elders of the past". He says more "in the future". They don't have a fixed opinion. Instead, he will tell the world a large number of quotations from the works of famous scientists. Almost all of them live and work in cities such as London, New York, Paris, Beijing..." (5; 279-280).

By adding such lines to a work of art, the author brought to the fore the actual problem of today - the problem of the Aral Sea. Including in the story, the writer's philosophical ideas about the Motherland, motherland, parents played a big role in the deep disclosure of the inner world and the psychological state of Aymurat. For example, the following lines from a piece of fiction are sure to set anyone's tongue tingling:

“ - A child cannot choose his mother from among many. Mother is given by Allah. Mother, fallen in the eyes of the Virgin! Oh, Karakalpakstan! You are my mother, sent by Allah, the creator of life on earth!” (Page 280). Including "Oh, lark! Do you want to shake the deaf ears and open the white eyes?! Let him tweet, my lark! Will God hear your voice if no one hears it?!" (5; 280).

Therefore, the symbolic description of the feeling of love for the Motherland through the lark and saksavul (shrub) reminds us of the poems of the famous poet I. Yusupov "The Lark" and "Saksavul".

In the story of K. Smamutov "Boy" there is also an ideological and thematic artistic feature. The artwork was first featured in the paper under the term "...Yellow Waiting". There is no significant difference in the composition of the text of the two works of art. But in some places there are fillings due to the experience of the author. This situation does not affect the content of the artistic work. In this novella, the author uses the actions of the heroes of the work of art, without dry narrations and words of praise.

Polat lost his parents and was raised by his grandmother. From the following lines of the novella, we understand Polat's inner experiences. "For the first time, I looked clearly at Polat's face. Her beautiful face without a smile shone like a flower. But under his round eyes was a shadow of infinite sadness.

As long as Polat is ready to praise, all you have to do is praise him and he will be happy. This behavior is typical for children who rarely hear a warm word from a loved one. "My grandmother praised me a lot," he says, "but not enough to be praised by a person like her, huh?!"[5].

In the novel, she is vividly embodied in the image of Polat, who lives in agony as a living orphan without parents, but misses his parents, who do not know that he is still an orphan, and waits on the roads with four eyes and turns. yellow every day. In it, he writes about some young brides and mothers who left for Kazakhstan in search of work, went into business and trade and forgot their family, child, life partner. The reality of the period is given through monologues, actions, internal dialogues.

- By the way, why doesn't he know? - I said.

- They can't come and get a message my dear.

- Why?

- It has been eight years since his mother died while working at Athirawa (Kazakhstan). They did not receive a message from their son. I distinctly felt that the ground under my feet was slipping away.

Here's how to craft dialogues. These do not need further clarification. All clear. You will be infinitely grateful to your grandmother, who brings up Polat without burdening him with the name of an orphan. But your anger boils over the wife who left her baby at ten months old. The achievement of a writer is determined by his ability to evoke such feelings in the heart of the reader [10].

Conclusion

In a word, in the artistic approach to life material and its evaluation, in the construction of the plot, in the selection of characters, in the artistic reflection of their images, each author's own atmosphere and style of narration are clearly visible. In short stories by K. Smamutov, life processes are depicted through a sharp plot with poetic skill.

References:

1. *Uzbekskaya sovetskaya entsiklopediya [Uzbek Soviet Encyclopedia]. – Tashkent. 1978. 2 tom.*
2. *Smamutov K. Sizlerge aytip ketejaqpan... [I'm going to tell you ...] // Amudarya. 2011. – №2.*

3. Barkina A. V. *Janr novelli v russkoy literature pervoy trety XIX veka* [Genre of the short story in Russian literature of the first third of the 19th century] // Avtoref. dis. kand. filol. nauk. – Moskva. 2007; Toshpo'latov A. *O'zbek adabiyotida novella janri va uning badiiyati* (A.Qahhor, Sh.Xolmirzaev, N.Eshonqul ijodi misolida) [The novella genre and its art in Uzbek literature (as an example of works of A. Qahhor, Sh. Xolmirzaev, N. Eshonqul)] // Doctor of Philosophy (PhD) dissertation abstract in philological sciences. – Samarkand. 2018.

4. Smamutov K. *Tuwilg'an jerdin' topirag'i* [Soil of the native land] // *Amudarya*. – Nukus. 2002. – №5.

5. Smamutov K. *Poshsha torg'ay* [The Lark] // *Sizlerge aytip ketejaqqan...* [I'm going to tell you ...] – Nukus. Bilim. 2017.

6. Baxtin M. *Voprosy literatury i estetiki*. – Moskva. Xudojestvennaya literatura. 1975.

7. Kamalova D. E. Theoretical and practical study of the genre of novella in Karakalpak literature. *ISJ Theoretical & Applied Science*, 03 (83), 2020. – P. 269-273. Soi: <http://s-o-i.org/1.1/TAS-03-83-51> Doi: <https://dx.doi.org/10.15863/TAS.2020.03.83.51>

8. Kamalova D. E. Rol xudojestvennoy detali v kompozitsii proizvedeniya (Na primere karakalpakskoy literatury) // *Donetskie chteniya 2022: obrazovanie, nauka, innovatsii, kultura i vizovi sovremennosti: Materialy VII Mejdunarodnoy nauchnoy konferentsii*. Donetsk: Izd-vo DonNU, 2022. – P. 194-197. http://science.donnu.ru/wp-content/uploads/2022/10/dch_2022-tom-4-filologicheskie-nauki-chast-2.pdf

9. Marziyayev J. K. K voprosu o spetsifike xudojestvenno-publitsisticheskix janrov (na primere pechati Karakalpakstana) // *Aktualnye problemi jurnalistiki: Sbornik trudov molodix uchenix. Vip. 10 / Red.-sost. A.Yu. Tishetskaya, P.P. Kaminskiy*. – Tomsk: Izdatelstvo NTL. 2015. – S. 102-104. https://www.newsman.tsu.ru/wp-content/uploads/2015/05/SBORNIK_2015_web.pdf

10. Kamalova D. E. *Qoraqalpoq novellalarining badiiy xususiyatlari* [Artistic peculiarities of Karakalpak novels] // *journal.fledu.uz*. – Tashkent. 2018. <https://journal.fledu.uz/uz/%D2%9Bora%D2%9Balpo%D2%9B-novellalarining-badiiy-hususiyatlari/>

Rezyume: Ushbu maqolada yozuvchining badiiy asar matni ustida ishlov berish masalasi, shuningdek, K.Smamutov asarlari misolida keng tahlil etilgan. Bitta badiiy asarni takroriy nashrgan chiqarish davomida muallif hayotiy tajriba to'plashi natijasida unga o'zgartirishlar kiritish holati kuzatilgan. Shundan kelip chiqib yozuvchining tanqidiy qarashi o'rganilgan. Ba'zi yozuvchilar tomonidan asarni qayta nashr etishda o'zgarishlarsiz chop etilgani yoritilgan. Shuning bilan birga, yozuvchi laboratoriyasidagi o'zgarishlar badiiy asar kompozitsiyasida ham muhim o'rin egallagani ochib berilgan.

Резюме: В данной статье широко анализируется вопрос писательской обработки текста художественного произведения, а также на примере произведений К. Смамутова. При переиздании одного художественного произведения внесены изменения, обусловленные жизненным опытом автора. Исходя из этого, был изучен критический взгляд писателя. Освещается, что некоторые писатели опубликовали произведение без изменений в переиздании. В то же время выявлено, что изменения в лаборатории писателя также сыграли важную роль в композиции художественного произведения.

Kalit so'zlar: yozuvchi, badiiy matn, individual xususiyat, variant, kompozitsiya.

Ключевые слова: писатель, художественный текст, индивидуальность, вариант, композиция.

THE CONCEPT AND ESSENCE OF THE INSTITUTION OF A PLEA AGREEMENT

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Summary: *The article analyzes the concept and essence of the institution of a plea agreement, the features of the application of this institution, explores the main provisions of the law regarding a plea agreement, important aspects of the procedure for a plea agreement, the advantages and disadvantages of this institution. The role of the court in concluding a plea agreement, the differences between such concepts as “plea agreement”, “cooperation agreement” and “abbreviated forms of litigation”, as well as their essence are highlighted. In addition, the views of scientists on the purpose and main functions of the institution of admission of guilt are studied, the author's conclusions and conclusions are presented.*

Key words: *guilt, admission of guilt, plea agreement, evidence, assistance in solving a crime, benefits in criminal proceedings, extenuating circumstances of the situation.*

INTRODUCTION.

At any stage of human development, society has been repelled from any actions that are contrary to the rules of conduct, and this can be seen in the ideas, religions, and laws that are in force in each period based on the scientific foundations of the past. In the Islamic religion, which has formed the core of moral values of our people for centuries, it is encouraged to turn back from bad deeds and repent from the heart of those who have committed such deeds, so many people understand that asking for forgiveness for a wrong action is the core of good behavior.

Since the confession of a person who has committed a crime or other illegal act facilitates the process of exposing crimes and increases the possibility of achieving the goals of considering this issue, it is evaluated as a positive event for the party affected by the crime, for the bodies fighting against crime, and even for the person who gave the confession. otherwise it is considered as a mitigating circumstance in liability.

The origin and history of the institution of plea bargaining and mutual reconciliation goes back to social relations aimed at peaceful, mutual resolution of criminal disputes between related clans. In ancient times, disputes between related clans and tribes were resolved not only by peaceful agreement, but also by bloodshed. The intervention of the state in solving these cases led to a decrease in violent revenge and revenge.

The institution of the plea agreement has a long history in US law, originating in the early 19th century in the US and being used in practice for over 150 years. According to data, about 90-95% of criminal cases in the US each year end with a plea agreement. Although this institution is rarely used in English law compared to the USA, it is always given special attention by English courts.[1]

As a symbol of justice, the decision issued by the court on behalf of the state was accepted by the people of the whole world.[2] By the middle of the 20th century, as a result of the development of society and the state, victimology emerged, and this field of science began to study the rights and legal interests of the victim. Victimology has advanced the theory of compensation for the harm caused to the victim and it has been adopted internationally by many countries. The concept of justice began to be approached differently, according to which the victim should receive compensation from the criminal before the court or during the trial, if this is not possible, the victim receives compensation from the state. Taking into account and directly satisfying all the demands of the victim was accepted as an absolute way to restore violated human rights.[3]

According to historians, various relations between ancient Greek and Roman merchants were regulated by intermediaries.[4] In the ancient Roman law, i.e., in Justinian laws, mediators who resolve disputes were called differently, among them we can include internuncius, medium, intercessor, philanthropus, interpolator, conciliator and finally mediator. Some ancient tribes settled

their disputes by the decision of tribal elders or chiefs. In the criminal process, the institution of confession of guilt appeared in a modern procedural form in the second half of the 20th century, and as a result of scientific research by scientists, an attempt was made to reflect its basis and content in the criminal procedural legislation.

This is probably why, in the sources of the theory of evidence, there are opinions that the confession of the accused is considered the best evidence, the "proof of evidence".[5] Confession of guilt has a positive effect on the effectiveness of proving the crime in situations where there are no witnesses. However, in history, evidence in the form of a guilty plea has been overvalued, considered as a necessary condition for issuing a guilty verdict, and in order to achieve this, false confessions have been obtained.[6]

For example, in the thirties and fifties of the last century, illegal methods were used to obtain the confession of the accused in the investigation of criminal cases for the repression of intellectuals in our country. Perhaps there was no "reliable" evidence other than a confession, or perhaps it was considered unconventional at the time to convict a person without pleading guilty.

However, the history of reconciliation, confession of guilt, and reparations, which took place in the 15th century from the 7th century to the 20s of the 20th century, that is, until 1920, is closely related to Islamic laws and Sharia rules. Because, during this period, the traditional legal and spiritual norms of many peoples have been inextricably linked with the Islamic religion and its legal system Sharia rules for centuries.

The social legal, public-household and even personal life of millions of people has developed under the influence of Islam and its law. At the same time, Islamic laws have created a solid basis for reconciliation in resolving disputes caused by violations of the parties' rights, forgiveness in mitigating the punishments for committed crimes and sins, and mediating principles based on tolerance in state affairs.

Under the influence of the gradual development of the Islamic religion in Central Asia, the beliefs of Islam are closely connected with the traditions and customs of the local people. Different types of mutual disputes are resolved on the basis of the same principles related to each other. In other words, Islam is a strong system that has been influencing the spiritual and cultural development, strengthening of statehood, and the development of the thinking of the vast masses living on our planet.

The historical method of reconciliation, which has been used in various names and terms in an unconventional manner in Uzbekistan, is inextricably linked with the rules of ethics, customs and, in general, the laws of the Islamic religion. Because, the well-known Oriental scholar, A. Masse, states that in Islamic law, customs and customs issues are common with legal norms.[7] The method of applying, comparing, comparing, comparing and observing the Islamic laws according to their similarity in resolving disputes was one of the methods widely used by Abu Hanifa (RA). Abu Hanifa (r.a.) was a supporter of "unanimous opinion of all parties on a specific issue, that is, unity, alliance, agreement, determination, agreement of the parties on a definite opinion on the issue to be discussed", that is, he used mediation in today's language.[8]

Abu Hanifa emphasized the need to use the Arabic word for *ijtihad*, that is, zeal, aspiration, all knowledge and patience in bringing the parties to a decision. Because this standard is one of the main pillars of Islam at that time and now. In the "Hidaya" of the great scholar Burhoniddin Marginani, there are long-standing rules about the relationship between the victim and the accused.[9]

Our great grandfather, Amir Temur, in his decrees stated that, despite differences in views with some countries, he exchanged letters and sent ambassadors on the basis of a peace-loving policy. In the history of world statehood and law, the Babur kingdom, which ruled for more than three centuries in the territory of present-day Afghanistan and India, put an end to the conflicts between different religions - Muslims, Hindus, Jains and other religious sects on this land, and in order to bring them closer together, based on Islamic laws - Tawheed Ilahi, that is, reconciliation. introduced the method.

This method has left an indelible mark in the history of world law as it was able to find a solution to the extremely difficult task of uniting, compacting and reconciling nations with different levels of development, political, legal, and religious views into a single state.

During the 70-year period from 1920 to 1990, after the establishment of Soviet power, all laws and decisions adopted were primarily designed to serve the interests of socialist property and the state.

It covers the period from 1991 to the present. It should be noted that the liberalization policy being carried out to strengthen our independence is of great social importance and has a positive effect on the formation of a democratic legal state and a humane civil society in our country.[10]

Strengthens the atmosphere of mutual trust, harmony, justice, humanity and respect for the law in the society. At the moment, it is gaining a positive meaning in the fate of thousands of people, allowing them to morally recover without being separated from society and family. This effective legal institution, which encourages guilty pleas, goes a long way toward speeding up and simplifying the process by eliminating excessive investigative effort and associated costs. This institution, which fully corresponds to the principles of humanity and justice in a legal democratic state and civil society, is also reflected in our national values. Since the person who committed the crime paid compensation to the victim, the injured party had the right to forgive him and demand the release of the guilty from punishment.

Democratic reforms in Uzbekistan are deepening year by year and gaining deep meaning. The fact that the democratic values of our people, such as tolerance and forgiveness, are expressed in our laws with the honor of independence, only makes our citizens to be good.

The introduction of the world experience of summary trial of criminal cases into the national procedural legislation is one of the modern mechanisms for the effective protection of the rights and freedoms of citizens.

In recent years, a number of laws have been adopted in our country aimed at reliably protecting the rights and freedoms of a person, respecting his honor and dignity, further expanding the application of the principle of dispute between the parties at all stages of court proceedings, and introducing international standards and advanced foreign experience in this field.[11]

According to the Decree No. PD-6041 of the President of the Republic of Uzbekistan of August 10, 2020 "On measures to further strengthen the guarantees of the protection of the rights and freedoms of the individual in judicial and investigative activities", the General Prosecutor's Office of the Republic of Uzbekistan, the Ministry of Internal Affairs, the State Security Service, the Ministry of Justice and Human based on the proposal of the National Center for Human Rights, the criminal procedure legislation was tasked with introducing the institution of plea bargaining.

In this regard, improving the activity of investigating criminal cases in our country taking into account international standards and advanced foreign experience, realizing the principles of the rule of law and the inevitability of responsibility, further improving the criminal procedural legislation, adding the "Plea Agreement" to the Criminal Procedural Code of the Republic of Uzbekistan In our view, the introduction of norms is of great importance in ensuring human rights and freedoms in the period of judicial reforms.

The concept of a plea agreement is a completely new institution in the criminal procedural legislation, based on the adoption of the Law of the Republic of Uzbekistan dated February 21, 2021 "On Amendments and Additions to the Criminal and Criminal Procedure Codes of the Republic of Uzbekistan" It is related to having a new chapter 621 called "agreement".

With this law, the implementation of foreign experience in the simplified procedure of criminal cases into the national legislation is undoubtedly one of the modern requirements for the effective protection of individual rights and freedoms. The use of this institution will first of all put an end to the excessive distractions of citizens, and then, in the next step, it will reduce the volume of work of the inquiry and preliminary investigation bodies, as a result, it will improve the quality of the cases being investigated in the general order, and it will open the door to the increase of work efficiency.

However, the analysis of judicial investigation practice shows that there are a number of problems in ensuring the rights and freedoms of the participants in criminal proceedings. As one of such problems, it should be noted that there are no clear guidelines and judicial recommendations on the practical application of the plea agreement institution.

This, in turn, requires the implementation of a number of scientific studies on the improvement of this institution. It should be said that to study or analyze any problem, it is necessary to study its legal regulation and socio-legal necessity in order to understand its essence.

According to Article 586 of the new Chapter 621 of the Criminal Code, which covers the norms on the "Plea Agreement" of the Criminal Code, "A plea agreement is made at the request of the suspect or the accused, who agreed to the charge, actively assisted in the detection of the crime, and eliminated the harm brought to the criminal case. It is basically an agreement with the supervising prosecutor for minor, serious and serious crimes with a low social risk." [12]

The main purpose of the plea agreement, which was introduced into the criminal procedure law, is to achieve a lighter sentence in court based on the confession of the accused in connection with the crime he committed, and therefore, to reduce the lengthy court proceedings that cause many scandals.

In the explanatory dictionary of the Uzbek language, it is assumed that "agreement" means an opinion, conclusion, decision, agreement, contract expressed through mutual consultation, as well as "collusion" means a compromise, agreeing, agreeing, conciliation. [13]

Therefore, the agreement, in the sense that we are interested in, is considered a part of the mutual agreement between the suspect and the accused regarding the confession of guilt with the prosecutor.

In the explanatory dictionary of the Uzbek language, there is no general concept of the concept of confession in the form of a phrase. But it is possible to find out its dictionary meaning by analyzing the words used in the phrase in this dictionary. The dictionary meaning of the word "guilt" includes the following meanings: defect, violation of rules and moral standards, behavior, sin. [14] Also, the concept of illegal behavior, a necessary condition for prosecution, has been expressed. It is noted that the dictionary meaning of the word "confession" means "to admit, to consider as true, to acknowledge, to admit". [15] The dictionary meaning of the word "agreement" is reflected in the meanings of the opinion, conclusion, decision, agreement expressed through mutual consultation. [16]

A contract is an agreement concluded between the parties (two or more persons) and their rights and obligations are recorded. A deal is a mutual agreement, a truce, a decision, an agreement, a contract, a contract officially drawn up and accepted by the parties. Also, in Article 586 of the Code of Criminal Procedure of the Republic of Uzbekistan (hereinafter referred to as CCP) "A plea agreement shall be made at the request of the suspect or the accused, who agreed to the charge, actively assisted in the investigation of the crime, and eliminated the harm brought to the criminal case. It is basically an agreement with the supervising prosecutor for crimes with a low social risk, not very serious and serious crimes. [17]

In our opinion, there are a number of ambiguities in the concept of the agreement on the admission of guilt presented in this norm of the law, and in order to clarify them, we found it necessary to refer to the existing definitions of the agreement on the admission of guilt in the theory of criminal procedure. To date, there is no consensus in the legal literature regarding the concept of a plea agreement. This indicates the versatility of this institution. Despite the fact that this institution (concept) is new in the legal system of our country, some opinions and comments were expressed by a number of practitioners and procedural scientists.

In particular, according to S. Tashniyozov, the plea agreement is a proposal made by the suspect and the accused to the investigative body, and it is emphasized that it should be drawn up on the basis of equal consent of the parties, and the agreement should be signed by the prosecutor and the suspect or the accused and their defense counsel. [18]

Close to the above opinion is a member of the committee on anti-corruption and judicial issues of the Legislative Chamber of the Oliy Majlis cited by D. Oripov, it expressed that "the agreement on confession is considered an agreement concluded with a prosecutor who controls the conduct of a criminal case, based on a petition expressed by a suspect or accused who has no great social risk, is not very serious and has no real remorse, actively contributed to the disclosure of the crime and eliminated the damage".[19]

As a logical continuation of this idea Sh. Khamidov expressed the opinion that the suspect, the accused can make a request for a plea agreement at any stage of the inquiry and preliminary investigation, and that the request for a plea agreement must be signed by the suspect, the accused, his defense attorney and, if he is participating in the case, his legal representative.[20]

Practicing judge K. Pansatov, on the other hand, entered into a plea agreement with the supervising prosecutor based on the request of the suspect or the accused, who agreed to the charge, actively assisted in the discovery of the crime, who agreed to the charge against him, and the supervising prosecutor for crimes of low social risk, not very serious, and serious crimes. emphasized that the agreement will be drawn up.[21]

If we pay attention to the opinions of scientists from foreign countries, some scientists have emphasized that the plea agreement serves only as a basis for mitigating criminal punishment, which does not protect against criminal liability, while V.A. Sementsov and Ya.V. Loshkobanovas on the part of the suspect evaluated the plea agreement as a one-sided transaction, recognized that the obligations of the accused are voluntary, and the obligations of the prosecutor on the other side arise in special cases in the law of criminal procedure.[22]

The opinion cited above states that the plea agreement is one-sided, and in our view, both parties should be interested in the plea agreement. In particular, if the suspect or the accused is interested in a lighter punishment, the state bodies and officials responsible for conducting the criminal case will be able to quickly and hotly solve crimes, save energy and resources, and reduce the volume of work.

According to researcher V.V.Kolesnik, the main feature and basis of the plea agreement should be understood as an agreement of equal subjects, even if they are in unequal (subjects) conditions.[23]

N.A. Dudina says that "in the plea agreement, sincere remorse and repentance by the suspect or the accused is considered the material and legal basis of the plea agreement, the plea agreement itself does not have a civil-legal nature, but is a document that provides one of the forms of law enforcement. He mentioned that it appears as a type.[24]

K.F. Bagautdinov, in his scientific research, concluded that the plea agreement is a voluntary agreement between the parties, that it is impossible to oblige the prosecutor to conclude a plea agreement, that the prosecutor's refusal to conclude an agreement does not prevent the achievement of justice, and does not limit the rights and freedoms of the participants in the proceedings, therefore also, in the review of the appeal filed by the prosecutor's decision by the courts, without discussing the validity of the decision to reject the decision, it is concluded that the decision was issued by the relevant person within the scope of his powers, unlike civil-legal contracts, the public has an advantage in the agreement on cooperation before the court, the uniqueness of the agreement, in which It is emphasized that in cases where public and private interests are in conflict, the case will be resolved taking into account the interests of the public.[25]

The above-mentioned K.F. Agreeing with Bagautdinov's opinion, in the plea agreement, the prosecutor explains and applies all the terms and features of the agreement specified in the Criminal Procedure Law. However, in the agreement itself, it is not possible to mention the obligation to fulfill certain obligations towards the prosecutor. The reason is that by going to court, the situation may change completely and it may not be possible to apply the provision of the agreement.

E.L. Fedoseeva also expressed her opinion that the plea agreement is not an agreement at the stage of bringing the case to court, but is unilateral in terms of the fulfillment of obligations by the

participants, the consent of the suspect or the accused to the prosecutor to assist in the investigation.[26]

According to O.V.Klimanova, the prosecutor, assuming responsibility, is able to guarantee that the fulfillment of the terms of the agreement by the accused will lead to positive consequences and that the terms of the agreement will be fully fulfilled in accordance with the norms of criminal procedure law.[27]

Another scientist O.Ya. Baev proposes that pretrial cooperation agreements include an obligation on the part of the prosecution to revoke or commute the pretrial detention selected for the suspect.[28]

O.N. Thiessen said that a plea deal means that the suspect voluntarily commits to exposing his accomplices in exchange for a significantly reduced sentence for his crime.[29]

In our opinion, although the scientists reflected the processes related to the structural structure of the institution of confession in the above-mentioned opinions, these opinions do not fully reveal the essence and understanding of this institution today.

Despite the variety of opinions presented above, the widespread use of such opinions in the literature and on the Internet, we can see that there is still no clear understanding of the confession of guilt. Because the institution of the plea agreement is a new institution in the criminal procedural legislation of our country and differs from the institutions existing in the legislation of foreign countries. The saddest thing is that although the institution of the plea agreement is reflected in the current criminal procedural legislation, the insufficient regulation of the norms on the mechanism of its implementation has led to the emergence of a number of problems in the judicial investigation practice, and as a result of this institution, there have been cases of non-use is happening.[30]

The in-depth analysis of the above-mentioned points made it possible to develop the author's definition of the plea agreement as follows:

A plea agreement is a voluntary procedural agreement concluded with the prosecutor based on the request of the suspect and the accused, who at any time during the inquiry and preliminary investigation has admitted the suspicion or charge against him, sincerely repented of his actions, actively helped to solve the crime, and fully compensated for the damage caused.

Therefore, the implementation of the plea agreement institution in the criminal procedural law, the stage of bringing the case to court in a simplified manner, and its application to the criminal and criminal procedural legislation of our country, serves as an important factor in raising the protection of human rights, freedoms and legal interests to a higher level.

As for the content of the plea agreement, it should be noted that although the rules of this institution are similar to the reconciliation agreement provided for in Article 66¹ of the Criminal Code of the Republic of Uzbekistan, the agreement differs from it.

True, reconciliation is also a special agreement, a deal, firstly, it leads to release from responsibility, and secondly, this deal is concluded between the person who committed the crime and the victim. First of all, let's pay attention to the circumstances in which it is possible to enter into a plea agreement.

In particular, according to the law, the following serve as the basis for entering into a plea agreement:

- submission of a motion for agreement by the suspect, the accused;
- submission of the request by the will of these persons;
- the level of social danger of the crimes committed by the person, that is, the social risk is not high, the crimes are not very serious, or serious crimes, which in turn indicates that an agreement will not be concluded regarding the commission of a serious crime;
- the suspect, the accused must confess to the crimes committed;
- the accused, the suspect must actively help in solving the crime;
- the damage caused as a result of the crime must be compensated; A request for an agreement is characterized by the fact that it can be submitted at any stage of the inquiry, investigation, and the parties can withdraw from the agreement during the court session.

The plea agreement is characterized by the fact that it is one of the effective measures in the legislation of a number of countries, including the USA, England, Italy, Spain, Germany, France, Estonia, Israel, India and the legislation of some CIS countries, including Russia, Moldova, the Republic of Kazakhstan, Georgia, the legislation of Ukraine and other countries are among them.

In Denmark, France and Germany, in order to prevent the prosecution of an innocent person, the principle of finding the truth by the court is emphasized and the court must take all measures to find the truth. In the legislation of the CIS countries, including Russia, Ukraine, Kazakhstan, Kyrgyzstan, the criminal procedural legislation is strengthened, and these provisions are strengthened as a form of imposing a lighter sentence.

Today, the norms in this regard are widely used in the judicial practice, which is the reason for applying the incentive norms of our legislation to the persons who committed the crime. For example, defendant B.Kh. – being a dangerous recidivist, in order to acquire a large amount of other people's property, in February 2020, he became aware that Kholov A., a resident of "Gulobod" neighborhood, Samarkand district, wanted to buy a plot of land for the purpose of doing business, got to know him and got to know him and told him that it did not belong to him, claiming that the land belongs to him, deceiving him and gaining his trust by promising to register 10 hectares of this land in his name, to help him transfer electricity to the land, and to bring construction materials to the facility to be built at low prices, February 2020 During the period from January to February 2021, he fraudulently obtained 19,000 US dollars, equal to 200,070,000 (two hundred million seventy thousand) soums, and it was considered an official document giving certain rights - No. 8741-Q of the district governor dated 18.12.2019 - decision No. 1, the document dated 14.10.2020 of "Kenagas" neighborhood and the date by falsifying the minutes of the meeting No. 1 of the working group formed on the transfer of unsold real estate belonging to legal entities and individuals in the district and presenting a forged document, he used the money he obtained fraudulently for his own needs.

The court approved the plea agreement of the defendant B.H. in criminal case No. 1-1416-2101/000. B.H. He was acquitted under Article 228, Part 3 of the Criminal Code, and found guilty under Article 168, Part 4, Clause "a" and Article 228, Part 1 of the Criminal Code of the Republic of Uzbekistan. Article 168, part 4, point "a" of the Criminal Code, applying Article 572 of the Criminal Code, a fine of 200 (two hundred) times the base calculation amount, i.e. 44,600,000 (forty four million six hundred thousand) soums, was imposed and levied on the state income. and 1 (one) year of correctional labor, with 20% of the monthly salary deducted from the state income, according to Part 1 of Article 228 of the Criminal Code.

In accordance with Articles 59, 61 of the Criminal Code of the Republic of Uzbekistan, by fully adding the penalties for the set of crimes, a fine of 200 (two hundred) times of the base calculation amount for intermittent driving, i.e. 44,600,000 (forty four million six hundred thousand) soums and sentenced to 1 (one) year of correctional labor with deduction of 20% of monthly salary as state income.[31]

It can be seen from the above that according to part 4 of Article 168 of the Criminal Code, B.H. was sentenced to not more than half (600 times) of the maximum punishment. Of course, in our opinion, this institution has its own shortcomings. Because despite the fact that the issue of approving the plea agreement has been referred to the court, in order to prevent illegal situations in the investigation, negative situations such as "in particular, the admission of guilt", it should be recorded on video footage, and the agreement to the JPK in each case is the will of the suspect, the accused. We believe that it is necessary to strengthen the rules that provide special importance to the construction of.[32]

So, according to the above, the plea agreement is a kind of multilateral agreement, and first of all, it is important for the suspect, the accused as follows:

- causes the application of incentive rules in sentencing (Article JK 572), that is, the duration and amount of the punishment will be reduced, in particular, the punishment will be reduced;
- various distractions are avoided;

- will be brought to justice quickly and clearly according to his actions, especially protected from difficult conditions, such as waiting for the court session while being kept in custody.

Secondly, for inquiry, investigation, prosecution and court:

- saving time and money;
- will lead to the abandonment of court hearings, the reduction of the workload of courts in criminal cases, and the expansion of the possibility of timely and thorough consideration of extremely serious and complex criminal cases.

Third, this agreement may also be important to the victim:

- compensation for the damage caused;
- prevents negative aspects such as frequent confrontations with the suspect, the accused (it is no secret, in crimes against the person, in particular, the victim of crimes against life, health, sexual freedom and other types of crimes, meeting the accused, as well as the defendant, is very painful for him);
- saves time;
- prevents the conduct of various face-to-face, investigative experiments.

Also, not only the procedural but also the material infrastructure of this institution was created, a new article 57² was added to the Criminal Code of the Republic of Uzbekistan, and it was named as punishment for crimes for which a plea agreement was concluded.

According to the newly introduced Article 57² of the Criminal Code of the Republic of Uzbekistan, the term or amount of the punishment imposed for the crimes for which a plea agreement was concluded should not exceed half of the maximum punishment provided for in the relevant article (part) of the Special Part of the Criminal Code.

This means that in the case where a person is punishable by imprisonment for three to five years according to Article 169, Part 2, Clause "a" of the current criminal law for the crime of robbery committed by a person, half of the term or amount of this punishment. shall be punished without exceeding. For example, if a criminal court wants to sentence this person to five years of imprisonment, half of it will be sentenced to two and a half years of imprisonment.

This amendment ensures that the principle of humanity in the criminal law is widely applied in practice. If the person who has actually committed a crime has agreed to the suspicion against him, the charge, actively assisted in the detection of the crime and eliminated the damage, the punishment imposed by the court shall not exceed half of the maximum punishment provided by the current criminal law.[33]

At the same time, in order to prevent abusers in practice, in Article 112 of the CCP "The testimony of the suspect about the crime he committed and the confession of the accused, only if this confession is confirmed by the available evidence can be used as a basis for accusation.

A person's guilty plea supported by other evidence is considered a special privilege for committing a crime under our current laws. For example, a person may be exempted from responsibility or punishment if he commits a crime of low social risk or serious crime for the first time, and in a situation where the investigative authorities have not yet found out about his crime, he officially confesses to committing the crime.

In addition, in the cases provided for by our legislation, the accused (defendant) expressing remorse for his/her act shall not be sentenced to more than two-thirds of the punishment provided for in the Criminal Code of the Republic of Uzbekistan for the crime he/she is accused of.

Simplified court proceedings are a product of adversarial criminal proceedings.[34] So, now, as in foreign countries, one of the simplified procedures for conducting criminal proceedings - confession is also available in Uzbekistan, and law enforcement agencies fighting crime enter into a contractual relationship with the accused in the field of conducting criminal proceedings.

In a plea agreement, an agreement can be reached regarding conditions such as providing information about criminal partners, compensation for damages, voluntary presentation of evidence.

A plea deal is seen as a way to compromise with the underworld or the person who committed the crime. It should be said that not everyone supports such rules of conduct. Opponents

of the plea-bargaining process argue that the court's decisions will be unfair due to the incompleteness of the evidence in court.[35]

The issue of introducing the plea bargain procedure in criminal proceedings into our national legal system has attracted the attention of the scientific community for many years. Although it is not possible to cite a scientific quote, we felt it is permissible to say that our mentors Professors G. Abdumajidov and Z. Islamov discussed the proposal to include this institute in our national legislation, first at the conference, and then they went to each other's rooms and argued from a scientific point of view.

Some of them said that the plea deal should be included in the law, while others said that this rule would lead to an increase in crime, negative situations such as illegal confessions, and that our people are not ready for it. Remembering this event, we would like to emphasize that such thoughts still exist today. [36]

It should be noted here that in Uzbekistan in recent years, many authors, including Q. Matkarimov [37], N. Koshaev [38] put forward proposals for the inclusion of the plea agreement in our national legislation.

Indeed, the introduction of the institution of plea bargaining into our national legislation has many advantages. In particular, there is the issue of procedural outcomes in the conduct of criminal cases, which cannot always be resolved "according to the brochure". For example, defendants may not always be able to cover extradition costs. There is no need to go through the many costly steps involved in a plea bargain.

Investigating and prosecuting crimes overwhelms investigative agencies and courts. This has a negative impact on the quality of criminal proceedings in some situations. The ease with which the burden of proof is met by government agencies and officials responsible for conducting plea bargain cases allows them to devote their attention to other criminal cases.

Article 8 of the Universal Declaration of Human Rights, Article 14 of the International Covenant on Civil and Political Rights and other international documents stipulate the right to a speedy trial. Ensuring this international standard in the national legislation and thereby achieving human rights guarantees has been proven scientifically. For example, in his research, N.I. Khairiev scientifically justified the need to introduce a plea agreement procedure as a form of speeding up criminal proceedings.[41]

Conditions are created to fulfill the obligation of state bodies to ensure the right to a fair trial in a fast or reasonable time frame in proceedings based on the plea agreement.

The adoption of the above-mentioned Decree of the institution of the agreement on the admission of guilt is the reason for the development of scientific disputes not about its inclusion in our national legislation or its proposal, but about the content of this institution. This situation is not accidental. It encourages us to think about what future consequences it might have and what should be taken into account when developing the rules specific to the institution of plea bargaining.

In our opinion, it is appropriate to legally regulate the following situations when proceeding with a plea agreement:

First, it is necessary that the investigation authorities do not initiate a plea agreement when there are other favorable grounds for the accused to terminate the criminal case. If the investigation authorities (or the prosecutor) offer a plea agreement to the accused in a situation where the criminal case can be terminated due to the reconciliation of the parties, the passing of the accountability period, or other grounds, this will be similar to the use of a prohibited method of deception in proof. This may later cause the accused to protest his right.

Second, since the creation of a plea agreement results in the provision of benefits to the accused, such an agreement without the consent of a victim who is not a dysmorphic person may later lead to his dissatisfaction with the fairness of the sentence. If in our criminal-procedural legislation, the opinions of this category of victims (enterprise organizations, business entities that are civil plaintiffs according to the practice of our national criminal-procedural legislation)

regarding the relief that can be given to the accused are taken into account when drawing up a plea agreement, the legal norms in this regard would be more consistent with the criterion of fairness.

Thirdly, the plea agreement is a contractual relationship, in which the principle of equality of the parties inherent in private law should be reflected. Among the duties that can be clearly performed on the accused, such as assisting in solving the crime, eliminating the damage, the obligation of not giving false testimony on purpose and not knowingly misleading the investigation should be imposed, otherwise the agreement should be voided. This can prevent the negative behavior of the person entering into the plea agreement in the form of misleading and deceiving the investigation by invoking the "right of defense".

Fourthly, in Europe and many other countries where the plea bargain applies, there is no provision for compensating for the severity of the sentence for committing several crimes or adding to the imposed sentences in whole or in part. not limited. In the situation where there is this humane provision of our national criminal legislation in determining the punishment, the benefits obtained from the plea deal should not cause the feeling of disrespect for the law to arise. Therefore, in the case of a complex of crimes, the issue of entering into a plea agreement should be carefully considered.

CONCLUSION

In short, the application of the institution of the plea agreement to the criminal and criminal-procedural legislation of our country serves as an important factor in raising the protection of human rights, freedoms and legal interests to a higher level.

References:

1. Alizade V. A., Volevode A. G. Legal institution of the plea deal in the US criminal process. // Criminal and criminal procedural law of foreign states. No. 2. 2018. S. 21-24.
2. Rakhmonova S.M., Possibilities of abolishing the institution of returning the case by the court for additional investigation, Abstract/// edited by prof. F.A.Abdumazhidov.-T.: TSUL, 2007.-4 p.
3. University of Gothenburg, School of Business Economics and Law, Victim-Offender Mediation in Sweden and South Africa, Frida Eriksson, Gothenburg, 2003, pp.5-10
4. <http://en.wikipedia.org/wiki/Mediation/History>
5. Solovieva N.A. Historical and legal analysis of the institute of admission of guilt in domestic criminal proceedings // Vestnik Volgogr. state university Ser. 5, Jurisprudence. 2011. No. 1 (14) - P.210-220.
6. Lazareva V.A. Admission of guilt as a basis for the application of chapters 32.1, 40, 40.1 of the Code of Criminal Procedure of the Russian Federation // Legal Bulletin of Samara University. 2016. Vol. 2 No. 1. pp.118-126.
7. <http://en.wikipedia.org/wiki/Mediation/History/Messe>
8. <http://en.wikipedia.org/wiki/Mediation/History>; Restorative Justice in the Twenty First century and in the History: A Social Movement Full of Opportunities and Pitfalls by Mark S. Umbreit, University of Minnesota, 2002, p.268.
9. To'laganova G.Z., Defense counsel's participation in criminal proceedings. Study guide / prof. Under the editorship of G. A. Abdumajidov.-T.: TDYuL, 2005.-141 p.
10. Islamov B.O., Some principles of criminal procedure. Risola.-T.: —Science and Technology Publishing House, 2007, p. 6.
11. Decree of the President of the Republic of Uzbekistan dated August 10, 2020 No. PF-6041 "On measures to further strengthen the guarantees of protection of the rights and freedoms of the individual in judicial and investigative activities" // <https://lex.uz/docs/4939467>
12. Criminal Procedure Code of the Republic of Uzbekistan. - Tashkent: Legal literature, 2021. // <https://lex.uz/docs/111460>
13. Annotated dictionary of the Uzbek language. 5-volume. - Tashkent: National Encyclopedia of Uzbekistan, volume 2, 347 pages
14. Annotated dictionary of the Uzbek language. T.I. - T., 2016 – 263 p. // <http://n.ziyouz.com>
15. Annotated dictionary of the Uzbek language. Edited by A. Madvaliev.-T., 2016-2018. – 51 p.
16. Annotated dictionary of the Uzbek language. T. IV. - T., 2018 – 347 p. // <http://n.ziyouz.com>
17. Criminal Procedure Code of the Republic of Uzbekistan // <https://lex.uz/docs/111460>
18. <https://huquq.uz/2021/03/12/pr-142/>
20. https://parliament.gov.uz/uz/events/opinion/36238/7sphrase_id=7837488

21. https://uza.uz/uz/posts/sud-tergovda-shaxsning-xuquq-va-erkinliklarini-himoya-qilish-yanada-kuchaytiriladi_3066537q=%2Fposts%2Fsud-tergovda-shaxsning-xuquq-va-erkinliklarini-himoya-qilish-yanada-
22. <https://ishtixon.uz/ru/node/1290>
23. Problems of Ensuring the Rights and Legitimate Interests of the Suspect, the Accused and the Victim at the Conclusion of a Pre-trial Agreement on Cooperation: monograph / V.A. Sementsov, Ya.V. Loshkovanov. - Moscow: Yurlitinform, 2016. - 174 p. - (Criminal process). – Bibliography: p. 164–173.
24. V.V. Kolesnik. The nature of the pre-trial cooperation agreement from the standpoint of the contractual concept of "plea bargain and cooperation" // <https://cyberleninka.ru/article/n/priroda-dosudebnogo-soglasheniya-o-sotrudnichestve-s-pozitsii-dogovornoy-kontseptsii-sdelka-o-priznanii-obviniya-i-sotrudnichestve>
25. N.A.Dudina. Correlation of production at the conclusion of a pre-trial agreement on cooperation with conciliation procedures in the criminal procedural legislation of foreign countries // <https://cyberleninka.ru/article/n/sootnoshenie-proizvodstva-pri-zaklyuchenii-dosudebnogo-soglasheniya-o-sotrudnichestve-s-soglasitelnymi-protsedurami-v-ugolovno>
26. K.F. Bagautdinov. Pre-trial cooperation agreement: concept, content, main features // <https://cyberleninka.ru/article/n/dosudebnoe-soglashenie-o-sotrudnichestve-ponyatie-soderzhanie-osnovnye-priznaki>
27. E.L. Fedoseev. The history of development and prerequisites for the creation of the institution of a pre-trial agreement on cooperation in domestic legislation in the period from the 10th to the middle of the 20th centuries. Public safety, law and order in the 3rd millennium: International scientific and practical conference. Part 2. Voronezh. 2010, p. 98.
28. O.V. Klimanov. Voluntariness of concluding a pre-trial agreement on cooperation as a condition for its legitimacy // <https://cyberleninka.ru/article/n/dobrovolnost-zaklyucheniya-dosudebnogo-soglasheniya-o-sotrudnichestve-kak-usloviye-ego-legitimnosti>
29. O.Ya. Baev. Pre-trial agreement on cooperation: legal and forensic problems, possible directions for their resolution: Monograph. M.: Norma, 2013.
30. O.N. Tisen. Theoretical and practical problems of the institution of a pre-trial agreement on cooperation in Russian criminal proceedings // Dissertation for the degree of Doctor of Law. Orenburg, 2017 - B.45.
31. A. Kurbanova. The concept of a plea bargain // Central Asian Research Journal For Interdisciplinary Studies (CARJIS) ISSN (online): 2181-2454 Volume 2 | Issue 3 | March, 2022 | SJIFactor: 5,965 | UIF: 7,6 | Google Scholar | www.carjis.org
33. Judgment of Taylok District Court on May 14, 2019 regarding criminal cases
34. Z. Muqimova, G. Shermatova. Concept of plea agreement, its characteristics. // Academic Research in Educational Sciences VOLUME 2 | ISSUE 12 | 2021 ISSN: 2181-1385 Scientific Journal Impact Factor (SJIF) 2021
35. https://uza.uz/uz/posts/aybga-iqrorlik-togrisidagi-kelishuv-ozini-nima_269577
36. Smirnov A.V. Typology of criminal proceedings: Abstract of the thesis. diss. ... cand. legal Sciences. M., 2001 // <http://www.kalinovsky-k.narod.ru/b/smir>
37. Brester A.A. On the erroneous attribution of a special procedure for making a judicial decision to criminal procedural activity / A.A. Brester // Actual problems of Russian law. - 2015. - No. 12. - P. 140–145;
38. Tatyana L. A special procedure for making a court decision // L. Tatyana // Legality. - 2003. - No. 12. - P. 30–33.
39. N.M. Koshaev. Some issues of introducing the institution of plea agreement in criminal proceedings // Journal of law research - No.- 2020 - P. 71-75
40. Matkarimov Q.Q. Humanization of criminal proceedings. Yu.f.d. (DSc)... thesis. –T., 2019. 285 p.
41. Khairiyev N.I. Acceleration of criminal proceedings. Yu.f.d. (DSc)... dissertation. - T., 2019. 292 p.

Rezyume. Maqolada muallif tomonidan aybga iqrordlik to'g'risidagi kelishuv institutining tushunchasi va mazmun-mohiyati, ushbu institutning o'ziga xos jihatlari tahlil qilinib, aybga iqrordlik to'g'risidagi kelishuv borasida qonunchilikdagi asosiy qoidalar, aybga iqrordlik to'g'risidagi kelishuv tartibida ish yuritishning ahamiyatli jihatlari hamda mazkur institutning ijobiy va salbiy tomonlari o'rganilgan. Aybga iqrordlik to'g'risidagi kelishuvni tuzishda sudning roli, "aybga iqrordlik to'g'risidagi kelishuv", "hamkorlik to'g'risidagi kelishuv" va "sud ishlarining qisqartirilgan shakllari" kabi tushunchalar o'rtasidagi farqlar va ularning mohiyati yoritilgan. Shuningdek, aybga iqrordlik to'g'risidagi kelishuv institutining maqsadi, asosiy vazifalari borasida olimlarning fikrlari o'rganilib, muallifning xulosalari berilgan.

Резюме. В статье анализируются понятие и сущность института соглашения о признании вины, особенности применения этого института, исследуются основные положения закона касательно соглашения о признании вины, важные аспекты процедуры соглашения о признании вины, преимущества и недостатки этого института. Освещена роль суда при заключении соглашения о признании вины, различия между такими понятиями, как «соглашение о признании вины», «соглашение о сотрудничестве» и «сокращенные формы судебного разбирательства», а также их сущность. Кроме того изучены взгляды ученых по поводу назначения и основных функций института признания вины, представлены авторские выводы и заключения.

Kalit soʻzlar: ayb, aybga iqrорlik, aybga iqrорlik boʻyicha kelishuv, dalillar, jinoyatni ochishga koʻmaklashish, jinoyat prosessidagi imtiyozlar, ahvolni yengillashtiruvchi holatlar.

Ключевые слова: вина, признание вины, соглашение о признании вины, доказательства, содействие в раскрытии преступления, льготы в уголовном процессе, смягчающие обстоятельства ситуации.

**COMPARATIVE LEGAL GUARANTEES OF THE REPRESENTATIVE INSTITUTE
UNDER THE LEGISLATION OF THE CIS STATES**

Asanov S.

Legal collage of the Republic of Karakalpakstan

Summary: *This article describes concepts such as "representation in civil proceedings", "legal representation", "contractual representation", "guarantees of representation", "appointment of a representative by the court", the issues of confirmation of the persons engaged in representative activities and their competence, representative activities of lawyers in civil proceedings devoted to the analysis of such issues.*

Key words: *representation, legal personality, unions, legal capacity, minor, guardian, inheritance, sponsor*

If we look at the activity of representation in the civil process in the legislation of the CIS countries, we can observe the aspects similar to our legislation along with the peculiarities.

Republic of Belarus

If we analyze the institution of representation in the Civil Procedural Law of the Republic of Belarus, we can see the similarities typical of the post-Soviet countries. Only the Republic of Belarus is making some changes and improving its legislation based on its national situation.

Speaking of common similarities:

Citizens have the right to conduct their cases in court personally or through representatives. Personal participation of citizens in the case does not deprive them of the right to have representatives in this case. Legal representatives can transfer the proceedings to another person of their choice as a representative.

The affairs of legal entities are carried out in court by their bodies or other representatives of legal entities acting within the framework of the rights granted to them by legal documents and founding documents or by a power of attorney. Collective management bodies of legal entities carry out cases in court through representatives.

On behalf of organizations that are not legal entities, cases are conducted in court by their leaders or representatives of managers.

In Article 72 of the Criminal Code of the Republic of Belarus, we can see the range of persons who can be represented in civil proceedings. "A representative in court can be a competent person who has appropriate representation authority to consider cases in court, except for persons who cannot perform representation.

The court may have representatives:

- 1) lawyers;
- 2) employees of legal entities - according to the circumstances of these entities;
- 3) the right of authorized representatives of public associations (organizations) to represent and protect the rights and legal interests of members of these public associations (organizations) and other persons in court;
- 4) representatives of authorized organizations who have the right to represent and protect the rights and legal interests of other persons in court;
- 5) legal representatives;
- 6) close relatives, spouse (husband, wife);
- 7) representatives appointed by the court;
- 8) one of the procedural partners - on behalf of other partners;
- 9) patent representative.

The range of persons who cannot be represented in court is as follows:

- 1) minors, minor parents - with the exception of their children;
- 2) persons recognized as incompetent or limited;

3) except for cases where judges, investigators and prosecutors participate as legal representatives of incapacitated persons or as representatives of the court, prosecutor's office or other investigative body.

It is necessary to pay attention to one aspect of legal representation that differs from our legislation, the powers of the legal representatives of minors participating in the case are terminated if the minor has acquired full civil procedural capacity during the consideration of the case. Although it is one of the situations that can be encountered in practice, this situation has not yet been included in our legislation and does not have a legal basis.

Civil Procedure Code of the Republic of Belarus

Article 77 provides for cases in which a representative is appointed by the court.

"The court appoints a representative to a party or a third party in the following cases:

- 1) absence of an incapacitated person or a representative of a third person;
- 2) absence of a representative of the defendant whose place of residence (location) is unknown;
- 3) the representative does not have the right to conduct court proceedings on the grounds established by the Marriage and Family Code of the Republic of Belarus;
- 4) other cases established by law.

In the cases provided for in clauses 1 and 3 of this article, a representative can be appointed by the guardianship and patronage body, and in the case specified in clause 2 of this article, relatives and other citizens can be appointed with their consent.

Ukraine

According to Article 58 of the Civil Procedure Code, "a party, a third party, as well as a person who is legally entitled to apply to the court for the interests of another person, may participate in the court proceedings in person (by means of self-representation) and (or) through a representative." This norm is considered a similar norm that has not changed much in the countries that are part of the Romano-Germanic legal system.

In the fourth part of Article 60 of this Code, "a representative can represent several plaintiffs or several defendants or the interests of several third parties at the same time, if there is no conflict of interest between them."

We can observe differences in legislation within the framework of persons who cannot be represented.

First, the person participating in the case cannot be represented in the court: the secretary of the court session, an expert, an expert, an interpreter and a witness or an assistant judge considering the case.

Secondly, a person who is a representative cannot be a representative if the interests of the representative conflict with the interests of the trustee.

Republic of Armenia

of the Civil Procedure Code of the Republic of Armenia

In Article 48, the norm regarding proceedings through representatives is determined, according to the first part of this article: "the person who declares trust can conduct cases in court personally or through his representative or through several representatives."

In the third part of this article, "a person participating in the case can perform all procedural actions independently, and the following cases are excluded when allowing one or more representatives to conduct the case":

1. "In case of a class action, the plaintiffs shall conduct their case in court through the class plaintiffs.
2. The number of group claimants should not exceed five, if they represent the interests of all claimants equally.
3. The participation of one of the group claimants in the case as a representative excludes the claimant's participation in the proceedings, except for cases where the claimant himself acts as a representative in the interest of the group.

4. The participation of the representative in the case when suing as a group does not exclude the right of the group plaintiff to familiarize himself with the case materials, to withdraw from the claims in his part, to cancel the powers of the representative in his part.

5. If the procedural actions stipulated in the civil procedural code are performed by the representative of the group of claimants, they are considered to be performed by all the claimants.

6. The number of representatives of defendants acting as a group should not exceed five."

Article 56 of this Code specifies the circumstances in which the representative must draw up a special power of attorney. According to this article:

"A power of attorney for court proceedings gives the representative the right to perform any procedural action on behalf of the principal, with the exception of the following:

- 1) signing the statement of claim;
- 2) agree to conclude an arbitration agreement and submit the dispute to arbitration;
- 3) full or partial waiver of claims;
- 4) full or partial recognition of claims;
- 5) change the basis and subject of the claim or one of them;
- 6) conclusion of settlement agreement;
- 7) conclusion of a reconciliation agreement;
- 8) participation in the conciliation procedure with the participation of a licensed conciliator;
- 9) transfer of authority to another person (transfer of trust);
- 10) receiving court notices and procedural documents;
- 11) appeal against court documents;
- 12) to submit an application to issue a writ of execution".

To perform each of the actions specified in part 1 of this article, these powers must be clearly provided for in the power of attorney given to the representative.

Russian Federation

In the legislation of the Russian Federation, we can see the similarity of the general rules on representation. That's why we decided to dwell on specific aspects of the representation.

"Citizens have the right to conduct their cases in court personally or through representatives. A citizen's personal participation in the case does not deprive him of the right to be represented in this case.

The affairs of the organizations are conducted in court by their bodies or their representatives acting within the scope of the powers granted to them by the Federal Law, other legal documents or constituent documents.

An authorized representative of the liquidation commission will act in court on behalf of the organization being liquidated.

According to Article 49 of the Code: "Representatives in the court can be competent persons whose authority to conduct the case is duly registered and approved. The representatives in the court may be lawyers with higher legal education or scientific degree in legal specialty and other persons providing legal assistance, except for the cases where the case is considered in arbitration and district courts.

Lawyers must submit to the court documents confirming the status of lawyers in accordance with the federal law and documents confirming their powers. Other persons providing legal assistance must submit to the court documents regarding their higher legal education or academic degree in legal specialty as documents confirming their authority.

Civil Procedure Code of the Russian Federation

In Article 50, "The court appoints a lawyer as a representative in the absence of a representative of the defendant whose place of residence is unknown, as well as in other cases provided for by the federal law." The lawyer appointed by the court as the representative of the defendant has the right to appeal against the court's decisions in this case."

One of the positive aspects of the civil procedural legislation of the Russian Federation is that a person participating in a case who has given a power of attorney for hearing a case in court and later canceled it must immediately notify the court that considered the canceled case.

The unknown location of the defendant and the presence of suspicion about the mental health of the person are considered legal facts. Their existence creates the need to appoint a representative by the court, but, by itself, cannot serve as a basis for its occurrence.

References:

1. "Civil Procedural Code of the Russian Federation" dated 14.11.2002 N 138-FZ (ed. dated 08.12.2020, revised dated 12.01.2021).
2. "Predstavitelstvo po naznacheniyu suda v grazhdanskom sudoproizvodstve" theme dissertation and autoreferata po VAK RF 12.00.15, candidate of legal studies Bortnikova, Nadezhda Aleksandrovna. S. 14
3. Civil Code of the Republic of Armenia. Prinyat 09.02.2018. (<http://www.parliament.am/legislation.php?sel=show&ID=6196&lang=rus>)
4. Civil Code of the Republic of Armenia. Prinyat 09.02.2018.
5. <http://www.parliament.am/legislation.php?sel=show&ID=6196&lang=rus>)
6. Khabibullaev, D. .; Mamadiev, A. . Garantii predstavitelstva v grazhdanskom processe i osobennosti opyta zarubejnyx stran. OI 2021, 2, p. 169.
7. Civil procedural code of Ukraine, article 61. (<https://zakon.rada.gov.ua/laws/show/1618-15#Text>),
8. Civil Procedure Code of the Republic of Belarus. January 11, 1999 No. 238-Z. (Law of the Republic of Belarus on December 10, 2020 No. 69-Z (National legal Internet portal of the Republic of Belarus,

Rezyume: *Mazkur maqola “fuqarolik protsessida vakillik”, “qonuniy vakillik”, “shartnomaviy vakillik”, “vakillikning kafolatlari”, “sud tomonidan vakil tayinlash” kabi tushunchalarni, vakillik faoliyati bilan shug'ullanuvchi shaxslar va ularning vakolatligi tasdiqlash masalalarini, advokatning fuqarolik protsessida vakillik faoliyati kabi masalalarni tahlil etishga bag'ishlangan.*

Резюме: *В данной статье рассматриваются такие понятия, как «представительство в гражданском процессе», «судебное представительство», «договорное представительство», «гарантии представительства», «назначение представителя судом», вопросы подтверждения лиц, осуществляющих представительскую деятельность. и их компетенция, представительская деятельность адвокатов в гражданском процессе, посвященная анализу таких вопросов.*

Kalit so'zlar: *vakillik, yuridik shaxs, kasaba uyushmalar, muomalaga layoqati, voyaga yetmagan shaxs, vasiy, meros, homiy*

Ключевые слова: *представительство, юридическое лицо, союзы, дееспособность, несовершеннолетний, опекун, наследство, поручитель.*

USE OF INFORMATION GENRES IN THE PRINT OF KARAKALPAKSTAN

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Summary: *This article discusses the classification of information genres and its use in the press of Karakalpakstan. The genres of information are comprehensively analyzed, the level and degree of use of genres in the Karakalpak press today is studied.*

Key words: *Information, genre, group, newspaper, note, interview, reporting, report.*

Introduction

Due to the overabundance of information in the world in recent times, humanity and society need only reliable and reliable information. Timely satisfaction of the needs of mankind and society in such information is also a special task of today. It is clear to us that the media play an important role in dealing with information. At the same time, other modern information technologies are being introduced in the work with information and its dissemination. However, in this paper we aim to study the issues presented by the press, i.e. by the press of Karakalpakstan, information genres that occupy a special place in the genres of journalism, their scope and level of coverage.

The main part

The press today remains one of the main means of filling the consciousness of mankind, not only of mankind, but of the whole society with various information [1; 18-21]. Newspaper materials differ in lighting, composition, even the number of lines. They are divided into three large groups: informational, analytical and artistic and journalistic [2]. Based on this, if we dwell on information genres, then the group of information genres, in turn, is divided into its internal groups. That is, the genres of information include the genres of a note, a reportage, an interview, a report. Their importance and main difference can be seen in the rapid delivery of news, events and events of social, political, economic, spiritual, social life to the audience. The genres of information are mainly based on sources and consist of specific facts. If information genres cover an event through brief, concise and clear facts, then the main characteristic of analytical genres is the analysis of facts, in-depth study and coverage of public opinion, as well as specific conclusions of a journalist.

It is natural that changes in the socio-political, economic and social life of society, the factors of mankind's striving for civilization have an impact on the development of science and technology. This situation began to be observed in the theory of journalism. We can say that the types of information and their specific characteristics began to form in all media. For example, "blits-opros" refers to the group of information genres, "questionnaire", "monitoring", "rating", "experiment", "essay", "analytical press release" - to the group of analytical genres, and "game" - to the group genres of analytics. artistic and journalistic genre group [2; 320] it is permissible to single out such genres. And in online journalism, long read, copywriting, rewriting, and so on.

Information genres are considered to be the leading genres of journalistic genres, the genres of this group basically answer the questions: what? where? when? [3; 123]. The note, which is considered the main genre of information genres, covers all aspects of the socio-political, economic, industrial, cultural and educational life of society. There is not a single sphere of public life, social activity of a person that would not be reflected in the information [4; 119], one might say.

The note genre is completely different from other genres in its form and structure. That is, it requires, firstly, brevity, accuracy and truthfulness, and secondly, the speed of combining these signs. Also, the note "is made up of one or more important, socially significant facts, it is only about the facts, the newspaper draws conclusions from the facts" [5; 29].

It should be noted here that today's newspaper publications published in the Republic of Karakalpakstan can be classified as follows [6; 274-277]:

1. Publications in the national (republican) newspaper;
2. Publications of regional and city newspapers;

3. Industry (specialized) newspaper publications;
4. Independent (private) newspaper publications;
5. Periodicals and weekly newspapers;
6. Entertainment newspaper publications.

The note genre can also be found in all these publications. Based on the specialization of newspapers, these news can be divided into central or official news, regional and city news, industry news, and so on. Also in the press of Karakalpakstan, the genre of the article is often given under the rubric of official news, foreign news, sports news (and so on). However, there hasn't been much such coverage in the news lately. In most cases, official communications contain messages from higher authorities. That is, it covers important news of the socio-political life of the country. When we look at the content of the posts, we see that the notes related to the name given in the rubric have been highlighted. For example, in the foreign news section, only news related to the life of foreign countries is presented, while sports news is covered in the sports news section.

Reportage, which is one of the most important genres of information genres, is also one of the most widely used genres in journalism. The reason is that reporting differs from other genres in its clear and fast coverage of events and incidents. Therefore, most journalists, especially young journalists, prefer to use the possibilities of this genre. For example, the main elements and features of the reportage genre are clearly visible in the materials entitled "The Pledge of Our Bright Future" [7], "Forces are given to sowing seeds" [7], "Wrestlers are preparing for competitions." [8]. If you pay attention to the general content of messages in the newspaper, then, firstly, on topics related to the tasks that must be performed in the socio-political sphere of the country, characteristic of the season of the year, secondly, topics arising from issues on the agenda of our public life, and, thirdly, it can be attributed to independent topics (that is, topics covered by a journalist independently).

The report differs from the genre of the note in that the report is distinguished by an abundance of facts, a wide coverage, and a wider coverage of events and incidents. At the same time, photographs may be used in press releases. This, along with improving the efficiency of reporting, affects the design of the newspaper.

The report is one of the genres that occupy a special place in the content of information genres. This type of information genre covers events and events of interest to society, in particular, issues considered at various congresses, events, meetings, parties, meetings, conferences in the form of reports. The significance of such a genre in the press is that it is prepared to give the population an understanding of important issues in public life, either in setting goals aimed at preventing some problem, or in meetings devoted to the study of the full implementation of necessary tasks. The audience interested in this will be able to satisfy their desire. Thanks to this feature, the genre takes its place in the composition of information genres. For example, a report entitled "Information on the joint meeting of the Legislative Chamber and the Senate of the Oliy Majlis of the Republic of Uzbekistan" [9] is devoted to the results of the election of the President of the Republic of Uzbekistan. This report provides details of the work done by the Electoral Commission. In this official report, information and facts are presented and interpreted consistently. So, the report genre provides information about an event involving a specific audience. At the same time, in accordance with the purpose and task of covering the material, events and facts are sequentially stated, or the commentary is focused on a specific issue, and the incident is evaluated. Also, the genre of the report has its own characteristics of preparing the material, which requires special skills from the journalist. Since reports require accuracy, they are based on facts with little or no artistic use. "A journalist who writes a report must first of all understand the content and essence of this conference, events and incidents, cover it in its entirety, identify facts, names, decisions and documents, conclusions. Only then should he present the facts and information he has collected in a clear and concise manner" [10; 127-128].

Interview in the group of informational genres is also one of the journalistic genres, which is widely used today in every issue of Karakalpak publications. Because in it "every fact, event and event in life, how it happened, how it happened, the details are usually asked from people who

know this fact, who saw the event, event, and then it becomes the basis for some kind of press material. For this reason, inquiry is primarily a means of knowing life, and its reflection in the press is the most important, widespread and popular genre of information journalism" [10; 129-130]. In other words, the interview is based on questions and answers. [3; 123]. According to their structure, theorists divide interviews into two types: interview-dialogue and interview-monologue. In an interview, the reporter and the interviewee answer each other's questions. This question-answer is carried out in the form of a direct oral or written question-answer in the preparation process. Interviews of this type often appear in the Karakalpak press. For example, in the interview with S. Janiev "The highest award is the respect of my people" [7] in the heading "The interview you have been waiting for" there is a question and answer session with M. Utamuratov. It tells about the achievements and skill of the singer. This material is an interview-dialogue. Because during the conversation, the correspondent and the interlocutor had a conversation in the format of questions and answers. A monologue interview reflects only one question asked by the speaker and the answer given by the interlocutor. For example, at the beginning of the interview "Presidential gifts were presented", published in the issue of the newspaper "Erkin Karakalpakstan" (Free Karakalpakstan) dated December 31, 2005, the correspondent says that on New Year's Eve it becomes a tradition to present gifts from the President to children, and then talks with the head of the public education department of the city of Nukus. At the end of the interview, the reporter concludes by saying that such events are held in all districts and cities of the Republic. This interview-monologic form of the interview was repeated in the material called "On the way to the health of the people" in this issue of the newspaper. In it, the correspondent A. Embergenov at the beginning of the conversation gives some information about the workplace of the hero (or interlocutor), and then the interlocutor continues the thought. These interviews reflected the answer given by the interlocutor to one question asked by the correspondent. That is, the answer given by the interlocutor to a single question asked by the correspondent is also reflected in this material.

It should be noted that in monologue interviews, the speaker may ask not one, but several questions. For example, in the interview "Influence of a new institution in the field of judiciary" [7], the correspondent of the Uzbek news agency N. Abduraimova talks with the judge of the Supreme Court of the Republic of Uzbekistan Kh. Yodgarov. In it, the interlocutor gives more detailed information on two questions of the correspondent. That is, with his next question, the reporter gained a broader and deeper knowledge of the topic.

It is known that the main task facing a reporter in the interview genre is to get as much and detailed information as possible from the interlocutor. If the interlocutor during the session of questions and answers gives an answer consisting of the words "yes" or "no", the topic can not be opened. Therefore, the questions asked by the speaker in a monologue interview should be carefully thought out and aimed at revealing the essence of the issue.

In general, the interview genre is one of the most common in the modern Karakalpak press.

Conclusion

In conclusion, it should be noted that today's Karakalpak press makes sufficient use of the possibilities of the information genre. For example, events and incidents taking place in our country and foreign countries are reflected in the news published in the press, and events and incidents in the socio-political, economic, cultural, spiritual, educational life of our country are widely and comprehensively covered. covered in the genres of reports, reports and interviews.

At the same time, we considered it necessary to note the following.:

- Based on the rules of the genre, the materials belonging to the group of informational genres covered in the Karakalpak press are subject to specific requirements for brevity, accuracy, truthfulness and speed;

- materials of the information genre in the press are wide in scope and cover events and phenomena in the social, political, economic, cultural and spiritual spheres of our society;

- the following genres were mainly used in the use of information genres:

First, note;

Second, reporting;

Third, the interview;

Fourth, report.

In addition, we can point out the following shortcomings in using the possibilities of the information genre in the modern Karakalpak press:

- 1) the fact that the preparation of foreign news is limited only to Internet sources;
- 2) the fact that in most cases the coverage of events in our country uses the same genres;
- 3) the possibility of using the latest modern genres of information genres is not obvious.

References:

1. Kamalova D. E. Baspaso'zde novellanin' janrlig o'zgesheliklari (Жанровые особенности новелл в прессе) [Genre features of the novel in print] // Materiali respublikanskoy nauchno-prakticheskoy konferentsii. – Nukus. Ilim. 2019.
2. Тертычный А. А. Жанры периодической печати. Учебное пособие. – Москва. Аспект Пресс. 2002.
3. Современная журналистика. (Рук. проекта Ирнарзоро К.Т. Авторы: Нестеренко Ф.П., Ирнарзоро К.Т., Маматова Я.М.) – Ташкент. ЗАР КАЛАМ. 2006.
4. Xudoyqulov M. Jurnalistika va publitsistika. O'quy qo'llanma. – Tashkent. Universitet. 2008
5. Мухаммадиев Р. Публицистика жанрлари (Ўзбекистон газета ва журналлари материаллари асосида). – Ташкент. Ўзбекистон. 1965.
6. Marziyayev J.K. The principles of the development of present Karakalpakstan's mass media // International Scientific Journal (ISJ) Theoretical & Applied Science. – Philadelphia, USA. №03(83),500. 2020. <http://www.t-science.org/arxivDOI/2020/03-83/PDF/03-83-52.pdf>
7. Еркин Қарақалпақстан [Free Karakalpakstan], 2008, 10 апрел. (newspaper).
8. Вести Карақалпақстана [News of Karakalpakstan], 2008. 29 апрел. (newspaper).
9. Аму тонги [Amu morning]. 2008. 24 январ. (newspaper).
10. Xudoyqulov M. Jurnalistika va publitsistika. O'quv qo'llanma. – Tashkent. Universitet, 2008.
11. Камалова Д.Э. Роль художественной детали в каракалпакских новеллах [The Role of Artistic Detail in Karakalpak Novels]. // Донецкие чтения 2021: образование, наука, инновации, культура и образы современности: Материалы VI Международной научной конференции. – Донецк: Изд-во ДонНУ. 2021. – с. 139-142.

Rezyume: *Ushbu maqolada axborot janrlarining tasnifi va uning Qoraqalpog'iston matbuotida qo'llanilishi haqida so'z yuritiladi. Axborot janrlari har tomonlama tahlil qilinib, bugungi kunda janrlarning qoraqalpoq matbuotida qo'llanilishi darajasi va ko'lam o'rganilgan.*

Резюме: *В данной статье рассматривается классификация информационных жанров и ее использование в прессе Каракалпакстана. Всесторонне анализируются жанры информации, изучается уровень и степень использования жанров в каракалпакской прессе на сегодняшний день.*

Kalit so'zlar: *Axborot, janr, guruh, gazeta, xabar, intervyu, reportaj, hisobot.*

Ключевые слова: *Информация, жанр, группа, газета, заметка, интервью, репортаж, отчет.*

ON THE ISSUE OF LEGAL REGULATION OF THE PROVISION OF PUBLIC SERVICES IN THE REPUBLIC OF UZBEKISTAN

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Summary: *The article is devoted to the issues of legal regulation of public services, by means of review and analysis of normative-legal acts of the Republic of Uzbekistan, the author highlights the stages of improvement of their mechanisms, reveals the existence of duplication in the normative-legal acts.*

Key words: *e-government, Unified portal of interactive public services, electronic public services, Ministry of Justice of the Republic of Uzbekistan.*

INTRODUCTION.

In the context of the ongoing large-scale reforms in Uzbekistan, the role of public services is increasing as a strategic tool to meet the needs of individuals and legal entities, both offline and online. The regulatory framework for the provision of public services is enshrined in the Constitution of the Republic of Uzbekistan, which is currently being amended and supplemented, laws and by-laws. So what exactly are public services? This is a relatively young and dynamically developing legal institution in the post-Soviet space, while in developed countries public services have been in demand since the early 1980s.

If we conduct a retrospective analysis of legal acts regulating the provision of public services, the Law of the Republic of Uzbekistan "On e-government" of December 9, 2015 No LRU-395 (The Law) can be defined as a priority document.[1] Article 3 of The Law stipulates that a public service is a service rendered by the state bodies on implementation of their functions, carried out upon request of applicants. A public service can also be provided by other organizations in cases where they are entrusted with the functions of providing public services in accordance with the law. Thus, the whole Chapter 3 of the Law (provision of electronic public services) discloses such provisions as: types of electronic public services; Unified Register of electronic public services; requirements for electronic public services; requirements for the request for provision of electronic public services; requirements for the response to the requested electronic public service; rights of the applicant when receiving electronic public services; procedure for quality assessment of provision of electronic public services.

Further, by Presidential Decree No. UP-4947 of 07.02.2017 approved the Strategy for the Further Development of the Republic of Uzbekistan. Thus, point 1.2 (reforming the public administration system) provided for the improvement of the "e-government" system, improving the efficiency, quality and accessibility of public services for the population and business entities.[2] Among the cardinal measures in the State Program for 2017, such progressive ideas were provided as: improving the quality and efficiency of public services, putting public control mechanisms into practice, posting on official departmental websites of all decisions and documents on issues related to the provision of public services and the application of administrative procedures, reducing the number of state unitary enterprises and involving the private sector in the implementation of certain types of public services, introducing a system for evaluating the performance of ministries, departments and local governments and the quality of public services provided by the population through sociological surveys, establishing interactive public services in the field of notaries for citizens and entrepreneurs, improvement of licensing procedures by automating the implementation of the complex of information systems "License" in all licensing authorities, the provision of personalized public services by creating a personal account of a citizen and an entrepreneur on the Single Portal, establishing a list of information sent using interdepartmental electronic interaction in the provision of public services, installing 250 info kiosks in One Stop Shop centers and branches of Uzbekistan Post JSC in the regions, public services will be provided through info kiosks,

payments will be accepted and received some permits and certificates for segments of the population who do not have access to computers, tablets or smartphones and the Internet, including for entrepreneurs, the increase in public confidence in government bodies is increased as a result of saving the population's time when using public services, opportunities will be created for collecting data and provision of electronic public services, improving the computer literacy of citizens and entrepreneurs, skills in using electronic public services.

Moreover, the Decree of the President of the Republic of Uzbekistan dated September 8, 2017 No. PD-5185 approved the Concept of Administrative Reform in the Republic of Uzbekistan (Concept), which structurally consists of six fundamental areas:

I. Improvement of institutional and organizational-legal bases of activity of executive authorities;

II. Concretization of tasks (functions, powers), mechanisms of their implementation and areas of responsibility of executive authorities, improvement of coordination and interaction processes;

III. Further reduction of administrative impacts on the sectors of the economy and expansion of market mechanisms of management;

IV. Improvement of mechanisms for the vertical system of governance and interaction among executive agencies;

V. Introduction of modern forms of strategic planning, innovative ideas, developments and technologies into the system of public administration;

VI. Formation of an effective system of professional civil service, the introduction of effective mechanisms to combat corruption in the system of executive power bodies.

It is in this document it is emphasized that the level of public service delivery does not meet the expectations and requirements of the population and businesses, does not contribute to increasing confidence in the system of public administration. And it was planned to further improve the system of public services by:

Creation on the basis of "one window" centers, including departmental, unified centers to provide public services to individuals and legal entities;

regulation of all government services, including them in the single register;

definition and gradual expansion of the list of documents and information to be obtained by the executive authorities through interdepartmental interaction in the provision of public services.

It is worth noting that electronic portals and databases have been created to ensure the openness of state bodies and improve the system of public services.

In particular, to simplify obtaining permits and licenses the website www.license.gov.uz was created, to ensure the provision of public services on the principle of "one window" - birdarcha.uz. As a result of the revision and optimization of public services, the number of procedures for registration of a business entity was reduced by 4 times, and the time required for registration - up to 30 minutes.[3]

In addition, the Decree of the Cabinet of Ministers of the Republic of Uzbekistan "On measures to improve the delivery of electronic public services through a Unified portal of interactive public services of the Republic of Uzbekistan" from 15.09.2017 № 728 (Unified Portal) in the world information network Internet launched a new version of the single portal.

According to paragraph 3 of the above-mentioned decree, it was established that the Ministry for the Development of Information Technology and Communications of the Republic of Uzbekistan is the authorized body to assess the demand for public services in order to further introduce them on the Unified Portal;

The most demanded public services, determined by the results of the assessment of the demand for public services, are implemented on the Unified Portal;

The Center for Development and Introduction of Computer and Information Technologies "Uzinfokom" of the Ministry of Information Technology and Communications Development of the

Republic of Uzbekistan is the Unified Integrator for the introduction and technical support of electronic public services on the Unified Portal;

Business entities on a contractual basis with the state and business administration, local public authorities and other organizations that provide public services, participate in the implementation on the Unified Portal and official websites of the popular electronic public services.[4]

It is worth noting that Appendix 1 of this decree approved the Regulations "On the unified portal of interactive public services of the Republic of Uzbekistan", which includes general provisions, goals and objectives of Unified Portal, types and classification of electronic public services, the order of delivery of electronic public services, a repository of electronic documents and final provisions.

The next stage in improving the system of public services was the signing of the Decree of the President of the Republic of Uzbekistan "On measures for radical reform of the national system of public services" from December 12, 2017 No. PD-5278. According to paragraph 1 of this Decree, the most important areas of radical reform of the national system of public services delivery were defined as:

First, the implementation of the idea "**It is not the people who should serve the state bodies, but the state bodies that should serve the people**" by drastically improving their quality, efficiency, transparency and accessibility;

Second, the transformation of Unified centers of providing public services to business entities on a "on a one-window" basis into Public Service Centers that provide services on a " on a one-window" basis to both legal entities and individuals;

Third, approval of administrative regulations for each type of public service, providing for a simplified mechanism for the provision of public services based on the principle of "*Moving documents, not citizens*", primarily by eliminating unnecessary procedures, independent receipt by authorized government bodies and other organizations of the necessary documents and information from other structures;

Fourth, accelerated introduction of innovative solutions and ICTs in the provision of public services, integration of databases of government agencies and other organizations into a unified system of interagency electronic interaction, expanding the practice of providing public services through the Unified Portal;

Fifth, the use of flexible, convenient and transparent methods of providing public services, including travel to remote areas ("mobile public services"), an automated queue management system and an extended work schedule, aimed at eliminating bureaucracy and corruption in this area;

Sixth, the introduction of advanced mechanisms for monitoring and evaluating the quality and efficiency of public services, the organization of an effective system of feedback from the population, including "hotlines", online surveys on official websites, social networks and mobile applications;

Seventh, organization of systematic training and retraining of qualified personnel in the provision of public services, periodic advanced training, including through internships in leading specialized institutions of foreign countries.

Paragraph 11 instructed the Ministry of Justice together with the ministries and departments concerned to ensure the formation of the Unified Register of public services by February 1, 2018. If since February 1, 2018 state bodies and other organizations providing public services ensure their registration in the Unified Register of public services, then since June 1, 2018 it is not allowed to provide public services not included in this register.

Also, Paragraph 9 of this document approved the Set of measures to further improve the system for the provision of public services to individuals and legal entities and the List of public services to be introduced in stages in 2018-2020, provided on a "one-stop shop" basis exclusively through Public Services Centers.

In addition, by Decree of the President of the Republic of Uzbekistan dated December 12, 2017 No. PD-3430, the Public Services Agency under the Ministry of Justice of the Republic of Uzbekistan was organized, and in accordance with paragraph 6 of this resolution, the Cabinet of Ministers was instructed to approve the Regulations on the Agency, as well as an action plan for the implementation of the List public services introduced in stages in 2018-2020, provided on "on a one-window" basis exclusively through public service centers.

In addition, by Decree of the President of the Republic of Uzbekistan dated December 12, 2017 No. PP-3430, the Public Services Agency under the Ministry of Justice of the Republic of Uzbekistan was organized" [5] and in accordance with paragraph 6 of this resolution, the Cabinet of Ministers was instructed to approve the Regulations on the Agency, as well as an action plan for the implementation of the List of public services to be phased in in 2018-2020, provided "on a one-window" basis exclusively through the Public Services Centers.

Thus, clause 1 of the Decree of the Cabinet of Ministers of the Republic of Uzbekistan "On measures to organize the activities of the Public Services Agency under the Ministry of Justice of the Republic of Uzbekistan" dated January 31, 2018 No. 70 approved the Regulations on the Public Services Agency under the Ministry of Justice of the Republic of Uzbekistan and the Action Plan for the implementation of the List of phased implementation in 2018-2020, public services provided on a one-window basis exclusively through the Public Services Centers.

In order to radically reduce unnecessary bureaucratic processes in doing business and further develop the national system for the provision of public services, the President of the Republic of Uzbekistan signed a Resolution "On measures for the further integrated development of the national system for the provision of public services" dated February 15, 2019 No. PR-4193. [12]

From June 1, 2019, this resolution established the procedure according to which:

individuals and legal entities have the right to receive public services in the centers of public services on an extraterritorial basis, regardless of the place of permanent (temporary) registration of citizens and the postal address (location) of legal entities;

when applying for public services through the Unified portal, the state duty, fees and other payments are paid in the amount of 90 percent of the amount paid when applying through the Centers or directly to the bodies providing services;

state bodies and organizations providing public services enter the information necessary for the provision of public services, according to the list determined by the Ministry of Justice of the Republic of Uzbekistan jointly with the Ministry for the Development of Information Technologies and Communications, into their databases and information systems in electronic form for the formation of electronic databases.

The Decree approved the Action Plan for the optimization of public services, the formation of electronic databases of information necessary for the provision of public services, as well as the integration of departmental information systems and databases into the "Electronic Government system".

Also, by this document, ministries and departments were instructed to ensure the revision of departmental regulatory legal acts in accordance with the schedule by bringing the procedures for the provision of public services in line with the Law of the Republic of the Republic of Uzbekistan "On Administrative Procedures".

An equally important role is played by the Decree of the President of the Republic of Uzbekistan "On measures to further improve the activities of bodies and institutions of justice in the implementation of state legal policy" dated May 19, 2022 No. PD-5997. [13] Despite the fact that this document was adopted during the period of intensive fight against the pandemic, it assigns additional tasks and functions to the Ministry of Justice, such as:

- ensuring the uniform application by state bodies and organizations of the basic principles and norms of the Law of the Republic of Uzbekistan "On Administrative Procedures", digitalization of public services, bringing the share of public services provided in electronic form to 12 percent,

increasing by 15 units the number of new services provided to the population by public service centers.

- introduction of public services of an informative nature, in automatic mode without queuing and making an application (for example, with a USSD request via mobile communication).

- Optimization of administrative procedures, automation of management processes, formation of an effective information exchange system for timely and adequate response to the challenges and problems arising at the level of territories and the country as a whole, automation of relationship management with service recipients, further expansion of electronic public service delivery using modern information technology.

- Optimization of processes of rendering all public services by applying methods of Business Process Reengineering (BPR), conducting analysis of relevance of requirements with maximum reduction of procedures, terms and required documents.

- Providing methodological assistance to government agencies and other organizations in the application of BPR in their provision of public services.

- Improving the public's skills in using public services through the Internet, Unified Portal mobile applications.

- Gradual reduction of licensing procedures in the sphere of entrepreneurial activity with the establishment of rules on the abolition of the requirement to obtain a permit to engage in these activities.

- Improvement, on a permanent basis, of the infrastructure of public service centers, as well as reduction of queues by digitalization of services and creation of rest rooms on the territory of these centers.

- Development of a single platform of public services, the connection of all responsible government agencies to this platform.

- Development of new areas of improvement of public services through an annual study of the level of satisfaction of citizens with public services.

- Gradual expansion of the list of public services provided on the basis of extraterritorial principle, as well as providing the opportunity to use them remotely, outside the Republic of Uzbekistan.

- Improving the literacy of the population in the development of skills to use electronic public services.

- Development and introduction of standards for public services (standard of integration of information systems and technical standards).

- Expanding the types of services provided by the Public Service Centers.

- Automating of public services of social importance.

In addition, in order to implement the goals and objectives, this document approved: "Roadmap" for the implementation in 2020-2021 of the Concept of development of justice bodies and institutions in 2020-2024; Target indicators of development of justice bodies and institutions in 2020-2024; Program of revision of norms of by-laws establishing legal responsibility and sanction; Additional measures to improve the legislation on administrative procedures.

The Decree of the President of the Republic of Uzbekistan "On measures to improve the infrastructure of public services and increase public access to public services" from July 24, 2021 № UP-6269 [14] established the order in accordance with which from November 1, 2021:

a) 50 percent discount is applied (except for applications for entrepreneurial activity or as a representative of a legal entity) when rendering public services to persons registered in the information system " Unified Register of Social Protection", as well as persons with group I and II disabilities through public service centers and (or) Unified Portal on state fees, charges and any other payments established by acts of legislation;

b) upon application of applicants, 50 percent of state fees, charges and any other payments paid for the use of services shall be returned to them within one working day in case of delay in provision of state services rendered through the state service centers, the information system

"License" and Unified Portal, for more than three working days from the term established by the acts of legislation. In this case:

payments are returned to the applicant at the expense of the Fund of development of public services of the Ministry of Justice and are recovered by the Ministry of Justice in an unconditional (acceptance-free) manner from the extra-budgetary and other funds of state bodies and organizations, which allowed a delay in the provision of public services.

In addition, this document approved:

The list of state services to be implemented in stages through state service centers and Unified Portal, the list of state bodies and organizations responsible for providing certain types of information and documents in electronic form through the interagency integration platform of the "e-government" system from October 1, 2021, the list of certain types of state services whose terms are reduced from January 1, 2022 and the Roadmap for further simplification of procedures, reduction of time and required documents and digitalization of state services.

Meanwhile, according to L.Iskhakova, the stages of the national legislation on electronic public services begin in 2005, when the first regulations on the provision of interactive public services were adopted. Further, the author notes that "today in Uzbekistan a certain legislative and institutional framework for providing these services has been created and it continues to develop. A unified state policy in the field of administrative procedures and public services is being implemented.[6]

However, it is worth noting that the provision of public services to the population in Uzbekistan began long before the introduction of ICT in government agencies. Thus, according to M. Babajanov, the development of the sphere of rendering public services to the population is conditionally divided into two stages, in which the first stage includes the period from 1991 to 2017, and the second stage begins in 2017 and lasts to the present. The author further emphasizes that "at the first stage, the level of public service delivery largely did not meet the expectations and requirements of citizens and entrepreneurs, characterized by a high level of paper bureaucracy and did not contribute to increasing confidence in the system of public administration, the second stage began the stage of establishing interagency cooperation, eliminating excessive bureaucracy and paperwork. Since 2017, the Agency of Public Services under the Ministry of Justice began operating in Uzbekistan (there are 205 public service centers across the country and 115 branches in remote areas), before which such a practice did not exist.[7]

However, in our opinion, there is a third stage of development, which is associated with the adoption of The Law of the Republic of Uzbekistan "On Administrative Procedures" of January 08, 2018 No. LRU-457 [8], which came into force after twelve months from the date of its official publication, i.e. from January 2019. As this Law applies to the procedures related to the provision of public services, enshrines a legal definition of administrative regulations. Thus, according to article 84 of the Law administrative regulations, taking into account the specifics of administrative bodies' activity on resolution of administrative cases, adoption of administrative and procedural acts, execution of administrative acts, as well as consideration of administrative complaints, are approved by the Cabinet of Ministers of the Republic of Uzbekistan, unless otherwise provided by the legislation. In addition, liability for violation of legislation in the sphere of rendering public services was introduced (Article 215⁵ of The Code of Administrative Responsibility of the Republic of Uzbekistan) [9].

Further, in connection with the dissolution of the State Services Agency and the transfer of its functions to the Ministry of Justice on March 17 of this year by Presidential Decree No. PD-89 "On measures to further enhance the effectiveness of bodies and institutions of justice in ensuring the rights and freedoms of citizens, as well as in the provision of legal services.[10]

Thus, paragraph 2 of this Decree entrusts the Ministry of Justice with the following additional tasks:

a) in the sphere of rendering state services to the population:

implementation of a unified state policy in the sphere of rendering state services to physical and legal persons;

ensuring fast, convenient and high quality provision of state services through elimination of excessive administrative procedures

monitoring and evaluating the effectiveness of government agencies and other organizations in the provision of public services, including the implementation of appropriate information systems, resources and databases.

And on April 20, 2022 the Decree of the President of the Republic of Uzbekistan "On additional measures to simplify the delivery of public services, to reduce bureaucratic barriers and develop the national system of public services", which approved the Strategy of New Uzbekistan and the National Strategy for the modernization and rapid development of public services for 2022-2026, which laid the foundation for a fundamentally new approach to the provision of public services (Strategy).[11]

The goal of the Strategy is to increase the range of public services that are easy to use, convenient and transparent for individuals and legal entities, expand the possibility of independent remote use of electronic public services and create an inclusive environment by ensuring equal conditions for all in the provision of public services.

To achieve the goal, the main objectives of the Strategy were defined:

Providing convenient ways to apply for public services;

Evaluating the regulatory impact of the Centers and Unified Portal by simplifying their procedures before the introduction of new services, mainly by organizing pilot services in a particular region;

Determination of effective mechanisms for reliable pre-trial protection of violated rights of individuals and legal entities;

Improvement of the Unified Portal mobile application and expansion of opportunities to use popular services through this application;

Improving the position of the Republic of Uzbekistan in international rankings in the field of e-government, the development of public services;

Improving the performance of the Centers;

phased transfer of some public services to the private sector.

The Strategy is based on the following principles:

Citizen - centric service in the provision of public services (Citizen – centric service). This principle implies that the organizational and legal mechanism of public services will be created with maximum user-friendliness. This, in turn, requires the active participation of users in the implementation and improvement of public services.

Creation of high social value at low cost. In order to ensure a high level of user satisfaction in the provision of public services, the government should effectively use advanced management technologies, public-private partnerships and market economy principles.

Innovative development of public services. It is necessary to use the mechanism of innovation, monitoring, quality control and making timely operational adjustments to the system of public services.

Legal clarity and security. Provision of public services must be carried out, in accordance with the law, administrative procedures and reliable guarantees of control over the legality of relevant decisions and actions.

However, despite the fact that the Strategy has a roadmap for its implementation in 2022-2026, consisting of 98 points, targets (indicators) of accelerated development of public services in 2022-2026, the Decree No. PD-357 dated August 22, 2022 "On measures to raise the sphere of information and communication technologies in 2022-2023" was adopted. Thus, paragraph 6 of this decree, in order to create additional convenience for the population and business entities in the use of electronic public services from November 1, 2022 allows:

mobile operators, commercial banks and payment system operators to provide electronic public services on Unified Portal through their mobile applications in compliance with information security requirements;

the use of electronic public services implemented on the mobile application Unified Portal, using the keys of electronic digital signature placed on the identification ID-card.

The users of electronic public services are identified through the Unified Information System of Identification of Users of the "E-Government" system.

In addition, the "roadmap" of the decree (Development of digital government and increasing the share of electronic public services p. 17-51) duplicates activities in terms of improving e-government and public services. In particular, if paragraph 68 of the "road map" of the Strategy (No. PD-113 of April 20, 2022) provides for the revision of the Law "On electronic government", while defining in it specific procedures for the provision of proactive government services, maintenance of "Mobile-ID" system, as well as stable sources of funding for "e-government" projects, then paragraph 30 of the "road map" of the Presidential Decree (No. PD-357 of August 22, 2022) also provides for a revision of the Law on e-government, preparation of proposals to make proposals for the introduction of e-Government.

But neither of the above-mentioned two documents provides for revision of the Law "On E-Government" from the position of clear definition of the status of the Ministry of Justice.

CONCLUSION

Thus, based on the review and analysis of normative legal acts on legal regulation of public services we can conclude that there is a sufficient and even a very large number of legal acts, which are regulated mainly at the subordinate level, at the same time there are duplicating activities in implementation of "road maps" of normative legal acts, which requires unification and systematization of legislation on public services provision into a single Law, which will ensure uniform and direct application of norms in law enforcement practice.

References:

1. Law of the Republic of Uzbekistan "On e-government" // <https://lex.uz/docs/2833855>
2. Presidential Decree of the Republic of Uzbekistan No. UP-4947 of 07.02.2017 // <https://lex.uz/docs/3107042>
3. Presidential Decree of the Republic of Uzbekistan No. UP-5185 of 08.09.2017 // <https://lex.uz/docs/3331176>
4. Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 728 of 15.09.2017 // <https://lex.uz/docs/3353198>
5. Presidential Resolution of the Republic of Uzbekistan No. PR-3430 of 12.12.2017 // <https://lex.uz/docs/3454986>
6. L.F. Iskhakova The main stages and features of the development of legal regulation of the provision of interactive public services in the Republic of Uzbekistan // "Adliya sohasida raqamlashtirishni rivojlantirishning zamonaviy tendensiyalari" xalqaro konferensiya materiallari (2021-yil 14-dekabr). pp. 41-51
7. M. Babajanov Development of the public service delivery system in the Republic of Uzbekistan // <https://www.cer.uz/uz/post/publication/razvitie-sistemy-predostavleniya-gosudarstvennyh-uslug-v-respublike-uzbekistan>
8. The Law of the Republic of Uzbekistan "On Administrative Procedures" <https://lex.uz/docs/3492203>
9. The Code of Administrative Responsibility of the Republic of Uzbekistan // <https://lex.uz/docs/97661>
10. Decree of the President of the Republic of Uzbekistan No. UP-89 // <https://lex.uz/docs/5915489>
11. Presidential Decree of the Republic of Uzbekistan No. UP-113 of 20 April 2022 // <https://lex.uz/docs/5971609>
12. Presidential Decree of the Republic of Uzbekistan No. PP-4193 of 15.02.2019 // <https://lex.uz/docs/4203399>
13. Presidential Decree of the Republic of Uzbekistan No. PD-5997 of 19 May 2020 // <https://lex.uz/docs/4820075>
14. Presidential Decree of the Republic of Uzbekistan No. UP-6269 of 24 July 2021 // <https://lex.uz/docs/5530491>

Rezyume: Maqolada davlat xizmatlari ko'rsatishni huquqiy tartibga solish masalalariga bag'ishlangan bo'lib, muallif O'zbekiston Respublikasining normativ-huquqiy hujjatlarini ko'rib chiqish va tahlil qilish orqali ularning mexanizmlarini takomillashtirish bosqichlarini yoritilmoqda, normativ-huquqiy hujjatlarni takrorlovchi holatlar mavjudligini aniqladi.

Резюме: Статья посвящена вопросам правового регулирования оказания государственных услуг, путем обзора и анализа нормативно-правовых актов Республики Узбекистан, автором выделены этапы совершенствования их механизмов, обнаружено наличие дублирований в нормативно-правовых актах.

Kalit so'zlar: elektron hukumat, Yagona interaktiv davlat xizmatlari portali, elektron davlat xizmatlari, Adliya vazirligi.

Ключевые слова: электронное правительство, Единый портал интерактивных государственных услуг, электронные государственные услуги, Министерство юстиции.

THE ROLE OF ART IN THE DEVELOPMENT OF TOURISM

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Summary: *The role of artistry in the development of tourism, the service of the "Art" group in Karakalpakstan, the systems of art masters included in tourist routes are included in the article.*

Key words: *national artistry, tourism, Master apprentice schools, tourist route, embroidery, weaving.*

Art is one of the areas that has a special place in the development of the tourism direction of the country. It has an important role in the development of both culture and economy due to the development of artistry. In today's globalization period, arts and crafts, which are considered an integral part of our spiritual life, the revival of the products made by our artists, and the growing respect for this field, will not fail to please everyone. Creativity is the most important wealth of any nation, and it is considered a data that shows spiritual and material wealth. Today, a number of measures are being implemented in order to promote and support arts and crafts. On October 24-25, 1995, the first republican fair of folk craftsmen and crafts of Uzbekistan was held in Tashkent in cooperation with the Embassy of Uzbekistan in Uzbekistan.

In 1997, the "Usta" (craftsmen) association of folk artists and craftsmen of the republic was established. The resolution of the President of the Republic of Uzbekistan dated March 31, 1997 "On the means of supporting and encouraging the development of folk arts and handicrafts"[1] was of great importance in the revival and development of the arts in Uzbekistan, as well as in the restoration of some desired directions. Artifacts were approved by the Chamber of Industry and Production, and then the Chamber of Commerce. They were united in a special group "Art" of the Republic.

On June 27, 1997, the Council of Ministers of the Republic of Karakalpakstan adopted a special resolution on the implementation of the presidential decree. According to this decision, the Karakalpakstan Republican branch of the "Art" joint venture was completed. On December 31, 1997, according to the Presidential decree No. 1741, it was transferred from the authority of the city of Nukis to the system and acquired the right of legal entity. Firstly, in the building of the "Maman" joint-stock company an office was built, the former felt printing plant. Currently, the "Doslyk" building on A. Shamuratova Street in Nukus is under construction. The Karakalpakstan Republican branch of the "Art" joint venture became a free enterprise People who have reached the age of 17, who are engaged in folk arts, masters of arts and crafts, well-known craftsmen among our people, are going to work voluntarily. There are more than 10,500 artisans, and more than 2,500 are craftsmen. In the Republic of Uzbekistan, 34 types of products are produced by crafts, while in Karakalpakstan works are carried out on 26 types of crafts. 52% of artifacts are women and the rest 48% are men. Among them are "ganesh" carving, hand-woven carpet weaving, hand-woven embroidery, stone carving, copper carving, metal products, tin products, national footwear production of clothes, national clothes, national headdresses, wood carving, bone carving, embroidery, making musical instruments, porcelain, earthenware and quality products, jewelry, toys, jewelry, jewelry made of precious metal in the national way, souvenirs. Many people are busy with making arts. Musical instrument makers, carpet weavers, carpet weavers, and black house (Qara u'y – national-historical house of Karakalpak people) makers in the Karakalpakstan region are different from the arts of other regions. For example, ala moynak duutar, girzhek, kobyz (musical instruments) differ from other peoples in their production techniques, form, and style.

As we know from history, there were a lot of arts in Shimbay, Qon'irat and Xojeliregions. Even their art was in the neighborhoods named after them[3.147]. Even today, in our villages, we use place names related to art. Although their names have been changed due to the politics of the era, village names related to art are still preserved in archive data.

Along with our mother tongue, customs and traditions, the importance of our artistry is great in the upbringing of young children, who are the pillars of our future, and in molding feelings of loyalty to the nation. The intelligence, skill, and nationalism of our ancestors are reflected in each artistic product.

For that reason, during the Soviet era, the artistic products and equipment of our ancestors were in places where they could not exist. For example, our aunt Zhumataeva Klara from Tahtakopir remembers what her mother said: "If we felt that an unknown person was touching us while we were spinning yarn, we would throw the yarn we were spinning into the burning hearth" [4]. However, despite that, we can see the artistic creations of our people in our museums. Exhibitors there are trying to impress visitors from foreign countries. In the museums, we have samples of the handicrafts made by our master flower masters the number of our artists who have developed their art is increasing day by day. According to the decision of the President of the Republic of Uzbekistan dated December 31, 2021, "On the system of support and improvement measures for the development of artistic business" PK-77, concessions have been granted to artistic subjects. In this resolution, in the area of "Jalaliddin Manguberdi Garden" in Yellikkala district of the Republic of Karakalpakstan, the "City of Crafts" dedicated to the production of carpets, felt weaving, leather goods, woodcarving and woodcarving products was developed, it was included in the tourist route, and the traditional Karakalpak national "blue dress" festival was learned and re-enacted. Also, in order to create the necessary conditions for the arts to provide services in this direction, the problems of launching the service "Arts of Art" in Xojeli region were noted [5]. The art of embroidery is also one of the popular fields. Because nowadays, people from abroad are interested in hand-woven products. In the same direction, with the aim of passing down our national embroidery from our ancestors, many young women are engaged in embroidery. One of the arts that restored the peasantry, after our country adopted its impartiality, it led to the restoration of our nationality and the increase of our interest in it, at the same time, the customs of our people took on a new color, and our national traditions were revived. Among them, our people's golden heritage, passed down from age to age, from generation to generation, from father to son, created in the Aral region, has been newly revived. I created a dream where I gathered the master girls together to recreate the golden heritage of the peoples who made it along the island, put it in a new color for today, put different patterns on the embroidery pages that do not repeat each other. This is the Republic of Karakalpakstan, which is called the "golden mire of the island" and opened its doors on Ayimkhan Shamuratova street in the city of Nokis The management of dream girls is a social integration of individual moments. Gulnara Embergenova, a specialist in her field, is in charge of this public association. A total of 60 people work in this company during joint production. 40 people are working in Moynak, 20 people are working in Nukus. The products of the co-operative workers are small handbags, eyeglass cases, bags for dream girls, necklaces, shirts, business cards, scarves and other consumer goods, carved using unique patterns of the Karakalpak people, and delivered to their users girls from Moynak embroider patterns on the goods, while Nukus girls embroider ready-made products from them.

Due to the strong interest of foreign guests in such ready-made products, this joint has not stopped its service even today. Joint head Gulnara Embergenova was born on November 14, 1961 in the city of Nukus. Between 1969 and 1977, he graduated from the secondary school named after Berdak in Nukus. In 1986, he graduated from the Ostrovsky Institute of Theater Arts in Tashkent, and later worked as a teacher of art poetry at the Japaq Shamuratov Academy of Arts in Nukus.

In the context of the new beginnings of the era of impartiality, Gulnara Embergenova has been working as the head of the public association of independent private meetings of girls of the Republic of Karakalpakstan since June 9, 1998. This joint set a number of tasks:

Revival of Karakalpak national traditions and national values and types of non-patterned embroidery and its development. In the Aral region, in the environmental crisis, they worked out solutions to improve the living conditions of mothers and children. In the culture, art, and education of the Karakalpak people, and at the same time, the progress of implementation of the exercises on

the environmental education, art, hygienic education among the children will be reflected in the joint works.

The Counterpart Consortium of the Global Society, the Open Society Institute of Uzbekistan, the Soros Foundation, ORP and other public institutions cooperated with me in this cooperation. With the help of UNESCO, I have seen with my own eyes how the artistic development in India and New York has increased.

The association "Golden Heritage of the Island" is contributing to the presentation of the beautiful heritage of the Karakalpak people at exhibitions and festivals with many products made by flower girls. Nowadays, this joint is engaged in sewing national clothes. In particular, the actress sews stage clothes and supplies our boys with national clothes. National clothes with national motifs are being sewn for the girls and boys of ensembles such as Aikulash, Hurliman, and Tumaris. Today, the girls trained by Gulnara Embergenova have their own apprentices and they are going to carry out their work in front of them in the name of Master's apprentice.

In her speech, Gulnara Embergenova notes that they realized that they have the opportunity to earn money from their handicrafts and provide for their families. And he said that the things that make each people different from other people are the products made by the arts. [6] The Karakalpak people are distinguished from other peoples by the "blue dress" made by artistic girls. The blue shirt is the Karakalpak national dress, and in its preparation we used products grown in our country. The blue dress is the most precious and valuable of the wedding dresses, and there was not a girl who did not forget to wear it.

The patterns of this dress were elaborate and had a great meaning. The blue color itself is the color of the sky and gives the basic meaning of life, and the trunk of a large tree with branches stretched in all directions shows that it is the opposite of mother and life [7].

Weaving was taught by mothers to their daughters and daughters-in-law. Every Karakalpak girl, before getting married, has been weaving whatever she needs for her family for years. Using goat and sheep wool, he developed his skills along with creating household goods. It is prepared as dyes from natural substances for dyeing threads in various colors. Carrot, onion, and pomegranate peels were used to obtain colors. The impact on our cultural life: thanks to our artistry passed down from father to son, our traditional customs and precious historical heritage are preserved from generation to generation. If we take this as an example of embroidery, Karakalpak girls tried to give them artistic beauty by embroidering their clothes. The ranks of our dream girls who continue this every day are growing day by day. One of them is Ramutullaeva Gumisay Bazarbaevna. Despite being young, the year 2009 perfected the company "Milliy kiyimlar tigiw xizmeti", she uses his own handiwork to put the Karakalpak patterns on bags, wallets, national capes, beshpents (traditional type of cloth), and collars. One of the Karakalpak people managed to recreate the "shanash". Milliy re-ticked on the "nogay jaga" calculated from the Karakalpak shores. They use their programs inspired by our national heritage in museums. According to Gumisay, one coin in a wallet can contain a lot of information. For example: the pattern on the wallet is used to determine how many girls and boys there are in this family, and how many girls have reached puberty. He explained that if the patterns are not completely done, there are girls in this family who have not yet reached the age of a man.

There are patterns on men's clothes and patterns on dream clothes. "Toye Taban" pattern is used only on men's clothes, "Kurbaqa" (a frog) pattern is used only on girls' clothes. Gumisay Rametullaeva is currently teaching her art to unemployed women at home, to people who have a passion for "Youth" [8].

We can see the attention paid to the development of the national art scene in our country in the exhibitions that have been rapidly developed in our country and abroad, and in the creation of conditions for the active participation of our artists in them.

Famous jeweler Tazhimuratov Adil took part in the festival in Bashkirstan with his jewelry, Adilshaeva Dilnoza took part in the Karakalpak national costume "blue dress" and saukele, Indira Mambetniyazova, Adilshaeva Dilnoza participated in the world festival "Stil mod" in Dubai,

Adilshaeva Dilnoza participated in Karakalpak national clothes under the brand "Sawkele", Indira Mambetniyazova participated in the topic "Aral Sea". The proof of this is the development of artistic events in the regions where the tourists visit more of the artistic products.

Departments of the Republic of Karakalpakstan were working in Tortkul, Qon'irat, Xojeli, Yellikkala, Amiwdaya regions under the association "Art". In Shimbay, there was a workshop called "Black House", in Moynak "Otaw" art workshop, in Moynaq and Bozataw arts alliance, in Xojeli "Arts" town, in Shomanay "Ustaz-shakirt" school. Nawbetova Altinay is the head of the "Ustaz shakirt" school. Art cooperation The Academy of Fine Arts, museums, cultural events, famous masters work together with them. [2]

Promotion of our material and cultural heritage through the promotion of tourism, allows for the development of our artistry. This is evidenced by the development of artistic products in areas where tourists visit more. Due to increasing the interest of tourists to our country, the flow of investment will expand, and the dances of our national culture will be learned more widely. In paragraph 12 of the resolution of the President of the Republic of Uzbekistan dated December 31, 2021, "On the system of support and improvement measures for the development of artistic business", the Ministry of Tourism and Sports

The Chamber of Commerce and the "Art" community have established the following entertainments for the aim of including the "Artistic Occasions" and "Ustaz Shakirt" schools in the tourist routes.

Initials;

	Name	Type of service	Address	Form of service
1	Adilchaeva Gulnaz Rustemovna	Preparing national clothes	Nukus city	School of "Ustaz-sha'kirt"
2	Qunnazarova Bibisara Qalmuratovna	Making handmade carpets	Nukus city	School of "Ustaz-sha'kirt"
3	Allamberganova Maxada Qudaybergenovna	Miniature, colourful paintings and patterns	Nukus city	School of "Ustaz-sha'kirt"
4	Kerova Jeren Qutlimametova	Making handmade carpets	Taxiyatash region	School of "Ustaz-sha'kirt"
5	Nazarbaev Fayzulla Eshimbetovich	Wooden items	Xojeli region	School of "Ustaz-sha'kirt"
6	Otambetov Salaxatdin Najimatdinovich	Musical instruments	Xojeli region	School of "Ustaz-sha'kirt"
7	Nawbetova Altinay	Making handmade carpets	Shomanay region	School of "Ustaz-sha'kirt"
8	Djabbarov Ramanberdi	Making hats	Ellikqala region	School of "Ustaz-sha'kirt"
9	Aminov Shoxnazar Kamildjanovich	Faience, porcelain, ceramic items	Tortkul region	School of "Ustaz-sha'kirt"
10	Iskandarov Qadambay Sheripovich	Musical instruments	Tortkul region	School of "Ustaz-sha'kirt"
11	Bozataw region		Amir Temur street	Alley of Craftsmen/Art

The place of artistry in the development of tourism in Karakalpakstan is enormous. We should keep really safe the artistic heritage that have been passed down from father to son and be able to use it productively.

One of our main goals should be to develop our artistry and, at the same time, increase the interest of foreign tourists.

References:

1. <https://lex.uz/docs/168968>
2. Tureniazova D.K. Field notes. No. 4.2022 (Head of the "Art" district of the Republic of Karakalpakstan Allambergenova Dilfuza Yakubovna, Nokis city)
3. Ethnography of the Karakalpaks at the end of the 19th century and the beginning of the 20th century. Tashkent. 1980.
4. Tureniazova D.K. Field notes. №3.2021 (Klara Zhumataeva, Takhtaköpir district, born in 1968)
5. <https://lex.uz/docs/-5807559>
6. Tureniazova D.K. Field notes. No. 4.2022 (Embergenova Gulnara, Nokis city, born in 1961)
7. Pirnazarova A. Art of Karakalpak people. \Amiodarya magazine, No. 1. 2022, 115 pages.
8. Tureniazova D.K. Field notes. No. 4.2022 (Rametullaeva Gumisay, Nokis city, born in 1992)

Rezyume: *Ushbu maqolada Qoraqalpog‘istondagi “Hunarmand” uyushmasi bilan turizmni rivojlantirishda hunarmandchilikning o‘rni, turistik marshrutlarga kiritilgan hunarmandlarning nomlari va faoliyati yoritilgan.*

Резюме: *В данной статье освещена роль ремесел в развитии туризма с союзом «Хунарманд» в Каракалпакстане, а также имена и деятельность ремесленников включенных в туристические маршруты.*

Kalit sózlar: milliy hunarmandchilik, turizm, ustoz-shogird maktablari, turistik marshurt, kashtachilik, tukuvchilik.

Ключевые слова: народные промыслы, туризм, школы мастеров, туристический маршрут, вышивка, ткачество.

THE CONCEPT OF SPECIAL SUBJECTS OF CRIME AND THEIR CLASSIFICATION

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Summary: *In this article, the concept of a special subject of the crime, the subject of the crime, the correct identification of the subject of the crime, the qualification of a criminal act, the correct application of the relevant article of the special part of the Criminal code are subject to decisive consideration. Also in article it is said that the issue of the subject of crime occurs in the theory of criminal law and in the practice of law enforcement bodies in close connection with the issue of the composition of the crime.*

Key words: *subject, official, war crimes, physical person, disposition, object, objective side, differentiation, demographic characteristics.*

Before proceeding to the description of the concept of a special subject of crime, let's consider the concept of the subject of crime itself, already the subject of crime, as one of the elements of the composition of the crime, forms the legal basis of criminal liability.

The correct determination of the subject of the crime is decisive in the qualification of the criminal act, the correct application of the relevant article of the special part of the Criminal Code.

The issue of the subject of crime arises in the theory of criminal law and in the practice of law enforcement bodies in close connection with the issue of the composition of the crime. It is known that in accordance with Article 16 of the CC of the Republic of Uzbekistan, the commission of an act in which all signs of the composition of the crime are present will be the basis for bringing to justice. The signs that characterize the subject of the crime are also included in the sentence of the symptoms mentioned above.

The definition of a criminal subject includes two aspects: the criminal legal aspect associated with the identification of legal symptoms, and the criminological aspect associated with the identification of socio-demographic, psychological and other social symptoms.

As a crime committed by an individual who is able to be criminally responsible for his act, a socially dangerous act provided for by criminal law is defined in this law as a subject of crime.

In the literature on criminal law, the view is put forward that the subject of the crime cannot be considered in the system of elements of the composition of the crime, since a person cannot be an element of the act committed by him.

The definition given to the concept of a special subject of a crime is a person who, in addition to the signs of a common subject of a crime, also has additional signs, is of great importance than theoretical and practical.

The current criminal law of the Republic of Uzbekistan does not give a general definition of the concept of a special subject of crime.

In criminal law, along with the general concept of the subject of crime, a separate concept – the presence of the concept of a special subject of crime-is determined only by the specific characteristics of individual types of crime associated with certain activities of people and their fulfillment of obligations established by law. That is why the legislator, unlike other crimes, in determining responsibility for certain crimes, meant not any person capable of committing a crime as their subject, but a person with special characteristics or signs under the law.

In accordance with the current criminal law, the sentence of special subjects of the crime includes officials, military personnel who have committed war crimes, as well as people of certain professions or persons engaged in muayan activities.

The content of a number of crimes is structured in such a way that the subject of the OES is not any sane individual who has reached the age established by law, but only a person who has certain additional signs, along with the general signs of the subject mentioned above.

Age, sanity – are the necessary signs of the subject, but the legislator in a number of cases associates the possibility of criminal prosecution not only with them, but also with special signs of the subject of the Crime.

It is known that in order to bring a person to criminal liability, the general subject of the crime must be filled with the necessary legal signs, that is – same and the age of responsibility established by law. However, when making has responsible for a number of crimes, along with the above-mentioned signs of a common subject, the presence of other additional signs is also required. Since these additional signs correspond to the description of the certain circle of persons, they are called facultative signs in the legal literature.

References:

1. Usmonaliev M. Jinoyat huquqi. Umumiy qism: Darslik/ - T.: Yangi asr avlodi. 2005.- 626.
2. Usmonaliev M. O'zbekiston Respublikasining Jinoyat huquqida ahloq tuzatish ishlari. O'quv qo'llanma/ - T.: TDYuI 2003.-B. 88.
3. Usmonaliev M., Bakunov P. Jinoyat xukuki. Umumiy kism. Toshkent. 2010. B. 143
4. Usmonaliev M.. O'zbekiston Respublikasining Jinoyat huquqida ahloq tuzatish ishlari. O'quv qo'llanma/ - T.: TDYuI 2003.-B. 88.
5. Abdumajidov A.«Jazo va javobgarlik» Qonun himoyasida. №4. 2001-B.14-16.
6. Abduqodirov Sh.Yo. Aybning ehtiyotsizlik shakli va uning belgilari. O'quv qo'llanma. —T.: TDYU, 2005
7. Abdurasulova Q. Jinoyatning maxsus su'bekt. O'quv qo'llanma. —T.: Taraqqiyot IICH x/f matbaa bo'limi, 2005

Rezyume: *Mazkur maqolada, Jinoyatning maxsus sub'ekti tushunchasini, jinoyat sub'ekti tushunchasi, jinoyat sub'ektini to'g'ri aniqlash jinoiy qilmishni kvalifikatsiya qilish, JK Maxsus qismining tegishli moddasini to'g'ri qo'llashda hal qiluvchi ahamiyatga egali haqida so'z yuritiladi. Shuningdek maqolada jinoyat sub'ekti masalasi jinoyat huquqi nazariyasida va huquqni qo'llovchi organlarning amaliyotida jinoyat tarkibi masalasi bilan uzviy bog'liqlikda yuzaga kelishi haqida aytiladi.*

Резюме: *В этой статье решающему рассмотрению подлежат понятие специального субъекта преступления, субъект преступления, правильная идентификация субъекта преступления, квалификация преступного деяния, правильное применение соответствующей статьи особенной части УК. Также в статье говорится, что вопрос о субъекте преступления возникает в теории уголовного права и в практике правоохранительных органов в тесной связи с вопросом о составе преступления.*

Kalit so'zlar: *sub'ekt, mansabdor shaxs, harbiy jinoyatlar, aqli rasolik, jismoniy shaxs, dispozitsiya, ob'ekt, ob'ektiv tomon, differentsiatsiyalash, demografik xossalar.*

Ключевые слова: *субъект, должностное лицо, военные преступления, вменяемое, физическое лицо, диспозиция, объект, объективная сторона, дифференциация, демографические характеристики.*

PECULIARITIES OF METAPHOR AND METONYMY IN ENGLISH

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Summary: *The article presents investigation on peculiarities of stylistic devices of metonymy and metaphor in English language. It discusses the deliberate replacement of names already in use that have been accepted by widespread usage and fixed in dictionaries, as motivated by the speaker's unique and subjective assessment of the world.*

Key words: *metaphor, metonymy, stylistic devices, trope, transference, substitution, contiguity, similarity, domain.*

Lexical stylistic device is such type of denoting phenomena that serves to create additional expressive, evaluative, subjective connotations. In fact, we deal with the intended substitution of the existing names approved by long usage and fixed in dictionaries, prompted by the speaker's subjective original view and evaluation of things. Each type of intended substitution results in a stylistic device called also a trope [1,207].

This act of substitution is referred to transference – the name of one object is transferred onto another, proceeding from their similarity (of shape, color, function, etc.) or closeness (of material existence, cause/effect, instrument/result, part/whole relations, etc.).

Metonymy is a figure of speech used in rhetoric in which a thing or concept is not called by its own name, but the name of something intimately associated with that thing or concept. For instance,

“... to whose young love

The vines of France and milk of Burgundy,

Strives to be interested.” (W. Shakespeare, “King Lear”)

Here, the italicized words stand for “the King of France” and “the Duke of Burgundy”.

Another example is “Westminster,” which is used as a metonymy for the Parliament of the United Kingdom, because it is located there.

Metonymy also may be instructively contrasted with metaphor. Both figures involve the substitution of one term for another. In metaphor, this substitution is based on some specific similarity, whereas, in metonymy, the substitution is based on some understood association (contiguity).

Metonymy works by the contiguity (association) between two concepts, whereas metaphor works by the similarity between them. When people use metonymy, they do not typically wish to transfer qualities from one referent to another as they do with metaphor: there is nothing press-like about reporters or crown-like about a monarch, but “the press” and “the crown” are both common metonymies.[1, 123]

Two examples using the term “fishing” help clarify the distinction. The phrase “to fish pearls” uses metonymy, drawing from “fishing” the idea of taking things from the ocean. What is carried across from “fishing fish” to “fishing pearls” is the domain of metonymy.

In contrast, the metaphorical phrase “fishing for information” transfers the concept of fishing into a new domain. If someone is “fishing” for information, we do not imagine that the person is anywhere near the ocean; rather, we transpose elements of the action of fishing (waiting, hoping to catch something that cannot be seen, probing) into a new domain (a conversation). Thus, metonymy works by calling up a domain of use and an array of associations (in the example above, boats, the ocean, gathering life from the sea), whereas metaphor picks a target set of meanings and transfers them to a new domain of use.[2, p. 124]

Sometimes, metaphor and metonymy may both be at work in the same figure of speech, or one could interpret a phrase metaphorically or metonymically. For example, the phrase “lend me your ear” could be analyzed in a number of ways. One could imagine the following interpretations:

Analyze "ear" metonymically first — "ear" means "attention" (because we use ears to pay attention to someone's speech). Now, when we hear the phrase "lending an ear (attention)", we stretch the base meaning of "lend" (to let someone borrow an object) to include the "lending" of non-material things (attention), but, beyond this slight extension of the verb, no metaphor is at work.

Imagine the whole phrase literally — imagine that the speaker literally borrows the listener's ear as a physical object (and the person's head with it). Then the speaker has temporary possession of the listener's ear, so the listener has granted the speaker temporary control over what the listener hears. We then interpret the phrase "lend me your ear" metaphorically to mean that the speaker wants the listener to grant the speaker temporary control over what the listener hears.

First, analyze the verb phrase "lend me your ear" metaphorically to mean "turn your ear in my direction", since we know that, literally, lending a body part is nonsensical. Then, analyze the motion of ears metonymically — we associate "turning ears" with "paying attention", which is what the speaker wants the listeners to do.

It is difficult to say which of the above analyses most closely represents the way a listener interprets the expression, and it is possible that the phrase is analysed in different ways by different listeners, or even in different ways by the same listener at different times. Regardless, all three analyses yield the same interpretation; thus, metaphor and metonymy, though quite different in their mechanism, may work together seamlessly. For further analysis of idioms in which metaphor and metonymy work together, including an example very similar to the one given here. [2, p. 130]

The concept of metonymy also informs the nature of polysemy, i.e., how the same phonological form (word) has different semantic mappings (meanings). If the two meanings are unrelated, as in the word pen meaning both writing instrument and enclosure, they are considered homonyms.

Within logical polysemies, a large class of mappings may be considered to be a case of metonymic transfer (e.g., chicken for the animal, as well as its meat; crown for the object, as well as the institution). Other cases wherein the meaning is polysemous, however, may turn out to be more metaphorical, e.g., eye as in the eye of the needle.

Metonymy also may refer to the rhetorical strategy of describing something indirectly, by referring to things contiguous to it, in either time or space. For example, in Jane Austen's novel *Pride and Prejudice*, the main character Elizabeth's change of heart and love for her suitor, Mr. Darcy, is first revealed when she sees his house:

They gradually ascended for half-a-mile, and then found themselves at the top of a considerable eminence, where the wood ceased, and the eye was instantly caught by Pemberley House, situated on the opposite side of a valley, into which the road with some abruptness wound. It was a large, handsome stone building, standing well on rising ground, and backed by a ridge of high woody hills; and in front, a stream of some natural importance was swelled into greater, but without any artificial appearance. Its banks were neither formal nor falsely adorned. Elizabeth was delighted. She had never seen a place for which nature had done more, or where natural beauty had been so little counteracted by an awkward taste.[Jane Austen, *Pride and Prejudice*, Chapter 43].

Austen describes the house and Elizabeth's admiration for the estate at length as an indirect way of describing her feelings for Mr. Darcy. One could attempt to read this as an extended metaphor, but such a reading would break down as one tried to find a way to map the elements of her description (rising ground, swollen river) directly to attributes of her suitor. Furthermore, an extended metaphor typically highlights the author's ingenuity by maintaining an unlikely similarity to an unusual degree of detail.

In this description, on the other hand, although there are many elements of the description that we could transfer directly from the grounds to the suitor (natural beauty, lack of artifice), Austen is emphasizing the consistency of the domain of use rather than stretching to make a fresh comparison: each of the things she describes she associates with Darcy, and in the end we feel that Darcy is as beautiful as the place to which he is compared and that he belongs within it. Metonymy

of this kind, thus, helps define a person or thing through a set of mutually reinforcing associations rather than through a comparison.

In conclusion both metonymy and metaphor belong to the language of design tools that ensure the coexistence of lexical items encountered at different stages in the history of the word. Sometimes he is denied the status of objects to study the rules of coexistence of linguistic units in their development, especially if they are not regular analogical models for the production of new units. The historical development of the meanings of the word, which is now on the way metaphorical, metonymical transfers or functional items, determine the appropriate type relations between coexisting further meanings of the word - just as the nature of the relationship between coexisting meanings of the word, to some extent indicates the course of its development. These types of associations (mostly metonymical and metaphorical) provide the most stable association of meanings within a single word.

References:

1. Lakoff, George and Mark Johnson. 1980. *Metonymy We Live By*. Chicago / London: Chicago University Press. P. 151-159
2. *Corpus-Based Approaches to Metaphor and Metonymy*. Edited by Anatol Stefanovic, Stefan Th. Gries. New York. 2006. P. 123-175
3. Jane Austen. *Pride and Prejudice*, Chapter 43 M, 1983

Rezyume: *Maqolada ingliz tilidagi metonimiya va metaforaning stilistik vositalarining o'ziga xos xususiyatlari o'rganiladi. Unda ma'ruzachining dunyoga o'ziga xos va sub'ektiv bahosi sabab bo'lgan, keng qo'llanilgan va lug'atlarda qayd etilgan ismlarni ataylab almashtirish muhokama qilinadi.*

Резюме: *В статье представлено исследование особенностей стилистических приемов метонимии и метафоры в английском языке. Обсуждается преднамеренная замена уже используемых имен, получивших широкое распространение и зафиксированных в словарях, мотивированная уникальной и субъективной оценкой мира говорящим.*

Kalit so'zlar: *metafora, metonimiya, stilistik vositalar, trop, ko'chirish, o'rinbosarlik, qo'shnilik, o'xshashlik, soha.*

Ключевые слова: *метафора, метонимия, стилистические приемы, троп, перенос, замена, смежность, сходство, домен.*

TYPES OF ABBREVIATIONS IN MODERN ENGLISH

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Summary: *This article deals with the category of abbreviation, which is one of the important problems that needs for further investigation. The following types of abbreviations: abbreviations of the initial type; syllabic type; mixed type combining elements; from a combination of the initial part (letter) of a word and abbreviations from the combination of the beginning of the first word have been analyzed.*

Key words: *abbreviation, type, category, letters, word, phrase, English, shortening, initial letter.*

A wide variety of abbreviations occupy a significant place in English scientific and professional texts. Since they function independently, are recorded in lexicographic sources and often become more well-known than their sources (radar- радар, sonar - сонар, laser - лазер), they can be considered lexical units of a scientific and technical language. In English, abbreviations, by sound and graphic design, are usually divided into abbreviations and acronyms.

Abbreviations are formed from the initial letters of significant words of the phrase: AA (antenna array) antenna array, RWM (read-write memory) RAM, kVA (kilovolt-ampere) kilovolt-ampere. When they are pronounced by the names of the letters, the stress falls on the last letter. The letters of the abbreviation can be written with dots, but in modern English they are usually avoided [4].

Acronyms are abbreviations that, unlike abbreviations (read, pronounced and perceived by the names of letters), are read and perceived as ordinary lexical units. Acronyms are formed from different combinations of letters (from the first letters, from the first few with the last, etc.) [2, 22]. These include the above terms-abbreviations radar, laser, maser. Note that the translation correspondences of these units in the Russian language are precisely these acronyms, and not wordy terms:

radar - Radio Detection and Ranging - *радиообнаружение и определение расстояния*;

laser - Light Amplification by Stimulated Emission of Radiation - *оптический квантовый генератор*;

maser - Microwave Amplification by Stimulated Emission of Radiation *микроволновое усиление с помощью индуцированного излучения*.

These abbreviations (acronyms) have been transferred to the Russian language as new terms by transliteration. Such units easily enter the terminology and are quickly assimilated into the language.

Abbreviation is one of the youngest ways of word formation. Therefore, it is not surprising that the study of this method and bringing it to a common denominator began relatively late. In the 50s of the XX century, I.V. Arnold made an attempt to classify abbreviations of the English language by types, and it should be noted that he attributed this method of word formation to secondary methods, singling out only conversion, affixal method and word composition as the most productive. To date, it can be stated with full evidence that the abbreviation "came out of the shadows" and took its rightful place among the most productive ways of word formation in the English language [1, 315]. In the description of the types of abbreviations, I.V. Arnold does not separate the concepts of "abbreviation" and "abbreviation". "Shortening (shortening of words, abbreviation) is a morphological word formation in which some part of the sound composition of the original word is omitted."

In our opinion, this confusion is unjustified, because "abbreviation" means truncation of a separate independent word, and "abbreviation" means truncation of a phrase. On a formal basis, abbreviations of words can be divided into 3 types:

1. Apheresis - apheresis, i.e. truncation of the beginning of the word; history - story; telephone - phone; esquire - squire; example - sample; defense - fence; complot - plot.

2. Syncope - syncope, truncation of the middle of the word: madame - ma'm; market - mar't; even - e'en [i:n]; ever - e'er; never-ne'er.

3. Apocope - apocope - truncation of the end of the word: editor - ed; advertisement - ad; veteran - vet; vampire - vamp; prefabricated - prefab; permanent - perm; promenade - prom (promenade concert - concerts where only part of the audience is sitting, and others are standing or walking); microphone - mike.

A combination of two types is possible: apheresis and syncope, syncope and apocope: influenza - flu; avantgarde - van; refrigerator - frig; perambulator - pram.

When an abbreviated word occurs, the full form may disappear, as the word avantguard disappeared from the language after the appearance of the abbreviated vanguard.

I.V. Arnold also draws attention to the fact that in English the abbreviation is much more developed than in Russian.

Abbreviations can also apply to whole phrases denoting one concept. This phenomenon is called an ellipse, for example: The grocer's (shop) was closed. They sell minerals (mineral waters) on every street corner.

In addition to abbreviations, the initial type of compound words, i.e. abbreviations made up of initial letters, has become widespread in the English language. According to spelling, they can be divided into two large groups:

1. They can be pronounced as a combination of alphabetic names of the letters included in them. For example, BBC - British Broadcasting Corporation, DJ - disk jockey, DIY - "do it yourself" - "сделай сам» (сеть магазинов) etc.

2. The second group of initial abbreviations is pronounced as if they were ordinary words written in the same letters. For example: radar - radio detection and ranging - radar. UNO - United Nations Organization - организация Объединенных Наций.

Of course, these methods of abbreviation are much less productive than the initial method, but they exist in English, and, therefore, should be included in the description of the types of abbreviations.

Therefore, we decided to propose the following division of abbreviations of the English language by type, which, in our opinion, is more complete and includes all methods of abbreviation, regardless of their productivity. We deliberately separate the concepts of "abbreviation" for the reasons we have already stated and do not include contractures (abbreviations) in the description.

The following types of abbreviations are distinguished in English:

1. Abbreviations of the initial type are abbreviations made up of the initial letters of the components of the phrase. These are abbreviations:

- sound type, i.e. read as simple words, the stress falls on the first syllable for example: a.s.a.p. (as soon as possible) - "as soon as possible", UFO - unidentified flying object (unidentified flying object), UEFA - Union of European Football Associations (Union of European Football Associations), ASEAN - Association of South East Asian Nations (Association of Southeast Asian Nations);

- letter type, i.e. read as a series of letters, or rather, the names of letters, the stress in such an abbreviation falls on the last syllable, for example: BST - British Summer Time ("British Summer Time"), CAB - Citizens Advice Bureau ("Public Consultation Bureau").

2. Abbreviations of syllabic type, i.e. composed of the initial syllables of the words that make up the phrase, for example: nem.con. - from Latin "nemine contradicente" - "without objection", libs - liberals - members of the liberal party.

3. Abbreviations of a mixed type combining elements of the two previous ones, for example: Rt. Hon - "Right Honorable" - "highly respected".

4. Abbreviations from a combination of the initial part (letter) of a word with a whole word that has not been shortened, for example: H-bomb (hydrogen bomb) - a hydrogen bomb; H-bag (hand bag) - "handbag", X-card (Christmas card) - a Christmas card.

5. Abbreviations from the combination of the beginning of the first word with the beginning and end of the second or only with the end of the second, for example: motel - motorists' hotel - "hotel on highways".

Compared with the many discrepancies concerning the division by types of English abbreviations, the classification of Russian abbreviations does not cause any disagreement, because it has been brought into the system for a long time. The academic publication "Russian Grammar" offers us the following definition of an abbreviation:

"Abbreviations are nouns consisting of truncated segments of words included in a synonymous phrase, the last of which (the supporting component) can be a whole, not a truncated word" [See: 5].

Thus, there are the following structural types of abbreviations:

1. Abbreviations of the initial type, with two subtypes:

- formations from combinations of initial sounds of words;
- formations from the names of the initial letters of words;

2. Abbreviations from a combination of the initial parts of words ("syllabic");

3. A mixed type of formations combining elements of the two previous ones;

4. Abbreviations from the combination of the initial part of the word (words) with the whole word;

5. Abbreviations from the combination of the initial part of the word with the form of the indirect case of the noun;

6. the beginning and end of the second or only with the end of the second: "motorcycle - bicycle" - moped, "destroyer squadron" - destroyer, "military commissariat" - military enlistment office.

Abbreviations - names of institutions may use abbreviated parts of not all words that make up the full name: "regional health department" - oblzdrav.

The main feature of abbreviated truncation of words is its independence from morphemic division: a separate affixal (submarine - submarine) or root morph (village council - village council) may remain from the word; more often, part of the root morph is cut off (procurement office - procurement office, criminal investigation - criminal investigation). Truncation on an open syllable is less productive than on a closed one.

So, letter abbreviations or abbreviations as a way of word formation declared themselves at the end of the XIX century and did not pass any of the European languages. This method of word formation is productive both in English and in Russian.

The types of abbreviations in these languages are the same, with the exception of one type: abbreviations from the combination of the initial part of a word with the form of the indirect case of a noun. In English, this type is not used at all due to the absence of indirect cases in English as such (except for the Possessive Case).

References:

1. Арнольд И.В. Лексикология современного английского языка. М.: «Высшая школа», 1978. С. 315.
2. Банкевич В.В. К вопросу о соотношении лексико-семантических и тематических групп // Семантика слова и предложения. Санкт-Петербург, 2005. с. 113-115.
3. Латышев Л.К. Курс перевода: Эквивалентность перевода и способы ее достижения. Москва, 2005. с. 22.
4. http://scjournal.ru/articles/issn_19972911_2013_6-2_47.pdf.
5. <http://cyberleninka.ru/article/n/sovremennyyetendentsiirazvitiyasokrascheniya-kak-sposoba-slovoobrazovaniya-vangliyskom-yazyke>

Rezyume: Ushbu maqola qisqartma toifasiga bilan shug'ullanadi, qaysi yanada tergov uchun kerak muhim muammolardan biri hisoblanadi. Qisqartmalarning quyidagi turlari: boshlang'ich turdagi qisqartmalar; bo'g'in turi; aralash turdagi birlashtiruvchi elementlar; so'zning boshlang'ich qismi (harfi) kombinatsiyasidan va birinchi so'z boshi harfidan (birikmasidan) qisqartmalar tahlil qilindi.

Резюме: В данной статье рассматривается категория аббревиатуры, которая является одной из важных проблем, требующих дальнейшего изучения. Проанализированы следующие типы аббревиатур: аббревиатуры начального типа; слогового типа; смешанного типа, объединяющего элементы; из сочетания начальной части (буквы) слова и аббревиатуры из сочетания начала первого слова.

Kalit so'zlar: qisqartma, tur, toifa, harflar, so'z, ibora, ingliz tili, qisqartirish, boshlang'ich harf.

Ключевые слова: аббревиатура, тип, категория, буквы, слово, фраза, английский, сокращение, начальная буква.

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Summary: *The article deals with some handicraft products related to woodworking. As a rule, items made of wood are one of the most common types of craft, without which more than one household could not do. Therefore, the use of wooden products and parts were universal. This work also notes the origins of woodworking among the Karakalpaks, the main items made of wood, some items are given that are gradually disappearing from everyday life. Of particular interest are the main parts (skeleton) of the yurt and the process of their manufacture, which are a classic example of woodworking. many household items were somehow connected with the design of the yurt.*

Key words: *craft, woodworking, carving, pattern, saddle, ergenek, ottoman, shanaraq, ormek*

In the past and until recently, wood craft was one of the leading types of traditional economy among the Karakalpaks. Carpentry was divided into a number of specializations: ergenekshi - masters in the production of doors, sandykshi - a chest maker, uishi - a yurt builder, ruffs - a er (saddle) manufacturer, arbash - wagons, etc. To this day, wood carving masters make the necessary goods, however, Compared with the past (pre-Soviet period), many professions have disappeared due to the appearance of factory goods. However, there are those goods that are still in demand due to the preservation of traditions and maternity rituals. This product includes besik (cradle), which is made by besikshi.

Master woodworkers - mouths - made all kinds of agricultural implements; the main ones are gunde (omach), mala, shygyr; they also made carts, kayik (boats), etc. In addition, they made wooden items used in home production: parts of looms (goat, ormek), grinders, machines for manually cleaning cotton - shygyrshyk, wooden utensils, etc. But there were also carpenters who made a wide range of various wooden products - from gunde to such complex items that required fine craftsmanship and skill, such as musical instruments (dutar, kobyz).

Many woodworkers were excellent wood carvers and decorated with artistic carving the doors for the yurt and the front parts of the sandyk, sabayak (chests), keli (stupa).

Masters still work in their workshops "ustakhana" or in the homes of customers doing their work. Customers provide craftsmen with timber. Woodworkers usually used a lathe - gorek, with which they made a handicraft spinning machine, a weaving shuttle, a shygyrshyk (a device for cleaning seeds), a cradle, a rolling pin, chests and other things.

Making patterns on wooden materials is very typical for the daily life of the Karakalpaks in the past. Many household items and designs of the yurt, as well as the wagon, were decorated with rich patterns. To this day, in the manufacture of chests, cradles, kerege and other items are decorated with patterns.

Below is a description of how handicraft wood products are made. One of the ancient items was a two-wheeled wagon "arba". It was made from torangyl wood. They write that the height of some wheels is 2.5-3 meters. The Karakalpaks had two types of arba: at-arba and telegen-arba. They have survived to this day almost unchanged. If the first was tied to a horse, then the second to a bull and a donkey. Telegen - arba differs from another one in that its rim is made of three bent willow logs and is called togyn. All components of the arba are connected to each other without a single nail and without any iron fasteners, even in the wheel there was no iron or steel nail. Therefore, when driving, the cart creaked strongly. As for the at-arb, it did not differ in any way from the Khorezm one. Its rim is very large, the wheel is surrounded by a thin iron bar and a nail is used instead of a girdle, which maintains durability. The rim of the at-arba does not bend, as it consists of 9 elements that are put on top of each other and, most importantly, it is fixed with a nail. As for the rest, it rests on the wheel frame, and the wagon itself rises a little higher with the help of

logs, and the front “altaqta” part is made in the form of an irradiation. The cavalry sits on the alta, the irradiation is set above the level of the horses. The irradiation consists of four support beams and is decorated with a pattern.

In the production of carts, local willow (tal), elm (karaman), apricot tree (erik), loha tree (zhide), etc. were used as materials. Different parts of the cart were made from a certain type of wood. For example, some parts of the cart - gupshek, kyida were made of caramana or turangil wood (turangil gupshek was boiled in water for one day); arys, altakta, cart wheels - from aktal. Wheels were made from arches (togyn). These arcs were smoked in special ovens. The spokes (kegey) of the wheels were made of aktal, kartal, etc. Thus, all parts of the cart were prepared separately, then the master connected them. The master spent 30-35 working days to make one arba.

Today, the wagon is still made of wooden materials, with the exception of wheels, instead of traditional wooden wheels, modern car or aircraft tires are used.

Master saddlers ruffs made saddles for horses and donkeys. Saddles were made of aktal (white willow) and kegeiterek (poplar). The material was taken out by the master himself, and sometimes by the customer. The master saddler had special equipment, the so-called at-arka kelip (stocks in the shape of a horse's back) of various sizes. First, the master prepared and processed the main parts of the saddle, then assembled and glued them with sturgeon glue; when the saddle tree was ready, its individual parts were wrapped with rawhide leather braid (singirden islengen cake). After that, the surface was treated with a knife and finally covered with skin (camel or bull). Sometimes the master decorated the head of the saddle with bone inlay. According to the report, they still make ep, which are already different from the previous ones, since there are no longer special masters like in the past. Some villagers who keep donkeys and horses on the farm make ep, mainly from leather and skins.

Karakalpak master woodworkers who make the skeletons of yurts were called uishi. The skeleton of the yurt of the Karakalpaks, as well as other peoples of the Middle

Asia, make up lattice sliding walls (kerege), consisting of separate links (rope); then - domed poles (uyk), the upper circle (shangarak), the door of the yurt (ergenek). Karakalpak Uisha craftsmen in the past (and at the present time) made yurts of various sizes. Usually its size determined by the number of ropes. In the process of making the wooden frame of the yurt, the Uisha accurately calculate the ratio of all its parts. Experienced Uishi determine how much is required for a given number of links of dome poles and how long they should be. They also know the height of the lattice walls, the dimensions of the rim, the number of holes in it for domed poles.

One of the common products was ergenek - the door of the yurt. They are always double-leaf, the dimensions of the wings are from 125 to 140 cm in height, from 42 to 48 cm in width, depending on the size of the yurt frame. The sashes are inserted into the door frame, consisting of the upper and lower lintel-manglaish, shabaksha, tabaldyryk and tayanysh racks. At both ends of the lintel there are two holes for the ends of the door frame posts and for the side posts of the door frame. In the lower lintel, the holes for the ends of the uprights are not through, the rounded heel of the upright easily rotates in the recess.

Archival Materials of Central Asia door leaves consist of a frame and panels pulled together by it. The frame is made of massive, round in cross section, vertical jaclau racks - these are lateral outer racks, and tulga - central ones. The plank connecting them is called manjara, ortalyk tact, balashyn, gebze. There are no local or generic differences in these names, the masters found different, but always logically justified names for the same details. The panels that are inserted into the grooves of the racks and slats are called orta ottoman, goats, ulken ottoman, ulken goats. The upper and lower planks are fixed in the posts with wooden rods, which are hammered into the holes through the posts and planks.

Panels are horizontal elongated or square rectangles, the dimensions of which are from 35 to 41 cm in length and from 17 to 30 cm in height. They are made from one or rarely two well-fitted boards up to one centimeter thick. The panels are always deepened in relation to the front plane of the slats by 1.5-2 cm. The slats, in turn, are deepened in relation to the uprights. Thus, the plane of

the door acquires a certain depth. This achieves a certain decorative effect. In addition, the surfaces of panels and laths are protected from possible damage during transport. On each leaf of the door there are from three to five panels of approximately the same size. The extremes are sometimes smaller. The connecting strips are often placed in pairs at a short distance from each other, and then a narrow panel of goat gut, or figured garrek balusters, is inserted between them.

Masters perfectly linked the carved ornament with the shape of the decorated objects. When distributing ornamental attire, they took into account the conditions for using the item. The side racks of the ergeneks were not decorated with carvings, because during transportation and in everyday life, the racks were easily damaged. Panels, as a rule, have a pattern only on one side - the outside. Double-sided threading would adversely affect the strength of the panels. In those rare cases when a carved pattern was applied to both sides of the door, it is deepened from the outside, and shallow cuts from the inside. The carving decorated the long side of the lintel of the manglaish facing inside the yurt. Rarely, flat figured boards were planted on top of it, resembling the outlines of the pectoral jewelry haikel and the musical instrument kobyzy, etc.

The next piece of wood was Sabayak. This is a low stand on four legs. It stored products for everyday use - flour, cereals, salt, dasturkhan with bread. Some sabayaks had a bottom that served as a shelf. In this case, small dishes were placed there. Sabayak stood in the utility part of the yurt, to the right of the entrance. Three types of sabayak are known:

- 1) a simple frame, the front part of which is covered with a carved pattern;
- 2) recessed patterned panels are inserted into the front part of the frame;
- 3) a sabayak with a shelf at the level of the bottom bar of the frame, the back and sides are closed. In another version, only the facade is closed with panels, small dishes are inserted and removed from the side. Sometimes instead of panels there are curly balusters (kerege goats). There are sabayaks with a single carved panel (birkozsabayak). Probably, sabayak meant "a structure for wooden utensils" (sabat - wickerwork + ayak + utensils - wooden utensils).

Thus, the manufacture of household items, the skeleton of a yurt, musical instruments includes a sequential procedure from processing wood to giving them patterns, and the same ornamentation characteristic of the Karakalpaks can be repeated on different objects.

1. Karakalpak woodcarving is associated with the semi-nomadic way of life in the past and the economic activities of the people. This determines the main composition of carved items and the nature of their artistic processing, as well as the ornament and its construction.

2. Carved items reflect the ethno-cultural ties of the Karakalpaks with the steppe pastoral culture, on the one hand (carved doors of the yurt, wooden furniture and some household items), and on the other hand, with the sedentary agricultural culture (carved columns of architectural structures similar to those of Khiva).

4. The traditions of Karakalpak wood carving can be actively applied in modern decorative art.

References:

1. Allamuratov A. "Archival materials of Central Asia" T. IV. Samarkand: "Mitsai", 2019
2. Allamuratov A. Artistic features of the Karakalpak folk embroidery. Manuscript. Author's archive. 1969
3. Zhdanko T.A., Kamalov S.K. Ethnography of the Karakalpaks in the 19th - early 20th centuries (materials and research) Tashkent: "Fan", 1980
4. Otemisov A. Qaraqalpaqlardıń ónerqasıpları. Nokis: "Qaraqalpaqstan", 1991
5. Tleubergenova N. The traditional dwelling of the Karakalpaks of the 19th-early 20th centuries // diss. on sois. Ph.D. Nukus. 1996
6. Shkapsky O.A. Essay on the Amu Darya. Tashkent. 1900

Rezyume: Maqolada yog'ochga ishlov berish bilan bog'liq ba'zi hunarmandchilik mahsulotlari haqida gap boradi. Qoida tariqasida, yog'ochdan yasalgan buyumlar eng keng tarqalgan hunarmandchilik turlaridan biri bo'lib, ularsiz bir nechta uy xo'jaliklari qila olmaydi. Shuning uchun yog'och buyumlar va qismlardan foydalanish universal edi. Bu asarda

qoraqalpoqlarda yog'ochga ishlov berishning kelib chiqishi ham qayd etilgan, yog'ochdan yasalgan asosiy buyumlar, kundalik hayotdan asta-sekin yo'qolib borayotgan ayrim buyumlar berilgan. Yog'ochga ishlov berishning klassik namunasi bo'lgan uyning asosiy qismlari (skeletlari) va ularni tayyorlash jarayoni alohida qiziqish uyg'otadi. ko'plab uy-ro'zg'or buyumlari qandaydir tarzda uyning dizayni bilan bog'liq edi.

Резюме: *В статье рассматриваются некоторые изделия из ремесленного производства, связанного с деревообработкой. Как правило, предметы из дерева являются одним из самых распространенных видов ремесла, без которого не обошлось не одно хозяйство. Поэтому использование деревянных изделий и частей были универсальными. В этой работе также отмечается истоки деревообработки у каракалпаков, основных предметов из дерева, приводятся некоторые предметы, которые постепенно исчезают из быта. особенно интересны основные части (остов) юрты и процесс их изготовления, являющиеся классическим примером деревообработки. многие предметы домашнего быта так или иначе были связаны с оформлением юрты.*

Kalit so'zlar: *hunarmandchilik, yog'ochga ishlov berish, o'ymakorlik, naqsh, egar, ergenek, usmon, shanaraq, ormek*

Ключевые слова: *ремесло, деревообработка, резьба, узор, седло, ергенек, тахта, шаңарақ, өрмек*

MUSIC OF THE ANCESTORS IN HUMAN DEVELOPMENT LOCATION HERITAGE

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Summary: This article expresses opinions on the creative musical views of our great ancestors, who had a great influence on the development of world science and culture, as well as on the role of the national musical heritage in increasing the spiritual maturity of a person.

Key words: *musical heritage, generation, ancestor, cultural value, spiritual heritage, thinker, musicologist, art, culture, musician, singer, hafiz.*

Introduction.

Today, more and more attention is paid to the education of perfect people by educating a healthy generation, forming the spirituality of a free citizen, raising to a high level of spiritual and educational work.

The President of the Republic of Uzbekistan emphasized the role of youth in Uzbekistan and said: "We will continue the state policy towards youth, never deviating. We will not only continue, but also raise this policy to the highest level that time demands today as our highest priority.

We mobilize all the forces and opportunities of our state and society so that our youth can be an independent thinker, have a high intellectual and spiritual potential, become people who are not inferior to their peers in any area of the world, and become happy- He said.

In the development of our society, the education of a mentally and physically healthy generation has risen to the level of pressing problems, life itself requires spiritual health and educational maturity from everyone, especially young people.

Musical art with its beautiful and unique influence served to unite people, strengthen friendship and solidarity between nations and peoples. Therefore, people spend their good days and happy moments accompanied by music.

Literature review.

There are such musical works in the world that, regardless of the concepts of people and nations, are able to conquer any heart, and therefore their unique aspects serve to improve human maturity. "The sounds of music represent the noblest, highest and most subtle human experiences, regardless of the people or the representative of the nation."

Music is considered as one of the important methods of studying the human factor and artistic development of the world, it is one of the leading factors in the formation of mental, moral maturity and spirituality of a person, the spiritual education of young people.

The wide possibilities of the impact of music on the human psyche since ancient times have attracted musicologists, thinkers and scientists. They tried to determine the features of musical art that affect the formation of a person as a person. "Music expresses human feelings, hopes, desires with its artistic language and actively affects human emotions. Music is both a science and an art."

After all, our great ancestors, who had a great influence on the development of world science and culture, deeply understood the role of music in the education of a perfect person and highly appreciated its educational value in the development of the individual. Great thinkers such as Farabi, Ibn Sina, Abdul Qadir Marogi, Sharafuddin Ali Yazdi, Ismatullah Mojizi, Mahmud Kashgari, Qutbuddin Shirozi, Jami, Kawkabi, Fakhridin Mubarakshah, Husaini, Darves Ali Changi, Kamil Khorezmi, Navoi, Babur. the information about music presented in his works is relevant today with its scientific and educational significance.

"The cultural values and spiritual heritage of the people for thousands of years have served as a powerful source of spirituality for the peoples of the East. " Despite the severe pressure that lasted for a long time, the people of Uzbekistan managed to preserve their historical and cultural

values and unique traditions that are passed down from generation to generation," said the First President of our Republic Islam Karimov.

After all, our great ancestors, who had a great influence on the development of world science and culture, deeply understood the role of music in the education of a perfect person and highly appreciated its educational value in the development of the individual. Great thinkers such as Farabi, Ibn Sina, Abdul Qadir Marogi, Sharafuddin Ali Yazdi, Ismatullah Mojizi, Mahmud Kashgari, Qutbuddin Shirozi, Jami, Kawkabi, Fakhriddin Mubarakshah, Husaini, Darves Ali Changi, Kamil Khorezmi, Navoi, Babur. the information about music presented in his works is relevant today with its scientific and educational significance.

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In particular, the sources note that in the time of Amir Temur we can observe the high development of music and singing along with other fields of science and culture. It is known that Temur highly appreciated talented people of all specialties, including talented scientists, artists, unique composers and invited them to Samarkand.

During this period, culture, literature and art developed in Movarounnahr. In particular, scientists, architects, painters, artists, actors, musicologists, singers and musicians gathered in Samarkand. Abdul Kadyr Marogi, outstanding representatives of musical science, musicians and composers Saifiddin Qutbi Noyi, Said Yusuf Kubuz, Darvesh Bek and others lived and worked.

The multifaceted creative heritage of Khoja Abdulkadir, one of the great musical thinkers of the era of Timur and the Timurids, was of great importance in the development of the musical culture of our people. Abdulkadir Maroga's twelve-chapter treatise Makasid ul-alkhan contains opinions on the rules of traditional music, singing education and singing activities.

Abdulkadir Marogiy also gave extensive information about about 40 types of ancient musical instruments used in the XIV-XV centuries. Although most of these musical instruments are related to the music of other Eastern peoples, they were introduced by brought musicians in the palaces of Timur and the Timurids, as well as in some folk dances of Central Asia and Khorasan. Musical instruments popular in the music of foreign peoples are mentioned in the epics and lyrics of poets who lived in the Timurid era and wrote in the Turkic language.

They were played at various meetings, parties and solemn meetings. These data once again confirm that these musical instruments were widely used in Central Asia and Khorasan.

Khoja Abdulkadir himself invented a lot of music, which was called "Sozi murassai Gaibiya". The melodies and songs created by him have been among the musical works loved by the people for many years.

Abdurauf Fitrat noted that the most famous musicians and singers, musicologists and poets of their time gathered in Samarkand, the capital of a large centralized state founded by Sahibkiran: art suddenly came to life, got back on its feet. Musical instruments and musicians from all corners of the Islamic East have served to rise and rise our classical music today.

These thoughts are vivid proof that the art of music was highly developed thousands of years ago in our country, known and glorified as the cradle of science and art. The works of our great ancestors on the history and theory of music also show how deep the roots of our national musical culture are.

Materials and methods.

First of all, Abu Nasr Farabi made a great contribution to the formation of the theory of music used by the Eastern peoples, and the work of the great thinker "The Big Book of Music" is a rich creative heritage with which he lived and was created in recent years. times serves as a rare and invaluable resource for scientists.

Another great scholar, Al-Khwarizmi, also created the encyclopedia *Mafatih ul-ilm* (Key of Sciences), which is one of the important sources for covering the history of science and culture of the peoples of Central Asia. In a special section of this encyclopedia devoted to the theory of music, specific aspects of the theory of music of the peoples of the East are widely studied.

Our great ancestor Abu Ali Ibn Sina, following in the footsteps of Farabi, took the development of music theory to a higher level. In fact, "*Kitab al-Shifa*" ("Book of Healing"), "*Donishnama*" ("Book of Knowledge"), "*Risalatun fil-ilmi Musiki*" ("Treatise on the Science of Music") by Ibn Sina.) and other works, not only of Central Asia, are of particular importance in the history of Central Asian and world musical science and culture. Ibn Sina's ideas about the influence of music on human health, as well as on spirituality, show that he is a high thinker.

Another great scholar, Al-Khwarizmi, also created the encyclopedia *Mafatih ul-ilm* (Key of Sciences), which is one of the important sources for covering the history of science and culture of the peoples of Central Asia. In a special section of this encyclopedia devoted to the theory of music, specific aspects of the theory of music of the peoples of the East are widely studied.

Founder Amir Temur also considered the important aesthetic value of music as a great force supporting morale, and was the first in history to equip the army with battle banners and musical instruments. This military practice is now strictly enforced in almost all countries.

"I have ordered," Sahibkiron writes in the Laws of Temur, "that every emir who defeated or defeated the armies of my people should be honored with three things—a proud book, a blade, and a drum—and called him Bahadir."

It should be noted here that Amir Temur highly valued musical art and used musical instruments as a symbol of courage, an unprecedented event in the history of world art.

In the East, musical art has always developed harmoniously with poetry, so our poets and thinkers who lived in different eras wrote poems and wrote works describing musical art and its power. In particular, the works of the great poet-thinker Alisher Navoi "*Mezon ul-Avzon*" and "*Majolisu-n-nafoys*" contain valuable thoughts about the secret music industry. Alisher Navoi in his work "*Majolis un-Nafais*" writes that he learned musical science from Khoja Yusuf Burkhan and is his student.

Also in the work "*Baburnom*" of our ancestor Zahiriddin Muhammad Babur there is a lot of rare information about navoi's talent in the field of music.

Results and analysis.

In fact, the musical views of our ancestors, who had a huge impact on the development of world science and culture with their incomparable talent and thinking, have not lost their significance in our days. Based on this, we can say that the heritage of ancestors serves as an important source in the development of personality.

Especially in the modern era of globalization, when humanity lives in an era of rapid development, the role and importance of our musical heritage in protecting young people from the negative impact of "mass culture", forming ideological immunity among young people, improving human spiritual maturity is growing.

It's no secret that people's worldview, thinking, faith and education are changing in accordance with today's rapid era. However, no matter how rapidly science and technology develop, occupying an important place in the life of society, and how effectively it affects the acceleration of production processes, educating young people as perfect people and giving them education at the level of world standards has not lost its essence. In our opinion, in this regard, the inculcation of the musical heritage of our great ancestors and the noble ideas put forward by them in the consciousness of the younger generation will also give positive results.

Conclusion

From this we can conclude that the musical heritage of our great ancestors is of great importance in the development of the national spirit, spiritual and moral culture, musical worldview, musical taste, national pride and patriotism, independence and initiative.

References:

1. Asaf'ev B. V. Muzykal'naya forma kak protsess. L.: Gosud. Muses. ed., 1971
2. Boburnoma. T., -1989
3. Navoiy. 9-jild., T., -2011
4. Karimov I.A. Yuksak ma'naviyat – yengilmas kuch. T., 2008
5. Karimov. I. O'zbekiston XXI asr bo'sag'asida: xavfsizlikka tahdid, barqarorlik shartlari va taraqqiyot kafolarlari. T., -1997
6. Mirziyoyev Sh. . Erkin va farovon, demokratik O'zbekiston davlatini birgalikda barpo etamiz. Toshkent- "O'zbekiston" -2016.
7. Rahmonov. M. O'zbek teatri. T.,- 1975
8. Fitrat. A. O'zbek klassik musiqasi va uning tarixi. T.,1993
9. Shodmonov N. Xoja Abdulqodir Marog'iy. T., -2000

Rezyume: Ushbu maqolada jahon fani va madaniyati rivojiga katta ta'sir ko'rsatgan ulug' ajdodlarimiz yirik musiqashunos mutafakkirlarning ijodiy musiqiy qarashlari hamda inson ma'naviy kamolotini yuksaltirishda milliy musiqa merosining o'rni haqida fikr mulohazalar bildirilgan.

Резюме: В данной статье высказываются мнения о творческих музыкальных взглядах наших великих предков, оказавших большое влияние на развитие мировой науки и культуры, а также о роли национального музыкального наследия в повышении духовной зрелости человека.

Kalit so'zlar: musiqa merosi, avlod, ajdod, madaniy qadriyat, ma'naviy meros, mutafakkir, musiqashunos, san'at, madaniyat, sozanda, xonanda, hofiz.

Ключевые слова: музыкальное наследие, поколение, родоначальник, культурная ценность, духовное наследие, мыслитель, музыковед, искусство, культура, музыкант, певец, хафиз.

FEATURES OF PERCEPTION IN MUSICAL ART

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Summary: *In this article, based on the sources of Uzbek and foreign literature, the most important aspects of mastering all types of musical activity are considered in detail: musical ear, memory and a sense of method.*

Key words: *Attention, hearing, memory, method, intuition, perception, absolute, relative and internal hearing.*

INTRODUCTION.

As the President of the Republic of Uzbekistan Sh. Mirziyoyev noted, “We consider it our top priority to improve the activities of the education and training system of today” .

"The sounds of music represent the noblest, highest and most subtle human experiences, no matter what people or nations they perform".

According to the first President of the Republic of Uzbekistan I.A. Karimov, "The most important thing is that today the art of music has a greater and stronger influence than other types of art on the development of our modern generation in the spirit of high spirituality".

"If a person's ear gets used to more frivolous melodies, it is possible that his artistic taste and musical culture will gradually decline, and there is no doubt that his spiritual world will be captured by false concepts. In the end, it will be difficult for such a person to accept such unique masterpieces of our national heritage as "Shashmakom" and the works of world-famous great composers such as Mozart, Beethoven, Bach and Tchaikovsky".

The above-mentioned phrases of the first President of the Republic of Uzbekistan I. A. Karimov are addressed not only to students in the field of music, but to all young people. It is important to raise the spiritual world and the cultural level of the younger generation, to listen to and perform classical works of domestic and world musical culture, to feel fulfilled in them.

As in other types of human activity, attention in the art of music is, first of all, an important and necessary condition for the effectiveness of human activity in all emotional (sensory), intellectual (thinking), motor processes.

Attention is the concentration of activity on one thing at a certain time.

There are basically two types: involuntary and voluntary attention. But one more specific type can be distinguished-it is characterized by the fact that it comes after voluntary attention and lasts for a long time. This is a very intense and effective mental activity, giving high efficiency to all types of work.

In the art of music, all types of musical activity are associated with attention. Attention is especially important in public speaking. The conductor's raised hands before the performance, the *aufakt*, gestures and movements between the soloist and the accompanist - all this is called attention in musical terminology.

In modern psychology, its qualitative features are studied in the structure of attention. This includes stability, shift, distribution, and attention span.

Attention is one of the most important components of the learning process. All the great musicians were exceptionally attentive. For example, Mozart could easily write music in a room where there were many people and even when extraneous voices were heard. The Polish pianist and composer I. Hoffman answered the question about the only correct way to work: concentration is the first letter in the alphabet of luck. Before starting work, you need to concentrate well and know what and how to do so that the musician is less tired.

The work will be successful only when it is done with full mental concentration. However, it is important to remember that the quantitative aspect of learning only makes sense when combined with the qualitative aspect.

Mindfulness, concentration puts an end to the question of how long to work. It is recommended to take a break every half hour and never work an hour or two hours without a break.

L. Barenboim proposed exercises to improve concentration for musicians. The concentration of an actor can be improved without special training if he is as attentive and disciplined as possible in his daily work, if he understands and takes responsibility for his professional activities. It is also emphasized that the ability to hear oneself from the outside is considered very important in shaping the attention of all musicians. That is why the ability of a musician to manage the work being performed, to be able to hear himself from the outside, is one of the foundations of musical art.

The attention of a musician can be different: wide and narrow, late and progressive. Automation of movements helps to focus on one place.

We learn the world around us through the senses; we feel and receive the necessary information.

Intuition is the simple mental process of perceiving things and events through the senses.

The sense organs correspond to visual, auditory, olfactory, gustatory, skin, muscle and organic types of senses. In the art of music, hearing, tactile (feeling), motor and rhythmic sensations are of great importance. For singers playing wind and string musical instruments, the sensation of vibration is also of great importance, giving a unique fullness and coloring of tone to the voice. Their quality, speed, duration and spatial localization can also be included in the regularity of sensations. Based on auditory intuition, musicians develop inner ear and musical ear. Our analyzers have the ability to adapt, that is, they can adapt to a stimulus. After listening to loud music for a long time, we hardly notice subtle changes in the volume of the "forte" or "mezzo-forte" sound. After a long period of silence, we perceive even a quiet sound as a loud sound. For example, Chopin never played a melody loudly. But he achieved melody through unparalleled piano playing, pianissimo, mezzo-forte.

The interaction of feelings. The interaction of the sense organs occurs mainly in two processes: sensitization and synesthesia. The increase in sensitivity in one analyzer during interaction is called "sensitization". For example, if you listen to ballet music in the theater, and not on the radio, it will be better and more fully perceived, that is, the combination of visual and auditory analyzers will enrich the reception process.

Synesthesia refers to the interaction of such sensations, in which, under the influence of irritation, a sensation arises from one analyzer to another analyzer. This is indicated by such expressions as "delicate taste" and "pleasant sound". A relatively common phenomenon is visual-auditory synesthesia, known as the phenomenon of color hearing. Rimsky-Korsakov, Scriabin, Chiurlionis possessed such a rumor.

Rimsky-Korsakov perceived various tones in the color palette of nature. A major for her is youth, spring, but not early spring on the icy, barren land, but spring, maybe the siren's flower has blossomed and the whole meadow is strewn with flowers.

For example, Scriabin, for the first time in his musical practice, introduced a special color range into a symphonic score, associated with color hearing, light music. ("Prometheus", "The Poem of Fire", 1910).

The Lithuanian composer Mikalojus Konstantinas Ciurlionis (1875-1911) associated his painting with the art of music. That is why he gave his paintings musical names such as "Spring Sonata", "Solar Sonata", "Prelude" and "Fugue". Also, the Uzbek composer G. Mushel (1909-1989) gave his paintings musical names, such as "Landscape in C major", "Landscape in D major" or "Spring Song", "Fugue in Samarkand".

Sense of overtones. Studies conducted by the German scientist G. Helmhols (1821-1894) showed that a single sound has a complex nature and can be divided into components. To do this, a device called a spectrometer was created, which separates the sound into its component sounds. In the sound spectrum, individual rising peaks, consisting of additional groups of sounds, are called formants. The brightness of the sound depends on their composition.

The feeling of loudness and grandeur of the voice testifies to the presence of high musical formants in a person. On the other hand, a low formant gives the sound a characteristic and highly valued quality known as "metal". There is also a low singing formant. It gives the voice a feeling of softness, thickness, softness, breadth and warmth. The sounds of musical instruments also have their own colors. This is necessary to convey the uniqueness of a particular work.

Sense of hearing. Hearing is the main thing in the art of music. Musical ear is the ability to fully perceive music. Physiologically, hearing is the perception of sound vibrations through the organs of hearing. Sounds pass through the outer ear along the auditory nerves, (it is considered about 3000, one octave corresponds to 300-400) pass through the middle and inner ear and reach the auditory analyzers in the brain. The analyzers also receive the sound of playing some musical instruments (violin, viola, wind instruments) in ff and the vibration of the cranial bone during speech and singing of a person.

The ear for music is good in terms of pitch, power, timbre and duration. Limits of auditory perception: lower sounds up to subcontract "do" with a vibration frequency of about 16 hertz (16 vibrations per second), higher - the fourth octave "E flat" about 20,000 hertz (20,000 vibrations per second). Sounds outside this limiting range (infrasounds-below and ultrasounds-above) are not accepted at all. The ability to listen to music better perceives changes in pitch, power and timbre in the middle register. At the same time, musicians can distinguish pitch changes of 5-6 cents (about 1G'20 of a whole tone: 1 cent - about 1G'100 of a whole tone) and one decibel (a unit of loudness).

Musical ear can be of the following types: absolute, relative and inner ear.

Absolute pitch is the ability to determine the absolute pitch of musical sounds, such as a tuning fork, without comparing them with standards. But not all great musicians have this ability. For example, Wagner, Schumann, Meyerbeer, Tchaikovsky, Grieg did not have such a talent, but successfully used the well-developed talent of relative hearing. It is known that Mozart, Liszt, Scriabin had perfect pitch. This is the result of technical activity and the ability to distinguish even minimal (up to 2 cents) volume changes.

Relative or interval hearing is the ability to perceive, identify and reproduce the pitch between sounds in melodies, intervals and chords. With relative hearing, a person must have a clear understanding of at least one sound and produce or find another in order to identify or play a note or chord. Good relative pitch is sometimes called false absolute pitch. A person remembers the lowest or highest pitch of his own voice or tuning fork and, based on this, determines other sounds that he hears.

Inner hearing is the ability to imagine the whole composition of music (from notes or from memory).

From a psychological point of view, ear for music is a unique mechanism for analyzing and synthesizing the external acoustic expression of musical information, expressing its emotional meaning. In this regard, rhythm, tone, melody, multiplicity, sense of timbre and other types of hearing are distinguished.

Another important component of musical ear is general musicality. This is expressed in an emotional response to music and musical experiences.

Musical ear develops during musical activity. Except absolute pitch, because it cannot be improved by special exercises. It is possible to develop a "false" absolute hearing (B. Teplov's term), which helps to determine the volume indirectly, through the timbre or a certain position of the voice. For the development of musical ear, a special training class has been developed-solfeggio. There is also a zonal nature of musical ear. This theory was developed by N. Garbuzov. According to this theory, sound, timbre, tone, dynamics and rhythm have their own different zones. For example, the entire tonal range (b.2) would have a quantitative value of 200 cents. However, 190 and 210 cents are equal to b.2 cents, but in a different zone. We recognize a melody played on the piano, trumpet or dutar thanks to the sense of harmony.

In the process of solfeggio, for the development of musical ear, they tend to rely more on a sense of rhythm than on a sense of intervals. The system for developing the sense of melody by the

Hungarian composer and teacher Zoltan Kodály was created on the basis of the sense of harmony. This system is called the "relative (relative) scale system" (the system uses different symbols and syllable names).

The ability to feel the melody and unison develops more easily and naturally in singers, performers on string and wind instruments. When learning to play the piano, stylists recommend voicing, singing, or exaggerating the pieces being practiced.

Perception of polyphony - this type of musical ear depends on the ability to simultaneously hear the movement of two or more voices in the musical texture. The ability to hear classical polyphony helps the musician to hear other parts in a group performance. For example, it allows the pianist to hear all the textural elements, except for the main melody - bass movement, accompaniment, and in a polyphonic piece, not only high voices, but also all other voices.

Feel the harmony. The ability to hear harmony is a musical feeling based on the harmony of sounds (intervals and chords) (according to B. Teplov). If the polyphonic feeling and its development depend on the ability to hear music horizontally, then the harmonic feeling is associated with the ability to hear sounds vertically and is better developed among pianists. The more the pianist achieves the basic harmonic meaning of the work, the more spiritualized his performance becomes. These words apply to all other music professionals.

These words apply to all other music professionals. Timbre is the color of sounds. Dynamics is the power of sound. The dynamics of sound, that is, its sound power, is directly related to the timbre. The color of the performance is achieved through the possibility of using the timbre capabilities of a musical instrument. And they, in turn, depend on small dynamic gradations that are in the hands of the performing musician.

The sense of timbre is well developed among orchestra players who regularly listen to the sounds of various musical instruments. The symphony orchestra covers a rich and colorful palette of sounds along with its more than twenty types of musical instruments. The professional qualification of a musician largely depends on the development of a timbre-dynamic sense, its accuracy and clarity.

Musical and auditory imagination. Musical-auditory imagination is the ability to hear the movement of pitch and pitch and embody it in the brain (B. Teplov). The concept of inner hearing and musical-auditory imagination is associated with the ability to hear and experience music without relying on external sounds. This ability underlies musical memory and musical imagination.

Feel the rhythm. The feeling of metro rhythm is a property of music that depends on time. It is of the nature not only of hearing, but of action in execution and hearing. The feeling of the metro rhythm is associated with a continuous sequence of different lengths. They seem to fill rhythmic movements with relatively small impulses. The sense of rhythm is one of the most difficult skills to develop.

Feeling of movement. The ability to move with precision, accuracy, speed, and agility is also a highly valued skill. This is a strong ear for music, a strong musical memory and a good sense of rhythm.

The art of playing all musical instruments is based on the unity of the artistic image and technical skills. The best way to achieve technical perfection in the performance of a piece, to strengthen the motor processes, is to train to play slowly and accurately.

Perception is the direct effect of things or events on our senses.

In psychology, perception is divided into such specific aspects as objectivity, integrity, structure, stability, awareness.

In intuition, individual parts of an object are felt, and in perception, all components of the object as a whole are felt. For example, after listening to a piece of music, we do not perceive separately its melody, rhythm, timbre, harmony, on the contrary, we understand and perceive this music as a figurative, generalized whole.

The Musical Encyclopedia says that musical perception is a complex activity aimed at connecting musical accurate reflection in human feelings and personal perception of musical material (perception) and musical and life experiences of a person (apperception), emotional experiences and value experiences.

Depending on which analyzer dominates in the process of reception, perception can be classified. There are visual, auditory, tactile, kinesthetic (spatial, temporal), olfactory and taste perceptions. All analyzers, except for smell and taste, are of great importance for the art of music. Hearing is required.

In addition to them, it is important to consider the issues of rhythm, timbre, tone, melody, harmony, polyphony, form, genre perception in musical psychology.

The completeness of musical perception directly depends on the development of musical abilities (musical knowledge, skills, qualifications), as well as the level of conditions in which students are brought up.

References:

1. Karimov I.A. High spirituality is an invincible force. T. Spirituality, 2008. 87 p.
2. Makinnon L. Playing by heart. L. Publisher: Muzyka - 1967 144 Art.
3. Petrushin V.I. Musical psychology: Textbook and workshop for universities M., 1997, st.121, 122.
4. Rags Yu.N. The concept of the zone nature of musical ear N. A. Garbuzova, M.: Muzyka, 1980, cc. 11-48.
5. Helmholtz German L.F. Published: "The doctrine of auditory sensations as a physiological basis for the theory of music" (1863; Russian translation: 1875). Publishing house "Society. Benefit". On the physiological causes of musical harmony. 1896.
6. Teplov B.M. Ability and talent. //Scholar, notes of the State. Institute of Psychology. T. 2. M., 1941.
7. Teplov B.M. Psychology of musical abilities. -M.-L.: APN RSFSR, 1947.-355p.

Rezyume: *Ushbu maqolada o'zbek va chet el adabiyoti manbalari asosida musiqa faoliyatining barcha turlarini o'zlashtirishning eng muhim jihatlari: musiqiy quloq, xotira va uslub tuyg'usi atroflicha ko'rib chiqiladi.*

Резюме: *В данной статье на основе источников узбекской и зарубежной литературы подробно рассмотрены важнейшие аспекты овладения всеми видами музыкальной деятельности: музыкальный слух, память и чувство метода.*

Kalit so'zlar: *Diqqat, eshitish, xotira, usul, sezgi, sezgi, mutlaq, nisbiy va ichki eshitish.*

Ключевые слова: *внимание, слух, память, метод, интуиция, восприятие, абсолютный, относительный и внутренний слух.*

ABBREVIATION AS ONE OF THE WAYS TO CATEGORIZE SPECIAL CONCEPTS

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Summary: *This article deals with the notion of abbreviation as one of the ways to categorize special concepts in Modern English, which is one of the important problems that needs for further investigation. The analysis of abbreviation show that they consist of a group of letters or words taken from the full version of the word or phrase. As with any word or phrase shortening, abbreviations are created to allow quicker and more effective communication. When the meaning of an abbreviation is universally known, it can be used in full confidence that the reader will understand what is meant.*

Key words: *abbreviation, category, letters, word, phrase, English language, shortening, communication, thinking, reality and cognition.*

One of the most popular and productive ways of word formation today is an abbreviation, which is used not only in Karakalpak or English, but also in all languages.

An abbreviation (from Latin brevis, meaning short) is a shortened form of a word or phrase, by any method. It may; for example, the word abbreviation can itself be represented by the abbreviation abbr., abbrv., or abbrev. It may also consist of initials only, a mixture of initials and words, or words or letters representing words [3].

The history of abbreviation from the moment of its origin to the present day has more than a dozen years, however, foreign language learners often do not pay due attention to this method of word formation. Meanwhile, the study of abbreviation is becoming an obvious necessity today, without which it is impossible to imagine the overall picture of word formation. The abbreviation serves almost all spheres of human activity, but is most widespread in the political, economic, military spheres, as well as in the field of computer technology and periodicals.

In the study of abbreviation, a certain bank of problems has been formed by now, the study of which has become traditional. These are issues such as the causes of abbreviation formations, their sociolinguistic conditionality, structural and semantic classifications of abbreviations, their place in the word-formation system of the language, trends in the development of abbreviations and ways of translating these types of lexical units.

At the same time, the range of problems dealt with by experts in the field of abbreviation turned out to be limited in the literal and figurative sense. The aporia of some conclusions about the essence of the abbreviation is obvious. Abbreviations as a new type of words enriched the lexeme system of the language, but did not lead to the emergence of any non-lexeme, typologically new units, nor did they lead to the complication (unbundling) of the language structure.

The conclusion suggests that new aspects are important in the study. The trend of the development of modern linguistics in their methodological awareness allows us to outline these aspects. The increasingly active appeal of linguists to the problems of the relationship between language and thinking, logic and language makes it relevant, for example, the development of the question of determining the place of abbreviated words in the linguistic creative activity of a person.

The abbreviations drawn from special texts in English and Russian are chosen as the object of research. The choice of languages is mainly due to the availability of resources in the languages of analysis.

So, let us consider the problem of categoricalness of scientific thinking. The position on the categoricalness of mental activity has become generally accepted in philosophical literature. On the one hand, it is argued that the categorical system of thinking acts as a prerequisite and condition for any cognitive act. On the other hand, epistemology, as it were, regretfully states that the exact number of categories has not been established.

Now there is a well-established scientific definition of the concept of "category". Categories are extremely general, fundamental concepts that reflect the most essential, natural connections and relationships between reality and cognition. Being forms and stable organizing principles of the thinking process, categories reproduce the properties and relations of being and cognition in a universal and most concentrated form. All this is true, but there is one very significant point missing in this definition. Categories defined as forms of mental activity themselves turn out to be "formless", "disembodied" [2, 415].

Based on the understanding of language as the immediate reality of thought and as an instrument of thought, linguists were able to "materialize", give form to many general philosophical and special scientific categories, including such well-known categories as quality, quantity, measure, place, etc.

The relevance of studying categorical structures as linguistic creative structures is obvious. Attempts have already been made to substantiate some general scientific categories (places/locatives, ambiguity/ambisemia, contiguity/adjacency) and to interpret these categories in theoretical and applied (methodological) aspects. In this work, we continued to study the features of categorical structures underlying the linguistic cognitive process, using the example of a mental category, which in recent decades has led to the formation of such a type of thinking as abbreviated.

Before proceeding to the description of the category on the basis of which the abbreviation thinking was formed, we would like to make a few comments about the concept of "type of thinking". Depending on what kind of conceptual-categorical thinking activity prevails in a person, we can talk about artistic, philosophical, technical, physical, mathematical, linguistic and similar types of thinking. The types of thinking will be different if we keep in mind certain principles or ways of thinking activity: idealistic thinking, dialectical, computer, statistical, etc. Finally, we can talk about types of thinking based on certain features of the use of language signs by a linguistic personality as material carriers of its mental intentions. Then, among such types of thinking as onomasiological, metaphorical, elliptical, there is an abbreviation thinking.

Abbreviation thinking is a person's mental ability to reflect on the abbreviated structures of language and operate on them as units of the conceptual level. The latter is of fundamental importance, because the definition of abbreviations as abbreviated versions of full names is at least naive. Let us draw an analogy between the metonymization of a word and the process of abbreviation. Adherents of the theory of linguistic economy see in metonymy the economical use of the means of language. In reality, this is not the case. With metonymy, there is a complex process of changing categorical structures. The system of categorical thinking is triggered. With the help of polysemy, a person structures the reality surrounding him, establishing categorical connections between phenomena, conceptualizing these connections with the help of the linguistic reality given to him.

A similar change of categorical structures from the point of view of epistemology occurs when words and phrases become abbreviated, i.e. the designation of a detonate by an abbreviated name, with the existence of an expanded name, translates this detonate from one category system to another. Now it remains to find out what kind of mental category the detonates, denoted by abbreviations, make up.

As the linguistic material and the realities behind it show, we are dealing with such phenomena of reality, designated by abbreviations, which can be attributed to facts qualified as "complex". This state of affairs gives grounds to fix the categorical status of the concept of "complexity" at the logical-epistemological level.

It should be emphasized that there are not always two forms in the language: the original, i.e. the full name and the abbreviated, i.e. the abbreviation. Sometimes, along with the abbreviation, there is no complete form, since in some cases a lexical abbreviation can eventually become an independent word, i.e. the main way of expressing this concept.

The full original form may disappear, and the abbreviation, in our opinion, turns into an independent word under the following circumstances:

- 1) if the abbreviation has acquired public significance;
- 2) if it is possible to read the abbreviation as a word according to the norms of the sound system of the language;
- 3) if there is a regular reproducibility in the process of communication, which, according to A.I. Smiritskiy, is "a necessary condition for the very existence and functioning of language as a means of communication." Examples of abbreviations that have become independent words can be: in French maser – "maser", laser – "laser", radar – "radar", OTAN – "NATO", SECAM – "SECAM color television system", ONU – "UN"; in Russian – VUZ, TSUM, KAMAZ, SPID, etc. [See: 1, 55].

Recognizing abbreviations as lexical units, we must recognize in them the unity of sound and meaning, and the meaning associated not with the individual sounds (phonemes) that make up this abbreviation, but with a specially organized sound complex, which is an abbreviation.

References:

1. Alekseev D.I. *Abbreviaturi kak noviy tip slov*..3-ed. M.: 1977.
2. Fomina M.I. *Modern Russian language: Lexicology*. Moscow "Higher School", 1990.
3. <https://en.wikipedia.org/wiki/Abbreviation>
4. http://elib.psuti.ru/Abramov_kommunikativ_abbrev_komputern_dickurc_a.pdf.
5. <http://ozhegov.textologia.ru/definit/sokraschenie/?q=742&n=204358>.

Rezyume: Ushbu maqolada qisqartma tushunchasi zamonaviy ingliz tilidagi maxsus tushunchalarni turkumlash usullaridan biri sifatida ko'rib chiqiladi, bu esa keyingi tergov uchun zarur bo'lgan muhim muammolardan biridir. Qisqartma tahlili shuni ko'rsatadiki, ular so'z yoki iboraning to'liq versiyasidan olingan harflar yoki so'zlar guruhidan iborat. Har qanday so'z yoki iborani qisqartirishda bo'lgani kabi, qisqartmalar ham tezroq va samaraliroq muloqot qilish uchun yaratiladi. Qisqartmaning ma'nosi hammaga ma'lum bo'lganda, o'quvchi nimani anglatishini tushunishiga to'liq ishonch bilan foydalanish mumkin.

Резюме: В данной статье рассматривается понятие аббревиатуры как один из способов категоризации специальных понятий в современном английском языке, что является одной из важных проблем, требующих дальнейшего изучения. Анализ аббревиатур показывает, что они состоят из группы букв или слов, взятых из полной версии слова или словосочетания. Как и при любом сокращении слов или фраз, аббревиатуры создаются для обеспечения более быстрой и эффективной коммуникации. Когда значение аббревиатуры общеизвестно, ее можно использовать в полной уверенности, что читатель поймет, что имеется в виду.

Kalit so'zlar: qisqartma, kategoriya, harflar, so'z, ibora, ingliz tili, qisqartirish, aloqa, fikrlash, haqiqat va bilish.

Ключевые слова: аббревиатура, категория, буквы, слово, фраза, английский язык, сокращение, общение, мышление, реальность и познание.

**LEGAL BASIS OF THE INSTITUTE FOR COMPREHENSIVE DISPUTE RESOLUTION
IN THE REPUBLIC OF UZBEKISTAN**

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Summary: *This article is devoted to analyzing concepts such as "Alternative Conflict Resolution," Contract Agreement, "Conditionation Agreement", "Mediation", "Mediation", "Mediation", "Mediation", of the economic and arbitration relations The article has developed proposals to increase disputes, improve its legal framework, and the solution of conciliation, to the solution of the conciliations, and the implementation of complications such as mediation, medical solutions*

Key words: *civil, economic, lawyer, Court, judicial protection, guarantee, commercial secret, representative, mediation, arbitration.*

Conflicts are an integral part of the life of society. They occur in different areas and are solved through different methods. The correct resolution of conflicts allows the parties to get out of the ubshu unpleasant situation with small losses and large results.

To date, disputes are resolved in court or using other methods that are an alternative to them. Resolving disputes in court will take a lot of time. When proceeding in the order of claim alone, the courts will accept the necessary judicial document, having studied it for no less than ten days so that the received application can be accepted for proceedings. This, in turn, causes significant losses in a certain respect for the parties to the dispute. The Institute for alternative dispute resolution serves to eliminate similar shortcomings.

As there is a base of normative-legal documents regulating the activity of any field, there is also a legal basis for the institution of alternative dispute resolution. In the Republic of Uzbekistan, there is no single normative document regulating the institution of alternative dispute resolution. The Law of the Republic of Uzbekistan "On Arbitration Courts" was adopted on October 16, 2006 in order to widely introduce conciliation procedures in our country.

The purpose of this Law is to regulate relations in the field of organization and activity of arbitration courts in the Republic of Uzbekistan. Law arbitration courts, disputes resolved by arbitration courts, main principles of their activity, types of arbitration courts, requirements for arbitration court judges, arbitration agreement, rights and obligations of the parties to arbitration, costs related to dispute resolution in arbitration court, documents accepted by arbitration courts clarifies such issues. In the initial version of the regulatory legal document, it was noted that it is a wrong interpretation that arbitration courts reflect "a type of pre-trial settlement of property disputes" or "legal service", an "alternative" (compared to court) way of conducting court proceedings. However, by the time the judicial system has developed and improved, arbitration courts have been evaluated as a type of alternative dispute resolution.

Adoption of this Law has provided some relief in resolving disputes arising from civil and economic relations. In particular, it caused a reduction in the volume of cases considered by arbitration courts, economic courts, and civil courts. The importance of arbitration courts is increasing in regulating relations between parties to a dispute, especially business entities. Unlike other methods of alternative dispute resolution, a document accepted by arbitration courts is considered binding. But since its adoption, the Law has not been filled with significant changes and additions.

One of the methods of alternative dispute resolution is the Law of the Republic of Uzbekistan "On Mediation" adopted on July 3, 2018, which reflects the mediation procedure. Studying the experience of many foreign countries, modern society has shown how important it is to introduce the institution of mediation in the legal system of our country. Citizens are realizing

that it is better to resolve the dispute before the court, during the trial and out of court than to go to court.

In addition, the growing number of appeals to courts increases the workload of judges and complicates the correct, objective, fair and timely resolution of disputes.

In order to increase the efficiency of justice by reducing the workload of judges, the Decree of the President of the Republic of Uzbekistan "On the strategy of actions for the further development of the Republic of Uzbekistan" adopted on February 7, 2017 and "Further reform of the judicial system, ensuring the rights and freedoms of citizens" dated October 21, 2016 According to the Decree on measures to strengthen protection guarantees, the task of preparing and adopting the draft Law on Mediation was set. The purpose of the adopted Law is to regulate relations in the field of mediation.

At the same time, the scope of mediation, basic principles, mediation participants, their rights and obligations, requirements for the mediator, his rights, obligations, responsibility, application of mediation and implementation of the mediation procedure have been clarified.

Despite the fact that the institution of mediation is one of the methods of alternative dispute resolution in the legal system of our country, its legal foundations have not been perfected. The fact that the parties to the dispute do not have enough information about the mediation procedure is the reason why this conciliation mechanism is not widely used. At the same time, the requirements for becoming a mediator have not yet been fully reflected in the regulatory legal document. This makes it difficult for the participants of the dispute to resort to the mediation method.

Another method of alternative dispute resolution, which is widely used in our country today, is a settlement agreement. The Economic Procedural and Civil Procedural Codes of the Republic of Uzbekistan serve as the legal basis for the use of settlement agreements in courts.

In addition, the Resolution of the Plenum of the Supreme Economic Court of the Republic of Uzbekistan "On certain issues related to the application of procedural law norms in the approval of the settlement agreement by the economic courts" settlement agreement, its composition, form and content, approval of the settlement agreement, refusal of approval, its recognition by the court clarifies such issues. There is no single regulatory legal document that clearly defines the legal status of the settlement agreement. Therefore, in most cases, the parties to the dispute, who have concluded a settlement agreement, refuse to fulfill it and appeal to the court again. The Economic Procedural and Civil Procedural Codes of the Republic of Uzbekistan cover general aspects related to settlement agreements. Issues such as the legal consequences of non-fulfillment of the agreement, the rights and obligations that may be assigned to the parties, and the validity period remain open. In this master's thesis, practical proposals for its improvement have been developed.

The decision of the President of the Republic of Uzbekistan "On measures to further improve the mechanisms of alternative dispute resolution", which was adopted in order to democratize the judicial and legal sphere, to reform it, and to widely introduce alternative dispute resolution methods into the legal system of our country, created the ground for raising the conciliation institute to another level. . Based on this Decision, the task of establishing Mediation Centers was established. The main tasks of the mediation center are as follows:

- creation of conditions for the implementation of alternative dispute resolution procedures to mediation, arbitration courts and international arbitration;

- proceeding on the basis of the principle of non-interference in activities related to mediation, arbitration and international arbitration proceedings;

- organization of training courses for training and improving the skills of specialists in the fields of mediation, arbitration courts and international arbitration;

- promoting the development and popularization of mediation and other methods of alternative dispute resolution, organizing seminars, trainings and conferences in this field.

The determination of these tasks is the reason for the increasing importance of the institution of alternative dispute resolution in the legal system. In addition, the international arbitration method of dispute resolution, which is currently used in the experience of foreign countries, is gradually

being introduced into the legal sphere of our country. In particular, the Law of the Republic of Uzbekistan "On International Commercial Arbitration" adopted on February 16, 2021 is proof of this.

Despite the fact that the regulatory legal document has not yet entered into force, the scope of the Law has been determined. It is established that disputes arising from all contractual and non-contractual relations of a commercial nature may be referred to international commercial arbitration by agreement of the parties. The widespread use of alternative dispute resolution methods in our society indicates that the judicial system is adapting to the requirements of the times.

This Law covers issues such as the limits of judicial intervention, the arbitration agreement, the composition and jurisdiction of the arbitration court, security measures and preliminary decisions, the conduct of arbitration proceedings, the adoption of the arbitration decision and the termination of the discussion, and the appeal of the arbitration decision.

In the Republic of Uzbekistan, methods of alternative dispute resolution such as mediation, arbitration courts, and settlement agreements are used. In foreign countries, there are several types of a single mediation method, and the legal basis for regulating conflict relations using this method covers a wider range of aspects.

Reference:

1. Civil Code of the Republic of Uzbekistan // National database of legal documents, 13.01.2021, No. 03/21/661/0011
2. Law of the Republic of Uzbekistan "On Arbitration Court" of October 16, 2006 // National database of legal documents, 03/21/2019, No. 03/19/531/2799.
3. Law of the Republic of Uzbekistan "On Mediation" dated July 3, 2018 // National database of legal documents, 01.15.2020, No. 03/20/602/0052
4. Alternativnoe razreshenie sporov: Uchebnik / Pod A58 ed. E.A. Borisova. M.: Izdatelsky dom "Gorodets", 2019. - 416 p.
5. Referee Discussion / Tutorial. The team of authors. - Tashkent: TDUU, 2016. - p. 103.
6. Decision PQ-4754 dated June 17, 2020 of the President of the Republic of Uzbekistan "On measures to further improve the mechanisms of alternative dispute resolution" // National database of legal documents, 06/18/2020, 07/20/4754/0771 - hip.
7. Law of the Republic of Uzbekistan "On International Commercial Arbitration" // National database of legal documents, 02/17/2021, No. 03/21/674/0123.

Rezyume: *Mazkur maqola “nizolarni muqobil hal qilish”, “kelishuv bitimi”, “mediatsiya”, “hakamlik sudlari” kabi tushunchalarni, iqtisodiy hamda fuqarolik munosabatlaridan kelib chiqadigan nizolarni hal etishda muqobil usullarni qo'llash masalalarini tahlil qilishga bag'ishlangan. Maqolada nizolarni hal qilishning muqobil usullarini mamlakatimiz sud-huquq sohasidagi o'rnini oshirish, uning huquqiy asoslarini takomillashtirish, nizolarni hal etishda mediatsiya, kelishuv bitimi va hakamlik sudlari kabi yarashtiruv institutlarini keng qo'llash bo'yicha ilmiy asoslangan va amaliy ahamiyat kasb etuvchi takliflar ishlab chiqilgan.*

Резюме: *Настоящая статья посвящена анализу таких понятий, как «альтернативное разрешение споров», «мировое соглашение», «медиация», «третейские суды», использованию альтернативных методов при разрешении споров, возникающих из экономических и гражданско-правовых отношений. Статья содержит научно-обоснованные и практические предложения по повышению роли альтернативного разрешения споров в судебной сфере нашей страны, совершенствованию её правовой базы, широкому применению таких институтов, как мировое соглашение, медиация и третейские суды.*

Kalit so'zlar: *Fuqarolik, iqtisodiy, advokat, sud, ixtimoiy himoya, kafolat, tijorat siri, vakil, mediatsiya, arbitraj.*

Ключевые слова: *Гражданский, хозяйственный, адвокат, суд, социальная защита, гарантия, коммерческая тайна, доверенность, посредничество, арбитраж.*

**DEVELOPING SPEAKING AND LISTENING ABILITIES IN MIXED-LEVEL GROUPS
(ON THE MATERIAL OF NEW ENGLISH FILE)**

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Summary: *The purpose of our study is to investigate works of scholars about the problems of listening and speaking in learning foreign languages. We try to analyze the difficulties in doing listening and speaking exercises in mixed level groups focusing on “New English File” (Intermediate) textbook. “New English File” presents different kinds of listening and speaking tasks in order to improve all four skills(listening, reading, speaking and writing).*

Key words: *“New English File”, mixed level groups, listening abilities, speaking abilities.*

“English is desirable in modern life and it is necessary tomorrow.” Hence, speaking and listening skills in English play a vital role for nowadays Kazakhstani students. For this, we have searched some ways of improving speaking and listening skills in mixed level groups in this study. All of our students have different language proficiency levels, because most of them are trained under the weak influence of English grammar at secondary schools. Some students cannot learn English individually, and others just are in the habit of doing textbook exercises and read given materials. Ultimately, in higher schools, they have difficulties in speaking and listening. They have difficulties in pronouncing words, understanding the meaning of the words, phrases, using the linking words, grammatical structure, expressing their ideas, thoughts, sharing their opinions in English, and analyzing the problems. In fact, speaking and listening are closely integrated skills in learning any foreign languages.

According to the requirements of our life, English listening and speaking have important utility values in all spheres. Speaking and listening tend to be more important in human communication and daily life. As a fact, any language develops from listening and speaking.

We agree that students face these problems not only in listening, but also in speaking skills. During listening and speaking, there is a difference between a native speaker and non-native speaker, where the speed of speech varies. Students can meet with difficulties in determining the meanings of words, idioms, and phrases of colloquial languages, and pronunciation. In our study, we try to find the solutions to solve these problems.

The aim of our study is to improve English listening and speaking skills of students in mixed level groups. In order to reach this aim, we put several objectives:

To conduct listening and speaking questionnaire (LSQ) about students’ attitude toward speaking and listening skills;

To identify learning efficient activities in developing listening and speaking skills on “New English File” edition;

To find solutions to reduce difficulties and improve listening and speaking skills of students in mixed level groups.

Literature review

Different scholars have different concepts of listening and speaking but they all agree with one very important feature of listening and speaking, that is a two way process between the speaker and listener.

Listening plays an important role in second language instruction for several reasons (Rost, 1994). If you cannot hear it well, you will find it hard to communicate or perhaps you cannot do listening task for instance. In fact, students often take the wrong way when listening and this leads them to the poor result. It should be noted that the learner’s perception of their listening problem and strategies can affect their comprehension both positively and negatively (Wenden, 1986). Thus, in order to help students get improved with their listening skill, it is needed finding out their

listening problems which cause difficulties to them. We strongly agree with this statement that to improve listening skills it is important to find out the listening problems regardless of the level of students' English knowledge. Each student has his/her own problems and the task of the teacher is to help him/her cope with these problems.

According to Yagang (1994), the problems in listening were accompanied with the four following factors: the message, the speaker, the listener and the physical setting. Furthermore, numbers of research have been carried out to pick out the problem in listening. The problems were believed to be caused by the speech rate, vocabulary and pronunciation (Higgins, 1995).

As Flowerdew & Miller (1996) assumed that the problems of the students were for the speed of delivery, new terminology and concept, difficulty in focusing and the physical environment.

According to Howatt and Dakin (1974) listening is the ability to identify and understand what others are saying. This process involves understanding of a speaker's accent or pronunciation, the speaker's grammar and vocabulary, and comprehension of meaning. An able listener is capable of doing these four things simultaneously. We think that strong students in our groups can also do these things simultaneously and show their good progress.

Tam (1997) says that it is necessary to give students a variety of situations and frequent speaking tasks which play a significant role in the improvement of students' fluency while speaking. When we give the students speaking tasks to do them in the form of the role-plays, creating real situations, we see that each student tries to speak freely and feel confident in communicating English.

Methods

In order to achieve our aim to improve listening and speaking skills in mixed level groups, our study was based on the collection and search of the theoretical and practical materials include literature sources and review. Practical materials involve: to conduct a questionnaire (LSQ) about students' attitude toward speaking and listening skills in mixed level groups; to identify learning efficient activities in developing listening and speaking skills; and to find solution in improving listening and speaking skills of student in mixed level groups.

The subjects of the study are 20 first-year students from different groups, they were randomly chosen. They range from 16-18 years of age. Of the 20 students, 8 students finished schools in villages. The duration of English classes at school was different. Some have learnt English for 4 years; some of them have learnt English for 3 years. The reason of choosing the first-year students for our study is our academic curriculum, and a textbook "New English File". This book fully provides with listening and speaking activities. Curriculum on "New English File" is the same for all groups. We made some changes in curriculum for our research, and try to adapt listening and speaking materials to mixed level groups.

We use LSQ in our study, because it helped us to create a group for our researching, and it is one of the easiest ways to compile data in short period of time. The aim of LSQ was to elicit students' background of English, students' attitude to listening and speaking skills, students' difficulties in listening and speaking. Data from the questionnaire were sorted and analyzed statistically and displayed in diagrams.

This questionnaire helped us to find fruitful learning activities in developing listening and speaking skills in mixed level groups, and to find solutions to reduce difficulties in listening and speaking skills.

1.Results

In our research we prepared a questionnaire for students of mixed level groups. Each question has four options.

The analysis and interpretation of questionnaire is shown in figures 1-5:

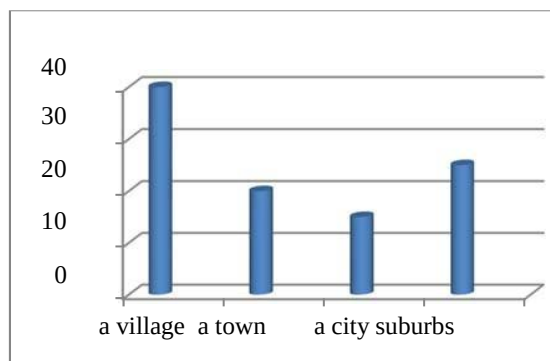


Fig.1. The analysis for the first question (What area did you arrive?)

8 (40%) of students arrived from villages, 4 (20%) – from towns, 3 (15%) – from cities, and 5 (25%) – from suburbs.

This question is aimed to identify what places students lived and finished schools before entering the university. It is one of the reasons of having different level of language proficiency in our groups. There are many students from villages and suburbs, than students from towns and cities

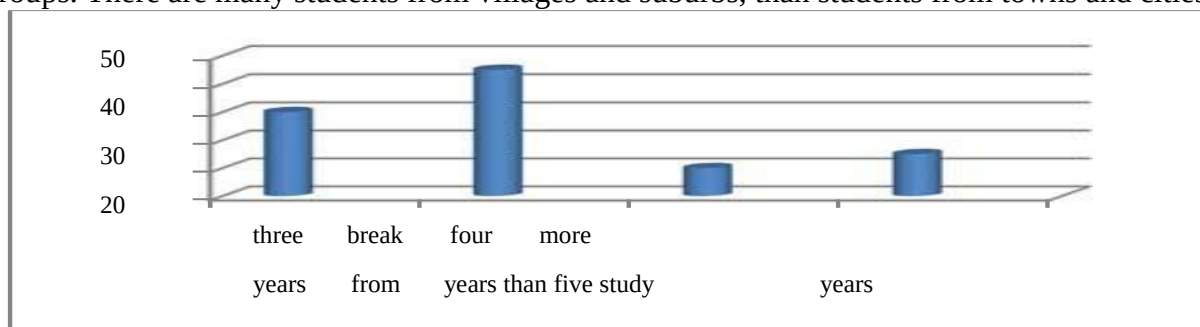


Fig. 2. The analysis for the second question (How long have you been learning English?)

6 (30%) of students have learned English for 3 years, while 9 (45%) students have had break from study. The students learning English 4 years constitutes 2 (10%), and only 3 (15%) of students learned English more than 5 years.

From this point, we can make a conclusion of having mixed level groups; the reason is in the duration of learning English.

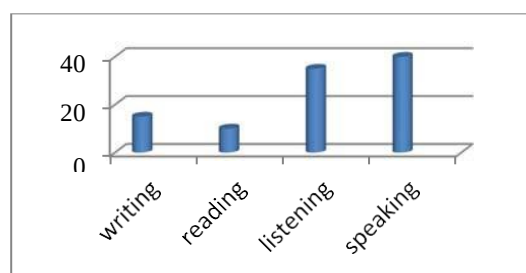


Fig.3. The analysis for the third question (What skills do you like more?)

3 (15%) of students like to write, while 2 (10%) prefer reading. Otherwise, almost 7 (35%) of students prefer listening, and 8 (40%) like speaking skills.

These answers of students for the given question shows positive attitude of students to listening and speaking skills. They would like to improve their skills in listening and speaking.

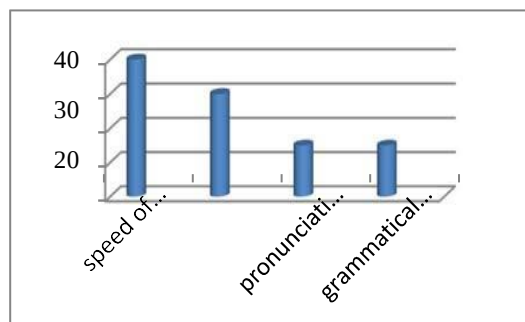


Fig.4. The analysis for the fourth question (What difficulties do you face in listening and speaking?)

8 (40%) of students have difficulties in speed of delivery during listening and speaking, 6 (30%) face problems with misunderstanding of new vocabulary and terminology.

3 (35%) of students think that they have problems in pronunciation of English words, while 3 (15%) of students have difficulties in composing sentences using correct grammatical structure

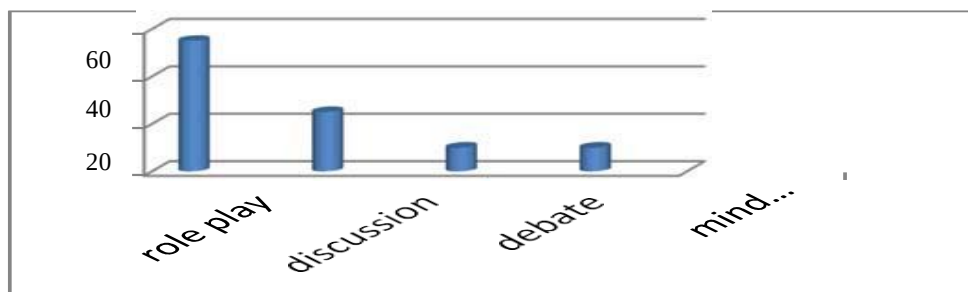


Fig.5. The analysis for the fifth question (What type of activity do you prefer in improving listening and speaking skills?)

Discussion

As for mixed level group students, role plays help students cope with real life situations, commonly used expressions, forcing them to think “on their feet”. Furthermore, role-plays help students work together as a team or a group, and communicate in order to understand each other. Role play can improve students speaking skills in any situation, and helps to interact.

Students with low English proficiency in mixed level groups push teachers to determine the useful and fruitful activities in improving listening and speaking skills. The first-year students study English on “New English File” textbook. During our experiment in mixed level groups, we used relevant role-play activities for our students, as Beautiful Mind, Bingo, Fishbowl, Interview, Leader of the XXIst century, Mind Mapping, Star Wars, Who Wins a Million? etc.

As an example, we present one of the role plays “Beautiful Mind”. The goal is to consolidate the learning material and practice listening and speaking skills. 20 questions of the previous topics are prepared beforehand by teachers. The tasks of the students are to listen to the questions from audio/video resources and to choose the correct answer. During this role play, students discuss the questions in the groups. In the case of any difficulties with answering the questions, they use prompts. At the end of this role play, we assess the students’ listening abilities and abilities to express their minds.

As it was mentioned before, students in mixed level groups have difficulties in speed of delivery during listening and speaking, face problems with misunderstanding of new words and phrases, have problems in pronunciation of English words, and have difficulties in composing sentences using correct grammatical structure. In order to find solutions to reduce these difficulties, we start to listen to short dialogues from “New English File” textbook. There are a lot of dialogues in “New English File” for doing listening tasks. Having in mind the difficulties of our students in listening, we start to listen to these dialogues by making pauses. After listening to short dialogues, students do exercises for comprehension. These exercises include: to find the main

heroes; to copy out numbers or figures; to highlight proper names; to mark signal words of grammar (usually, always, sometimes, every day). The content of the listened part of the dialogue students tell his/her partner.

References:

1. Brown, G. and Yule, G..(1983). Teaching to spoken language. Cambridge Language Teaching Library.
2. DeFilippo, C.L., & Scott, B.L. (1978). A method for training and evaluating the reception of ongoing speech. The Journal of the Acoustical Society of America, 63(4), 1186-1192.
3. Flowerdew, J. Miller, L. (1996). Student perceptions, problems and strategies in second language lecture comprehension. RELC Journal, 23 (2), 60-80.
4. Rost, M. (1991). Listening in action: Activities for developing listening in language teaching. New York: Prentice Hall.
5. Rost, M. (1994) Listening. London: Longman.
6. Tam, M. (1997). Building fluency: a course for non-native speakers of English. English Teaching Forum, 35(1), 26. Retrieved from <http://eca.state.gov/forum/vols/vol35/no1/p26.htm>.
7. Wenden, A. (1986). What do second language learners know about their language learning? A second look at retrospective account. Applied Linguistics 7 (2), 186-205.

Rezyume: Tadqiqotimizning maqsadi chet tillarini o'rganishda tinglash va gapirish muammolari haqidagi olimlarning ishlarini o'rganishdir. Biz "New English File" (O'rta daraja) darsligiga e'tibor qaratgan holda aralash darajadagi guruhlarda tinglash va nutq mashqlarini bajarishdagi qiyinchiliklarni tahlil qilishga harakat qilamiz. "New English File" to'rtta ko'nikmalarni (tinglash, o'qish, gapirish va yozish) yaxshilash uchun turli xil tinglash va nutq vazifalarini taqdim etadi.

Резюме: Целью нашего исследования является изучение работ ученых о проблемах аудио говорения при изучении иностранного языка. Мы постараемся проанализировать трудности при выполнении упражнений на аудио и говорение в группах разного уровня, ориентируясь на учебник «Новый английский файл» (средний уровень). New English File предлагает множество заданий на аудио и говорение для улучшения четырех навыков (аудио, чтение, говорение и письмо).

Kalit so'zlar: "New English File", aralash darajadagi guruhlar, tinglash qobiliyatlari, nutq qobiliyatlari.

Ключевые слова: «Новый английский файл», группы разного уровня, аудио, говорение.

**SOME ISSUES REGARDING RESOLUTION OF INVESTMENT DISPUTES IN
ECONOMIC COURTS**

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Summary: *In this article, the general situation of consideration of disputes related to investment activities by economic courts is thoroughly researched. The article provides a legal assessment of the legal documents of Uzbekistan and foreign countries related to these issues related to the activity of economic courts.*

Key words: *economic courts, economic disputes, investment activities, investment disputes, court practice, economic procedural legislation.*

It is known that attracting investments, ensuring the development of certain sectors through the implementation of investment projects are important issues in the economy of our country.

One of the tasks is to ensure the rights and legal interests of the participants of the economic-legal relations that have arisen due to existing economic factors. However, resolving disputes related to the fulfillment of contractual or non-contractual obligations that may arise between the parties under the conditions of the existing opportunities and the formation of the investment competition environment is one of the urgent issues facing the economic courts.

Disputed issues related to the performance of trade, payment or other types of obligations between the participants of economic relations, damage caused by one party to the other party's timely or improper fulfillment of contractual obligations, conflict between the internal legislation of the other party's own country and the norms of national state law. Due to various other factors, such as the emergence of norms, the adoption of fair decisions by economic courts, based on the relevant procedural legislation, creates the ground for the emergence of the above-mentioned topical issues.

In solving these and other similar disputed issues, it is shown that there are also necessary issues such as resolving disputes arising from direct investment relations in the procedural activities of economic courts within their powers.

In particular, the increase in the flow of investment into the economy of Uzbekistan, in turn, causes an increase in investment disputes. In economic courts alone, 576 disputes related to investment activities were resolved in 2017, 609 in 2018, and 647 in 2019. However, the existing economic legislation in the field, including a certain gap in the existing legal norms on the resolution of conflicting cases related to investment activities, is an obstacle to the full protection of the rights of foreign investors in our country.

There are still issues that need to be resolved in terms of providing an effective mechanism for resolving investment disputes that have arisen in our country, as well as for restoring the rights of violated investors, as well as transparent and open implementation of these processes.

For example, Ismail Safo, who lives in Germany and is originally from Afghanistan, was a victim of fraud in Uzbekistan - it has been more than a year since a criminal case was opened against those who fraudulently embezzled \$80,000 from him. The fact that the inter-district economic court refused to satisfy the claim of "Regent Corp" LLC regarding the annulment of the decision of the Tashkent city administration is a proof of our opinion.

Permitting corruption in state authorities and administrative bodies is one of the negative factors in attracting foreign investments. Therefore, investment disputes may arise at any stage of investment activity. Ensuring that such disputes are resolved fairly and legally is essential.

If we look at the international mechanism for consideration of investment disputes, as an example, according to Article 11 of the Moscow Convention "On the Protection of Investor's Rights", disputes arising during the implementation of investment activities shall be settled by the courts or economic courts of the countries participating in the dispute, as well as the Commonwealth of Independent States. Considered by the Economic Court.

In accordance with the Convention on the Procedure for Settlement of Investment Disputes between States and Foreign Persons signed on March 18, 1965, the International Center for Settlement of Investment Disputes (ICSID) was established.

The jurisdiction of the international economic specialist in these investment disputes has been further expanded by the adopted protocols. It was determined that the center can consider not only disputes related to investment, but also some disputes related to commercial transactions.

If we analyze our national legislation [1] on consideration of investment disputes, the Decree of the President of the Republic of Uzbekistan on July 24, 2020 "On additional measures to improve the activity of courts and increase the efficiency of justice" No. PF-6034 protects the rights of investors in order to provide adequate protection, a special judicial structure was established in the Supreme Court for handling investment disputes and competition cases [2].

Judiciary was empowered to hear investment disputes and competition cases arising between individuals or legal entities and state bodies who made an investment of not less than twenty million US dollars equivalent on the date of investment.

Investors can now, at their discretion, directly approach the Supreme Court to resolve the dispute.

Based on the decision of the Executive Committee of the Chamber of Commerce and Industry of the Republic of Uzbekistan on February 1, 2011, the International Commercial Economic (Arbitration) Court was established and registered with the judicial body on February 15, 2011.

According to Article 63 of the Law "On Investments and Investment Activities", disputes (investment disputes) related to foreign investments and arising during investment activities of a foreign investor in the territory of the Republic of Uzbekistan shall be resolved through negotiations [3]. If the parties to an investment dispute are unable to reach a negotiated settlement of the dispute, such dispute shall be settled through mediation.

An investment dispute that is not settled through negotiations and mediation should be resolved by the appropriate court of the Republic of Uzbekistan.

In the event that it is not possible to resolve investment disputes in the above-mentioned manner, such a dispute may be resolved through an international economic instrument, if the international agreement of the Republic of Uzbekistan and (or) the agreement concluded between the investor and the Republic of Uzbekistan provides for a relevant and valid economic condition.

Only the signed and valid international agreements of the Republic of Uzbekistan and (or) the written agreement concluded between the investor and the Republic of Uzbekistan at the time of applying to the international economy shall be considered as the agreement of the Republic of Uzbekistan to resolve the investment dispute by economic means.

According to the last paragraph of the article cited above, if no international agreement has been signed between the state of the disputing investor and Uzbekistan, the dispute will be considered by local courts..

In addition, the investor can apply to the economic court only when the dispute is considered by the local court.

In our view, this provision on written consent was introduced due to the 2006 dispute between the Newmont-Maying company and Uzbekistan, and this article limits the consideration of investment disputes in international economic courts. On the contrary, in order to guarantee the rights and freedoms of investors, it is necessary to pay more attention to economic courts than to local courts. Because investors do not trust local courts. The reasons for this are as follows:

1) a foreign investor has always been suspicious of local courts, because there is a view that any local court protects the interests of its own country;

2) although local judges are specialists in local legislation, they do not have knowledge of international law and the legislation of foreign countries, and economic courts give the parties the opportunity to choose a judge who is an expert in a certain field of law;

3) consideration of disputes in local courts can take a very long time, sometimes for years, while in economic courts this process is completed faster;

4) economic courts ensure the confidentiality of the parties, unlike local courts [4., 38].

In order to increase the confidence of investors in local courts, it is necessary to ensure compliance with the principles of transparency, openness and transparency in the activities of local courts, and systematically announce the details of the cases.

In our country, the fact that investors are worried about corrupt situations in the process of considering disputes is one of the factors that have a negative impact on the investment environment.

In conclusion, the role of economic courts in the consideration of investment disputes should be increased, because investors trust economic courts more than local courts. It is desirable to change the norms limiting the right of investors to appeal to economic courts (such as written consent, the requirement to be heard in local courts).

It is necessary to take measures to eliminate cases of corruption in the bodies that have direct contact with investors, and to deal with investment disputes, and the actions taken in this regard should be regularly covered in the media.

References:

1. Ўзбекистон Республикасининг Иқтисодий процессуал кодекси. // Қонун ҳужжатлари маълумотлари миллий базаси, 25.01.2018 й.
2. Қонун ҳужжатлари маълумотлари миллий базаси, 24.07.2020 й.
3. Қонун ҳужжатлари маълумотлари миллий базаси, 26.12.2019 й.
4. Иқтисодий процессуал ҳуқуқ: Дарслик муаллифлар жамоаси. –Тошкент: 2022. – Б.38.

Rezyume: *Ushbu maqolada iqtisodiy sudlar tomonidan investitsiya faoliyati bilan bog'liq nizolarni ko'rib chiqishning umumiy holati atroflicha tadqiq qilingan. Maqolada iqtisodiy sudlar faoliyatiga taalluqli O'zbekiston va xorijiy davlatlarning ushbu masalalarga oid qonunchilik hujjatlariga huquqiy baho berilgan.*

Резюме: *В статье подробно исследуется общая ситуация рассмотрения хозяйственными судами споров, связанных с инвестиционной деятельностью. В статье дана правовая оценка правовых документов Узбекистана и зарубежных стран по данным вопросам деятельности хозяйственных судов.*

Kalit so'zlar: *iqtisodiy sudlar, iqtisodiy nizolar, investitsiya faoliyati, investitsion nizolar, sudlov amaliyoti, iqtisodiy protsessual qonunchilik.*

Ключевые слова: *экономические суды, экономические споры, инвестиционная деятельность, инвестиционные споры, судебная практика, экономическо-процессуальное законодательство.*

THEORETICAL ISSUES OF GLOBAL WATER SECURITY

Tursunov O.

Doctor of philosophy (PhD) in law

Summary: *The article discusses theoretical issues related to the crisis of water resources, global water security, concepts of water security, definition of water security, analyzes international legal documents in the field of water security, and also makes theoretical conclusions on the impact of the water crisis on the economic development of many countries and individual regions to ensure water security.*

Key words: *water, water resources, water crisis, global water security, water supply, water assessment.*

At the beginning of the 21st century, the Earth, with a population of more than 6 billion people and its many and varied forms of life, is facing a severe water crisis. According to the forecasts of the UN and other international organizations, the situation will continue to worsen if appropriate measures are not taken to correct it¹. Throughout history, human progress has depended on access to clean water and on the ability of societies to harness the potential of water as a productive resource. Water for life in the household and water for livelihoods through production are two pillars of human development.

In this regard, in recent years, much attention has been paid to water security. This is understandable as the frequency of water-related problems has increased [1]. There are 260 major rivers that separate two or more states and serve more than 70 percent of the world's population. Only 3 percent of the world's water is fresh water, much of which, as Patricia Wouters notes, "is unevenly distributed over the earth and is subject to great variability" [2]. In addition, fresh water resources are vulnerable and can be severely affected by climate change and lead to wide-ranging consequences for humanity and the ecosystem [3.,210].

Water security is high on the agenda of political and business leaders, as well as the academic community. As concerns about water resources grow, politicians, institutions, investors and individuals are now using the term "water security" to express their views. There is a growing international consensus to improve water security in a sustainable manner and build more resilient and reliable water systems. However, water security as a concept provides various disciplines and interest groups with a common language and starting point [4., 20].

The Republic of Uzbekistan also pays great attention to issues related to the provision of water resources, their legal aspects, and international cooperation in this area. For example, a number of scientists (A.Jalalov, Sh.Khamraev, Yu.Rysbekov, D.Ziganshina, V.Dukhovny, B.Alikhanov, Zh.Kholmuminov, B.Ismailov, Kh.Yunusov, and others [5., 266].) devoted their research to issues of water law, implementation of international legal norms, international cooperation, organizational and legal mechanisms of cooperation, rational use of transboundary waters in the region and others. As Zh. Kholmuminov rightly notes, "The solution to the problem of using transboundary environmental and water problems, which pose a real external threat to the country's environmental security, is ensured by joint actions of neighboring states within the framework of international treaties. National legislation is also called upon to play a certain role in regulating the transboundary use and pollution of water problems. However, as a rule, this role will be derived from the adoption and legal consolidation of the relevant international rules" [6., 11].

To date, a set of international legal documents in the field of international water law has been developed. Thus, the 2000 Hague Ministerial Declaration on Water Security, which is one of the first instruments for ensuring water security, listed the following problems related to achieving water security: meeting basic needs, providing food, protecting ecosystems, sharing water resources, managing risks, assessing water resources and regulation. water wisely [7].

The Hague Ministerial Declaration on Water Security in the 21st Century (2000) was adopted at the Second World Water Forum in 2000. The declaration lists the following seven objectives: meeting basic needs, providing food, protecting the ecosystem, sharing water resources, managing risks, water assessment and water management wisely.

More recently, the UN Water Resources has provided a definition of water security, highlighting the various aspects related to water security.

According to UN Water, water security means: “the ability of the population to ensure sustainable access to sufficient acceptable quality water to support livelihoods, human well-being and socio-economic development, to provide protection from water-borne pollution and water-related natural disasters and to preserve ecosystems in conditions of peace and political stability” [8., 20].

Implementing the concept of water security means defining its various parameters, setting targets, and finding measures to achieve these goals. This will be a difficult process and will take some time. Successive steps will improve our understanding, but the core of improving the water level of water security lies in the following: ensuring the availability of sufficient and reliable water resources of acceptable quality to provide water services for all social and economic activities in an environmentally sustainable way; to reduce water-related risks such as floods, droughts and pollution; and in resolving conflicts that may arise from disputes over shared water resources, especially in situations of increasing stress, and turning them into win-win solutions.

The discourse on legal security includes both legal and non-legal aspects. Tadessa Kassa Voldestadik notes that while the former refers to the legally or diplomatically enforceable rights of a person or state, the latter refers to whether one is bound to a physically secure source of water legally or on the basis of water capture [9., 650].

In addition, aspects of water security may concern people, states and ecosystems. A number of scientists, for example, Wouters, Vinogradov and Magzig note that the main problems in water security are united around three topics: the availability of water, access to water and conflicts over water use [10., 3].

When considering water security from the point of view of international law, one should pay attention to the following. First, for a better understanding of water security, it is important to focus on the function of international water law, as it is very difficult to deal with water security in the abstract. Although water security is a relatively recent concept, it has been dormant in the evolution of international water law. Many key principles of international water law reflect and promote thinking about security, although they are not explicitly referred to as water security principles.

Secondly, with the relationship between man and water. From the point of view of water security, it is necessary to answer the question: how does international water law regulate these relations? Whether water is only an object to be used and protected or is related to the formation of these relations more complex due to the occurrence of various extreme events.

Thus, at the present stage, water has become one of the main limiting factors in the economic development of many countries and individual regions, since the growth of world water consumption, along with the increasing level of its pollution, leads to an increase in the number of countries in which the availability of water resources is declining. Climate change will also intensify contrasts, especially droughts and floods, which will be more intense. All this will give rise to new conflicts around water, both internal and international..

Today, the problems of water supply and the joint use of water resources of transboundary rivers, water security are especially acute today in the countries of Central Asia. Therefore, contradictions in this area should be resolved by the Central Asian countries, taking into account the totality of geographic, climatic, environmental and demographic factors, as well as the socio-economic needs of the states of the region, with special attention to the requirements to meet urgent human needs and the needs of ecosystems in sufficient water..

At the same time, it is important that the issues of using the water resources of the transboundary rivers of Central Asia, as well as ensuring water security, be resolved taking into

account the interests of the population living in all countries of the region, and that all actions carried out on transboundary rivers should not have a negative impact on the existing environmental and water balance of the region.

We also believe that it is necessary to further improve the mechanisms for the joint use of water resources in the region and ensuring water security, which will create a stable, long-term and trusting basis for resolving existing and emerging issues in the interests of all Central Asian countries.

References:

1. О мировом кризисе см., например, Всемирная программа оценки водных ресурсов ООН «Вода для людей» 1-23. On the world's crisis, see eg UN World Water Assessment Programme Water for People 1-23.
2. <https://www.dundee.ac.uk/media/dundeewebsite/water2/documents/policy-briefs/No1.Wouters.pdf> 2. For example, there are 260 major rivers which are shared by two or more states, serving more than 70 per cent of the world's population.
3. Bates et al Climate Change and Water. –P.210.
4. Илко ван Бик и Воутер Линклаен Арриенс. Водная безопасность: Применение концепции на практике. Стокгольм, Швеция. Опубликовано GWP CACENA, Тематическая публикация Технического комитета № 20. –С.20.
5. Джалалов А., Хамраев Ш. Национальное водное право Республики Узбекистан и его увязка с международным водным правом. Приоритеты и проблемы. Направления совершенствования // <http://www.cawater-info.net/bk/water law/pdf/djalalov rus.pdf>; Рысбеков Ю.Х., Рысбеков А.Ю. О некоторых вопросах имплементации глобальных Водных Конвенций в национальное законодательство (на примере Узбекистана) // <http://www.cawater-info.net/bk/water law/pdf/rysbekov16-2.pdf>; Зиганшина Д.Р. Комитет по осуществлению – новый организационно-правовой механизм сотрудничества в рамках Водной Конвенции ЕЭК ООН // <http://www.cawater-info.net/bk/water law/pdf/ziganshina2012.pdf>; Духовный В. Аспекты и перспективы долговременных соглашений между государствами в Аральском бассейне // <http://www.cawater-info.net/bk/water law/pdf/dukhovny3.pdf>; Алиханов Б. Экологические проблемы и вызовы в контексте глобальной кооперации по обеспечению экологической устойчивости и стабильности в регионе // Материалы международной конференции «Трансграничные экологические проблемы Средней Азии: применение международных правовых механизмов для их решения», 16-17 ноября 2010 года. – Ташкент, 2010. – С.12-15.; Исмаилов Б. Международные стандарты рационального использования трансграничных водотоков // Халқаро давра суҳбати материаллари тўплами. – Т. 2010. Б.21-29.; Юнусов Ҳ., Маматова З. Трансчегаравий дарёлар ва йирик тўғонлар: таҳдидлар, талафотлар ва хавфсизлик чоралари. Илмий-оммабоп тадқиқот. – Тошкент: “Янги аср авлоди”. 2015. -266 б.
6. Холмунинов Ж. Эколого-правовые вопросы использования трансграничных водных ресурсов и международное сотрудничество Республики Узбекистан и государства Центральной Азии // Ҳуқукий тадқиқотлар журнали/Журнал Правовых исследований / Journal of Law Research. №7, 2017. С.11 // <http://www.cawater-info.net/bk/water law/pdf/halmuminov.pdf>
7. The Ministerial Declaration of The Hague on Water Security in the 21st Century (2000) was adopted at the Second World Water Forum in 2000. The declaration listed the following seven challenges: meeting basic needs, securing food supply, protecting ecosystems, sharing water resources, managing risks, valuing water, and governing water wisely.
8. Илко ван Бик и Воутер Линклаен Арриенс. Водная безопасность: Применение концепции на практике. Стокгольм, Швеция. Опубликовано GWP CACENA, Тематическая публикация Технического комитета № 20.
9. Woldetsadik. "Remodelling Sovereignty". – P.650.
10. Kuokkanen T. "Water Security and International Law" PER / PELJ 2017 (20). – P.3 – <http://dx.doi.org/10.17159/1727-3781/2017/v20n0a1652>.

Rezyume: *Maqolada suv resurslari inqirozi, global suv xavfsizligi, suv xavfsizligi kontsentsiyasi, suv xavfsizligining ta'rifi bilan bog'liq nazariy masalalar o'rganilgan, suv xavfsizligini ta'minlash sohasiga oid xalqaro-huquqiy hujjatlar tahlil qilingan, shuningdek suv inqirozining ko'plab mamlakatlarning iqtisodiy rivojlanishiga ta'siri va alohida mintaqalarda suv xavfsizligini ta'minlash yuzasidan nazariy xulosalar qilingan.*

Резюме: В статье рассматриваются теоретические вопросы связанные с кризисом водных ресурсов, глобальной водной безопасности, концепции водной безопасности, определение водной безопасности, проанализированы международно-правовые документы в сфере обеспечения водной безопасности, а также сделаны теоретические выводы по влиянию водного кризиса на экономическое развитие многих стран и отдельных регионов по обеспечению водной безопасности.

Kalit so'zlar: suv, suv resurslari, suv inqirozi, global suv xavfsizligi, suv ta'minoti, suvni baholash.

Ключевые слова: вода, водные ресурсы, водный кризис, глобальная водная безопасность, водоснабжение, оценка воды.

THE CATEGORY OF GRAMMATICAL CASE IN THE KARAKALPAK LANGUAGE

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Summary: *This article analyzes the category of possessive case in Karakalpak, which is one of the important problems that needs for further investigation. The analysis of the category of possessiveness is related to the study of grammatical functions of case system. The main notions of possessiveness in Karakalpak are relatedness, ownership, possessiveness.*

Key words: *Karakalpak language, morphology, case system, grammatical category, grammatical meaning, possessiveness, suffixes, affixes.*

In Karakalpak language, as in all Turkic languages the case category is considered to be as an advanced category. Modern Karakalpak language has six cases. Linguist A.Kidirbaev in his scientific work devoted to the case category in the Karakalpak language added the seventh auxiliary case [1: 95].

The grammatical indicators of this case were conveyed by the words *menen*, *benen*, *penen* (*qalem menen*, *at penen*). Here the scientist must have considered it to be based on the auxiliary case in the Kazakh language. However, these elements in the Kazakh language have been shortened and formed as a suffix in the form of *-men*, *-ben*, *-pen*. Karakalpak and Uzbek languages do not have such phenomenon. The above mentioned words are considered as special words and called “conjunctions” (*da’neker* and *tirkewish*). Thus, the Karakalpak language has six cases, not seven: each case has its own specific forms, grammatical meanings and syntactical functions.

Since our work is related to the category of possessiveness, we will express our opinion not about all the cases in the Karakalpak language, but about the possessive case.

The possessive case in the modern Karakalpak language is formed by the affixes *-niń/-niń*, *-ning/-diń*, *-tıń/-tıń*. In most languages of the world, the main notions of possessiveness are relatedness, ownership, possessiveness. They are even more evident in the noun phrases.

The phrase “the property of the farm” (*fermanıń malı*) conveys a clear meaning of communicative function of the possessive case, which is, in this case, formed by the grammatical mechanism of the possessive case to express it. In addition, it is given in the form of a syntactical position of an attribute. Many scholars mentioned about the convenience of such language constructions [2: 89].

In this regard, it is important to determine the social-communicative function of possessive case. For example, in the Russian language, the noun in the possessive case conveying the function of possessiveness can serve not only as attribute but also predicate. In Russian, in the sentence “*etot dom brata*” the word “*brata*” is in possessive case, which serves as predicate as well. In the Karakalpak language, the use of an affix *-diki* is a specific construction rather than a possessive case when serving a communicative function. (This house is my brother’s) “*Bul u’y ajag’amdiki*”.

According to the authors of the grammar written in the Turkic languages, the use of possessive case with affix is related to the fact that the noun component indicates a clear and definite object, that is, there are semantic differences between the forms of use with and without affix. A famous turkologist A.Gulomov conducted research on the basis of the Uzbek language materials and concluded that the affix form of the possessive case does not always indicate accuracy. According to him, the attributive function of the case can be found both with and without an affix [3: 67].

However, in certain situations, one form can be replaced by another with no semantic difference or with little noticeable semantic difference. In the Russian equivalents, the difference of these constructions in meaning is not so noticeable. However, in some cases, the use of the participle with an affix, compared to the use without an affix, their alternative use causes a significant difference. This is related to the position of possessiveness in the context.

The phenomenon is expressed by the possessiveness and connection of the categorical form of the possessive case. This is clarified in the syntactic combination of two noun components.

These constructions are morphologically expressed by the adding of the noun combination of the component which is in the possessive case. They change in the agglutinative languages, and have the possessive case form.

In this case, the noun component in the possessive case functions as an attribute and it is more clear by the form in dative case than the form of possessive case without an affix: “the field of the farmer” (fermerdiń dalası), “the caw of the farmer” (fermerdiń malı), “the reconstruction of the school” (mekteptiń rekonstrukciyası), the garden of the school (mekteptiń bağı), etc.

In the above-mentioned examples, the inconsistencies and incompatibilities are highlighted. For example, in the Karakalpak language, the phrase “the edge of the table” (stoldıń sheti). Here are two pieces of information, two views used in the sense of mutual possessiveness: “edge and table”, the edge belongs to this table, it is connected to it. In this case, the connections are not compatible, because the concept of “the edge” can not be an attribute to the table, the edge is the edge of the table, not the edge. This idea proves that the combination can not be changed and replaced.

It should also be mentioned that in most Turkic languages, as well as in the Karakalpak language, the dative case can be used in the use of the attributive possessive function. In this case, some constructions are very interesting, especially in the colloquial language. For example, in the sentences “cotton plant” (paxta zavod), “flour mill” (un zavod), and “oil plant” (may zavod), the third participle pronoun of the possessive form is lost, omitted. Usually, in the Karakalpak language, it is necessary to use them as “a cotton factory” (paxta zavodı), “oil factory” (may zavodı).

From the point of view of the lexical concept, it is possible to consider it as one form of the specific composition of “khlebzavod” (the factory of bread) and “klopszavod” (the factory of cotton) in the Russian language with the above-mentioned functions of the possessive case and dative case. However, should it be considered as an influence of the Russian language or as a process of language development? In the second case, the morphological indicators get disappeared which is certainly a complicated problem. In any case, it should be said that this process has its own grammatical construction in the Karakalpak language. Here it is good to mention these phrases: “our village” (biziń awıl), “our city” (biziń qala), “our school” (biziń mektep). As you realized, in them, the pronoun-possessive case form is left in the first person of the plural form. Such constructions are statistically the typical form for the literary language, especially for the spoken language. It should also be noted that this construction is only component of the pronoun in the first person plural that are made with the possessive case form and noun in the dative case. It is possible to replace the word at the end of the construction, but the previous one – the pronoun – can not be replaced by other person. For example, we can not say “I village”, “he village” or “you village”, but it is possible to say “your village”. This phenomenon is a specific characteristic of the Turkic language, and the Karakalpak language, as well, that differentiates them from others, especially Germanic languages.

In some Turkic languages, the use of quantity is clearly expressed, while in others, uncertainty is noticeable. However, it is necessary to mention that there is not a single language among the Turkic languages that does not express this phenomenon by the affixes of the possessiveness.

The structure of syntactic constructions which expresses geographical features is made up of a dative noun component that notes noun objects. The second of them refers to geographical terms. Such communicative construction can be noticed by the following example: “African animals”.

However, the communicative function of the syntactic construction should be mentioned here. Communicative methods of this case are not the same in most Turkic languages.

Even so, it is necessary to mention that it conveys a whole indivisible meaning. The first component of it can be represented by an adjective. For example: “African animals”, “Caucasian mountains”, etc.

In the Karakalpak language, the noun in the possessive case is used with and without affixes, as in other Turkic languages. The two forms of the use of noun in the possessive case in the Karakalpak language are related to the category of definite and indefinite case, including other reasons. The noun in the possessive case is used with affixes in the following cases:

1. When the noun in the possessive case refers to the speaker and the listener with a known object: “the boy of the village”.
2. The noun in the possessive case is the case of possessiveness and when it has ownership connection. “the market of Khojeli” (Khojeliniń marketi), “I.Yusupov’s songs.” (I.Yusupovtń qosıqları), etc.
3. When the noun possessive case has a special dative case: “the time of yesterday’s child.” (Keshegi balanıń waqtı), “the meaning of today’s news” (bugungi xabardıń manisi)
4. When there are other words between the noun and the word in possessive case: “the city’s wide streets”, “the new work of poet”, “the previous chairman of the school”, etc.
5. When expressing the same owner of objects: The poet’s songs and poems have been translated into other languages. “The student’s books and notebooks are clean.
6. When personal pronouns and other substantial units of speech are in the possessive case: “As if he had not read my letter, neither he talked nor answered”. “Many people come to the house of the good.
7. When it is necessary to distinguish the word of possessive case and emphasize it. “A child of another school, not our school.
8. When the fractional numbers are in the possessive case: one of three, two of seven, etc.
9. The possessive case is used with and without affixes when it comes in front of auxiliary noun. “In front of friends”, “inside the house”, “in front of the door”.

In some other cases, the possessive case is used without affixes when it expresses grammatical uncertainty, generality in constructions representing geographical terms: “Aral Sea, Chimbay city, Abay street, the doctor of science, the professor of University, etc.

If we change constructions, the meanings will also change, even some of them can not be changed. The “Aral Sea” never changes. “Abay street” means the street named after Abay. When we say “Abay’s street”, we mean the street that Abay lives in.

References:

1. Kidirbaev A. Hazirgi qaraqalpaq tilindegi atlıq sozler. Nokis, 1961.
2. Patullaeva G. Qaraqalpaq tilinde tartım manisinin bildiriliw usılları. Tashkent, 2005.
3. G’ulomov A. O’zbek tili grammatikasi. Toshkent, 1969.
4. Hazirgi qaraqalpaq adebiy tilinin grammatikasi. Nokis, Bilim, 1994.
5. www.possessivecase.com

Rezyume: Ushbu maqolada qoraqalpoq tilida egalik kategoriyasi tahlil qilingan bo'lib, bu qo'shimcha tekshirish uchun zarur bo'lgan muhim muammolardan biridir. Egalik kategoriyasini tahlil qilish tizimining grammatik funksiyalarini o'rganish bilan bog'liq. Qoraqalpoq tilida pozessivlik kategoriyasining asosiy tushunchalari qarindoshlik, egalik, mulkdorlikdir.

Резюме: В данной статье анализируется категория притяжательного падежа в каракалпакском языке, которая является одной из важных проблем, требующих дальнейшего изучения. Анализ категории притяжательности связан с изучением грамматических функций падежной системы. Основными понятиями позессивности в каракалпакском языке являются родство, собственность, стяжательство.

Kalit so'zlar: Qoraqalpoq tili, morfologiya, holat tizimi, grammatik kategoriya, grammatik ma'no, egalik, qo'shimchalar, affikslar.

Ключевые слова: Каракалпакский язык, морфология, падежная система, грамматическая категория, грамматическое значение, притяжательность, суффиксы, аффиксы.

**NEWSPAPERS IN THE CONTEXT OF MULTIMEDIA: THE EXPERIENCE OF
MASTERING DIGITAL MEDIA PLATFORMS**

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Summary. This article provides information on experiences on how to adopt secular newspapers, digital information media and digital media platforms in a multimedia environment.

Keywords: secular newspaper, digital media, digital information media, digital media platforms, multimedia environment.

Introduction. The first electronic bulletin boards (BBS) and a number of newsgroups (Newsgroups), which were published on the Internet at the time of its emergence, are recognized as the ancestors of today's electronic publications. Later, the Internet incorporated all the elements of traditional mass media. The first electronic newspaper "The Electronic Club" was created in 1990. After that, a real development took place in the system of electronic periodicals. By this time, world-famous electronic publications such as "The Wall Street Journal" and "Los Angeles Times" were launched. Electronic copies of newspapers recognized by the world have been operating on the Internet since 1996. The first of them: "The New York Times", "The Washington Post", "The Boston Globe", "Известия", "Независимая газета", "Коммерсантъ", "Le Monde", "The Guardian", "The Economist", "Der Spiegel", "The Jerusalem Post" and similar publications.

Today, the analysis of such well-known and popular publications shows that the steps of newspapers towards media convergence started with their assimilation of online media platforms.

Actuality of the research. The New York Times is the number one newspaper in the United States. According to the results of research and polls conducted by "Nielsen/Net Ratings" agency, it is the most popular newspaper among the publications of the American press. The newspaper's website (<http://www.nytimes.com/>) receives 19 million monthly visitors. This newspaper's website provides information on all areas of society: political, economic, cultural and sports news. In addition, the site provides the latest details of events taking place in the USA and around the world. "The New York Times" newspaper is one of the independent publications with a high status. Its number is 1.1–1.6 million copies. The newspaper mainly reflects the views of important circles in the north-eastern states, which are of liberal importance.

"The Washington Post" is the second most popular publication in the United States, according to the conclusion of the above-mentioned "Nielsen/Net Ratings" agency. Its electronic copy (<http://www.washingtonpost.com/>) is read by 10 million people in a month. This newspaper is one of the prominent and prestigious daily publications. The number is 20 thousand copies. The pages of the newspaper contain information about the activities of the White House, Congress and the federal administration of America. It is in this newspaper that a lot of information and information about the "Watergate case", one of the biggest political scandals in the history of the United States of America, was published. It is known to everyone that President Richard Nixon resigned in this regard.

Main part. Another major publication is the British newspaper "The Guardian", according to the results of surveys conducted by the "comScore" rating agency, the Online copy of this newspaper is the most popular publication among readers of the country and worldwide. it turned out to be. Its website (<http://www.guardian.co.uk/>) is estimated to receive more than 4 million monthly visits. It should also be noted that the information in the electronic copy differs in its breadth and completeness compared to the printed version. "The Guardian" is a daily political and public newspaper, which was founded in 1821. To date, its number is 355,750 copies. The political views of the newspaper are liberal, that is, free. The editors of this publication have established a close relationship with the Labor Party.

The next place is occupied by “The Daily Telegraph” newspaper. Its online copy (<http://www.telegraph.co.uk/>) is watched by 3.9 million people in a month. The newspaper “The Daily Telegraph” was founded in 1855. It is the first low-cost newspaper in the history of the British press. At first, he had a very radical point of view. It is for this reason that it gained great popularity in its time. Currently, its main readers are representatives of the upper and middle classes with conservative views. It is one of the quality publications in Great Britain because it publishes interesting articles on its pages and provides information based on complete and accurate analysis. The newspaper is published in London, with a circulation of 1,000,000.

The Times Online (<http://www.thetimes.co.uk/tto/news/>) is the third-ranked electronic publication with an audience of 3 million readers (over a month). “Times Online” is an alternative electronic copy of “The Times” newspaper, which has been published since 1785. It is widely read mainly by representatives of the upper class of the country. Today, its number is 692,581 copies.

“АиФ” is an electronic copy of “Аргументы и факты” newspaper, which is a weekly publication. The printed edition has been published since 1978. It was originally published as a statistical bulletin. At that time, it was difficult to find such statistical information in press publications, and it was the newspaper “Аргументы и факты” that started this work. Currently, its number is 2,997,800 copies and it ranks first in the Russian Federation in terms of its popularity. In addition, in the “Top 100 Rating” of the “Mail.ru” and “Rambler” social networks, the newspaper’s website (electronic copy) ranks higher in terms of the number of visitors compared to other sites. 160,000 people visit “АиФ” online every day.

“The Moscow News” (“Московские новости”) is also an electronic publication widely popular worldwide (<http://themoscownews.com/>). It is a daily social and political newspaper, which was renewed and improved at the end of March 2011. Earlier, this newspaper was published in countries such as the United States of America, Germany, Israel, and Australia. Regularly distributed to 54 countries of the world. As of today, copies of this newspaper are also published in English and Arabic languages. Since February 2010, “The Moscow News” has been published twice a week – on Tuesdays and Fridays.

Materials and methods of the research. The electronic copy of “The Sun” was recognized as the most uncomfortable publication to read. According to the report of “The Guardian”, the electronic copy of “The Sun” has not been so “undervalued” in its life. They came to such a conclusion about it due to the results of the final evaluation criterion given by the UK agency “Webcredible”. The fact that the electronic alternative of this newspaper, which has the largest circulation in the country, was considered inconvenient for users damaged its reputation. Until recently, this publication was considered the most popular newspaper not only in Great Britain, but on the whole planet. Due to the illegal activities of its owner, the British media magnate Rupert Murdoch, the reputation of the newspaper was greatly reduced. News about the electronic copy made this situation worse. Why was this conclusion reached? The main reason was the aggressive design of the newspaper’s website and the large number of advertisements filling the screens. It is these two reasons that made the readers who visited the site nervous. According to a report by Webcredible, an alternative version of The Sun for iPads resembles a scanned newspaper. The publication is not adapted for special equipment and is rather inconvenient to read. In order to find out all this, “Webcredible” agency selected 10 publications with electronic copies and conducted a study based on them. Four of these publications (including The Guardian) do not have iPad versions. However, this situation is not considered the main factor determining the final conclusions. The agency evaluated newspaper websites and electronic versions for mobile phones based on strict criteria. Evaluation criteria: based on the design of the site, what features are used on the site (templates and new entries) and usability (facilities created for users), the number of features on the site, the content and the adaptability of information for special equipment – computers, iPhones, iPads and other devices marked. The highest indicators were obtained by “The Guardian”, “The Financial Times” and “The Daily Telegraph”.

The Sun newspaper is famous for its sensational stories about famous people. Circulation of the printed edition in 2011 was 2.8 million copies. It is published in Great Britain and Germany.

In addition to the increase in production costs and the decrease in purchasing, the Internet and mobile communication tools are rapidly entering the information market, forcing newspapers to come up with new strategies. As always, France is cutting back on press releases and spending more on Internet and mobile services (the average French citizen spends 6 percent of his budget on Internet and cell phone service, and 0.28 percent on newspapers and magazines). Traditional press is developing its own Internet versions to face the fierce competition of new media. At the moment, there is no other way out of the difficult situation for publications caught in the net of competition. On the one hand, a significant part of the French population (30 million) regularly uses the international network. In particular, almost all young people prefer electronic media to traditional media. On the other hand, in the conditions of the market economy, even necessary advertising, like water and air, is moving more and more to the Internet.

Results and discussions. The electronic version of Le Monde (<http://www.lemonde.fr>) is the most popular website in France. The newspaper has a circulation of more than three hundred thousand per day, and its website is visited by more than 600 thousand users every day. Sites are also a good source of income for editors. “Le Monde” newspaper organized an electronic subscription of important news for 6 euros per month. Economic newspaper “Eco” also provides reports and financial studies for a fee.

Britain’s media magnates claim that print media may soon disappear. The legendary newspaper “The Guardian” may be the first to face such a situation. The founders (owners) of the newspaper mentioned separately that they are suffering from huge losses, that printing a single issue of the printed edition requires a lot of money. It is becoming more and more obvious that it is appropriate to spend the expenses intended for the printed publication on expanding the possibility of electronic publication.

“The Guardian” newspaper, published in London, is a widely popular publication among the residents of the capital. The simple style of notes, vital (material) topics, in-depth analysis, comments and reviews are typical features of the newspaper. It is precisely for this reason that Londoners love to read it. Today, the newspaper is 200 years old. However, readers prefer the electronic version to the printed version. Because of this, it became known that the daily newspaper “The Guardian” and its special weekly issue “The Observer” are suffering a lot. The amount of this damage is several million pounds. As if this is not enough, the amount of damage is increasing day by day. In the electronic copy of the newspaper, the situation is the opposite. It has been determined that about 3 million people visit The Guardian’s website every day. After a long discussion, the Guardian News and Media (“GNM”) editorial office made the following decision:

- radical reform of the editorial office of the newspaper and implementation of drastic measures and changes in this process;
- reducing the amount of expenses, that is, allocation of funds in the amount of 25 million pounds for a period of five years;
- abandoning publishing services, reducing the number of printing houses;
- the most important thing is to be one of the first in the history of the press of Great Britain and the world to switch to a completely electronic format.

American newspapers will make their sites paid, RIA Novosti (<http://www.rianovosti.ru>) reports, based on information received from the electronic newspaper “The Washington Post”. Now a subscription to electronic publications will be introduced, and reading it on the Internet will be paid. “Most customers say it’s the right thing to do”, said Rob Gursch, vice president of marketing for the Minneapolis – based Star Tribune. Starting from November 2011, newspaper readers will be required to pay \$1.99 per month after 20 visits to the website. According to “The Washington Post”, in the 1990s, in order to ensure the popularity of newspapers, the use of their websites was made free. The main funds came from the sale of printed publications. However, later, readers began to prefer to read it for free through the Internet site rather than buying the printed edition for money.

As a result, sales of printed publications fell sharply. Almost a quarter of the 1,350 sites in the US have paid access. "The Guardian", in turn, is also known for its activity in other social networks. 1.5 million people are registered as permanent followers on his Twitter account. He has almost 8,500 fans on Facebook.

On October 31, 2011, The Guardian's search bot went live on Twitter. Now his search engine has its own account on Twitter. Users can get all the interesting information right here. "Mashable" writes that the equipment that allows searching through microblogs has also been launched. The user can find the information he needs on "The Guardian" website, more precisely through "@Guardian Tag Bot Occupy Wall Street". This is just an active search tool, says Nina Lawrence. Since 1999, the system of "Guardian Unlimited" websites has been launched, and since 2008, it has changed to guardian.co.uk. 176 years after the establishment of the printed publication, its official website was created.

The Guardian's first blog on the Internet was founded by Leo Hickman. However, due to the poor traffic flow, users could not enter into a debate with each other. On April 17, 2000, Leo Hickman launched the first blog on The Guardian website. "At that time, we had no idea that the blog would become so popular in Keljak. Initially, this direction was called "Blogging", later the concept of "Webblog" was introduced. If we compare that time with today, there are sharp differences in the interactive participation of students, says Leo Hickman.

In London subways, newspapers are placed in a special place next to the seats. Students can browse it and read information until they reach the desired station. This measure, which was used to ensure the popularity of printed publications, is not effective, the need and demand for printed publications is decreasing day by day. The emergence of the latest technological tools such as iPhone, Blackberry, iPad, the possibility of reading electronic publications with the help of high-speed Internet extinguishes the interest in printed publications, readers prefer online copies of publications.

Among electronic copies of "The Guardian" and many other similar publications on the Internet, "The Sun" newspaper is the leader. The next place is occupied by "The Guardian". The electronic copy of "The Guardian" won a "Webby Award" this year. Also, "Daily Telegraph" and "Times Online" were recognized as popular publications. There are also opinions that the relationship between printed and electronic publications does not affect each other, and the index of the Internet is characterized only by the good work of the Internet editors. Guardian.co.uk. popularity and activity are determined on the basis of several specific features. The most interesting thing is that none of these features are new, all of them are traditional methods that have been used for several years. These are: breadth of search possibilities, information on hot topics, speed and quality are factors that determine daily traffic. Just one example, about the death of Patrick Swayze, the famous film actor, who gained the attention of many fans through the movie "Spirit", 15 articles were written in "The Guardian", 10 in "Daily Telegraph", 5 in "The Mirror". the article is written. In the rest of the publications, there is almost no information about this. Visitors to the site are very active. However, this is not only determined by the availability of search. Sections and pages on the site, especially blogs, work well. Blogs with the opinions of reporters (correspondents) attract the attention of site users, and therefore the number of visitors to the site is the majority. It is precisely because of blogs that the number of pages being watched is increasing. Among English users, it is common for one person to visit the same page three or four times.

"Fast Flip" service was introduced by "Google" in cooperation with "The Guardian". It features beautiful looking articles and intertextual ads from popular newspapers and magazines. This, in turn, creates new business opportunities for media companies.

Conclusion. It can be seen that the electronic edition has fully incorporated all the features of the printed edition, it has established the equal application of traditionality and modernity, and it positively reflects all the new features that have arisen as a result of the development of information and communication technologies are characterized by its positive assimilation.

References:

1. Aquino R., Bierhoff J., et al. The European Multimedia News Landscape. Mudi Reports, 2002. – p. 15.
2. Баранова Е.А. Особенности влияния процесса конвергенции на газетную периодику Великобритании // Медиаскоп. №4. 2009г. <http://www.old.mediascope.ru /node/498#1> (28.11.2013й.).
3. Thurman N., Lupton B. Convergence Calls: Multimedia Storytelling at British News Websites. In: International Symposium on Online Journalism. Austin. Texas. 2008. April, 4–5. – p. 3.
4. Муратова Н. Интернет – журналистика: вчера и сегодня. Ежемесячный информационно аналитический журнал Infocom.uz. №2. 2005. стр. 80.
5. <http://www.economist.com/multimedia> (28.11.2013).

Rezyume. *Ushbu maqolada multimedia sharoitida dunyoviy gazetalar, raqamli axborot vositalari va raqamli media platformalarini joriy etish tajribasi haqida ma'lumot berilgan.*

Резюме. *В этой статье представлена информация об опыте внедрения газет, цифровых информационных медиа и цифровых медиа – платформ в мультимедийную среду.*

Kalit so'zlar: *gazeta, raqamli media, raqamli media, raqamli media platformalar, multimedia muhiti.*

Ключевые слова: *газета, цифровые медиа, цифровые информационные носители, цифровые медиаплатформы, мультимедийная среда.*

**GENERAL CONSIDERATIONS ON OBJECTIVE SIGNS OF NON-REPORTING OR
CONCEALMENT OF CRIME**

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Summary: *The article made general observations about the objective signs of non-reporting or concealment of a crime. The article highlights in detail the controversy of the question of the object of involvement in the crime. Based on these considerations, the author's views on the objective signs of not reporting a crime or concealing it are given.*

Keywords: *crime, involvement, participation, object, non-reporting, concealment, state bodies, encroachment.*

In the theory of criminal law, it is noted that the composition of the crime consists of objective (object and objective side of the crime) and subjective signs (subject and subjective side of the crime). When we highlight the objective signs of not reporting a crime or concealing it, it is appropriate to first of all dwell on the issue of its object. It is known that the object of any crime is divided into horizontal (general, special, related and direct objects) and vertical direction (direct main, direct additional and direct facultative objects).

A common object is a set of all social relations protected by criminal law. This complex is the objects provided for in Article 2 of the Civil Code. The general object of not reporting or concealing a crime is also based on this article.

A certain group of authors puts forward the idea that concealment as a type of involvement in crime is a multi-objective crime. They distinguish, on the one hand, social relations in the field of prevention, stopping or detection of specific crimes, and on the other hand, social relations in the field of prevention of crimes of a certain type, that is, there is a situation of non-prevention, non-stopping or non-detection. G.I.Baymurzin does not agree with this point of view and writes: "based on this, they conclude that the activity of a person involved in a crime simultaneously encroaches on two objects - the interests of justice and the object of the crime that caused this activity [1, 149].

In this case, the object of the crime is recognized as the main, decisive object. It is reasonable to consider the perception of the dual nature of involvement in crime as a mistake. It is based on the artificial division of the single essence of criminal activities. According to L.V. Lobanova, concealment of a crime acquires an intermediate character, that is, on the one hand, it is a violation of the conditions for the implementation of both procedural activities and activities related to the execution of a sentence, and on the other hand, the fulfillment of a specific and specific task of justice - exposes the culprits, determines their level of guilt and allows them to be punished for what they have done. According to another group of scientists, the basis of public safety and social relations that ensure public safety apply as the object of involvement in crime [2, 39]. For example, N.S. Kosyakova in her work, having studied different approaches of the legislator and different points of view of scientists, comes to the conclusion that the essence of involvement in crime is expressed in an attack on the system of social relations that form the conditions of normal and safe existence of society [3, 35]. By violating the rules set out in the criminal law, a person encroaches on people's safe way of life. In conclusion, the author concludes that it would be appropriate to move the norms establishing the institution of involvement in crime to the section of the RF JK called "Crimes against public safety". Researching the issues of responsibility for concealing a crime according to the Shura criminal law, some scholars come to the conclusion that the actions of the concealer violate the same social relations as the actions of the perpetrator. Others, on the contrary, try to justify the opinion that unpromised concealment, although objectively connected with the main serious crime, does not actually harm its immediate object and is aimed only at harming social relations in the field of justice. He stated that combining the two objects of

different aggressions or separating the social relations that are violated during the commission of the main crime as the object of the crime and the criminal's concealment distorts the legal nature of concealment as an independent act worthy of punishment under the criminal law and, moreover, turns it into an additional element of participation in the crime.

So, if we analyze the above opinions, two cases are put forward in them, i.e., some scientists evaluate the special object of the researched crime as social relations that ensure public safety, while others evaluate it as social relations that arise in the process of justice. Of course, in both cases there are points on which we can agree to a certain extent. In particular, let's comment on the first case. It is known that public safety is a concept that expresses the state of protection of an individual, society and the state against crime, other illegal actions, the consequences of emergency situations, social conflicts, natural disasters, epidemics, epizootics, major disasters, accidents and fires. Looking at another definition, public security is a social relationship that ensures safe conditions for social life, as well as the safety of citizens' lives and health, the property interests of individuals and legal entities, and the normal functioning of all state or public structures. In one respect, the most important purpose of imposing liability for failure to report or conceal a crime seems to be to protect the public from crime. However, this goal is the same goal of all norms of the Criminal Code, as stipulated in Article 2 of the Criminal Code, in other words, the determination of responsibility for other types of crimes. Approaching from the first point of view, we should consider all types of crimes as crimes against public safety. For this reason, this idea is wrong, because not reporting a crime or concealing it is against the best interests of justice. However, it is wrong to think that the special object of this crime is the social relations that arise in the process of justice. The reason is that judicial activities are carried out directly by courts. Courts are a link of the three branches of government. If any crime is directed against the activity of justice, in turn, it is evaluated as a crime against the activity of authorities. However, there are a number of other crimes, such as failure to act by the authorities (Article 208 of the Civil Code), resisting a representative of the authorities or a person performing a civic duty (Article 219 of the Civil Code), which also disrupt the normal functioning of the authorities, such as not reporting a crime or concealing it. . But we cannot call them crimes against justice. It is clear from this that the second approach stated regarding the special object of not reporting or concealing the crime, that is, the approach in the context of "social relations that arise in the course of justice, is its special object" is also wrong.

In our opinion, this situation should be resolved as follows. That is, the special object of not reporting a crime or concealing it is the social relations that ensure the normal functioning of the authorities, and the relations that arise in the course of justice should be considered as its related object.

Now, let's turn to the issue of the direct object of the analyzed crime. According to M.H. Rustambayev, the direct object of the criminal crime is the social relations consisting of the normal activity of the court, prosecutor's office, preliminary investigation or inquiry agencies [4, 145]. Z.Kh.Gulomov and M.M.Kadirov expressed a similar opinion.

As the direct object of concealment of crime, it defines the social relations that ensure the normal activity of judicial bodies in exposing the culprits and investigating cases of serious crimes. A similar approach can be found in criminal law textbooks. For example, in the criminal law textbooks edited by A.B. Melnichenko, S.N. Radachinsky, it is proposed to divide crimes against justice into five groups according to their direct object. Here, the concealment of a crime is included among the crimes that encroach on the activities of the authorities to stop and detect crimes in a timely manner [4, 96]. Dividing the crimes against justice into six groups, V.Y. Sharaya includes unpromised concealment in the group of crimes combined with the sign of encroachment on the established order of investigation by refusing to fulfill constitutional, procedural obligations or the judgment of the court [5, 9].

Taking into account the controversial nature of the object of involvement in crime, it is appropriate to understand the social relations in the sphere of activities of the relevant state bodies

to prevent, stop and solve crimes as a direct object. This relationship is an integral part of the normal administration of justice. This conclusion can be justified by the fact that the relevant norms of the criminal law are located in the chapter "Crimes against justice", and since one of the tasks of law enforcement agencies is the prevention and stopping of crimes, involvement in crime in any form and in addition to harming other relationships, first and foremost always violates the interests of justice.

Thus, in our opinion, the opinion of the authors, which determines social relations in the field of activity of the relevant state bodies to detect, prevent, stop and solve crimes, as an object of concealment as a type of involvement in crime, is correct and leads in criminal law. Concealers of crime are persons who help the criminal to avoid responsibility by hiding the trace of the offense committed by the criminal, and sometimes by hiding the person himself, and by their actions, they cause great harm to the interests of justice and prevent the implementation of the principle of inevitability of punishment.

Concealers of crime hinder the state's fight against criminal aggression. He defined the normal functioning of judicial authorities as the object of non-promised concealment, "because concealment makes it difficult to solve the crime and expose the culprits. The degree of social danger of this crime is determined by the attack on this object. However, the degree of social danger of concealment increases significantly due to the fact that concealment creates conditions for committing other, in some cases, serious crimes without affecting other objects.

Based on the study of the opinions of the above scientists, it can be said that the direct object of research, i.e., not reporting a crime or concealing it, is the social relations that ensure the normal functioning of the court, prosecutor's office, preliminary investigation, rapid-search activities, and investigative bodies.

References:

1. Baimurzin G.I. Responsibility for involvement in a crime. - Alma-Ata, 1968.
2. Lobanova L.V. Crimes against justice: problems of classification of encroachments, regulation and differentiation of responsibility: diss. Doctor of Law. Sciences. 12.00.08. / L.V. Lobanova. - Kazan, 2000.
3. Kosyakova N.S. Involvement in crime in Russian criminal law: formation, state and development prospects: Author. dis...candidate...jurid...sciences. - M., 2001.
4. Rustamboev M.H. Comments on the Criminal Code of the Republic of Uzbekistan. Special part. - Tashkent: Ilm Ziya, 2006.
5. Melnichenko A.B., Radachinsky S.N. Criminal law. A common part. Tutorial. - Rostov-on-Don: March, 2002.
6. Sharay Yu.V. The object of crimes against justice: author's abstract ... diss ... candidate ... legal ... sciences. - St. Petersburg, 2005.

Rezyume: *Maqolada jinoyat haqida xabar bermaslik yoki uni yashirishning ob'ektiv belgilari haqida umumiy mulohazalar keltirib o'tilgan. Jinoyatga daxldorlikning ob'ekti to'g'risidagi masalaning bahsliligi maqolada atroflicha yoritilgan. Mazkur mulohazalardan kelib chiqib, muallifning jinoyat haqida xabar bermaslik yoki uni yashirishning ob'ektiv belgilari haqida fikrlari keltirilgan.*

Резюме: *В статье сделаны общие наблюдения об объективных признаках несообщения или сокрытия преступления. В статье подробно освещена спорность вопроса об объекте причастности к преступлению. На основе этих соображений приводятся взгляды автора на объективные признаки недонесения преступления или сокрытия его.*

Kalit so'zlar: *jinoyat, daxldorlik, ishtirokchilik, ob'ekt, xabar bermaslik, yashirish, davlat organlari, tajovuz.*

Ключевые слова: *преступление, причастность, участие, объект, недонесение, сокрытие, государственные органы, посягательство.*

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THE MAIN DIRECTIONS IN THE CHANGE OF THE LANDSCAPE-ECOLOGICAL CONDITIONS OF THE ADYRS OF THE FERGANA VALLEY

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Summary: *The adyrs of the most densely populated Fergana Valley of the Republic of Uzbekistan are considered the main land reserve for agriculture. The presence of favorable natural geographical conditions and landscape complexes for the development of agriculture and various industries and recreation systems of these adyrs have led to a number of changes in the natural landscape complexes under the influence of anthropogenic factors. They were mainly manifested in the forms of formation and development of anthropogenic landforms, changes in soil cover, and development of agricultural -landscapes.*

Key words: *adyrs, adyr landscapes, anthropogenic relief, relief forms, soil cover change, agricultural landscapes, development of agricultural landscapes, effective use of nature, meso-relief, erosion, soils, natural-anthropogenic systems.*

Introduction

In the Fergana Valley where one of the most densely populated areas of the Republic of Uzbekistan, the adyrs are considered the main land reserve for agriculture. As there are favorable natural geographical conditions and landscape complexes for the development of agricultural sectors and various industries and recreation systems, the natural landscape complexes of these adyrs have been highly changed under the influence of anthropogenic factors [8]. From this point of view, the landscape-ecological condition of the adyrs of the Fergana Valley has undergone a number of changes under the influence of various branches of human economic activity, especially agriculture. Studying such transformational processes from the point of view of effective use of nature is considered one of the urgent tasks of today.

Analysis and results

Under the influence of anthropogenic activity, natural relief forms are changing. According to the degree of relief change, the Fergana Valley is divided into very little changed (20%-40%), moderately changed (40%-60%), strongly changed (80%-100%) areas. Genetic categories of anthropogenic terrain are divided into amelioration, quarry, terrace, leveled, construction, ravine suffusion-karst, irrigation-erosion, irrigation-accumulative and residual "subject" genetic groups [6].

Adyr landscapes of the Fergana Valley have anthropogenic landforms in predetermined or undefined forms depending on the purpose.

Predefined landforms include reclamation (drainage canals, irrigation canals, reservoirs, ponds, rice paddies), quarries (formed by excavation of adyrs and road construction), leveled, terraced slopes (slopes, terraces), devices (roads, flood dams, wind erosion barriers).

1. Reclamation relief. It results from the construction of irrigation facilities and secondary forms of irrigation. Under the influence of irrigation and drainage reclamation, the surface of the earth undergoes certain changes. Among them are canals and ditches connected with the release of water to the territory, and collector ditch structures built in the territory. The geography of channels and collector-drainage areas depends on a number of natural geographical factors. Irrigation systems are considered to be meso-relief forms, their occurrence is associated with changes in certain meso- and micro-relief forms.

2. Careers. Minerals are produced by open pit mining, excavation of foothills and erosion of the land as a result of road construction. F. N. Milkov distinguishes three main groups of quarries (quarry, restored and century state) [4,5].

3. Artificial terrace relief. It is formed as a result of the construction of artificial terraces and gardens on the slopes of the territory. Such areas are built according to the flow of water along the horizontal lines. It is a pity that farming is not carried out in the pre-mountain landscapes of Ferghana Valley, creating a terrace relief, which is causing great damage to the adyrs.

4. Flat terrain. Land leveling is divided into capital (fundamental) and current leveling. Both methods are implemented on old irrigated and newly irrigated lands. In the development of adyrs, it is required to carry out capital and current leveling works on the basis of the project. Leveling works are carried out on the basis of horizontal slopes and topographical surfaces. To level the adyrs, it is necessary to take into account such features as the granulometric composition of the soil group, the degree of leveling, the relief, the depth of the impermeable layers. According to the information provided by "The Ministry of water resources of the Republic of Uzbekistan" Institute, it is not recommended to carry out smoothing works on the lands with a thickness of 100 cm of soft rocks, the thickness of the leveling layer is 50 cm, and when the thickness of soft rocks is 50-100 cm. When leveling adyrs consisting of thick loess and loess-like rocks, this recommendation loses its validity. Because the surface of the existing loess adyrs with a thickness of 1-2 m to 4-5 m is being leveled using powerful techniques. This leads to a radical change of relief forms.

As a result of inspections and land leveling works in the Kokumboy adyrs, 20,000 tons of soil with a volume of 13,500 cubic kilometers were removed from an area of 5,000 square kilometers. The pushed soil was carried away into the valleys and depressions, causing the formation of suffocation and mounds. Anthropogenic ravines are caused by improper use of water in the adyrs and mistakes in choosing the type of place. As a result of irrigation of sloping lands, the bottom of the slopes is eroded. Improper use of water in the development of adyrs leads to the formation of collector-drainage ravines. A clear example of this is the huge ravine that divides the village of Kazanbulok, which belongs to the Yangikurgan district. Local residents say that there used to be many springs in this place, and the water flowed in a small stream. In 1976, after water was released to the adyrs, waste water appeared. On top of that, the filtered water accumulated on the impermeable layers and began to leak towards the village of Kazanbulok in the form of seeps. The level of the ground waters has risen in this village between the adyrs, and swamps have appeared. Local residents decided to dig a collector in order to reduce the level of seepage water. As a result, first smaller, then 15-20 m wide and 12-18 m deep ravines appeared. In some places of the ravines, tributaries with a length of 50-100 m have formed. The village of Kazanbulok was divided into two, parks, buildings, electricity networks and roads were destroyed [6]. Such unpleasant scenes can also be found in Chartak, Chust, Kosonsoy adyrs.

As a result of the change in the soil cover of the adyr landscapes of the Fergana Valley, landscape-ecological conditions also change and completely new landscape types appear [1,2].

Adyr landscapes are the main land fund of the Fergana Valley, and along with ecological problems related to the agricultural sector, changes in the soil layer are also observed in the area. Its main directions are manifested in the change of humus, turning it into cultural soil, salinization, erosion and other forms.

The emergence of such processes directly depends on the geological, geomorphological and soil conditions of the place, as well as mainly on the characteristics of anthropogenic factors.

In irrigated gray soils, due to agricultural-irrigation deposits, organic and mineral fertilizers, the thickness of the soil increases, gypsum is further washed down, the forms of nitrogen absorbed by plants increase, and the soil becomes increasingly cultivated. The areas where these soils are distributed have an average slope of 8-15°, and this slope is one of the main factors causing irrigation erosion. When irrigation is used to irrigate crops on sloping land, the fertile part of the soil is washed away as a result of the increased velocity of water spread over the fields. As a result, soils with different fertility and other properties are formed.

According to historical sources, gravelly landscapes were covered with soft rocks in ancient times. Their irrational use led to the washing away of soft rocks on the surface of these soils.

Typical and pale gray soils are widely used in agriculture, including irrigated agriculture. As a result of their development, newly irrigated typical and irrigated light gray soil types were formed.

Long-term cultivation of irrigated gray soils has led to the formation of gray oases. Humus content of irrigated gray soils decreased in the first years of development, and then increased. The continuation of exploitation causes the leaching of carbonates and gypsum, the fertile soil thickens, and the amount of agronomically valuable substances increases. At the same time, leached carbonates and plasters have a negative effect on other areas, causing some agricultural lands in the lower regions to become unusable [7,8,9].

Irrigation erosion is common in irrigated agricultural areas. For this, all natural and anthropogenic factors have developed in the adyrs. There is a strong risk of erosion in the areas. As a result, the upper soft rock layer of the soil is washed away and the gravel layer is exposed. As a result, the water-climate regime and fertility of the soil deteriorate sharply, and it becomes completely unsuitable for agriculture. Irrigation erosion reduces soil fertility, seriously hinders timely agricultural operations, reduces cotton yield and quality, and causes leaching of applied mineral fertilizers (Table 1).

Partial wind erosion (deflation) is observed in the southwest of the adyrs. Chust-Pop foothill plains are seriously damaged by wind erosion. The reason for this is that it is not located in the direction of the Kokand-Bekabad wind, but the pressure over the Syr Darya riverbed diverts a certain part of the wind in this direction.

As a result, the properties of the front sloping plains of hilly landscapes are completely deteriorated due to the deflation of soils with a light mechanical composition.

One of the ways to combat deflation is to place the edges of irrigation fields across the direction of the wind, and to build tree groves of willow, acacia, mulberry, linden, poplar, apricot.

Table 1

Effects of irrigation erosion on soil fertility

Level of soil leaching	The slope of the land (°)	The thickness of the humus layer (cm)	Amount of compost (%)	Cotton crop (cen /hec)
The place where the washed product is collected	0°	More than 100	1,3-1,7	32,7
Less washed Pale gray soil	1-2°	50	1-1,2	28,4
Medium washed	3-4°	25-30	0,8-0,9	25,9
Strongly washed	5-7°	15-20	0,4-0,6	23,0

Note: The table was prepared based on the data of A. Maksudov.

Improper use of water in Adir landscapes, i.e. deterioration of the condition of collector-water systems, use of brackish water for irrigation causes secondary salinization.

The change of hilly landscapes of the Fergana Valley under anthropogenic pressure is in turn related to the features of relief exposure (slope), rock density, water permeability and other factors [3]. . Development based on scientific recommendations that take into account the condition of the relief, the composition of the rocks and the forms of the impermeable layer, the preservation of landscapes and the improvement of the agrotechnical method of irrigation, and the improvement of the reclamation condition of irrigation facilities are among the important tasks.

It is necessary to carry out the following activities in order to improve the cultural level of the adyr landscapes of the Fergana Valley, to develop measures for soil desalination, to maintain soil fertility, and to prevent unpleasant ecological problems in anthropogenic landscape complexes:

- Increasing the area of crops with low water demand in the hilly landscapes of the Fergana Valley, reducing the area of intensive farming;
- stopping the construction of new hydrotechnical structures, effective use of existing ones;
- carrying out repair works in the existing collectors and reservoirs in areas with strong

salinity;

- such as placement of agricultural crops in accordance with landscape types.

Measures such as conversion of farms located in the hilly landscapes of the Fergana Valley into viticulture and horticultural farms, and expansion of the scope of low-demand crops will also have the expected effect.

In the hilly landscapes of the Fergana Valley, agrolandscapes make up a large part of the natural-anthropogenic systems. They can be different according to their structure and characteristics. The agrolandscapes of the hilly landscapes of the Fergana Valley can be divided into irrigated agriculture, dryland agriculture, pasture and grassland landscapes. Also, the territory of agrolandscapes is divided into agrourochishe and agrofacies, like natural landscapes. Agrolandscapes are characterized by low tolerance to natural-dynamic changes compared to natural landscapes [10,11]. Because in these landscapes, as a result of anthropogenic influence, a certain change has occurred in the life of living organisms, in the water and heat regime, in the process of soil formation, in the exchange of biogeochemical substances. destruction of pastures, etc.) leads to its emergence and development.

Irrigated agricultural landscapes are composed of meridional branching river basin directions in the regions. These irrigated agricultural areas are better developed in the lower regions of the Fergana Valley than in the upper parts of the hilly landscapes.

Non-irrigated agricultural landscapes are well developed in the upper parts of the hilly landscapes of the Fergana Valley.

Pasture landscapes include the upper parts of the adyr landscapes of the Fergana Valley and the adyrs of the lower slopes.

Conclusion

It is natural that the location and development of agricultural industries in the adyrs of the Fergana Valley will continue in the future. Because, firstly, the adyrs are the main land fund of the region, and secondly, the number of the population of the region due to their growth, not only providing them with land, but also meeting the need for agricultural products is one of the important tasks. This means that the anthropogenic influence on the hilly region is increasing. As long as the adyrs of the Fergana Valley continue to be used for the development of society, it is necessary to rely on scientifically based action plans, along with careful treatment of adyr landscapes.

The change of the relief in the adyr landscapes of the Fergana Valley takes place in the following directions: quarry relief forms due to the excavation of land in the adyrs and the construction of roads; Constructions built for the purpose of irrigation and secondary forms of irrigation are melioration reliefs; terrace relief forms as a result of the establishment of gardens in the form of terraces on steep adyrsides; The emergence of flattened relief forms on adyrs intended for new irrigation affects the formation of landscape-ecological conditions

As a result of soil changes in the adyr landscapes of the Fergana Valley, landscape-ecological conditions have also changed. The directions of soil changes were manifested in the reduction of humus, conversion to cultural soil, salinization, erosion and other forms.

In the adyr landscapes of the Fergana Valley, agrolandscapes make up a large part of the natural-anthropogenic systems. They are divided into irrigated agriculture, dryland agriculture, pasture and grassland landscapes.

Irrigated agriculture is better developed in the lower adyrs than in the upper adyrs.

Non-irrigated agricultural farming is well developed in the upper parts of the adyrs.

References

- 1 Abdulkosimov A.A. Problems of studying intermountain-hollow landscapes of Central Asia. -T.: Fan, 1983. -P. 210
- 2 Abdulkasimov A. Anthropogenic transformation of the landscapes of Central Asia and the issues of its forecasting // Geography and natural resources, №3.1980. -P. 198
- 3 Kurakova L.I. Anthropogenic landscapes and the tasks of their integrated study // Geographical Research at Moscow University. -M.: 1976. -P. 134.

- 4 Milkov F.N. Physical geography: the doctrine of the landscape and geographic zoning. -Voronezh: Voronezh Publishing House. un-ta, 1986. -P. 224
- 5 Milkov F.N. Natural-anthropogenic landscapes as a special category of natural complexes. Sat. Anthropogenic landscape. Voronezh, 1988. -P. 217
- 6 Maksudov A. Changes in soil and environmental conditions of the Ferghana Valley under anthropogenic impact. – Tashkent: Fan, 1990. -P. 92
- 7 Mirzamahmudov O.T. Shimoly Fargona adirlari landscape-ecological sharoitining inson faoliyati tasirida uzgarishi. //Geography of zhamiyati akhboroti, 34-zhild. -Toshkent, 2009. -P. 29-31
- 8 Mirzamakhmudov O.T. Foothill landscapes of the Ferghana Valley. Monograph. LAR LAMBERT Academic Publishing EN. Publishing house "LAR", Germany -2021, -C -989 Mirzamakhmudov O.T. Monograph. "Muharrir" nashriyoti, Tashkent - 2011, -P. 122
- 10 Zakirov Sh.S. Anthropogenic and applied landscape science. -T.: University, 1998. -P. 128
- 11 Chupakhin V.M. Landscape-ecological research and agricultural organization of the territory // Landscape-ecological research and nature management. USSR Academy of Sciences, -M.: MFGO, 1985. -P.246

Rezyume: Aholisi eng zich joylashgan O'zbekiston respublikasining Farg'ona vodiysida qishloq xo'jaligining asosiy yer zahirasi hisoblangan adirlarida qishloq xo'jaligi va turli sanoat tarmoqlari hamda rekreatsiya tizimlarini rivojlantirish uchun qulay tabiiy geografik sharoit va landshaft komplekslarining mavjudligi tabiiy landshaft komplekslarini antropogen omillar ta'sirida bir qator o'zgarishlariga olib kelgan. Ular asosan antropogen rel'ef shakllarining hosil bo'lishi va rivojlanishi, tuproq qoplamining o'zgarishi hamda agrolandshaftlarning rivojlanishi ko'rinishlarida namoyon bo'lgan.

Резюме: В густонаселенной Ферганской долине Узбекистана адыры считаются основным земельным запасом для ведения сельского хозяйства. Наличие благоприятных природных условий, а также ландшафтных комплексов для развития рекреации системы ландшафтных комплексов привели к их изменению. Они в основном проявляются в возникновении и развитии антропогенных рельефных форм, изменении почвенного слоя, а также развитии агроландшафтов.

Kalit so'zlar: adirlar, adir landshaftlari, antropogen rel'ef, rel'ef shakllari, tuproq qoplamini o'zgarishi, agrolandshaftlar, agrolandshaftlarning rivojlanishi, tabiatdan samarali foydalanish, mezorel'ef, eroziya, tuproqlar, tabiiy-antropogen tizimlar.

Ключевые слова: адыры, адырные ландшафты, антропогенный рельеф, формы рельефа, изменение почвенного слоя, ландшафты, развитие агроландшафтов, рациональное использование природы, мезорельеф, эрозия почвы, природно-антропогенные системы.

**SUBSTANTIAL AND LEGAL ESSENCE OF CRIMINAL IMPLICATION IN
CRIMINAL LAW**

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Summary: *The article analyzes the concept of involvement in a crime in criminal law and its legal essence. It states that the acts constituting a form of involvement do not contribute to the commission of a specific crime and are not connected by a causal relationship with the actions of the participant.*

Keywords: *crime, involvement in a crime, complicity, punishment, responsibility, concealment, failure to report, subject of crime.*

In criminal law, involvement in a crime is not considered participation in a crime, because the actions constituting the form of involvement do not contribute to the commission of a specific crime, are not causally connected with the actions of the participant, are not directed to the single goal pursued by the participants of the crime, and do not cause it. V. G. Trifonov, showing the differences between the concealer-participant of the crime and the person concealing the crime-concerned person, said that the presence of causal and guilty links is only characteristic of the act of the concealer of the crime who promised the perpetrator of the crime to carry out his actions to conceal the crime until the completion of the crime, and in the same case promised notes that the person's behavior is considered intellectual assistance. Concealment of a crime in relation to it, on the other hand, does not create any conditions for the commission of the main crime, since it is not committed in advance, and the person concealing the crime does not know about the crime committed or, even if he knows, does not come into contact with the perpetrator of the crime, and the crime manifests itself only after it has been committed [1, 103]. This situation is also noted in the literature published during the Shura era. For example, some authors wrote: "A participant is always a co-perpetrator of a crime: no matter what role a participant plays (organizer, witness, executor or assistant), he always causes a criminal outcome. The actions of the participant, on the other hand, are not considered the cause of the criminal outcome. A person who conceals a crime and does not report it renders a great service to the criminal, sometimes even more than an accessory, but they do not assist in the commission of the crime; because of this, they are not considered participants" (A.N. Trainin). Of course, this idea has its place in modern criminal law.

The actions of the concealer when concealing a crime that was not committed in advance do not create objective conditions for committing the main crime, they do not have a direct causal connection with the committed crime, they are not considered a necessary factor for the occurrence of a specific criminal result. The legal nature of concealment is determined by the extent to which it is related to the crime committed. The fact that a person promises to help the perpetrator of the main crime in advance to hide the criminal or the traces of the crime strengthens the covenant to carry out his criminal intent and strengthens the motivation to commit the crime. By his actions, this person creates an opportunity to commit a crime, that is, he becomes an assistant to the perpetrator of the main crime. The actions of the person concealing the crime after the commission of the crime, in the absence of prior subjective contact with the criminal, do not determine the will of the perpetrator, nor can it determine the commission of the crime. It is not the fact that the main crime was concealed after the completion of the main crime, but determining whether these actions were promised to the perpetrator of the main crime by the concealer of the crime or not, is the basis for distinguishing between participation in the crime and non-promised concealment.

In the legal literature, there are different definitions of the concept of involvement in crime. That is, individual authors understand involvement in a crime as an intentional activity expressed in the concealment of the committed crime, the preparation and failure to report on the committed

crimes, or the non-resistance of the persons charged with the responsibility of eliminating crimes and taking measures to prevent them. (S.N. Sabanin).

However, this definition does not clarify who is meant by the persons involved in the crime. When M.Usmonaliev is involved in a crime, he did not take part in the crime committed or committed by other persons, but knowing clearly that they were preparing for the crime, committing the crime, without making a promise in advance, not informing the authorities, as well as the criminal, the weapon of the crime, emphasizes that it is necessary to understand the concealment of traces of a crime or things obtained by criminal means without prior promise. However, in our opinion, this definition does not cover all forms of involvement in crime. That is, this definition does not emphasize the commission of a crime [2,296.].

G.I.Baymurzin also pointed out the need to distinguish between aiding and abetting a crime and concealment that was not promised in advance: "The presence or absence of a causal and culpable connection between the concealer's actions and the crime being concealed is of decisive importance in distinguishing the types of concealment and determining its legal nature. In cases where the concealment of a crime is promised in advance, it becomes an accessory to the commission of the crime because there is a causal connection between it and the crime being concealed. Concealing the promised criminal or the traces of the crime has a decisive influence on the will of the executor. A person who promises to conceal a crime becomes an accomplice, regardless of whether he later fulfills his promise or not, because he testifies that the promiser has committed the crime with himself, and is responsible for the criminal result that occurred due to this, along with the executor. Consequently, here we are not dealing with concealment in the true sense of the word, but with participation in the form of intellectual assistance. Concealment as an independent form of activity worthy of punishment under the criminal law can be discussed only when a person conceals a crime in which he did not participate in any way. However, in premeditated concealment, a person conceals a crime that is the product of an activity he or she has performed with the perpetrator. Because of this, here there is not a kind of concealment of the crime, but an auxiliary activity expressed in intellectually influencing the will of the perpetrator by promising to help him evade responsibility for the act. Based on the above considerations, it would be correct and appropriate to recognize a single criminal-legal concept of concealment, which, according to its content, is equivalent to the construction of non-promised concealment that we currently use. As for the pre-promised concealment, it is more correct to call it intellectual assistance in the form of promising to conceal the criminal or the traces of the crime, because the fact of concealment itself does not have the characteristics of an act worthy of punishment according to the criminal law" [3, 149].

In his time, N. Poletaev, justifying the differences between concealment and participation, said: "How can a concealer who did not contribute to the crime in any way be a participant in the crime? How can participation exist here? You can call this act any crime, but it is not complicity. I buy things that are obviously stolen, let an escaped murderer into my house, etc. No one will say that I am innocent: I should be held accountable for these actions under the criminal law, but I cannot be made a participant in a crime that I did not help, or did not know about. Likewise, the basis of the punishment of concealment should not be sought from the doctrine of participation," says [4, 11]. N.I. Neklyudov also said: "Involvement in a crime (permitting a crime, concealing a crime, not reporting a crime) as an activity carried out after the commission of a crime cannot be included in the sentence of participation in a crime, but is an independent crime, such as not providing assistance, giving false testimony should be considered as "[5, 93]. N.S. Tagantsev noted that no one can be recognized as both a participant in the crime and a person related to the crime at the same time. According to him, the transfer of a person involved in a crime to the number of participants depended only on a promise not to hinder the commission of a given crime or to conceal it "before or during the commission of a crime", because in such cases the person involved in a crime became an accessory [6, 143].

Therefore, on the basis of the above analysis, different approaches to the legal content of involvement in crime can be grouped into three groups: 1) involvement in crime is a type of participation in crime. The authors Feuerbach, Titman, Kleinschrod, Borst, some criminologists - Gefter, Rossgirt, Bauer, Buri, Hugo-Meyer, Merkel, Vilnov, Carrar can be included among the supporters of this rule. The reason this view is criticized is that a) to understand participation, there must be an agreement made before the criminal act; b) the activities of those involved in the crime take place after the crime, and therefore are not among the factors that created it, therefore, there is no causal connection with it, which is necessary to understand participation. 2) Involvement in the crime is not covered by the meaning of the concept of participation in the narrow sense, it implies additional joint guilt or an additional crime, it is inextricably linked with the participation in the narrow sense or the main crime. Zander, A.S. Jiryaev, G.E. Kolokolov, A.D. Kistyakovskiy acted as defenders of this theory. According to L.S. Belogrits-Kotlyarevskiy, this provision is not justified because: a) it is not of serious importance to apply to the general trial, which connects the participants and those involved in the crime; b) the content of the concept of involvement in crime does not include joint responsibility of persons who create favorable opportunities for crime; c) the amount of responsibility of the person involved in the crime is not directly related to the severity of the main crime. 3) The theory that recognizes involvement in a crime as a separate independent crime that does not fall under the concept of "participation", and considers that there is no necessary relationship to the main crime in the matter of punishment.

We believe that the third view of complicity (failure to report or cover up the crime) is correct. The reason is that complicity differs from participation by its own characteristics, and considering it as a form of participation is contrary to the principle of justice provided for in the criminal law.

References:

1. Trifonov V.G. Concealment of crimes not promised in advance and failure to report them as types of involvement in the crime. - Diss. ... shakar. Yurish fani - St. Petersburg, 2000.
2. Usmonaliev M. Criminal law: General part: Textbook for higher education. - Tashkent: New age generation, 2005.
3. Baimurzin G.I. Responsible for involvement in the crime. - Olma-Ota, born in 1968
4. Pletaev N. Naturalness to crime [Text]. Yu.M.Yu. T. XIV. Part II. born 1862
5. Neklyudov N.A. The general part of criminal law [Text] / N.A. Neklyudov. - St. Petersburg, 1875
6. Tagantsev N.S. Russian criminal law. Part General. T.1. - M., 1994

Rezyume: *Maqolada jinoyat huquqida jinoyatga daxldorlik jinoyatda tushunchasi va uning huquqiy mohiyati tahlil qilingan. Unda daxldorlik shaklini tashkil qiluvchi qilmishlar muayyan jinoyat sodir etishga yordam bermasligi va ishtirokchining qilmishlari bilan sababiy bog'langan bo'lmasligi keltirib o'tilgan.*

Резюме: *В статье анализируется понятие причастности к преступлению в уголовном праве и его правовая сущность. В нем указывается, что деяния, составляющие форму вовлечения, не способствуют совершению конкретного преступления и не связаны причинно-следственной связью с действиями участника.*

Kalit so'zlar:: *jinoyat, jinoyatga daxldorlik, ishtirokchilik, jazo, javobgarlik, jinoyatni yashirish, xabar bermaslik, jinoyat sub'ekti.*

Ключевые слова: *преступление, причастность к преступлению, соучастие, наказание, ответственность, сокрытие, несообщение, субъект преступления.*

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THE ROLE OF GEOTECHNICAL SYSTEMS IN THE TRANSFORMATION OF THE ADYRS OF THE FERGANA VALLEY

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Summary: *In this article, the development of geotechnical systems in the adyrs of the Fergana Valley and the transformational processes that have arisen as a result of it are thoroughly studied, and the adyrs of the Fergana Valley are landscape-ecologically regionalized.*

Key words: *adyr landscapes, geotechnical system, development of geotechnical systems, classification of geotechnical systems, landscape changes, natural-technogenic systems, anthropogenic landscapes, changed landscapes.*

Introduction.

It is important to study the transformation of adyr landscapes, to separate, demarcate, and classify their morphological units, as well as map them for various sectors of the national economy, and to develop ways of their effective use. In the Strategy of Actions for the further development of the Republic of Uzbekistan during 2017-2021, important tasks were identified for "further improvement of the reclamation state of irrigated lands, development of land reclamation sectors and irrigation facilities" [1]. In this regard, in order to improve the productivity of irrigated areas in the hilly landscapes of the Fergana Valley, to improve land reclamation and water supply, to implement large-scale irrigation and land reclamation measures within the framework of state programs in order to comply with agrotechnical rules, research the transformation of hills, their zoning, determine the geo ecological condition and optimize them, targeted research on mapping for various purposes is important.

The formation and development of geotechnical systems is directly related to the development of science and technology and the rapid increase of the population, as well as the desire to use natural resources as much as possible and the development of the economy. Since the middle of the last century, many geotechnical systems have been created and developed as a result of the interaction of technology with nature and taking the form of an integrated natural-technical system. [11]. One side of this issue, this was a great impetus for meeting the needs of the population and the development of the economy. On the other hand, the creation and development of geotechnical systems causes a certain change of the natural environment and landscapes in those areas. In turn, this requires the study of development processes of geotechnical systems and their consequences.

To date, the theoretical foundations of geotechnical systems have been studied by several scientists. In this regard, A.E. Fersman, G.F. Khilmi, V.S. Preobrazhensky, I.P. Gerasimov, L.F. Kunitsyn, V.I. Bulatov, A.Yu. Reteyum, K.N. Dyakonov, I.Yu. Dolgushin, F.N. Milkov and others views are commendable. In their works, they mainly tried to define the concept of geotechnical systems, to classify geotechnical systems as much as possible, to study their general aspects, and in some cases to reveal the characteristics of geotextiles in a certain area [4,5,9,13,14,]. However, the development processes of geotechnical systems in all regions and their consequences have not been sufficiently studied. Also, as the population continues to grow and science and technology continue to develop, in turn, it requires continuous study of the development processes of geotechnical systems and their consequences.

The methodological basis of the research work is the following, i.e. the factors affecting the transformation of the adyrs of the Fergana Valley are identified and analyzed. The factors influencing the change of adyrs are evaluated and the area is zoned.

Analysis and results.

Most of the territory of the Fergana Valley consists of adyr landscapes, and the natural conditions of these areas provide favorable opportunities for the development of agriculture. As a result, the main part of these regions specialized in irrigated agriculture, on the basis of which many irrigated lands, canals, collectors, reservoirs, and other geotechnical systems were created and developed. As a result, the territory lost its natural character and was replaced by a number of anthropogenic systems. Including Andijan Reservoir, Karkidon Reservoir, Chortoq Reservoir, Eskier Reservoir, Kenkolsoy Reservoir, Almasoy Reservoir, Sarvoksoy Reservoir, Big Andijan Canal, Big Fergana Canal, Big Namangan Canal, Northern Fergana Canal, Southern Fergana Canal and others. In addition, most of the large cities of the valley, various factories and plants, transport and railways are located in the adyrs which have favorable natural conditions.

In turn, the formation and development of such geotechnical systems, shows its positive and negative effects. For example, among the canals, the Southern Fergana canal is 162 km long and supplies water to 75.8 thousand ha, the Big Andijan canal is 109 km long, and the total irrigation area is 140.6 thousand ha, the Big Namangan canal is 135.3 km long and 47 provides water to 1,000 ha of land, the Big Fergana canal is 270 km long in the territory of Uzbekistan and supplies water to an area of 203,600 ha.

From reservoirs, the full water volume of Kosonsay reservoir is 165.0 million. m³, 32,000 hectares of new cultivated land in Kosonsay-Chust-Torakurgan districts, full water volume of Chartaksay reservoir is 23 million. m³, a total of 3207 hectares of cultivated land, full water volume of Eskier reservoir is 20.0 million. m³, covering a total of 2464 hectares of cultivated land, the full water volume of the Karasuv reservoir is 7.0 million. m³, covering 1250 hectares of cultivated land, the full water volume of the Varzik reservoir is 18.0 million. m³, which allows to supply 2428 hectares of cultivated land with water [10].

As a result of this, high productivity in agriculture has been achieved in the Fergana Valley and serves as an important factor in meeting the needs of a large number of people.

There are a number of opinions regarding the processes of development of the geotechnical systems of the hills of the Fergana Valley and their consequences.

N.I.Akhtyrtseva distinguishes five types of anthropogenic landscapes based on the characteristics of the direction of the anthropogenic process of all landscapes.

1. Altered landscapes. 2. Renatured landscapes. 3. Transformed anthropogenic landscapes. 4. Natural landscapes. 5. Anthropogenic landscapes [2].

A.G.Isochenko classified the impact of human activity on landscapes and its theoretical problems mainly reflects four groups of landscapes:

1) conditionally unmodified (primitive) landscapes. 2) weakly modified landscapes. 3) disturbed (strongly modified) landscapes. 4) cultural landscapes [7].

D. L.Armand divides landscapes changed under the influence of human activity into five types:

1. Almost completely changed landscapes. 2. Strongly modified landscapes. 3. Slightly modified landscapes. 4. Weakly modified landscapes. 5. Almost unchanged landscapes [2].

V.L.Kotelnikov divides landscapes into modified, weakly modified, moderately modified, strongly modified and planned types [10].

According to I.M.Zabelin, anthropogenic landscapes are further divided into two: natural anthropogenic and cultural landscapes [10].

According to A.G. Isachenko, most of the modern landscapes have been changed as a result of unreasonable human activity, and it is necessary to turn them into cultural landscapes. One of the main characteristics of such landscapes should be responsibility and economic efficiency [6,7].

The main goal of man is to develop the internal potential of landscapes, to activate natural processes and to increase the efficiency of landscapes. For example, when he engages in farming, he sets his sights on one thing first, that is, to get as much agricultural produce as possible. To achieve this goal, he flattens the landscape, turns the soil to a certain thickness, applies fertilizers,

plants a certain crop, irrigates, uses various drugs against weeds and pests, washes the salt of the soil, drains the sewage, etc. In this case, it causes various environmental problems.

Conclusion.

The adyrs of the Fergana Valley have undergone a number of changes under the influence of various branches of human economic activity, especially agriculture. They consist of the change of the relief, the reduction of the amount of humus in the soil, the creation of agricultural-irrigation deposits, the washing of the soil layer, the pollution of landscapes, the development of engineering geographical processes, etc. [11].

During the formation of geographical conditions in the hills of the Fergana Valley, relief changes occur in the following directions: quarry relief forms due to land excavation and road construction; constructions built for the purpose of irrigation and secondary forms of irrigation are melioration reliefs; unique relief forms as a result of the establishment of gardens and vineyards in the form of terraces on sloping hillsides; flattened landforms have appeared in the areas targeted for new irrigation.

The directions of soil change were manifested in the reduction of humus, conversion to cultural soil, salinization, erosion and other forms.

A large part of the natural-anthropogenic systems in the region is made up of agricultural-landscapes. They consist of irrigated agriculture, dryland agriculture, pasture and grassland.

It is natural that the location and development of agricultural industries in the adyrs of the Fergana Valley will continue in the future. Because, firstly, the adyrs are the main land fund of the region, and secondly, due to the growing number of the population of the region, it is one of the important tasks to provide them not only with land plots, but also to satisfy the need for agricultural products. This means that the anthropogenic impact on the hill region is increasing [12]. As long as the hills of the Fergana Valley continue to be used for the development of society, it is necessary to pay attention to the following, along with careful treatment of adyr landscapes:

1. For this, it is necessary to properly understand the features between the geological structure and paleo geographical conditions of the place or region and the development of agricultural-landscapes. (If there is a layer of water-permeable rocks (gravel, sand, sandstone, etc.) in the beds below the soil, groundwater may not rise during irrigation. If an impermeable layer is located above, groundwater may rise during irrigation and cause salinization and swamping processes.

2. The paleogeographic conditions of the place can have a positive and negative effect on the development of agricultural-landscapes. (If salt layers or deposits with a high content of salt were formed in ancient geological periods, when the underground water rises, these salts can rise and lead to salinization of land resources. The development of ravines, landslides, erosion also lead to the failure of land resources).

3. Artificial factors include land leveling, drying, plowing, irrigation works and structures. In the process of development of land resources, depressions are filled, heights are lowered, as a result of which the natural topography of the place changes. During the drying up of land resources, their water and air conditions change dramatically. If the drying process is carried out incorrectly, the moisture of the soil will decrease and it will dry out, causing the development of wind and water erosion. If mistakes are made during irrigation, soil salinization, waterlogging and erosion processes develop.

4. As a result of excessive use of mineral fertilizers, the amount of salts in agricultural-landscapes increases dramatically. If a lot of phosphorus fertilizers are applied, a lot of fluorine accumulates in agricultural-landscapes, if a lot of nitrogen fertilizers are applied, a lot of nitric acid salts are accumulated.

5. As the weight of agricultural machinery increases, the density of the soil increases. The amount of weight that falls on the soil is 1 kg/cm², if the weight is 3-5 kg/cm², the productivity decreases by 30-35% [3,15]. These processes have a great influence on the development and

morphological structure of agrarian landscapes. Natural factors play an important role in the stratification of land resources or agricultural-landscapes and their classification.

Taking into account the changes that have occurred in the geosystems of the adyrs of the Fergana Valley due to human influence, O.T. Mirzamakhmudov divided the following regions into it: weakly changed, changed, moderately changed, strongly changed, extremely strongly changed landscape-ecological regions [10]. (Figure 1).

In particular, the geographical conditions of the landscape-ecological region, which have been slightly changed, are mainly caused by pasture livestock, climate, inland waters, and terrain.

The geographical conditions of the changed landscape-ecological region are created by the economic activities of people, internal waters, relief.

The geographical conditions of the moderately changed landscape-ecological region are created by relief, climate and economic activities of people.

Highly changed landscape-ecological conditions are caused by anthropogenic influence and inland waters, mainly pasture livestock, as well as climate and relief.

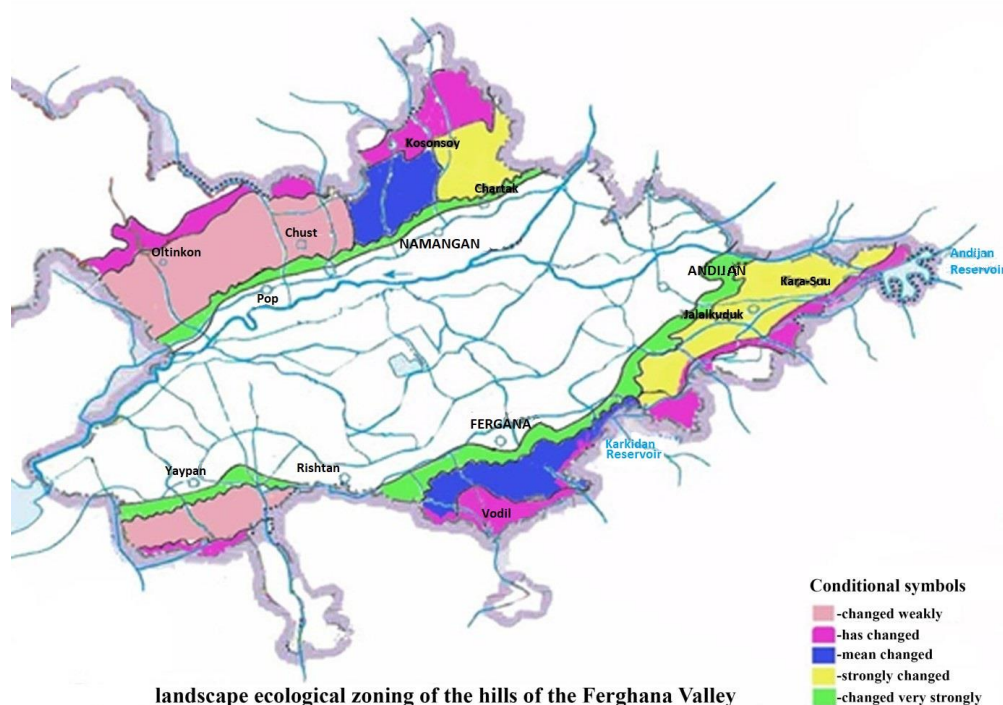


Figure 1.

In the formation of the strongly changed landscape-ecological region conditions the main role of human economic activities, climate, inland waters, relief has been fully substantiated.

References:

- 1 Decree of the President of the Republic of Uzbekistan dated February 7, 2017 No. PF-4947 "On the Strategy of Actions for Further Development of the Republic of Uzbekistan".
- 2 Armand D.L. Landscape science. M.: Thought, 1975. Akhtyrseva N.I. On the classification of anthropogenic landscapes // Questions of Geography, , 1977. -P.106
- 3 Gulyamov P., Umarov E.M. Natural conditions of the northern foothill part of the Ferghana Valley for agricultural purposes // News of the Uzbekistan Geographical Society. T. 13. -T.: Fan, 1971. -P. 146.
- 4 Gerasimov.I.P. Transformation of nature and development of geographical science. (Essays on constructive geography) -M.: Knowledge, 1967. -P. 189.
- 5 Dyakonov K.N. Studies of the vertical structure of the landscape // Methods of landscape research. -L.: Nauka, 1971. -P. 229.
- 6 Zakirov Sh.S. Anthropogenic and applied landscape science. -T.: University, 1998. -P. 128
- 7 Isachenko A.G. Landscape science and physical-geographical zoning. M., 1991. -P. -361

8 Kurakova L.I. Anthropogenic landscapes and the tasks of their integrated study // Geographical Research at Moscow University. -M.: 1976. -P. 134.

9 Milkov F.N. Physical geography: the doctrine of landscape and geographic zoning. -Voronezh. 1986. -P.328

10 Mirzamakhmudov O.T. Foothill landscapes of the Ferghana Valley. Monograph. LAR LAMBERT Academic Publishing EN. Publishing house "LAR", Germany -2021, -P.98

11 Mirzamakhmudov O.T. Assessment of the landscape-ecological condition of the hills of Namangan region. Monograph. "Muharrir" publishing house, Tashkent- 2011, -P.122 .

12 Mirzamakhmudov O.T. The role of hilly agro-landscapes of Namangan region in the change of landscape-ecological conditions. // Regional problems of geography. Proceedings of the republic scientific-practical conference. - Jizzakh. 2017 year. May 11-12, -P. 15-17.

13 Preobrazhensky B.C. Landscape research. - M.: Nauka, 1966.-P.-227 .

14 Reteum A.Yu. O parageneticheskix landscapex complexax // Izv. VGO, 1972, vol. 104 // -P.217.

15 Chupakhin V.M. Landscape-ecological research and agricultural organization of the territory // Landscape-ecological research and nature management. USSR Academy of Sciences, -M.: MFGO, 1985. -P.246

Rezyume: *Farg'ona vodiysi adirlarida geotextizimlarning rivojlanishi va uning natijasida vujudga kelgan transformatsion jarayonlar atroflicha o'rganilib, Farg'ona vodiysi adirlari landshaft-ekologik jihatdan rayonlashtirilgan.*

Резюме: *В данной статье сделан подробный анализ развития геотехнических систем адыров Ферганской долины и вытекающих из этих трансформационные процессы ландшафтно-экологического районирования.*

Kalit so'zlar: *Adir landshaftlari, geotextizim, geotextizimlarning rivojlanishi, geotextizimlarni tasniflash, landshaftlarning o'zgarganligi, tabiiy-texnogen tizmlar, antropogen landshaftlar, o'zgargan landshaftlar.*

Ключевые слова: *ландшафты адыров, геотехническая система, развитие геотехнических систем, классификация геотехнических систем, изменения ландшафтов, природно-техногенные системы, антропогенные ландшафты, измененные ландшафты.*