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CONTENT

EARTH SCIENCES

ECONOMIC SCIENCES

MEDICAL SCIENCES

PEDAGOGICAL SCIENCES

PHILOLOGICAL SCIENCES

PHYSICAL SCIENCES

TECHNICAL SCIENCES

EARTH SCIENCES

ГЕОЛОГИЧЕСКОЕ СТРОЕНИЕ И МОДЕЛИРОВАНИЕ ПОДКАРНИЗНОГО ОБЪЕКТА НА ВОСТОЧНОМ БОРТУ ПРИКАСПИЙСКОЙ ВПАДИНЫ

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GEOLOGICAL STRUCTURE AND MODELING OBJECTS ON THE EASTERN BOARD OF THE CASPIAN DEEP

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Аннотация

Современная геологическая модель — трехмерный цифровой аналог месторождения. Он создается на основе данных сейсмических исследований (в первую очередь 3D-сейсмика), геофизических исследований скважин, керна, траекторий пробуренных скважин и другой необходимой геолого-промысловой информации. В статье представлена современная методика построения геологической модели, позволяющая спрогнозировать распространение фациально-петрофизических свойств в пределах продуктивного пласта верхнепермского горизонта на примере одного из месторождении на восточном борту Прикаспийской впадины. Это актуальная возможность повысить шансы успешного планирования геолого-разведочных работ, мониторинга разработки и прогнозирования добычи.

Abstract

A modern geological model is a three-dimensional digital analogue of a field. It is created on the basis of seismic survey data (primarily 3D seismic), geophysical surveys of wells, core samples, and drilled well trajectories. The article presents a modern technique for constructing a geological model that allows predicting the distribution of facies-petrophysical properties within the reservoir of the Upper Permian horizon using the example of one of the fields on the eastern side of the Caspian deep. This is a relevant opportunity to increase the chances of successful exploration planning, development monitoring and production forecasting.

Ключевые слова: 3D геологическая модель, геолого-геофизические данные, литология, пористость, водонасыщенность, Petrel.

Keywords: 3D geological model, geological and geophysical data, reservoirs, porosity, water saturation, Petrel.

Месторождение приурочено к юго-западному крылу соляного купола, расположенного на Жаркамысском поднятии. (Рисунок 1).

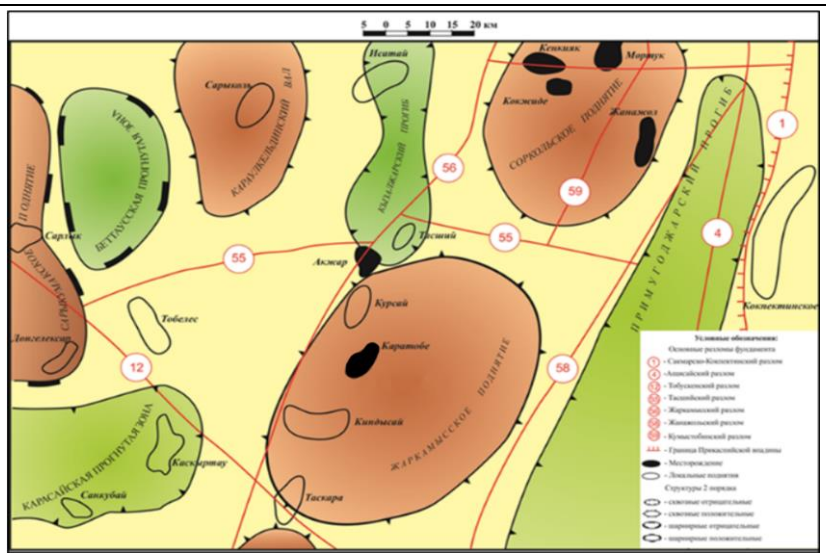

Рисунок 1. Схема тектонического районирования надсолевого комплекса Восточной части Прикаспийской впадины

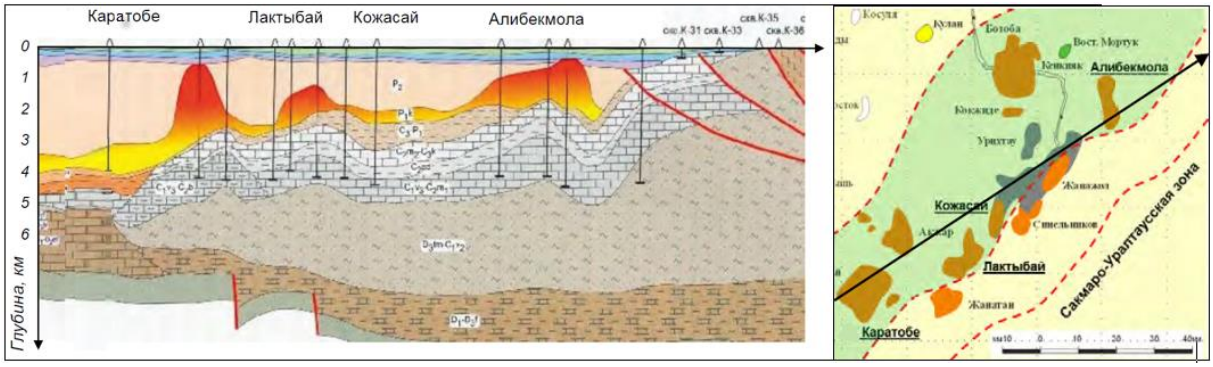

Рисунок 2. Схематический региональный профиль через восточную бортовую зону

Продуктивная залежь верхнепермского горизонта образовалась под соляным карнизом в терригенных отложениях казанского яруса верхней перми. Нефтяная залежь пластовая, экранированная крутым склоном соли. (Рисунок 3)

В 1995 году после проведения буровых работ на месторождении была проведена объемная сейсморазведка 3Д.

В 2001 году на основе бурения 14 скважин и полученных сейсмических данных был произведён подсчёт запасов нефти и растворённого газа методом 2D.

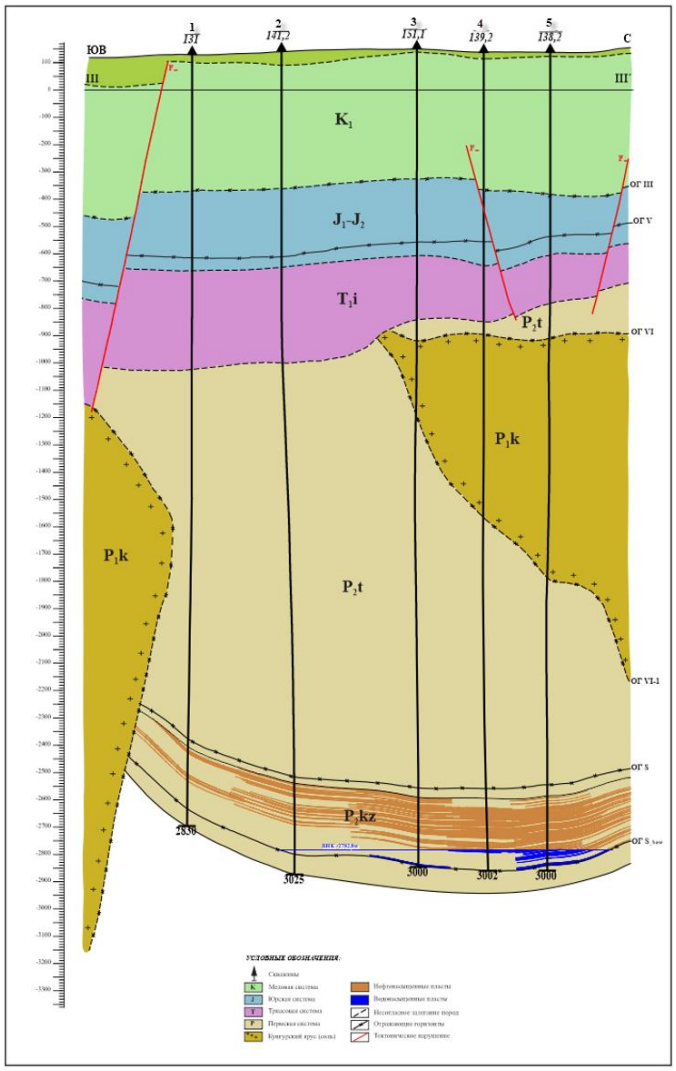

Рисунок 3. Геолого-стратиграфический разрез

После ПЗ-2001 г. пробурено 8 новых скважин при общем пробуренном фонде скважин в 23 единицы.

В 2007-2008 г.г. на месторождении были проведены сейсморазведочные работы 3Д общим объемом 46 км^2. Анализ результатов 3Д сейсмической базы показал слабые стороны имеющихся сейсмических данных, в связи с этим, в 2018-2019 г.г. на месторождении выполнены работы по переобработке и переинтерпретации сейсмических материалов.

В 2020 году Атырауским филиалом ТОО «КМГ Инжиниринг» выполнен «Пересчет начальных запасов нефти, растворенного в нефти газа…»). Выполнение ПЗ-2020 г. реализовано с применением цифрового геологического моделирования (3D). Параллельно с выполнением геологической модели, создана и ГГДМ, с помощью которой произведен расчет прогнозных технологических показателей разработки.

Построение данной 3Д цифровой геологической модели (ЦГМ) проводилось с целью повышение эффективности и достоверности изучения геологического строения, подсчета запасов и разработки нефтегазовых месторождений на основе применения технологии построения трехмерных цифровых геологических моделей с учетом этапности геологоразведочных работ и интеграции геолого-геофизических и промысловых исходных данных, с возможностью промышленного использования геологических моделей при изучении и эксплуатации месторождения. Для построения ЦГМ применялся пакет программного обеспечения Petrel. Построение 3Д модели проводилось по пласту P_2kz верхнепермского горизонта. Результатом расчетов является набор реализаций геологической модели, формирующий распределение геологических запасов нефти.

Исходными данными для построения геологических моделей являлись:

– координаты устьев скважин, данные инклинометрии скважин;

– результаты корреляции разрезов скважин;

– результаты послойной обработки и интерпретации данных ГИС;

– данные об интервалах перфорации и результатов испытаний скважин;

– трехмерные сейсмические кубы по глубине и времени;

– переинтерпретация данных 3Д: поверхности и полигоны разломов (временной и глубинной области).

Построение структурного каркаса

В целом использовались данные 23 скважин. Для построения структурного каркаса была создана область моделирования (граница моделирования). Область моделирования строилась таким образом, чтобы обеспечить условие присутствия надкарнизной части границы соли и водоносной области.

Рисунок 4. Граница соли (ПЗ-2001 г.)

В ПЗ 2001г. граница соли была взята по данным бурения и имеющейся сейсмической основы (Рисунок 4). При построении 3D модели в 2020 году удалось уточнить геометрию соли по данным переинтерпретации сейсмики. В создании актуальной геологической модели основной сложностью было - *смоделировать карнизную часть модели*. Решением данной задачи послужило использование разломов как граничной поверхности. (Рисунок 5).

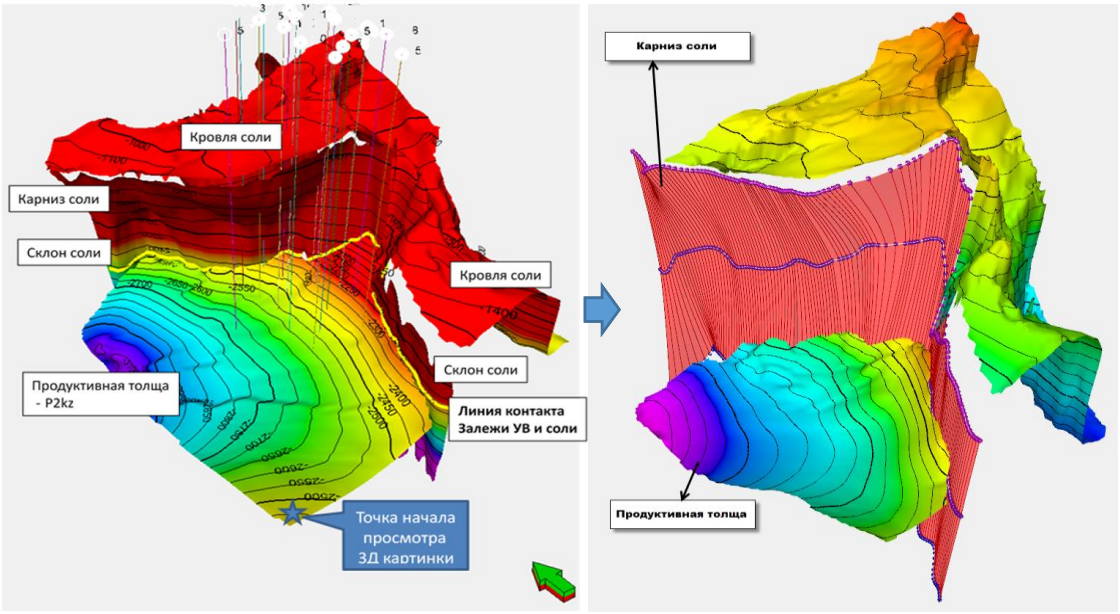

Рисунок 5. Моделирование поверхности соляного карниза

Для структурного каркаса размерность по горизонтали отдельной ячейки составляет 35 х 35 метров, при такой размерности все скважины находятся на расстоянии друг от друга не менее, чем в три ячейки. Размерность ячейки по вертикали составляет в среднем по продуктивным горизонтам 0,35 м, что позволит с наименьшими погрешностями перенести данные РИГИС на ячейки модели при осреднении. Сетка по каркасу имеет пропорциональную слоистость (Таблица 1).

Таблица 1

Характеристика геологической сетки

Объект моделирования	Число ячеек по оси			Размер ячеек по оси			Объект число ячеек по моделям
	nI	nJ	nK	X	Y	Z	
P_2kz	96	137	650	35	35	0,35	8548800

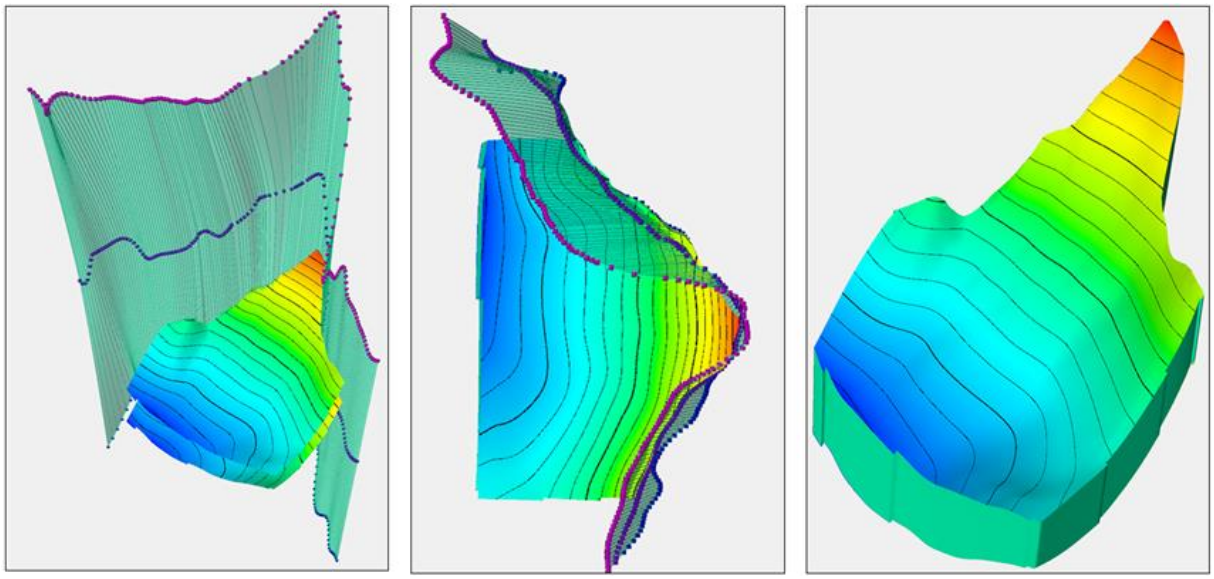

Рисунок 6. Структурный каркас

Моделирование литологии проводилось детерминистическим методом – *Indicator Kriging*. Толща пород рассматривалась с разделением на коллекторы/неколлекторы и плотный песчаник(алевролит). Литотип плотный песчаник (алевролит) был смоделирован для использования в адаптации скважин к истории разработки (как пласт проводник в пластовых условиях, т.е. можно было пласту присвоит граничное значение проницаемости) (Рисунок 7).

Выделение различных литологических типов пород, слагающих геологический разрез, продиктовано не только необходимостью идентификации геологического разреза по комплексу геофизической информации, но и тем, что различные литологические типы пород-коллекторов обладают различным коллекторским потенциалом. Их выделение и количественная оценка фильтрационно-емкостных свойств позволяют более надежно определять углеводородный потенциал месторождения и их распределение в объеме резервуара, что, безусловно, повышает эффективность их извлечения.

Построение модели контактов

При обосновании межфлюидного контакта основывались на результатах опробований скважин, анализа керновых и геофизических данных по скважинам, что позволило в рамках ПЗ-2020 г. пересмотреть положение ранее утвержденного ВНК. По скважине 16 нефтенасыщение керна отмечено до абс.глубины -2781м, что на 18 метров глубже ранее утвержденного ВНК (-2762,6м). По результатам переинтерпретации ГИС с учетом данных керна положение ВНК выделено на абс. отметке **-2782,8 м** (Рисунок 8).

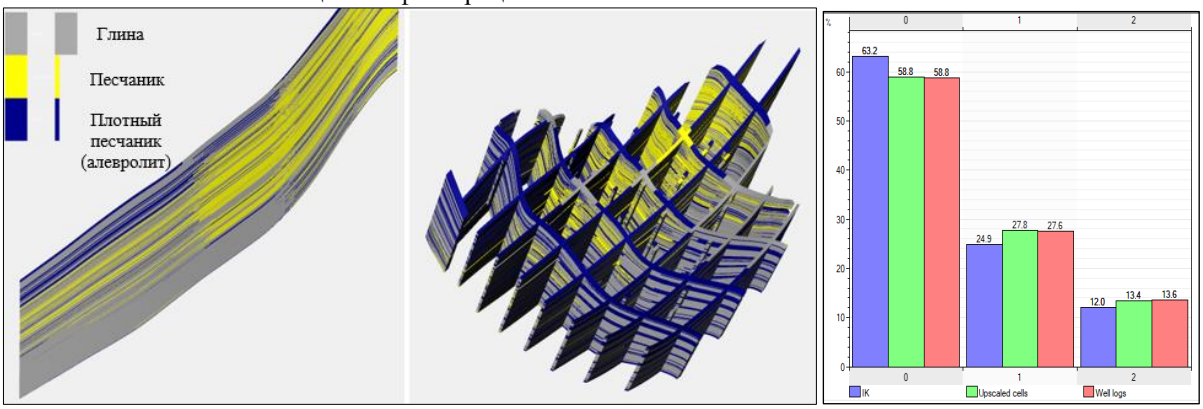

Рисунок 7. Куб литологии

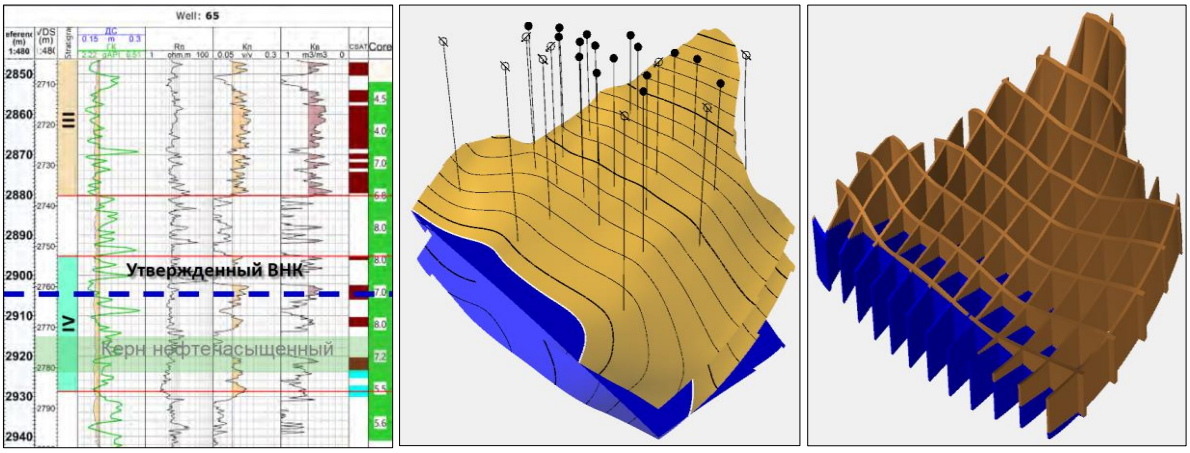

Рисунок 8. Куб ВНК

В полученном кубе литологии проводилось распределение пористости (PHIE). Методом Gaussian random function simulation была смоделирована пористость (Рисунок 9). Значение пористости распространялось в пределах присутствия коллектора и плотного песчаника (алевролит).

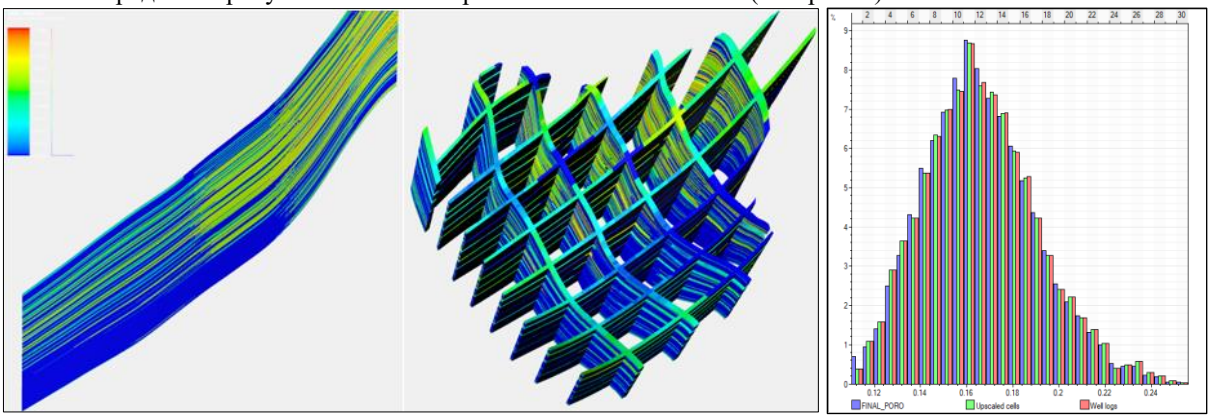

Рисунок 9. Куб пористости

Для построения трехмерной модели насыщения использовались данные специального анализа керна с месторождения, а именно, кривые капиллярного давления (Pc). Кривые Pc были использованы для J-функции, которая связывает водонасыщенность Sw с пористостью и высотой над уровнем свободной воды (Рисунки 10-11).

В геологической модели 3Д, нефтенасыщенность рассчитывалась при помощи J-функции: $J=\frac{Pc\sqrt{k/\varphi}}{\sigma\cos\theta}$

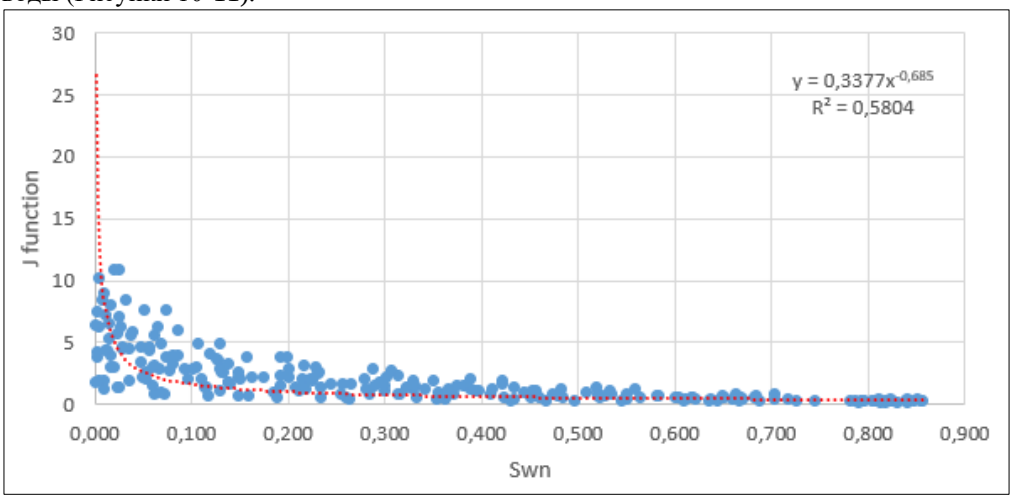

Рисунок 10. Зависимость нормализованной водонасыщенности от J функции

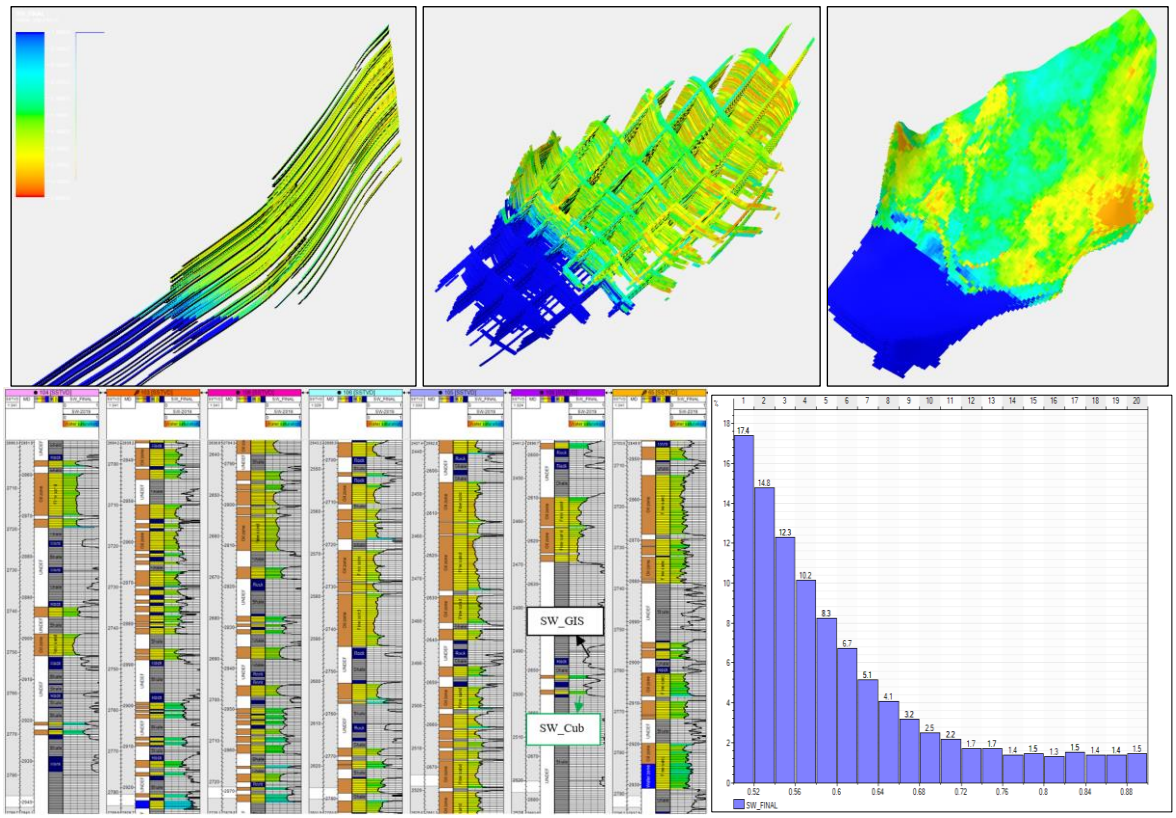

Рисунок 11. Куб водонасыщенности и сравнение насыщенности по данным обработки ГИС и распределенной в модели

Окончательная корректировка модели проводилась визуальным контролем на вертикальных слайсах кубов индекса насыщения, литологии и пористости. В трехмерной модели первоначально запасы рассчитываются для каждой ячейки. Для этого рассчитываются несколько кубов параметров объемов: геометрического объема ячейки, эффективного объема ячейки, порового объема ячейки объема углеводородов в пластовых условиях. Кроме этого задаются поверхности контактов и границы, в которых проводится подсчет запасов. Суммированием указанных значений в ячейках модели получены: объем нефтенасыщенного коллектора (NetV), объем порового пространства нефтенасыщенного коллектора (PoreV), объем нефти в пластовых условиях (HCPV). При расчетах также определялись площади соответствующих полигонов (S). Средние параметры по каждой зоне рассчитывались по формулам:

$$Нэф.нср = NETV /S; \quad (1)$$

$$Кп = PoreV/ NetV; \quad (2)$$

$$Кн = HCPV/PoreV. \quad (3)$$

Расчет средних параметров, таким образом, эквивалентен способу расчета взвешиванием по объему (объемный метод). При этом исключаются систематические ошибки, связанные с наличием корреляционных связей между подсчетными параметрами и приводящие к занижению или завышению средних значений.

В целом после всех этапов построения 3Д кубов по месторождению подкарнизного объекта начальные геологические запасы нефти в сравнении с числящимися на Государственном балансе увеличились порядка на **74,0%,** т.е. можно говорить *о существенном восполнении ресурсной базы* рассматриваемого месторождения.

Таким образом, для данного месторождения была создана действующая ГГДМ, которую можно оперативно обновлять по мере поступления новых данных, и контролировать запасы УВ, не тратя большое количество времени по сравнению с 2Д моделью. Такую модель можно использовать на протяжении всего жизненного цикла месторождения и вести постоянный мониторинг за всеми процессами происходящими в резервуаре при его разработке: например изменением уровня водонефтяного контакта, пластового давления, выявлением зон с максимальными остаточными запасами нефти и.т.д.

Использование геологических моделей при сопровождении бурения позволяет обеспечить оперативное перестроение разреза и корректировку траектории скважины для ее оптимального размещения в продуктивной части пласта, что снижает потери из-за неэффективного бурения.

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ECONOMIC SCIENCES

EMPIRICAL ANALYSIS OF GLOBAL ECONOMY DURING COVID-19

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Abstract

The COVID-19 in 2020 has caused a huge impact on the world economy. As the COVID-19 continues to rage around the world, major economies around the world experience a steep economic decline, rising unemployment, rising inflation, high prices of various commodities and the continued geopolitical penetration of countries during 2020-2021. This paper uses an empirical analysis using a 2-year panel data of global countries from 2020-2021 to conduct model regressions to derive the impact of the COVID-19 on key economic indicators such as the world economy, trade, inflation and unemployment, respectively, to fully substantiate the paper's argument. The study finds that the COVID-19 can dampen global economic growth, trade growth and increase the risk of rising unemployment and inflation in economies around the world. The study also found that opportunities for the digital economy in the light of COVID-19 and the economic policies introduced by countries.

Keywords: COVID-19; empirical analysis; economy; digital economy.

Introduction

The outbreak of COVID-19 at the end of 2019 is a serious challenge for the world. As of today, there are still some countries and regions in a worrying situation and no effective way has been found to control the world epidemic, the global economy is facing a major test and growth is stagnant. starting in January 2020 to soothe the damage and impact of the COVID-19 on the economy, countries have adopted corresponding quantitative easing policies to stimulate the economy and keep it relatively stable. However, under the unconventional economic stimulus policies, it may be followed by huge fluctuations in the world capital markets, such as the beginning of July 2022, the United States began a comprehensive interest rate hike and tapering policy, resulting in the continuous return of the US dollar to the US market, in this situation the foreign exchange markets of all countries in the world have been hit to varying degrees, bringing more uncertainty to the world economic growth. Under the impact of the epidemic, the losses suffered by service-based economies have been enormous, with many emerging economies around the world facing the risk of national bankruptcy in the period 2020-2021.

Literature review

The impact of the COVID-19 on the world economy has been studied by many scholars, both domestic and foreign, in terms of the factors affecting economic development during this period. Since the outbreak of the COVID-19, most countries around the world have taken corresponding measures to restrict the movement of people in order to limit the exponential growth of pandemic cases, which has had different degrees of impact on the world economic operations and the world economic landscape. Qin Yu argues that the impact of the epidemic on the economy is a short-term impact, for which effective epidemic control measures should be adopted and the right economic macroeconomic control measures should be taken to reduce the impact of the epidemic on economic growth [1]. Liu Di argues that the outbreak of the COVID-19 directly led to severe losses in the service industry, and that the reduction in demand for services indirectly reduced people's consumption demand, which in turn led to difficulties in returning to work for small and medium-sized enterprises and slowed down industrial development, resulting in job losses and a steep increase in structural and frictional unemployment [2]. Guo Zelin and others argue that the widespread spread of pandemics has multiple impacts on global economic activities, affecting the global division of labour and the existing global governance system, and challenging existing governance rules [3]. Regarding the economic impact of COVID-19 on countries or regions, Kistanov argues that Japan is one of the four developed countries in Asia with a high level of economic and social development and a high standard of living for its people. COVID-19 has had a new impact on the political situation in Japan, which has been forced to coordinate foreign economic and diplomatic strategies [4]. An Chunying argues that due to the COVID-19, the African region's economies may face an even greater test, with oil and commodity prices plummeting and tourism collapsing in African economies. To deal with the pandemic, Africa has used its national strength. Money from pay cuts for ministers was used to help the country fight off the economic and social damage caused by the COVID-19. One can imagine how serious the impact of the spread of the COVID-19 has been on African economies [5]. Ma, Wanqing argues that COVID-19 has important short-

term economic impacts on China's secondary industry, consumption and services, and international trade, and its long-term impacts depend on the global epidemic and its control [6]. Yu Ziqing believes that due to the outbreak of the pandemic, the world economy has been hit hard and the international trade situation has changed, with China as a major trading nation facing huge losses [7]. As Li Rong, Yu Ziqing and Gospodarik C.G point out that during the epidemic, the digital economy had a positive impact on the development of the global economy [8, 10]. This paper draws together relevant literature from various scholars and draws on various perspectives in the literature to examine the exogenous shocks of the COVID-19 and to empirically study the impact on global economic development.

Empirical analysis

Data sources and variable definitions. From the previous literature, there are many factors that influence the changes in the world economy, including there are consumption, GDP level, trade prosperity, etc. And this pandemic is a major public health emergency that occurs globally with the fastest spread, the widest range of infection and the difficulty of prevention and control. It has the characteristics of rapid development and wide scope. This paper uses data from 106 countries worldwide for the period 2020-2021 for model regression analysis. The data for the COVID-19 is the excess number of deaths released by the World Health Organization (WHO) taken as a logarithmic value, the unemployment rate data is from the EPS database, and the other data is from the CSMAR database.

In this paper, we analyze GDP of 106 countries worldwide for the period 2020-2021 as the explained variable, excess mortality is selected as the explanatory variable, and CPI, M2 and exchange rate are selected as control variables. All variables are described in Table 1 and the calculations were made in Stata package.

Table 1

Variable definitions

Type of variable	Name of variable	Variable codes
Explained variables	GDP of countries or regions	ln_gdp
Explanatory variables	Excess mortality rates	In_covid
Control variables	CPI	In_cpi
	M2	In_M2
	Exchange rates	In_exrate
	Ex_in	In_exin

Research Model design. Having determined the definition and selection of variables through the previous study, the following empirical model is constructed in this paper.

$$GDP_{it} = \alpha_0 + \beta_1 \mathrm{Covid}_{it} + \beta_2 \mathrm{M2}_{it} + \beta_3 \mathrm{Ex\_in}_{it} + \beta_4 \mathrm{cpi}_{it} + \beta_5 \mathrm{Exrate}_{it} \mu_i + \omega_i + \varepsilon_{it}$$

GDP_{it}—— the level of GDP in country i in year t

Covid_{it}—— excess mortality rates

$\mathrm{M2}_{it}$—— Broad money

$\mathrm{Ex\_in}_{it}$—— export and import

cpi_{it}——Consumer price index

μ_i——Individual fixed effects items

ω_i——Time fixed effects term

ε_{it}——Residual term

3.3 Descriptive statistical analysis

Following the previous study, this paper analyses the data for each variable, including the explained variables GDP, total exports and imports, CPI, the explanatory variable excess mortality and including the control variables, for overall descriptive statistics as shown in Table 2.

Table 2

Descriptive statistics

Variables	Variable definitions	Obs	Mean	Standard deviation	Minimum value	Maximum value
In_gdp	Economic growth	72	27.72301	1.550798	23.84561	31.32599
In_ex_in	Import and export	72	27.79192	1.878381	23.56941	31.53954
In_exrate	Exchange rates	72	3.793068	2.943233	.4402581	10.75221
In_Covid	Excess mortality	59	4.353483	1.147263	0	5.863631
In_M2	Broad money	72	12.09082	2.466971	8.204672	18.63096
In_CPI	Consumer Price Index	72	5.030975	.3508611	4.658711	5.979392

The results show that the maximum value of the variable economic growth (GDP) is 31.33; the minimum value is 23.85; and the standard deviation is 1.55, which indicates that there is a large gap in economic power between the various countries of the global economy, with the wealth of the lagging countries being much smaller than that of the developed countries. The maximum value of imports and exports (ex_in) is 31.54; the minimum value is 23.57; and the standard deviation is 1.88, which indicates that there is a significant gap between countries' total imports and exports in the general context of the epidemic. For countries with more affluent domestic products, there are enough productive goods to meet domestic demand, while for

trade deficit countries, COVID-19 increases the trade deficit of small economies. The maximum and minimum values of exchange rates for the sample as a whole are 10.75 and 0.44 respectively, with a standard deviation of 2.94. This indicates that during the COVID-19, there were large differences in exchange rates for different countries, which may be due to different economic conditions in different countries. From the above descriptive statistics, it is not only clear that the world economy is performing poorly in the context of pandemic, but also that the world economic recovery is facing a very big challenge.

Baseline regressions analysis. This paper first uses benchmark regression analysis to examine whether the epidemic has had a negative impact on the global economy. Drawing on Liu Xueliang and Zhang Xiaojing [9] to model the impact of the 2003 SARS shock on economic growth, selecting GDP as the data indicator of economic impact. From the basic regressions, it can be seen that in equation (1) the regression analysis is the relationship between excess mortality and economic growth.

Table 2

Basic regression

(1) ln_gdp	Coefficient	Std.err	t	P>|t|	[95% conf.interval]	
In_covid	-0.029	0.009	-3.35	0.001	-0.045	-0.012
In_CPI	0.690	0.169	4.09	0.000	-0.359	1.021
In_exin	-0.047	0.006	-7.27	0.000	-0.060	-0.035
In_exrate	-0.871	0.506	-17.20	0.000	-0.970	-0.772
In_m2	0.841	0.057	14.84	0.000	0.730	0.772
_cons	19.126	1.015	18.84	0.000	17.14	28.776
Sigma_u	0.425					
Sigma_e	0.036					
rho	0.995					

The results can be output directly from table 2, as shown in table 3.

Table 3

Results of Basic regression

	(1) ln_gdp
In_covid	-0.029***
	(-3.35)
ln_cpi	0.690***
	(4.09)
In_exin	-0.047***
	(-7.27)
In_exrate	-0.871***
	(-17.20)
In_m2	0.841***
	(14.84)
_cons	19.13***
	(18.84)
N	106

Note: Standard errors in parentheses,* $p < 0.1$,** $p < 0.05$,*** $p < 0.01$

The results show that in (1) it can be found that the regression coefficient is -0.029 and excess mortality inhibits global economic growth at the 1% level of significance. This would suggest that global economic growth has been affected by COVID-19 and is negatively related.

Predictive Analysis. Based on the previous regression analysis coefficients and model, the regression equation can be established as:

$$GDP_{it} = -0.029^{*}\mathrm{Covid}_{\mathrm{it}} + 0.841^{*}\mathrm{M2}_{\mathrm{it}} - 0.047^{*}\mathrm{Ex\_in}_{\mathrm{it}} + 0.69^{*}\mathrm{cpi}_{\mathrm{it}} - 0.871^{*}\mathrm{Exrate}_{\mathrm{it}} + 19.13$$

The regression equation allows for the within-group prediction data to be made and Table 4 shows the predicted results.

Table 4

Predicted results of the modelling

Variable	Mean	Std. dev	Min	Max
Loggdp pre	27.52653	1.212689	24.9809	30.03777
Loggdp	27.72301	1.550798	23.84561	31.32599

From the table, we can see that the difference between the predicted and true values is small for the mean, median, maximum and minimum values, so we can assume that the prediction model works well.

The above content presents an empirical and regression analysis of the study to verify that COVID-19 will have a negative impact on the global economy. And the feasibility of the model is demonstrated by using the model to make within-group predictions. Recommendations will then be made based on the findings of the study in conjunction with existing national economic policies.

Opportunities for the digital economy for China. With the arrival of the epidemic causing huge restrictions on travel, digital technology is being used extensively in epidemic prevention and control, work and life. During the epidemic, the digital economy has developed rapidly, radiated widely and had a deep impact, and is becoming a key force in restructuring global factor resources, reshaping the global economic structure and changing the global competitive landscape. At the micro level, new technologies such as the Internet, big data and cloud computing continue to promote economies of scale and scope in various industries, which can also make use of the long-tail effect to promote the growth of industrial profits, while improving the price mechanism and optimising the matching relationship between supply and demand, thereby improving the equilibrium of the economy. Take China as an example, in 2020, in the midst of the adjustment period of the world economic crisis and the impact of the COVID-19 epidemic, the development of China's digital economy bucked the trend and achieved remarkable results, reaching 39.2 trillion yuan, an increase of 3.3 trillion yuan compared to 2019, and accounting for 38.6% of GDP, an increase of 2.4 percentage points year-on-year. In 2008, the number of Internet users in China jumped to the number one position in the world, reaching 253 million. The early development of the digital economy took shape with the Internet and information technology, and the design of policies to support the development of the digital economy in China began with information technology. During the epidemic, many local regulatory documents for the digital economy have been issued by local governments in various provinces in China, covering specific measures to support the development of the digital economy, methods of managing special funds, and investments in new infrastructure (Table 4).

Table 4

Methods and Policy for digital economy

Time	Policy	Contents
April 2020	Opinions on building a more complete institutional mechanism for the market-based allocation of factors	1. Vigorously cultivate the new digital economy 2. Deeply promote the digital transformation of enterprises 3. Create a data supply chain, lead the flow of materials, talents, technology and capital with the flow of data, and form a digital ecosystem with upstream and downstream industrial chain and cross-industry integration
July 2020	Opinions on supporting the healthy development of new industries and models, activating the consumer market to drive employment expansion	We are fostering an industrial platform development ecology, accelerating the pace of digital transformation of traditional enterprises, creating "virtual" industrial parks and industrial clusters that cross physical boundaries, and developing an "unmanned economy" based on new technologies.
August 2021	Implementation Plan of Beijing on Accelerating the Construction of a Global Digital Economy Benchmark City	The world's first "blueprint" for the development of a digital economy benchmark city. The plan specifies Beijing's strategic plan for accelerating the development of the digital economy, creating "six highlands" that will lead the development of the global digital economy, and building a global digital economy benchmark city by 2030
January 2022	"The 14th Five-Year Plan" for the Development of the Digital Economy	It is proposed that by 2025, the value added of core industries in the digital economy will reach 10% of GDP, a market system for data elements will be initially established, the digital transformation of industries will reach a new level, the level of digital industrialization will be significantly improved, digital public services will be more inclusive and equal, and the governance system of the digital economy will be more perfect.

Source: author's development based on policy documents

The sudden outbreak of COVID-19 is a rare major international public health event in recent years, and countries have introduced policies from different perspectives.

1) Epidemic Prevention and Control Policy

As of 5 November 2022, China is adhering to the general strategy of "preventing external imports and internal rebound". This means reducing imports from abroad and preventing a rebound of the epidemic at home. In order to facilitate the travel of people, in 2020 China will launch the "Health Code", which is based on actual real data and is generated by citizens through their own online declaration, which will be audited by the back-office and generated as their own QR code. The QR code is used as an electronic proof of personal travel and can be declared once and used throughout the city. Even with a health code, each city has different entry policies. For example, in Beijing, Entry to Beijing

is strictly limited by the history of residence in the area where the new indigenous New Coronavirus infected person was living within 7 days prior to entry, a negative nucleic acid test within 48 hours to prove a green code for Beijing Healthbot, home quarantine for 3 days after entering Beijing, and two tests for 3 days after entering Beijing are launched (one nucleic acid test within 24 hours of entering Beijing, one nucleic acid test within a 24-hour interval After 24 hours, one nucleic acid test within 72 hours). Upon entry into Beijing and the emergence of risks related to the epidemic, suspected symptoms are reported at the first opportunity. This is only the prevention and control policy for entry into one city, so you can imagine how strict China's prevention and control of COVID-19 outbreak is. On 23 March 2020, the UK officially declared a three-week state of lockdown, during which all major gatherings were cancelled, citizens were advised to implement a policy of social distancing and isolation, and people who could afford to work from home adopted a home isolation policy. However, on 19 July 2021, the UK government lifts most of the prevention and control measures, no longer mandating the wearing of masks and allowing more businesses to reopen.

2) Macroeconomic policy in different developed countries during the pandemic COVID-19

The United States. In terms of GDP, the US Treasury, Fiscal Services and Internal Revenue Service (IRS) quickly issued three rounds of benefits to direct payments to households and individuals due to the impact of COVID-19. One is that under the March 2020 CARES Act, the U.S. government provides economic impact payments of $1,200 per eligible adult and $500 per child under the age of 17. In addition, in December 2020, Congress passed the COVID-19 Tax Credit Act of 2020 (CRTR), which provides an additional $600 for each eligible adult and $600 for each child under the age of 17. Third, with Biden in office, the American Relief Plan Act of 2021 (ARP) provides a $1,400 economic impact payment for eligible individuals, $2,800 for married couples filing jointly, and $1,400 for dependents, including adult dependents. In the fiscal years 2020 and 2021, the US Treasury disbursed a total of $274.654 billion and $569.508 billion in EIP, respectively.

In terms of unemployment, *the United States* has also carried out large-scale unemployment compensation. All the workers who lost their jobs due to the epidemic can receive an additional unemployment compensation of $600 per person per week on top of the state unemployment compensation. Beginning in March 2021, the ARP extends unemployment compensation and gives individuals with adjusted gross income of less than $150,000 an exemption from federal income tax on unemployment benefits received in 2020 of less than $10,200. *Germany* gave up the principle of fiscal balance that it had insisted on for many years. In order to cope with the impact of the epidemic, the German government gave up the two fiscal balance principles of "Black zero" and "debt brake" that it had adhered to for more than a decade, and launched the largest economic aid package since the Second World War, totaling 750 billion euros, among which 156 billion euros was raised through debt, mainly for government supplementary budget, and 600 billion euros was used for corporate aid. This includes €400 bn in corporate guarantees, €100bn in corporate equity bail-outs and €100 bn in state-backed loans through Germany's state-owned KFW bank.

In response to unemployment, the German government has also provided various tax relief measures for businesses, independent workers and freelancers to improve their mobility. On the employee side, the Government has introduced temporary regulations to simplify and increase the number of short-time allowance recipients, which reached a record high of about 6 million in April 2020. The German government is also providing €255 million in "short-term work" subsidies and €50 billion in small business subsidies to small business owners and self-employed people who have been hit hard by the pandemic. On monetary policy, in addition to measures at the eurozone level, Germany has cut interest rates from 0.25 percent to zero; Within the World Financial Fund, €100 bn has been set aside to take direct stakes in the worst-affected companies and strengthen their capital positions.

Facing the severe domestic epidemic and economic risks, *the French government* vowed to protect and save its economy "whatever the cost". In terms of fiscal policy, a €45 billion fiscal plan and a €300 billion national guarantee plan have been proposed to support COVID-19 patients, affected micro-enterprises, freelance and independent workers, including direct subsidies, deferment of social security and taxes, payment of rent and utilities, and extension of unemployment benefits. On monetary policy, 120 billion euros of asset purchases by the end of 2020 will be supported by the European Central Bank. A further €750bn programme of asset purchases of private and public sector securities. It relaxed asset and collateral standards for the banking sector and expanded the scope of asset purchases and refinancing. Support banks in renegotiating bank loans to small businesses.

Great Britain launched the "biggest government intervention in the market" since the Second World War to protect businesses and help people tide over the difficulties, and an unprecedented fiscal policy package. These include: £5bn of extra funding for the NHS and other public services, £27bn of direct grants for hard-hit small businesses and sick leave compensation for staff, almost £7bn of support for the vulnerable and 80% of the earnings of self-employed and business employees over three months (up to £2,500 a month). On monetary policy, the Bank rate has been cut by 65 basis points to 0.1%, the lowest level in more than 300 years. The central bank's holdings of British government bonds and non-financial corporate bonds increased by £200 billion. Provide £330 billion of loans and guarantees to businesses, which alone amounts to 1.5% of the UK's annual gross national product, while launching the Coronavirus Business Interruption Loan Scheme with high street banks to support the financing needs of small and medium-sized enterprises.

Japan enacted the biggest economic stimulus bill since World War II. Since the outbreak of the pandemic, Japan has passed two emergency response plans on 13 February and 10 March 2020, respectively, with a total value of about 446 billion yen, focusing on supporting strengthening the response capacity of the medical system, increasing paid leave and compensating working parents affected by school closures, and providing subsidies for companies to maintain employment. on 7 April 2020, the Japanese government approved a 108 trillion yen emergency economic plan, described as the country's biggest ever stimulus package. The plan is divided into two parts: an "emergency support phase" during the outbreak and a "V-shaped recovery phase" after the outbreak has subsided. The first part mainly supports families and small and medium-sized enterprises affected by the epidemic. The standard of supplementary income is 300,000 yen per household. Small and medium-sized enterprises with a big drop in turnover can get a subsidy of up to 2 million yen, and freelancers and self-employed people with a big drop in income can get a subsidy of up to 1 million yen. In addition, the government will increase the level of employment subsidies for companies, allow companies to defer the payment of income tax and social insurance premiums, expand financial support for small and medium-sized companies, and provide assistance to airlines whose performance has deteriorated. In monetary policy, the Bank of Japan announced that it will keep short-term interest rates at minus 0.1 percent and keep long-term interest rates at around zero by buying long-term government bonds.

Conclusions and recommendations

This paper examines the impact of the COVID-19 on world economic growth, international trade and employment using data from 106 national economies over the period 2020-2021. The study finds that, in general, the COVID-19 can slow world economic growth and impede international trade at this stage, while increasing unemployment. In a partial view, the available data is divided into developed and non-developed countries, and it is found that the impact of the COVID-19 on non-developed countries is more costly. Therefore this paper puts forward relevant recommendations respectively. Firstly, in the case of global value chain reversal, the focus should be on promoting the development of new types of industries in each country, accelerating the reconfiguration of global industrial chains and global supply chains, and advocating diversified investment to achieve the purpose of risk stabilisation. Secondly, we should accelerate the resumption of global industries, enhance the flow of capital and technicians between countries, accelerate economic globalization to integrate both developing and developed countries into this world economy, and accelerate the development of world economic integration and national cooperation. Third, to avoid international conflicts, countries to prevent geopolitical conflicts and prevent the emergence of unilateralist ideas.

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DEVELOPMENT OF SERVICES AS A FACTOR IN INCREASING THE COMPETITIVENESS OF A LOGISTIC ORGANIZATION

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Abstract

The article is devoted to the issues of organizing and developing logistics services in an organization. A definition of logistics service is given, and the main groups in the field of logistics services are considered. The degree of influence of logistics services on the competitiveness of an organization is analyzed. The criteria for service quality that influence the attitude of consumers towards the organization are determined.

Keywords: Logistics, service, logistic services, customer satisfaction, competitive advantages.

In connection with the transition from a seller's market to a buyer's market, firms have increasingly focused on increasing their competitiveness. One of the factors that increases the competitiveness of a company is the construction of an effective logistics system. Each company is a complex mechanism with its own characteristics, goals and means. Moreover, when building a system for effective functioning in the market, it is necessary to take into account many different factors.

Logistics allows you to significantly reduce the time interval between the purchase of raw materials and semi-finished products and the delivery of the finished product to the consumer, contributes to a sharp reduction in material inventories, speeds up the process of obtaining information, and increases the level of service [1].

Currently, there are rarely companies on the market that provide their consumers only with goods or provide only services in their pure form. To sell a product, it is necessary to give it properties that meet the needs of the buyer and distinguish it from competitors. Research shows that attracting new consumers costs a company more than retaining existing ones, so modern companies focus their efforts on maintaining consumer loyalty, using various measures, including the development of logistics services, expanding the scope of services provided, and improving the quality of service.

Providing a range of services in the process of purchasing and selling involves bringing the purchased goods to consumers. Moreover, the more different services are provided, the higher the use value of the product will be. This is aimed at modifying the product offer, without which modern trade cannot function successfully in a competitive market. All this predetermines the successful development of various types of services.

Logistics service can be understood as a set of intangible logistics operations that ensure maximum satisfaction of consumer demand in the process of managing material and information flows in the most optimal way, from a cost point of view.

All work in the field of logistics services can be divided into three main groups:

– Pre-sales, i.e. work on the formation of a logistics service system;

– Work on the provision of logistics services carried out in the process of selling goods;

– After-sales logistics service.

Before the implementation process begins, work in the field of logistics services mainly includes determining the company's policy in the provision of services, as well as their planning.

In the process of selling goods, a variety of logistics services can be provided, for example:

– Availability of inventory in the warehouse;

– order execution, including assortment selection, packaging, formation of cargo units and other operations;

– ensuring delivery reliability;

– providing information on the passage of goods.

After-sales services include warranty service, obligations to address customer complaints, and exchanges [2].

In modern market conditions, the buyer influences the success of the seller. Buyers are becoming more and more demanding and professional, they are looking for goods and services adapted to their characteristics, and are seeking completeness of purchasing information. Today, purchasing decisions have become more prepared. A characteristic feature was the emergence of a "connoisseur buyer" with the following qualities:

– High awareness of products of interest and the ability to compare and choose distracted from advertising, brands or sellers. This means the ability to find the best quality/price ratio.

– The ability to separate the properties of the goods themselves from the services at the point of sale that increase the value of the goods. Thus, the connoisseur usually compares the quality not only of the goods themselves, which can be purchased anywhere, but also of the stores.

– Ability to quickly recognize almost identical brands. A connoisseur will not necessarily choose a well-known brand over a lesser-known one simply because it is more familiar to him or because of its image. A product should always be perceived as having special value.

Thus, in order to be accepted by the market, a company needs to satisfy consumer demand, which is not always limited to demand for the product itself. To maintain competitiveness, the company needs to develop measures for the organization and development of logistics services [3].

Planning a logistics service includes: determining a list of services that are significant for the buyer, ranking services, determining service standards, determining the optimal level of service.

To assess the quality of service, it is necessary to monitor consumer satisfaction with the quality of service, since improving the quality of logistics services is closely related to the successful conduct of the company's business as a whole.

To monitor customer satisfaction with the level of logistics services, it is necessary to determine service quality criteria. The criteria for measuring service quality are:

– Tangibility (appearance of the staff, convenience of the office location, availability of a convenient approach and access to the place where the service is provided, agreed upon time for the provision of the service, availability of the necessary equipment);

– Reliability (execution of the order at the agreed time, ensuring the safety of personal data, reliability of financial procedures, safety of cargo during physical distribution);

– Responsibility (ability to fulfill obligations, quality assurance);

– Safety (the organization's ability to ensure the safety of life, health, and property of the client);

– Politeness and communication skills (goodwill, politeness of staff, ability to correctly resolve conflicts).

The consumer draws conclusions regarding the quality of service based on communications, personal preferences and needs, and experience. Thus, the level of quality is a subjective value and depends on the consumer's perception of certain factors [4]. To influence the assessment of quality, it is necessary to segment the consumer market, i.e., divide it into specific groups of consumers according to various criteria, and seek an approach to each group based on the most significant criteria and characteristics of consumption.

Segmentation of the consumer market can be carried out according to geographical criteria, the nature of the service, the type of service or any other criterion. The selection of services that are significant for buyers, their ranking, and the determination of service standards can be done by conducting various surveys and carrying out ongoing monitoring. The organization's resources and capabilities are concentrated in providing customers with the identified services that are most important to them [5]. Each group of products will have its own indicators of service quality and their significance.

By paying attention to research into consumer needs, you can bring your customer service policy as close as possible to the required quality parameters. Nevertheless, at the same time, there is a problem of increasing costs of servicing consumers. The company's management needs to find a level of service at which the level of costs will not increase significantly. This is one of the problems with setting service boundaries. After all, not every company can afford to spend a significant portion of its profits on serving consumers. Providing high-quality logistics services is the activity of an organization to provide services that best meet the level of consumer requirements [6].

In a methodological sense, the main difficulty in monitoring the quality of the service provision process lies in the fact that the consumption of the service occurs at the time of its provision. For logistics optimization of a service, it is necessary to assess the quality of services using a system of indicators ranked according to their importance for consumers, and to minimize negative discrepancies between what consumers expect and the actual values of service quality indicators.

The improvement and development of service logistics can be considered as optimizing the process of product distribution and improving the quality of service. After all, if there are several suppliers of goods of the same quality on the market, the consumer will give preference to the one that is able to provide a higher level of service during the order fulfillment process. Therefore, the organization must not only maintain the established level of service, but in the process of constantly changing external conditions, develop and improve it [4].

This requires constant monitoring of external environmental factors, competitors and own resources, control of service quality, customer satisfaction and order fulfillment. The management of the organization must set for employees a certain set of goals in the field of quality control, such as accurate implementation of all aspects of customer orders, compliance with delivery times, continuous monitoring of the requirements for the logistics service system, optimization of costs for maintaining the level of logistics service. To achieve this, the organization needs to analyze and streamline its logistics system. Creating an effective logistics system involves the interaction of the organization's employees to ensure the quality of the services provided. If employees in one department of the organization do not perform their tasks well, efforts in other departments will be in vain [5]. Therefore, it is necessary to coordinate and harmonize the activities of the organization's employees involved in fulfilling customer orders.

So, service is inextricably linked with the sales process and represents a set of services provided in the process of ordering, delivery of purchases and further servicing of products. Planning a logistics service is an important stage in increasing the competitiveness of an organization. One of the most difficult issues in service logistics is determining the quality of services. In a methodological sense, the main difficulty in monitoring the quality of the service provision process lies in the fact that the consumption of the service occurs at the time of its provision. For logistics optimization of a service, it is necessary to accurately assess the quality of services using a system of indicators ranked according to their importance for consumers and minimize negative discrepancies between what consumers expect and the actual values of service quality indicators.

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РАЗВИТИЕ И СОСТОЯНИЕ СЕСТРИНСКОГО ДЕЛА В РЕСПУБЛИКЕ КАЗАХСТАН

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DEVELOPMENT AND STATE OF NURSING IN THE REPUBLIC OF KAZAKHSTAN

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Аннотация

В статье рассматриваются основные периоды развития и состояния сестринского дела в Республике Казахстан. Автор берет за основу хронологический период с момента обретения страной независимости и до настоящего времени. Исследует основные статистические показатели, выявляет проблемы.

Abstract

The article discusses the main periods of development and state of nursing in the Republic of Kazakhstan. The author takes as a basis the chronological period from the moment the country gained independence to the present. Examines basic statistical indicators and identifies problems.

Ключевые слова: Сестринское дело, состояние, развитие, кризис, изменения, медсестра расширенной практики.

Keywords: Nursing, condition, development, crisis, changes, advanced practice nurse.

Сестринское дело на территории современного Казахстана возникло в рамках развития российской медицины, в связи с тем, что во время возникновения профессии медицинской сестры территория современного Казахстана была в составе царской России. Эта профессия в последующем продолжит развитие до обретения современной формы в составе СССР, вплоть до распада, а затем уже в независимом Казахстане.

Сестринское дело в Республике Казахстан продолжает изменяться вслед за изменениями в государстве. Естественно то, что изменения в формах государственного устройства влекут за собой и изменения всех сфер общественной жизни, как в экономике, так и в здравоохранении. Так, для определенной величины населения должна быть сформирована достаточная система здравоохранения для того, чтобы обеспечивать функцию охраны здоровья. Государство обеспечивает некоторый уровень качества здравоохранения и достаточность ее в соответствии с изменением величины населения, однако вместе с реформированием экономики следует изменение системы здравоохранения и выявляются общие негативные тенденции, присущие всей экономики в целом, такие как миграционные процессы, вызывающие отток квалифицированной рабочей силы, так и снижение квалификации работников, вызывает обеспокоенность качество образования.

Республика Казахстан обладает населением превышающим 18 млн. граждан, проживающих на огромной территории страны и удовлетворение потребности в охране здоровья требует очень развитую систему здравоохранения, которая должна обеспечивать защиту здоровья населения в соответствии с изменением ее величины. С распадом СССР и разразившимся экономическим кризисом в 90-х годах население РК стало сокращаться, а затем можно наблюдать постепенный его рост. Экономический кризис существенным образом повлиял не только на демографию в стране, а также на систему здравоохранения, которая состоит из разных учреждений с различным статусом, но основными из них являются больницы и поликлиники, где концентрируется основная масса высококвалифицированных врачей и среднего медицинского персонала, в том числе и медицинских сестер.

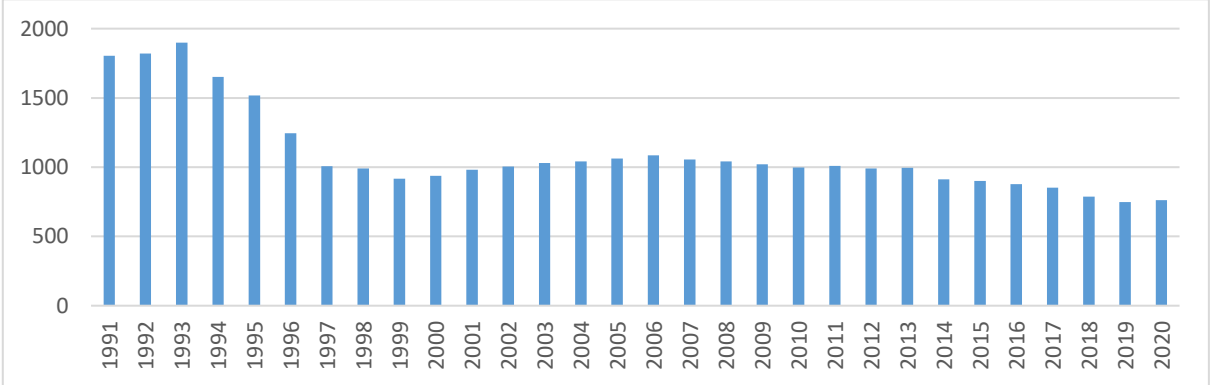

Рисунок 1 - Движение величины больничных организаций в Республике Казахстан, единиц

Примечание – составлено автором на основании данных источника [1]

Как видно на рисунке 1 количество больничных организаций в Республике Казахстан с обретением независимости сократилось с 1805 до 761 единиц. Хотя в эксплуатацию вводятся еще 94 новых больницы в 1992-1993 годах, что, скорее всего, объясняется завершением строительства объектов, начатых в период СССР. Экономический кризис и политика руководства страны того времени привели к сокращению или оптимизации больничных организаций в Республике Казахстан. Причем последующий экономический подъем в Казахстане в 2000-х годах не исправил положение с больничными организациями.

Изменения коснулись и врачебных организаций, оказывающих амбулаторно-поликлиническую помощь населению, которые также в некоторой степени сократились под влиянием экономических условий. Данная категория врачебных организаций, оказывающих амбулаторно-поликлиническую помощь населению, также как и больничные организации, во время экономического кризиса 90-х годов сократилась, но впоследствии, с преодолением экономических трудностей восстановило свое количество. В целом их величина сохранилась и осталось неизменной за наблюдаемый 30-летний период, что уже можно считать положительным моментом. Однако вслед за увеличением количества населения, показанного ранее, количество данной категории учреждений должно было соответственно увеличиться, но этого не произошло.

Изменения в кадровом составе работников системы здравоохранения показывают, что количество врачей стало превышать соответствующую величину советского периода, начиная с 2014 года и продолжает расти, что с одной стороны положительно характеризует кадровую политику государства в сфере здравоохранения. С другой стороны, наблюдаемое увеличение количества врачей должно иметь соответствующий рост рабочих мест, т.е. должно происходить возрастание числа больничных учреждений, но этого также не наблюдается.

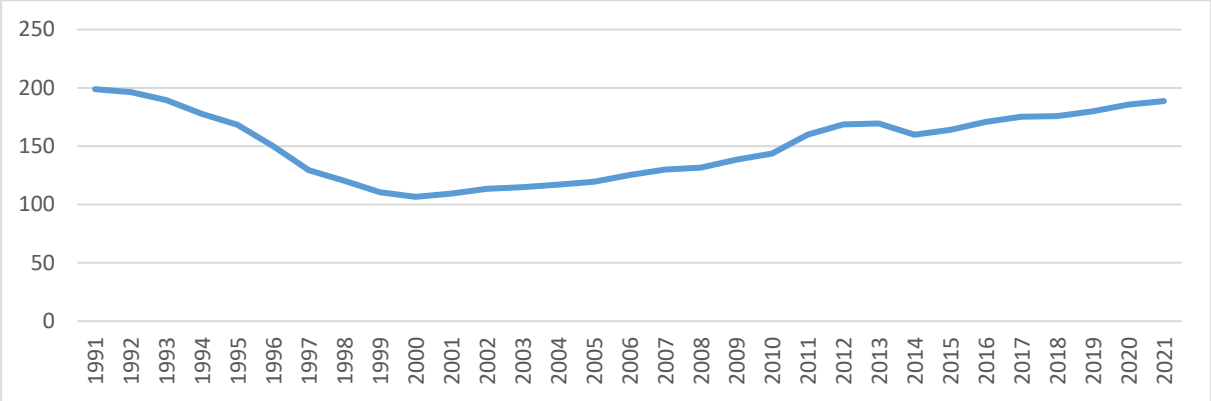

Рисунок 2 - Численность среднего медицинского персонала РК, тыс. человек
Примечание – составлено автором на основании данных источника [1]

Изменение численности среднего медицинского персонала в Республике Казахстан повторяет в некоторой степени картину изменения количества врачей с тем различием, что количество последних превысило уровень советского периода, а величина среднего медицинского персонала так и не достигла уровня 1991 года. Это может означать, что система здравоохранения, испытавшая влияние экономического кризиса 90-х годов, так и не смогла оправиться в смысле восстановления численности среднего медицинского персонала, но численность медсестер в то же время в республике растет (рисунок 3).

Рисунок 3 - Движение величины численности медсестер РК, тыс. человек
Примечание – составлено автором на основании данных источника [1]

Рисунок 3 демонстрирует увеличение количества медсестер в Казахстане за последние 20 лет (2000-2022 годы) с 60 тысяч до 140 тысяч или почти на 80 тысяч работников, т.е. медсестер в системе здравоохранения увеличилось более, чем в 2 раза. Это означает, что в Республике, во-первых, появилась потребность в подобном росте количества медсестер, а, во-вторых, в стране сформировались условия для подготовки указанного числа медсестер. Анализ величины специалистов данной категории в общей массе среднего медицинского персонала посредством сопоставления с предыдущим рисунком позволяет сделать вывод, что при недостижении среднего медицинского персонала до показателя 1991 года (196 тысяч работников) и увеличении количества медсестер, то подобное осуществляется за счет замещения остальных специальностей.

Действительно, при исследовании структуры среднего медицинского персонала оказывается, что медсестры становятся преобладающим большинством (140 тысяч из 189 тысяч работников).

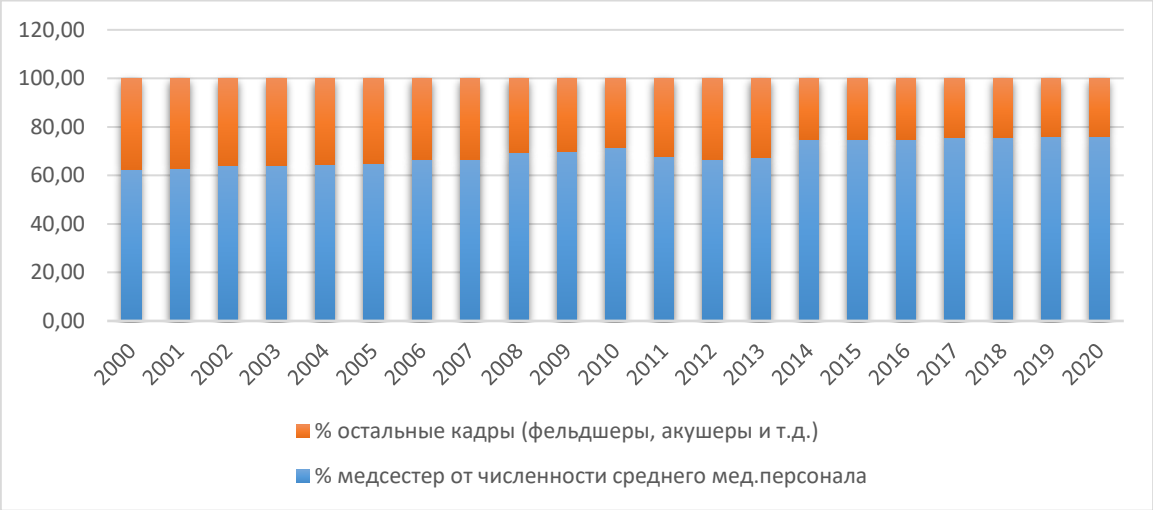

Рисунок 4 - Изменение соотношения медсестер и других работников среднего мед.персонала, %
Примечание – составлено автором на основании данных источника [1]

Рисунок 4 позволяет сделать вывод, что в кадровой политике системы здравоохранения Республики Казахстан созданы условия для увеличения количества медсестер, а в отношении остальных работников среднего медицинского персонала (фельдшеров и акушеров) условия складываются таким образом, что их количество в соотношении с медсестрами уменьшается. Если раньше, в 2000 году, соотношение было примерно 60/40, то через 20 лет, в 2020 году соотношение стремится к значению 80/20, следовательно, в общей массе среднего медицинского персонала медсестры становятся большинством, стремящимся полностью заполнить всю структуру среднего медицинского персонала.

Новые, возросшие требования к профессии медицинских сестер требуют соответствующего изменения в образовании. Как известно, с присоединением Казахстана к Болонскому процессу сфера образования находится в состоянии постоянных реформ. Это коснулось и образования медицинских сестер.

Государственной программой развития здравоохранения «Денсаулық» на 2016-2019 годы [2] в связи с повышением значимости медицинских сестер, вызванное увеличением обязанностей и расширением функционала среднего медицинского персонала, было запланировано изменение сестринского образования. Изменения вносятся, как в стандарты образования, так и переподготовку медицинских сестер. В 2018 году приказом Министра была внедрена отдельная должность «медсестра расширенной практики» для прикладных и академических бакалавров сестринского дела в номенклатуру должностей работников здравоохранения.

Таким образом, образование в сестринском деле приобретает следующую форму.

Таблица 1

Уровни сестринского образования в РК

№	Название ступени образования	Материальная база
1	- среднее профессиональное образование для получения диплома медсестры общей практики	(для этого в Казахстане существуют 48 медицинских колледжа);
2	- прикладного бакалавриата для получения диплома медсестры расширенной практики	(22 высших медицинских колледжей РК);
3	- академического бакалавриата для получения диплома медсестры расширенной практики	(9 медицинских ВУЗов РК);
4	- магистратура для получения степени магистра по специальности «Сестринское дело»	(7 медицинских ВУЗов РК);
5	- докторантура PHD – для защиты докторской по сестринскому делу	(1 ВУЗ РК – «НАО «Медицинский университет Астана»).
Примечание: составлено автором		

Данные ступени образования позволяют медсестре развиваться в своей профессии и сделать карьеру до доктора PHD сестринского дела.

Основной вывод по проведенному исследованию развития и состояния сестринского дела Республики Казахстан состоит в том, что в целом развитие сестринского дела не стоит на месте и продолжается, но в тоже время исследованный момент развития можно считать противоречивым. С обретением независимости Казахстан вместе с реформами в экономике должен был перестроить работу здравоохранения, в том числе и работу медсестер. С одной стороны, в стране увеличивается население, а, следовательно, повышается нагрузка на систему здравоохранения, что влечет необходимость совершенствования работы этой сферы, а статистика демонстрирует противоречивую картину: количество больниц уменьшается, но растет количество врачей; уменьшается величина фельдшеров и акушеров, но растет число медсестер; количество медсестер увеличивается, хотя заработная плата их существенно ниже по рынку труда и т.д.

Эта противоречивая картина развития сестринского дела, конечно, есть результат реформ, осуществление которых отражается в том числе и в правовом обеспечении: принимаются законы, кодексы, подзаконные акты. Действительно, для развития сестринского дела со стороны государства делается немало: внедряются новые программы образования, на работников возлагаются новые функции, создается новая профессия медсестры расширенной практики, формируется система научной деятельности и т.д. В тоже время с материальной стороны в части поддержки работы медсестер в сделано недостаточно, заработная плата критически мала. Оказалось, что заработная плата медсестер ниже средней заработной платы работника почти на треть, около 30%. Это может означать, что привлекательность профессии медсестер снижается, а также минимизируется мотивационная составляющая к развитию личных профессиональных качеств, притом, что здравоохранение страны нуждается в квалифицированных кадрах.

В подобных сложных условиях осуществлять управление самой многочисленной частью системы здравоохранения является трудной задачей. Поэтому государству, обществу следует изучать и использовать самые новые, перспективные, инновационные методы менеджмента, чтобы наилучшим способом решать проблемы, возникающие в системе здравоохранения в целом и сестринском деле в частности.

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MEDICAL SCIENCES

PREVENTION OF COMPLICATIONS IN REMOVABLE PROSTHETICS

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Abstract

Dental prostheses are an irritant to the tissues of the oral cavity, because they exert pressure in certain areas of the prosthetic bed. Complications can manifest as pain, burning, tingling, numbness, etc. The goal is to improve the method of preventing pain when using removable dentures, creating conditions for preventing pain and increasing the sensitivity threshold of the mucous membrane of the prosthetic field.

Keywords: orthopedic dentistry, pain syndrome, removable dentures, microneedle therapy.

Orthopedic dental treatment is a serious intervention in the human body. Negative emotions and pain are stress factors that negatively affect the functional state of the cardiovascular system of healthy people and especially patients with pathology of the circulatory organs [8]. Orthopedic dental treatment may be accompanied by pain of a different nature, impaired sensitivity and the appearance of various paresthesias (burning, itching, tingling, patience, etc.) [1;5]. Dental prostheses are an irritant to the tissues of the oral cavity, because they put excessive pressure on certain areas of the prosthetic bed. It is well known that a large number of patients using removable dentures cannot get used to them because of the occurrence of pain [2;3]. Removable dentures and the materials from which they are made damage the oral mucosa. Mechanical trauma occurs, accompanied by inflammatory reactions from the oral mucosa, allergic reactions, and increased atrophic processes [7]. At the same time, the attention of an orthopedic dentist is most often directed to the treatment of complications that have arisen after the imposition of a removable prosthesis, while their prevention is no less important [4;6]. The relevance of the issue lies in the fact that it is necessary to create such a prosthesis or such conditions for using it that prevent the development of secondary pathologies [9; 10].

Modern authors suggest the use of immunocorrective preparations Likopid and Imudon. They reduce complications from the oral mucosa of prosthetic wearers due to the ability to cause the creation of antibodies, thereby weakening inflammation and stimulating the human immune system in a natural way [11].

The disadvantage of this method of treatment is the inability to prevent inflammation before the use of dentures. Therefore, work in this direction is relevant.

Our study is based on the goal of improving the method of preventing pain syndrome, in which, by making changes to the special preparation for prosthetics and the means of preventing inflammatory phenomena, conditions are created to prevent pain syndrome and increase the sensitivity threshold of the mucosa of the prosthetic field.

Materials and methods

The study involved 10 patients with complete removable dentures for the upper and lower jaws. Patients indicated poor fixation, pain when using prostheses.

The task is solved by using electropuncture diagnostics of the state of the tissues of the dentoalveolar system by the method of R. Voll, that is, the threshold of pain sensitivity of the mucous membrane of the alveolar processes and palate is determined. After that, the auricular points of the earlobe zone are determined. Micro acupuncture is carried out by continuous exposure to a group of acupuncture points, the duration of exposure is 7 days. When using prolonged auricular microneedle therapy with needle-buttons, the sensitivity threshold of the mucous membrane of the prosthetic field will be increased to prevent pain (pain) during orthopedic treatment using removable prostheses. shell, tooth with its ligamentous apparatus and the corresponding fragment of the alveolar process of the jaw.

The results of electrical measurements of the points are entered into the examination card of patients according to the current standard energy ranges in electropuncture diagnostics: 50±1-65 UOP, 66-100 UOP, 48-0UOP (R. Voll, 1993). After determining pain points, auricular micro acupuncture. For patients using auriculotherapy for the first time, sessions should be performed in the supine position. Special needle-buttons are placed in the classical way on the auricular points of the ear. Compared to microneedles for cocoral points, they are smaller in size, and the needle shaft is perpendicular to the branches of the pen. Use the following points:

zone I - earlobe;

AD 1 I - the highest point of analgesia during tooth extraction;

AO 2 I - sky (point of the upper part of the mouth) cavities);

AO 3 I - floor of the mouth;

AO 4 I - language;

AO 5 I - upper jaw;

AD 6 I - lower jaw;

AD 7 I - the lower point of analgesia during tooth extraction.

Microneedle therapy is carried out in cycles, continuously affecting a group of acupuncture points. The duration of the cycle is 7 days, because needles with silver are used. Then take a break between cycles of 5 days. To achieve a significant clinical effect, as well as for auricular microneedle therapy. After each cycle, electropuncture diagnostics is carried out by the method of R. Voll. After lowering the threshold of pain sensitivity of the mucous membrane of the alveolar processes and the palate in the most characteristic areas of pressure, prosthetics are carried out with removable dentures.

Patients underwent electropuncture diagnostics by R. Voll's method. In order to obtain comparative data, the most characteristic zones of pressure on the alveolar processes and the palate were determined in the area of 16, 14, 12, 22, 24, 26, 32, 34, 36, 42, 44, 46 teeth and on the vestibular and oral surfaces, along the crest alveolar process and in the area of the vestibular and oral. After electroacupuncture measurement, it was determined that the threshold of pain sensitivity of the mucous membrane of the processes and the palate fluctuates on average within 69–74 SPV in the most characteristic pressure zones with removable dentures. In parallel, complete dentures were made for the upper and lower jaws. Prostheses are corrected and handed over on the day of the end of the course of auricular microneedle therapy.

Research results.

After the end of the 3rd cycle, electroacupuncture measurement determined that the threshold of pain sensitivity of the mucosa of the alveolar processes and the palate in patients decreased on average to an interval of up to 54 to 58 SPV in the most characteristic zones of pressure with removable dentures. Control examinations were carried out after three days, a week and a month. Patients did not complain about pain when using removable dentures. Using electroacupuncture measurements, it was determined that the threshold of pain sensitivity of the mucous membrane of the alveolar processes and palate is at the normal level.

Conclusion

Therefore, the use of auricular microneedle therapy, carried out in cycles lasting 7 days with an interval of 5 days, reduces the pain sensitivity of the mucous membrane of the alveolar processes and the palate to the norm, which significantly shortens and facilitates the period of adaptation to complete removable dentures.

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PEDAGOGICAL SCIENCES

CRAFT SMANSHIP IN SETTAR BAHLULZADE CREATION ISSUES

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Abstract
Thesis is a well-known brush master of Azerbaijan. It is dedicated to the artistic issues observed in the work of the people's artist Sattar Bahlulzade. The 34-year period of artistic research, which included portrait, landscape and still life genres in the artist's work, was rich in research. This manifested itself primarily in the performance of works of different genres with different artistic interpretations. In this sense, it should be noted that the artist's handwriting was changed several times. This is also confirmed by the fact that the artist's artistic heritage was expressed in realistic handwriting in the forties of the last century, lyrical in the fifties, laconic-generalized in the sixties, and finally, in the seventies, full of expression
Keywords: art, creativity, craftsmanship, aesthetics, good, tradition.

The rich artistic heritage of Sattar Bahlulzadeh (1909-1974), a famous brush master and People's Artist, who has a unique place in the 20th century Azerbaijani fine art, is notable for its variety of genres and executions. In other words, the numerous paintings created by him in portrait, landscape and still-life genres are eye-catching primarily because of the color solution that can make the viewer emotional. It is possible to witness the periodic renewal of his attitude to color and performance in his 34-year-long work. Although this kind of script evolution happened several times, the audience was able to recognize the creative "I" of Sattar Bahlulzade every time. It is for this reason that he is known as a tireless and unique singer of Azerbaijani nature.

By following the work of the famous artist in chronological order, which consists of several stages, it is possible to clarify the unique features of the artistry displayed by him in the creation of these works of various genres. It is possible to observe Sattar Bahlulzade's handwriting, which meets the aesthetics of primary and more academic painting, in the paintings he created in the 1940s. It is possible to refer to the works "Babak Uprising" and "Defense of Bezz Castle", as well as "Portrait of Gubali Fatali Khan" and "Calligrapher Mirali Tabrizi", which he painted as diploma work. In the color layer of these paintings, formed by harmonious colors, the figure and individual details that make up the composition are mainly realistic.

After that, the artist's close acquaintance with Absheron allows him to reveal aesthetic points that may seem interesting to the viewer in the harsh nature of this place at first glance. This causes the young artist's interest in the landscape genre to become even more serious. his visit to the Guba region at that time and the rich descriptive materials he collected here allow him to create beautiful landscapes.

After returning to Baku, he exhibited those paintings at exhibitions organized in the capital in 1947-1953 and won great audience sympathy. "Gudyalchay coast", "Gudyalchay valley", "The road to Gizbanovsh", "Spring song", "Green carpet", "Among the gardens", "Amsar gardens" etc. his works are like this. In these scenes, the artist was not satisfied with presenting what he saw in nature as it is, but tried to add a lyrical-emotional spirit to each motif. As a result, natural motifs, which have become ordinary in the eyes of many, have become more attractive and well-maintained.

The result of Sattar Bahlulzade's creative trips to Karabakh and Lankaran in the fifties was also successful, and he was able to exhibit new possibilities of his artistic potential by adding a realistic-romantic spirit to the scenes he created. The painting "Evening on the Caspian" painted by the artist in 1959 can be considered a starting point in the direction of changing his known handwriting. The most remarkable aspect of the work is the perceptible thinning of the color layer on the canvas, creating the impression that the laconic colors are painted with watercolors. Such a new manner, i.e., relatively little hearing of the "traces" of the eye, gave the image an eye-catching transparency, but did not prevent it from exhibiting its known capacity for attributes of various scales. In this sense, in "Evening on the Caspian" at the same time, the seagulls in the foreground are as elegant as the oil rigs in the background are, on the contrary, magnificent and large-scale. This kind of approach becomes a unique, characteristic artistic-aesthetic merit for the artist's work in later years. In other words, this kind of artistic approach serves as a reliable tool for the author of the works to create an image. Sattar Bahlulzade's "Beauty of the Caspian", "Land's Dream", "Kepaz's Tears", "Through the Field", "Spring in Mughan", "At the Foot of Bozdag", "Summer Evening", "Gülüstan" created by Sattar Bahlulzade in the 1960s. it is possible to be sure of this in the example of the tableaus. Although the spatial concreteness is not clearly felt in these works, which are the results of the artist's impressions from the most diverse corners of the republic, it is undeniable that each of them rises to the level of an almost generalized image of the land of Azerbaijan.

The artistic interpretation of Sattar Bahlulzade's understanding of nature, based on classical realism, took place in the second half of the sixties and the beginning of the seventies. The paintings created by the famous landscape artist in the mid-sixties are of special interest due to the extraordinary richness of the color

layer - the images created from different shades of colors. It is possible to witness the high artistry of the artist in these amazing landscapes created by the intersection of countless shades of color. Undoubtedly, such emotive scenes expressing different times of the day could be created only thanks to the continuous observations made in those places. It is impossible not to be impressed by Sattar Bahlulzade's skillful play in "Bazardüzü", "Shahnabad", "The Tale of Azerbaijan", "Ancient Flames of Surakhani" and other paintings covering that period.

One of the qualities that confirm the uniqueness of Sattar Bahlulzadeh's craftsmanship is related to his attitude to light and shadow. If we look at his creativity, we can see the successful results of this persistent attitude to "shadowlessness" in his works, large and small. Although the artist could not completely avoid this in the period of his creativity up to the sixties, in the later stage he almost continuously achieved the shadowlessness of artistic images, in other words, the realization of the image directly with the closeness and contrast of colors, and achieved a convincing and impressive appearance. The basis of this kind of expressive artistic interpretation is, first of all, giving a modern look to the ancient traditions of miniature style. This unique aesthetic of painting can be found in "Dadegunesh", "Laza man's waterfalls", "Singing mountains", "Shamakhi vineyards", "Blue fairy tale", "Absheron still life" and several other works created by the artist in the last three to four years of his life. . In our opinion, it would be logical to consider the artist's high level of performance throughout his work as the result of his creative attitude to classical painting and its artistic and technical possibilities.

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PHILOLOGICAL SCIENCES

DERIVATIVES AND WORD FORMATION METHODS (STRUCTURAL ASPECT OF WORD FORMATION DESIGNATIONS)

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Abstract

Our article is about derived words and the ways of word formation underlying the structural aspect of word-formation markup. We also give arguments that all derived words created with the help of word-formation techniques are the result of the word-formation process.

Keywords: word-formation markup, derived words, ways of word formation.

Word formation is a separate branch of linguistics. In Kazakh linguistics, word formation began to be studied as a separate branch only in the 80-90s of the XX century, first as part of morphology, some problems were considered in lexicology. The collection "the system of Word formation of the modern Kazakh language", published in 1989, was recognized as an independent branch of Word formation and became the basis for the formation of theoretical problems [1]. And in the academic "Kazakh grammar", published in 2002, the field of Word formation was given as a large chapter and found its place [2].

In Kazakh linguistics, word formation is studied from a descriptive (synchronous) and historical (diachronic) aspect. The works of Kazakh scientists have contributed to the formation of Word formation as a separate branch. In particular, N. Oralbayeva, G. Kaliyev, S. Isaev, A. Salkynbay, Z. Beisembayeva, L. Zhanalina, B. Kassym, G. Shaharman, G. Zheksembayeva, zh. Otarbekova, A. Ibatov, E. Zhanpeisov and others.

Word formation studies the function of language to create a name, to create a new word, to give birth to a word.

The main object of study of the word-forming branch of the language are derived words. Derived words are lexical units formed by word-building methods of the language. Derivative words are the result of the word-forming activity of the language.

Since new things and new concepts are continuous, the emergence of new names through word formation is also a continuous phenomenon.

The composition of derived words consists of one main, one auxiliary morpheme, or consists of two main morphemes. The composition of these examples is made up of the main and auxiliary morphemes. The composition of derived words is made up of two main morphemes. If the first auxiliary morpheme is connected, the derived Root is formed, and in the second case, complex words are formed.

A derivative word contains an independent meaningful word, which is the basis for its creation. The meaning of the word that was the basis in the derived word becomes the core to the meaning of the derived word. For example: medicine doctor, treatment Polyclinic, lecture lecture, retirement pensioner, etc. For example, if we take the derivative word mentor, then the word mentor in its composition was based on the lexical meaning of the derivative word mentor. And the creator of the derived word added The Meaning of the profession to the main word of the second morpheme-gertalim. Thus, the word mentor was created, which means educator. That is, the meaning of the word mentor derivative is formed from the meaning of the morphemes teach and-Ger. Therefore, the meaning of this derivative word is associated with the meaning of the word teaching in its composition. Such a semantic connection is also clearly visible in the complex word-forming adverbs. For example, the word greenhouse is made up of two words. One is warm, the other is just. This word formed the name of the warm place where the plant is grown by combining the Word "year", which is a sign of a thing, and the simple word "place", which means "place". In other words, the meaning of the complex word greenhouse is formed from the meaning of SYN in the composition. Therefore, a word that does not have a semantic connection cannot be a derived word.

The basis in the composition of the meaning of derivative words will be more complex than the

meaning of the word. That is, the meaning of the base word and the meaning of the derivative word are not equal. Because in derived words, the meaning of the base word is added to the meaning of the suffix attached to them. The base in the composition of the derived root combines the meaning of the word and the meaning of the word-forming suffix to create the meaning of the derived Root [3].

From the word that served as the basis for the formation of the derivative word, the composition of the derivative word will also be more complex. For example: *әкім әкімшілік, жекеше жекешелендіру, шебер шеберхана, мейрам мейрамхана* etc. From the first of these, the composition of the second is complex, the first consists of one morpheme, the second of two morphemes. It is a strict pattern in the language that the composition of derived words is more complex than the composition of the main word. However, not only derived words formed by the semantic approach in the language are subject to this pattern. Since there is no personal change in the composition of words formed by the semantic approach, that is, the derived word is created by acquiring a new meaning, the composition will be the same as the base word. For example, the word *құн* as a term in economic science is a derivative word, that is, it has another meaning in addition to its previous meaning, but there is no change in personality.

In terms of the formation of derivative words from two morphemes, they are similar to other two-morpheme linguistic phenomena in the language. For example, the worddifferentiation, i.e. formcomposition units also consist of two or more morphemes. However, while auxiliary morphemes in the composition of derivative words give rise to a new word and create a lexical unit with a new meaning, the second base only adds an additional grammatical meaning without changing the lexical meaning of the word, the base gives rise to the grammatical form of the word, that is, it does not create an independent lexeme with a new meaning.

If a word has only one lexical meaning in a different person (in a word-forming paradigm), then in a word-forming paradigm there are as many lexical meanings as there are members of it, and accordingly there are as many independent lexical units. For example, *білім, білгіш, білгір* are root words formed from one root, each of which is an independent lexeme, *адамға, адамды, адамда* etc the paradigm of words is a grammatical transformation of a word with only one lexical meaning.

Similarly, complex words formed by a combination, which is one of the derived words, belong to a phenomenon similar in personality to a phrase. However, complex words carry a single lexical meaning, no matter how many syllables they consist of. And all the consonants contained in a phrase are collected and do not carry a single lexical meaning, as in complex words, they do not form a single name. Each word in the composition of a phrase is a separate sentence-forming member, a separate independent meaningful word. And no matter how many consonants a compound word contains, it will be only one member of the sentence. For example, in the sentence *Қызыл ала көйлегі өзіне жарасып тұр*, *қызыл ала* the answer to the question of what is the compound adjective "what?" is only one determinative member of the sentence.

Derivative words, like root words in a language, are the names of objects and their signs in real life, and therefore belong to a lexical unit and are included in the vocabulary of the language, enriching it. Since derivative words are ready-made lexical units that are created and entered into the vocabulary at each stage, they are used ready-made in a sentence, as well as basic root words, that is, derivatives are lexical units that are obtained ready-made for any sentence, regardless of the construction of the sentence.

Derivative words are divided into the following two groups depending on their composition:

A) Derived roots;

B) Complex words.

Derived roots 1) the derived Root is a two-morpheme word, they are: the base word and the word-forming suffix; 2) the meaning of the derived Root is formed from the meaning of the base word and the word-forming suffix in its composition; 3) the base word and the meaning of the derived root in the composition of the derived Root are related.

Since derived roots are recognized according to the current stage of development of the language, the division of morphemes in their composition is clearly visible. For example: *кедей +лік, қымыз + хана, тап + қыр, тот + ық*, etc.all the derived roots clearly show the morphemes in their composition. However, this situation does not apply to derived roots in a historical context. Because the morphemes contained in historical derived roots have been destroyed. Therefore, they are not currently considered a derived root.

Word formation approaches:

Derivative words are not formed randomly, as it should be. It is formed according to the word-forming laws of the language, that is, through ready-made word-forming patterns in the language. For example, derived roots are most often formed by the main root + word-forming suffix pattern: *мал + шы, қой + шы, егін + ші*, etc.the main morpheme in these words is a noun, and the suffix *-шы/ші* adds the value of the business owner to the attached Word, creating a new meaningful word. Also, this suffix permanently attaches this meaning to the word to which it is attached. In other words, a derived word has a consistently formed way, way, pattern (model), meaning, adverbial meaning.

Derivative words are formed in the language in different ways. The word formation system of the Kazakh language has three main approaches that have been used since ancient times. They are: *synthetic, analytical, lexico-semantic.*

Synthetic approach.

Since the Kazakh language is an agglutinative language, the derivative word-maker is the main approach. The creation of a derivative word through a synthetic approach has its own specifics, which is formed in the language. To create a derived word through this approach, two Language units must be involved in it:

1) lexically meaningful word;

2) word formation suffix.

Each of these linguistic units involved in the creation of a derived word through a synthetic approach has its own function.

The lexical unit in the composition of the derived word is based on the meaning of the derived word. It is called the base word [4]. A base word is a lexically meaningful word that is the basis for creating a derivative word. For example, *дәрігер, аңшы, өнерпаз* base words in derivative words: *дәрі, аң, өнер* words. The meaning of derivative words and the meaning of the base words in their composition are constantly related. This applies not only to derived roots, that is, words formed using a synthetic approach, it is an established, strictly observed pattern in relation to word formation in general. Thus, in the composition of derived roots, the base is the function of the word itself to carry a new lexical meaning, to be the core.

The connectedness of the meaning of the derived root word and the base word is especially evident in the word-forming nest. No matter how many derived roots are in each word-forming cell, they will be semantically related to each other. Because of the composition of all derived roots in one nest, the base word of the nest is formed, and the derivative roots in the nest are related in meaning. For example: *бастық, басшы, басқар, басқарма, баспана, басшылық, баста, бастама* etc. The common basis for all these derived words is that the word "head" connects the meanings of all of them.

The second person, the second linguistic unit in the synthetic approach is the word-forming suffix. In synthetic word formation, the suffix is considered the main unit, without its participation, no derived Root is formed using a synthetic approach.

Derived words formed using a synthetic approach are called derived roots. The derived root base is formed by adding a word-forming suffix to the word. For example, *байпақ+шаң, сыр+лы, шүкір+лік, әсем+паз* etc.

Each of the morphemes contained in derived roots, created using a synthetic approach, has a place. The main morpheme is in the first place, the auxiliary morpheme, that is, the word-forming suffix, is in the second place, that is, the base stands at the end of the word. The place of morphemes in the composition of derived roots is constant. Deviations from this pattern are found only in some morphemes entered from another language. For example, *бисаясат, бейкүнә* etc.

A word-forming suffix has a function that creates a derived root. Its main function is to create a derivative lexical meaning. Most word-forming suffixes create a lexical new meaning. For example, *ойыншық* the suffix *-шық*, which created the root of the derivative, has a lexical meaning other than the word game base, that is, it is necessary for the game, created the name of the object being *ойын*. Сонда мұндағы *ойын* сөзінің лексикалық мағынасы мен *ойыншық* туынды түбірінің лексикалық мағынасы екі басқа. Then the lexical meaning of the word *ойын* here and the lexical meaning of the root of the *ойыншық* are two other.

Each of the word-forming suffixes, along with its own specific meaning, has common meanings that are common to several of them. For example, a number of suffixes create words denoting a material concept, a number of suffixes give rise to words denoting a criticism, quality, sign of an object, and now a group of derived root verbs, for example, *-сыз/ сіз, -лы/лі, -шаң/шең, -ғыш/гіш* suffixes such as quality value if derived roots, *-ла/ле, -ғыла/гіле, -ар/ер* suffixes such as action-valued derivative root verbs create. Suffixes with such common meanings are formed as suffixes of a certain class of words. Therefore, when the question of word-forming suffixes is raised, it is customary to consider them individually as a word-formation of each word class. This tradition is also characteristic of the periods when word formation is considered as part of morphology. For example, noun-generating suffixes, verb-generating suffixes, etc.

Analytical approach.

The analytical approach is a productive approach that came from ancient times in our language, which supplemented our language with many complex words. The analytical approach to word formation differs from the synthetic approach by its word formation units. If in the synthetic approach a lexical unit and a word-forming suffix are involved in the creation of a derivative word, in the analytical approach a suffix is not involved, where only two or more lexical units act as a word-forming person.

In an analytical approach, two or more words are combined with each other *бірігу (кірігу), тіркесу, қосарлану, қысқару* a new lexically meaningful word is created.

The combination of the analytical approach, that is, the word combination type, creates lexical units in the Kazakh language, in which two or more words are pronounced with one accent, combined into a single sound composition and carrying a single lexical meaning. For example, *қырықбуын, аққу, итмұрын* etc.

Wordthe method of incorporation can be divided into two ways of unification, integration. Each of the inner consonants of words formed by the method of union fully retains its own sound composition: *қолбасы, таусағыз, бойтұмар, көлбақа, көртышқан* etc. But the independent meanings of the words are not preserved, but carry a single lexical meaning. And the sound composition of words formed by the method of integration, when used independently, is not preserved, they are transferred to a single sound composition. For example, *білезік (білек жүзік), апар (алып бар), табалдырық (табан тұрық), қайны (қайын іні)* etc. The word compound type of analytical approach to word formation is a very productive approach to creating derivative words in a language.

The duality approach is the way in which two words merge into one, creating a single meaningful word. Words formed by the double way are called double words. It belongs to the ancient method used in the language of the most ancient written monuments. Our language is very rich in double words. For example, *ата-ана, туған-туысқан, көрпе-жастық, өнер-білім, ән-күй, дәрі-дәрмек* etc.

The duality approach has its own pattern formed in the language. Double words formed by the method of duplication, firstly, must be from the same word class. For example, *бау-бақша, қыз-келіншек, аяқ-табақ, үлгі-өнеге* etc. Secondly, double words formed by the duality method are often synonymous. For example, *сән-салтанат, сауыт-сайман, ойын-күлкі, туған-туыс* etc.

The attachment type of the analytical approach is also one of the very productive ones. Compound words formed by combination are formed by the combination of two independent words. Their sentences are written separately from each other, but their sentences have lost their independence of meaning and have a single meaning. For example, *қызыл ала* the thing is one color in its own way, it is a color that is not homogeneous, but mixed with red another color. Same as *тоқпан жілік*, name of one of the types of shingles, *алпыс бес* the number is the name of a new single number, which is the sum of the numbers sixty and five, and the two words merge to form a single lexical meaning. However, the derived meaning in complex words does not go far from the meaning of the SYN, which serves to create them, but is closely related to them. It is formed from the sum of two meanings.

The abbreviation approach is especially necessary for the abbreviated use of complex names. For example, ҚазҰУ (Қазақ ұлттық университеті), АлМУ (Алматы мемлекеттік университеті), АҚШ (Америка құрама штаты), БАҚ (Бұқаралық ақпарат құралдары) etc. Such words are called abbreviated words.

Thus, words formed using an analytical approach are called compound words.

Complex words.

Kazakh is a language rich in complex words. Complex words contribute to the enrichment of our vocabulary from ancient times to this day. Compound words belong to derived words. They are created using an analytical approach to word formation.

Complex words refer to a complex problem that has not been fully solved in science, despite the fact that language naming is a very common phenomenon.

The main feature of complex words is that they have a complex structure, that is, they are formed from the sum of several lexical units. The similarity between a singular word and a compound word is that both belong to a lexical unit that has an independent lexical meaning. The difference is that a singular word contains only one lexical unit, while a compound word contains at least two lexical units. Complex words are formed from independent words with lexical meaning. For example, *алтыбақан, белбеу, бозторғай, ақсақал* etc. the fact that the composition of each of the complex words, such as, is made up of independent words, does not cause any controversy.

Lexical units in the composition of complex words create a derivative meaning in complex words. The meanings of complex words will be related to the meanings of the conjunctions that make it [5].

Complex words, despite the fact that they are formed from several words with independent lexical meanings, carry a single lexical meaning and, accordingly, are recognized as a word with a single lexical meaning. No matter how many complex words consist of sounds, it is one word. Compound word pronouns do not form a single phrase in a sentence. The composition will be constant, it cannot be changed. For example, *аққұба, бозторғай* changing the composition of complex words, *құбаала, торғайбоз* if we, they are *аққұба*, *бозторғай* it cannot give the meanings of complex words. Because the meanings of complex words were integrated and had a single meaning. Therefore, both the composition of complex words and the order of their conjugation are constant.

Since the meaning of a complex word is integrated and conveys a single meaning, it is recognized as a single word and used in a ready-made form in a sentence. Therefore, since complex words are lexical units that are taken into a sentence in a ready-made form, it performs the function of one word in a sentence, has one member of the sentence, answers one question. A word is a word, a word is a word, a word is a word, a word is a word, a word is a word, a word is a word. No linguistic units are added between the consonants in the composition of complex words. The composition of complex words is also divided in pronunciation, and pauses are not pronounced between the syllables. The compound word is pronounced in a single Rhythm.

The above four types of analytical approach create four types of compound word, which are: *біріккен сөздер, қос сөздер, тіркесті сөздер, қысқарған сөздер*.

Compound words are words that have moved into a single lexical unit in terms of the meaning and sound composition of two, sometimes three words. Combined words differ from other complex words in that the word-forming units in their composition move into a single sound composition and merge, that is, they are written together, since the consonants of other types of complex words are written separately.

United words are words whose sounds are united both in meaning and in person, express a single Meaning, have a single sound composition, are pronounced with one accent and serve as one member of the sentence. For example, *әнұран, елорда, елбасы, елтаңба, әуежай* etc.

Integrated words are a word whose composition has undergone a sound change, which has now moved to a single sound composition, expresses a single lexical meaning, answers one question in a sentence, acts as one member of a sentence, is pronounced with one accent. For example, *әкел, әпер, биыл, бүгін, білезік* etc.

Double words.

Double words occupy a large place in the vocabulary of all Turkic languages and are among the most frequently used lexical units in the language. Double words are formed using the dual approach of the analytical approach. For example, *ойын-сауық, ине-жіп, ыдыс-аяқ, ата-ана, құрал-сайман, ұзынды-қысқалы* etc.

The composition of double words does not occur from any words. The language has its own established patterns of formation of double words. Both

conjunctions of double words come from the word of the same word class. For example, *жауын-шашын, тамыр-таныс, қауіп-қатер* etc. both conjunctions of double words are nouns. This also applies to other word classes.

Double words are formed from words that are close in meaning, with a certain semantic connection between them. No semantic connection, words that are not related to each other can merge with each other and form a double word. Double words are the result of two equal words close in meaning being doubled and transformed into a single word [6].

In modern language, double words sometimes have one ending, and sometimes both endings are meaningless. This is due to the current stage of development of the language, when they first became meaningful words, and then one, sometimes both, as a result of language development, the lexical meaning faded, or completely lost its meaning and reached the present degree. For example, *бала-шаға, жора-жолдас, некен-саяқ, ағыл-тегіл, әлем-жәлем, шөп-шалам* etc.

Double words are formed in the language in two different ways: 1) through the duplication of two words; 2) through the repetition of one word. In connection with this, in Kazakh linguistics, there is a division of double words into two types: 1) double words; 2) secondary double words.

Double words are very numerous in the language, they are formed from two words that are close in meaning and give a single lexical meaning. For example, *аяқ-табақ* if the double word "ыдыс" refers to the concept of, *ине-жіп* general name of the items you need to sew a case, *туған-туысқан* the double word means "туыс". Therefore, in the meaning of the double double words, accumulation, generalization is the meaning. Although the synonyms of double words are two different words, they necessarily belong to the same word class.

Redundant double words are made by repeating the same word twice. For example, *қора-қора, бау-бау, үйір-үйір, құшақ-құшақ* etc. These secondary double words do not represent the lexical meaning of their individual counterparts, they represent the size, quantity, and territory of an object. In the process of word formation, the components of double words acquired lexical meanings other than their original meanings.

In the language, repeated double words are found in different compositions. 1) reduplication in root form without suffix (*тау-тау, өркеш-өркеш* etc.); 2) one is an additional repetition (*бетпе-бет, кімде-кім, қолма-қол* etc.); 3) both are complementary repetitions (*қолдан-қолға, өзінен-өзі* etc.).

Compound words. Compound words are made up of two or more words and have a single lexical meaning. In a sentence, it answers one question and serves as one part of the sentence. It is taken ready for the sentence. Compound compound words, like other types of compound words, have a fixed composition, their parts cannot be replaced, they are pronounced with the same rhythm. Unlike other types of complex words, compound words are written together and double words are written with a hyphen, while compound words are written separately.

There are many compound words. For example, *ауыз әдебиеті, он бес, екі жүз, жаз бойы, қара көк, қызыл күрең, келіп кет, кіріп шық, тарс етті, құрмет ет, жақсылық қыл, көмек ет* etc. Compound words are also formed from the combination of the meanings of their counterparts.

Among complex words, there is a peculiarity in the formation of complex verbs and Quranic verbs. Compound verbs are connected by a prepositional suffix, that is, a preposition serves as a connecting link between two verbs. Prepositional suffixes, which are now retained in the composition of complex verbs, distinguish complex verbs from complex words that are connected without another suffix. For example, *кел**ін** кет, кір**ін** шық* etc.

Qur'anic verbs in the group of complex words also have their own characteristics from other complex words. If a complex word is formed from independent words with a full meaning, the Koranic verbs are formed from a combination (conjugation) of a noun with an independent meaning and an auxiliary verb. For example, *көмек ет, құрмет ет, қызмет қыл, телефон соқ* etc. Auxiliary verbs in the Qur'anic verbs function as suffixes that add action meaning to nouns and verbs. For example, *табыс ет – тапсыр, баян ет – баянда, мазақ қыл – мазақта, үміт ет – үміттен* etc. Just as suffixes attached to nouns add action meaning to it and turn it into a verb, auxiliary verbs also add action meaning to nouns and turn it into a verb. However, it seems that the auxiliary verbs forming the Qur'anic verbs have the same grammatical meaning as the suffixes, but in fact, this phenomenon began when the auxiliary verbs were independent words with a full meaning, and then their verb form lost its original meaning and became auxiliary. [7].

All compounds in compound words have a word-forming function. However, there is a difference in their function. For example, *алып кел, беріп кел, көріп кел, біліп кел, қызмет ет, жәрдем ет, адам ет* in all complex verbs, the first conjugation changes and the second conjugation remains constant. *Иіс май, тоң май; ауыз омыртқа, бел омыртқа*; *ал қызыл, қоңыр қызыл, күңгірт қызыл* also have this feature. And *он бір, он екі, он үш* in the plural nouns, one form is stable and one form is variable. If so, this phenomenon is characteristic of compound nouns. Related to this is the composition of complex words *тірек сыңар* and *ауыспалы сыңар* is divided into.

The position of the anchors in complex words is fixed, usually it is the second part of complex words. For example, *алып қайт, келіп қайт, көріп қайт, тоқпан жілік, асықты жілік, ортан жілік, қара көк, күлгін көк, ашық көк, екі мың, үш мың, бес жүз, сегіз жүз* etc. however, there are situations contrary to this principle. In the way of formation of numerals, the anchor is in the first place. For example, *он бір, он екі, он үш* etc.

Abbreviated words.

Abbreviated words occupy a large place in the language due to the regularity of shortening in the language. During the era of Soviet power, many words

shortened from the Russian language entered. For example, КПСС, партком, колхоз, совхоз, СССР, компартия etc. Words such as archaism and historicism are now added to the list of words, and shortened words are also appearing today. For example, ТМД (Тәуелсіз мемлекеттер достастығы), АлМУ (Алматы мемлекеттік университеті), ҚазҰУ (Қазақ ұлттық университеті) etc.

The difference between shortened words and other types of complex words is that shortened words retain their full meaning, that is, word formation does not create new meaning in shortened words. However, abbreviated words belong to word creation. Because abbreviated words serve as independent words as a variant of a complex full name. Meets all requirements for personal speech. Abbreviated words have a certain meaning, are ready-made words in the language, enter into a sentence as a ready-made word, answer a question in a sentence. The composition of shortened words is stable, functions as a part of a sentence, and is pronounced with one accent. Therefore, shortened words, like other types of complex words, take place as individual words from the group of lexical units in the language.

Lexical-semantic approach.

In the lexical-semantic approach, there is no change in the content of the word, the change is only in the meaning of the word. A word already existing in the language acquires a new meaning while preserving its sound composition. Since there is only a semantic change in creating a derived word, this method is called a lexical-semantic method. This method of word formation has been in our language since ancient times. For example, the adjective *ақ*, meaning color, later added the meanings "адал", "тағам атауы" (dairy food), "truth, reality".

There are many words in our language where nouns have become words through the materialization process through the lexical-semantic approach. For example: *бүлдірген, ағарған, айтыс, қоршау, ақ, жетісі, қырқы, жаратқан, туысқан* etc.

Adverbs were also formed through the aging of adverbial endings, that is, with the participation of the lexical-semantic approach. For example, *текке, бірден, зорға, бекерге, кейде, шетінен, шынымен, қапыда, етпетінен, шалқасынан* etc.

Many terms were created in our language using the lexical-semantic approach. For example, *екпін, буын, мағына, үстеу, жұрнақ* etc., which are linguistic terms. the words were initially meant for the general public and gradually acquired a term meaning. This phenomenon is characteristic of other fields of science. For example, *теңеу, суреттеу, әңгіме* әдебиет terms, *бұрыш, көбейту, қосу, алу* mathematical terms have migrated to new meanings through this lexico-semantic approach to word formation.

Thus, the examples given indicate that the lexico-semantic approach has its own place in the enrichment of vocabulary. And all derived words formed by word-forming methods are the result of the word-forming process.

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POEM GENRE İN AZERBAİJANİ LİTERATURE OF THE PERİOD OF İNDEPENDENCE
MÜSTƏQİLLİK DÖVRÜ AZƏRBAYCAN ƏDƏBİYYATINDA POEMA JANRI

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Annotasiya

Məqalədə Azərbaycanın müstəqilliyini bərpa etməsindən sonra yazılmış poema nümunələri tədqiq edilib. Müstəqillik dövrü Azərbaycan ədəbiyyatında poema janrını tədqiq edən alimlərin məqalələri göstərilib. Janrın inkişafında xüsusi xidmətləri olan müəlliflərin yenilikləri qeyd edilib. Azərbaycanın müstəqilliyindən sonra yazılmış poemaların xüsusiyyətləri göstərilib. Müstəqillik dövründə yazılmış Azərbaycan poemalarının özünəməxsusluqları qeyd edilib. Bir neçə müəllifin və əsərin adı çəkilib. Həmin əsərlərin timsalında janrın son illərdəki yenilikləri tədqiq edilib. Müstəqillik dövrü Azərbaycan ədəbiyyatında yaranan poemaların mövzu və ideyası öyrənilib. Daha çox hansı poema tiplərinə üstünlük verildiyi qeyd edilib. Janrın daxilində yaranmış forma dəyişiklikləri əsərlərə istinad edilərək araşdırılıb.

Abstract

In the article, were studied the examples of poems written after the restoration of Azerbaijan's independence. The articles of scholars who studied are shown the poem genre in Azerbaijani literature of the period of independence. The innovations of the authors who have special services in the development of the genre are mentioned. The characteristics of written poems are shown in the period of independence of Azerbaijan. Peculiarities of Azerbaijani poems were noted in the period of independence . Several authors and works are mentioned. In recent years the innovations of the genre were studied on the example of those works. The subject and idea of the poems were studied appeared in the Azerbaijani literature of the period. It has been noted which types of poems are preferred. Form novations within the genre were investigated with reference to the works.

Açar sözlər: poema janrı, Azərbaycan ədəbiyyatı, müasir şairlər, poemanın tipləri müstəqillik dövrü

Keywords: poem genre, Azerbaijani literature, modern poets, types of poems, period

Azərbaycanın dövlət müstəqilliyinin bərpası 1991-ci ilin oktyabrında gerçəkləşdi. SSRİ-dən ayrılan müstəqil Azərbaycanda bütün sahələrdə olduğu kimi, ədəbiyyat sahəsində də müstəqilliyin təsiri hiss olunmağa başladı. Bu dövrdə yaranan ədəbi nümunələrdə yeni dövrün reallıqları da əksini tapırdı. Digər janrlar kimi poema janrında yazılan əsərlərin də forma və mövzusunda yeniliklər müşahidə olunurdu.

Poema janrının mövcud şəraitə tez uyğunlaşması, baş verən hadisələrdən mövzu kimi bəhrələnməsi həmin janrın tez-tez müraciət olunmasına səbəb ola bilir. Hətta sovet dönəmində yaranmış Azərbaycan ədəbiyyatı nümunələri içərisində poema janrında kifayət qədər sanballı əsərlər vardır. Sovet dövründəki poemaları araşdıran alimlərdən biri də professor Şirindil Alışanlıdır. Şirindil Alışanlının qənaətinə görə "Poema janrı ətrafında gedən söhbətlərdə bütün polemik mülahizələrlə, bir-birini təkzib edən müddəalarla yanaşı, əksər müəlliflər belə bir fikri yekdilliklə iqrar etmişlər ki, müasir poemalarımızda lirikləşmə, gerçəkliyin dərkində lirik qəhrəmanın aparıcı mövqeyi, həyata yazıçı müdaxiləsinin güclənməsi, lirik-psixoloji təhlilin üstünlüyü və assosiativ düşüncə tərzi qabarıqdır" [1, s. 413]. Sitatda vurğulanan fikirləri müstəqillik illərində yazılmış Azərbaycan poemalarına da aid edə bilərik. Yəni bu illərdə yazılmış poemalarda da lirik təzahür daha çox müşahidə olunur. Bununla yanaşı, Azərbaycanın dövlət müstəqilliyini bərpa etməsindən sonra yaranan poemalarda hansı xüsusiyyətlərin daha çox üzə çıxdığını araşdıra bilərik.

Bunun üçün həm poemaların quruluşunda, həm də mövzularında olan dəyişikliyi tədqiq etmək mümkündür. Poemaların formaca müxtəlifliyini göstərmək üçün ən münasib termin olaraq tip sözündən istifadə olunur. Bu səbəbdən də həmin termindən istifadə etmək daha məqsədəuyğundur. Çağdaş poemaların formasından söhbət gedərkən alimlər qəhrəmannamə sözü ilə yanaşı, miniatür poema terminindən də istifadə edirlər. Hətta ən son hadisələrə istinad olunaraq yazılan poemalar haqqında Rahid Uluselin orijinal fikirləri vardır. Esmira Fuad onun

fikirlərini ümumiləşdirərək yazır ki, "fil.e.d. Rahid Ulusel 2021-ci ildə qələmə alınan poemaların əksəriyyətini səciyyəsinə görə "hadisə-poema" deyil, "ideya-poema" adlandırır" [4. s. 74]. Təbii ki, bütün bu deyilənlər səbəbsiz deyil. Deməli, janr yaranır və mütəmadi olaraq yeniliklərə açıqdır. Bununla belə, 1991-ci ildən sonra yazılmış Azərbaycan poemalarına kifayət qədər nümunə göstərib, baş verən dəyişiklikləri araşdıra bilərik.

Bu istiqamətdə kifayət qədər işlər görülmüşdür. "Ədəbi proses-2013" toplusundakı "İlin poema yaradıcılığı (janrın qürubu, yoxsa ədəbi laqeydliyimiz?!)" və "Ədəbi proses-2014" kitabındakı "İlin poema mənzərəsi: Aydınlığa doğru" məqalələri Elnarə Akimova tərəfindən yazılmışdır. "Ədəbi proses-2015" kitabında poema yaradıcılığı haqqında "Zamanın hökmü və janrın taleyi" icmalı Fidan Abdurahmanovaya məxsusdur. Esmira Fuad isə "2017-ci ilin epik şeiri: tənəzzül, yoxsa inkişaf?", ("Ədəbi proses-2017"), "2018-ci ilin epik şeiri: epos təfəkkürünün və lirik-fəlsəfi duyğuların bəyanı", ("Ədəbi proses-2018"), "2019-cu ilin epik şeiri: tarixi yaddaşın, gerçəkliklərin və milli ruhun inikası" ("Ədəbi proses-2019"), "2020-2021-ci illərin epik şeiri - poemalarda Qarabağ zəfərinin poetik ifadəsi" ("Ədəbi proses-2020-2021") icmallarında mövzunu araşdırmışdır.

Müxtəlif mövzularda yazılmış poemalara misal olaraq Elxan Zal Qaraxanlının "Polonez" (2008), "Güney göyərçini", Balasadığın "Atəşgahda möcüzə" (1999), Cabir Novruzun "Xalça əfsanəsi" (2002), Baloğlan Cəlil İdrisinin "Körpə harayı", Yusif Həsənbəyin "Cənnətin bağlı yolları" (2006) və digər əsərləri göstərə bilərik. Bəzi müəlliflər isə bu illərdə müxtəlif poema tiplərində bir neçə əsər yazmışlar. Onlardan Əli Rza Xələflinin "Azadlığın qanı", "Allahların görüşü", "Göyəzəndən bəri gəl", "Damcılı", "Bir Xələfli var imiş...", "İçəri şəhər: Daşlar-insanlar", "İnsan tarix və zaman", Elçin İsgəndərzadənin "Bu qala bizim qala", "Turan savaşçısının nəğmələri", "Şahmar şikəstəsi", "Adil Mirseyidin palitrası", "Mavi mərmərə", "Biganəlik iqlimi", "Oğlum Əliyə dualar", "Eşq", Balayar Sadiqin "Qan" (1996), "Yol" (1996), "Başdaşı" (1996), "Edam günü" (1996), "Bir ovuc yaddaş torpağı" (1998), "Zindan görüşləri" (1996), Zəlimxan Yaqubun "Ey vətən oğulları!", "Allahım, mənə bir ağsaqqal yetir", "Qurtuluş dastanı" (1997), "Azərbaycan oxusun" (1994), "Xalqın ehtiyacı var" (1992), "Əbədiyyət dastanı" (2003) və s. nümunə çəkə bilərik.

Müstəqillik illərində poema yaradıcılığından danışarkən Yusif Nəğməkarın xidmətlərini xüsusi vurğulamaq lazımdır. Belə ki, onun poemalarında mövzu rəngarəngliyi ilə yanaşı, forma eksperimentləri də özünəməxsusdur. Yusif Nəğməkarın "Sizli", "Ah-naz - Şahnaz", "Şər şənbə", "Zal ağacı", "Nizami demiş" "Vəslin edamı", "Çingiz çini", "Çanaqqala", "Qurbannamə", "Bəxtiyar" kimi poemalarında həm tarixi, həm də müasir mövzulara yeni baxış sərgilənmişdir. Bu poemaların quruluşundan söhbət gedərkən müəllifin yenilikləri qeyd edilməlidir. Əsasən poema-anım, poema-elegiya, poema-esse kimi tiplərə müraciət edən şair janrın daxili quruluşunda da orijinal üslub seçmişdir. Ənənəvi poemalarda istifadə olunan proloq və epiloq kimi terminlərin əvəzinə "ən ön ün", "ön ün", "ünləmə", "sonlama", "son ün", "ən son ün" kimi sözlərdən istifadə etmişdir.

Müstəqillik dövrü Azərbaycan ədəbiyyatında daha çox poema yazan şairlərdən biri də Nəriman Həsənzadədir. Onun bu illərdə yazdığı poemalardan "Xarı bülbül", "Qaçaq Kərəm", "Nuru paşa", "Qafqaz", "İstiqlal əsgəri", "Poylu-beşiyim mənim", "Nizami", "Sözü tara verin" və digərlərinin adlarını çəkə bilərik. Nəriman Həsənzadənin Azərbaycan torpaqlarının işğalı və soydaşların yurd-yuvalarından didərgin düşməsindən bəhs edən "Qarabağdan gələn var" (1997) poeması real Azərbaycan həqiqətlərini əks etdirir. Əsərin qəhrəmanı qaçqınlıq dövründə başlarına gələnləri müəllifə söyləyir. "Qurulu ev-eşik, barlı bağ-bağat, ermənіyə qaldı bizdən "amanat" [4, s. 44] tipli misralarda bədii tondan daha çox, tarixi həqiqətin nəqli diqqəti çəkir. İki hissədən ibarət olan poemanın birinci hissəsi Məmməd müəllimə, ikinci hissəsi onun həyat yoldaşı Səyyarə xanıma ithaf olunmuşdur.

Müstəqillik illərində yazılmış poemaların spesifikasından danışarkən Adil Mirseyidin poemalarına xüsusilə diqqət yetirmək lazımdır. Adil Mirseyidin "Cazz", "Payız hannibalizmi", "Classical music for meditation", "Metropol röyaları", "Röyaların rəsmləri", "Unio mistika", "Bürkü" kimi poemaları özünəməxsusluqları ilə seçilir. Adil Mirseyidin "Gorrigulum vitae" (2002) poeması başında qara sevdası olan insanın bu yaşında ölümə gedən yolları bula bilməməsindən gileylə başlanır. Poemanın bütün sətirləri insanı hər addımda izləyən ölümün müşayiəti ilə yazılır. Ölümün yaxınlaşdığı anı çılpaqlığı ilə göstərmək üçün kiçik bir təhkiyə verilir:

Gecəyarı pəncərələr sönəndə
Mən bir səfərdən evə dönəndə
Arxadan vurdular tində
əlimdə çörək vardı
çörək düşdü əlimdən
qanım damcıladı isti çörəyin üstünə
ay gördü bu cinayəti [6, s. 30].

Bu təsvirdə çox güclü gizli məqamlar var. Əsas ziddiyyət sənin yemək istədiyin çörəyə sənin qanını "yedirtmələrində" və bütün bu cinayətlərin ayın gözləri qarşısında vaqe olmasındadır. Niyə məhz ay?! Şair əvvəldən cinayətin gecəyarı baş verdiyini vurğulayır. Gecənin təkbaşına nur saçanı isə aydır. O, qaranlıqda törədilmiş cinayətə işıq salıb hər kəsə göstərmək əvəzinə, cinayətin özünü nurlandırır. Bu hadisədə şair nə sirdirsə yıxılmayıb ayaqüstəcə öldüyünə təəccüblə yanaşır. Əsərin davamında içində bir şeirin misraları ağrıyan şairin özünəməxsus düşüncələrə dalmağının obrazlı ifadəsi əks olunub. Şairi göylərin, bizə naməlum qalan asimanın daha çox cəlb etdiyi hiss olunur. Göyün yeddi qatında infarkt vuran ulduzun öləziyən şöləsini düşünür. Ulduzun bu halını əlacı bir qurşuna qalmış insanla müqayisə edir. Poemada müəllif, əsasən, təbiətlə təmasda olduğunu qabardır.

Müstəqillik illərində Azərbaycan şairləri içərisində poemaya müraciət edənlərdən biri də Fikrət Qocadır. Onun "Bakı-Quba yolu" (2011), "Qəbələ" (2010) "Dörd addım" (2008), "Cənnətdən qovulanlar" poemaları daha çox müasir mövzuları əhatə edir. Fikrət

Qocanın “Cənnətdən qovulanlar” poeması “Ol” - dedin kainat oldu” - misraları ilə başlayır. Göstərilir ki, Adəmlə Həvvanın tanrının sözündən çıxıb cənnətdən qovulmağının cəzası bu günə qədər davam edir. Poemada tanrı və onun insan həyatındakı mövqeyi məsələsi də qoyulub. Müəllifin fikrincə, insan özü bir dara düşməyincə yadına düşmür ki, tanrı da təkdir. “Müəllif qonşu dövlətlərin yardımını dəstəkləsə də, el məsələsini xatırladır ki, qonşu işığına ümid olan qaranlıqda qalar. Özün əkib-becərməsən başında turp əkəcəklər - deyə xəbərdarlıq edir. Şair “millət” və bu sözün tərkibindəki “illət” sözünə açıqlama verir. Hər iki sözün izahı fonunda inkişaf və məhvə yuvarlanmaq anlayışlarına aydınlıq gətirir. Min il əvvəl olmuş İmam Hüseyn müsibətinə başına, döşünə qara bağlayıb yas saxlayan xalqın öz Qarabağ dərdinə, əsirlikdə olan qızlara, gəlinlərə, körpələrə yas saxlamamağı illətin başlamağı kimi qələmə verilib. Fatimeyi-Zəhra Azərbaycanın bu gününü görsə, balalarını unudub dərdimizə şaxsey deyəcəyi halda, bizim öz fəlakətlərimizin fərqində deyilmişik kimi, özümüzü xoşbəxt göstərməyə, başqalarına təsəlli verməyə meyl etməyimizi qəbul edilməz gerçəkliklər kimi əks etdirib” [8, s. 161]. Bu yerdə müəllif milli düşüncədən irəli gələn bir deyimi xatırladır: “Türklər gözünüzdə yaş qalıbsa, öz halınıza ağlayın - deyərdi” [5, s. 233]. Bəşəriyyətin diqqətini özümüzə yönəldib, Azərbaycanın problemlərinin həllinə çağırmaqdansa, başqalarının fikrini çəkməyimizin əbəs olduğunu yazıb. Sona yaxın müəllif Azərbaycanın ikiyə parçalanmasına da toxunur.

Vaqif Bəhmənlinin poemalarını da müstəqillik illərində Azərbaycan ədəbiyyatında yazılmış orijinal poemalar hesab edə bilərik. Vaqif Bəhmənlinin “Cəza” (2011) və “Diaqnoz” poemaları bunu deməyə əsas verir. “Diaqnoz” poeması həm struktur, həm məzmun baxımından orijinal poemadır. Poetik məziyyətlərinə görə poema janrında yazılsa da, müəllif əsərini roman kimi qələmə verir: “Bu silsiləyə daxil olan yazıların hər biri əslində ayrıca yaranıb. Amma bir-birilərinə yaxın müddətlərdə; 2008-ci ilin on-on beş qızmar yay günündə...” [2, s. 261] Bu əsərdəki mövzular o qədər sərbəstdir ki, bölümlərin yerini dəyişdikdə nə məna, nə də “süjet” pozulmur. “Diaqnoz”dakı şeirlərin əksəriyyəti heca vəznində dördlük şəklindədir. Əsərdə bəşəriyyətin bütün problemlərinin kökündə ürək çatışmazlığı olduğunun diaqnozu qoyulur. Bu həm tibbi xəstəlik, həm də insanların ürəksizləşməsi anlamına gəlir. Cəmiyyətdəki ən naqis xəbisliklərin kökündə dayanan ürək çatışmazlığının sirli diaqnozu üçün fərmanı Allah versə də, altından Baş həkimin öz imzasını atdığına ironik münasibət görünür. “Diaqnoz” poeması bütövlükdə müasir cəmiyyətin kəsirlərini və eyiblərini sərgiləyən əsər kimi mühüm əhəmiyyət daşıyır.

Dəyanət Osmanlı da müstəqillik dövrü Azərbaycan ədəbiyyatında poema janrını zənginləşdirən şairlərdəndir. Dəyanət Osmanlı “Ölüm dəngəsi”, “Tələş içində”, “Suya qarışmış izlər”, “Yağmur saatı” kimi əsərlərində müxtəlif mövzulara müraciət etmişdir. Şairin “Yağmur saatı” poeması sərbəst şeir şəklində yazılmış on bir kiçik bölümdən ibarətdir. Əsərin əvvəlində müəllif fevral yağışının pıçıltıları altında tanrıyla həmsöhbət olur. Tanrıya dəfələrlə verilən “bu sənmisən” sualında dünyanın çatışmazlıqları sadalanır. Bütün eybəcərliklərə göz yumanın, doğrudan da, həmin tanrı olduğuna inanmaq istəmir. İnsanların bu qədər dəyişməsi, dünyanın ən qoca sahibi olan tanrını hərdənbir keçmişlə bağlı bir arzutək yada salmaqları poemada heyrətli etiraza səbəb olur. Müəllifin tanrıya ünvanlanan “Bu sənmisən, Tanrım, verdiyin dillə əzizlənib, can əvəzi verdiyin sözlə söyüldün və güc verdiyin qolla döyüldün...” [7, s. 140] müraciətində şair sanki tanrının seyirçi mövqeyinə təəccüblənir. Əsərin sonlarında müəllif: “Səniydin, Tanrım, qadağan olunmuş səmavi kitablarda adından fərmanlar verilən” [7, s. 142] - deyərək tanrının gözündən yayınan zülmə etiraz edir. Bütövlükdə poema bəşəri ədalətsizliyə qarşı tanrıdan ədalət istəyinin bədii ifadəsidir.

Müstəqillik dövründə Azərbaycan ədəbiyyatında yaranan bir sıra poemaların mövzusu folklordan alınmışdır. Şifahi xalq ədəbiyyatından alınan mövzular içərisində Dədə Qorqud motivlərinə müraciət üstünlük təşkil edir. XX əsrdə olduğu kimi, XXI əsrdə də Dədə Qorqud motivlərinə müraciət edərək əsər yazan müəlliflər vardır. Bu mövzuda ən çox diqqəti çəkən yazarlardan biri Kamal Abdulladır. O, “Yarımçıq əlyazma” kimi bir romanı həmin mövzuya həsr etməklə kifayətlənməyib, kiçik poemalar da yazmışdır. Kamal Abdullanın “Dədə Qorqud: “Mənlik deyil”, “Ümid qaldı sabaha...”, “Dədə Qorqud: “Mən nə edim?!”, “Bəkilin Xatunu: Dilim, dilim, vay dilim...” kimi poemalarında dastanın motivlərinə postmodernist münasibət əks olunub. Bu poemalar bütövlükdə “Yarımçıq əlyazma”nın tamamlanmağına cəhd edilməsi təsiri bağışlayır. Yəni mövzu Dədə Qorqud movitləri olsa da, işlənmə dərəcəsi romandakı kimidir. Dastanda rastımıza çıxmayan, tamamilə bədii təxəyyülün məhsulu olan fikirlərin poemada yer almağı diqqəti çəkən məziyyətlərdəndir.

Gətirilən nümunələr onu göstərir ki, müstəqillik dövrü Azərbaycan poeziyasında poema janrı özünəməxsus yolla inkişaf etmişdir. Belə ki, poemalarda istər ənənəvi məzmun və formalara müraciət, istərsə yeni təmayüllərin təzahürü fərqli şəkildə büruzə verir. Müəlliflər ən müxtəlif mövzuları poema üçün aktuallaşdırır, mövzuya uyğun forma seçimində tamamilə sərbəstlik nümayiş etdirirlər. Yəni folklordan alınmış bir mövzunun sərbəst şeir şəklində yazılmağını bədii normativ kimi təqdim edirlər. Şairlər öz poemalarını janrın müxtəlif tiplərində fərqləndirməyə meyl edirlər. Quruluşundan və həcmindən asılı olmayaraq dövrün poemalarını poetik tələblərə cavab verən əsərlər hesab etmək olar. Bütün özünəməxsusluqları ilə yanaşı, çağdaş dövr Azərbaycan ədəbiyyatında poema janrı kifayət qədər müraciət edilən janrlardandır.

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THE PROCESS OF DIGITALIZATION AND THE KAZAKH LANGUAGE

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Abstract

The article examines the influence of digital technology on the Kazakh language. The purpose of the article is to study the development of the Kazakh language in the process of digitalization, identify linguistic phenomena arising in linguistic uses and conduct their linguistic analysis. Language units collected from state portals were taken as research materials.

Keywords: Kazakh language, digitization, digital system, new words, language features.

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The development of the national language is not limited to the demand and use of the native language, it directly depends on the language policy of the state, various programs and documents that support the language, as well as various extralinguistic and economic factors. The introduction of modern IT and innovative technologies into the daily life of the population also affects the development of the state Kazakh language. This article provides for a study from the point of view of sociolinguistics on how the state program "Digital Kazakhstan", approved by the resolution of the Government of the Republic of Kazakhstan No. 827 dated December 12, 2017, influenced the development of the state language, how much the use of the state language has increased, as a result of which new words have entered the language use of citizens, including various social groups. This is due to the fact that during the implementation of this state program, any new technological digital developments will be developed and put into effect in the state and official language. The target consumer of digital products are Kazakhstanis. From this point of view, it is clear that the state program "Digital Kazakhstan" has definitely influenced the development of the state language, and the article deals with linguistic issues related to the said state language.

The initial primary information on language usage in the state language on the state e.gov.kz website and platforms was collected by the field research method, the collected materials were processed, sorted, and a linguistic analysis was made.

The object of research of the article is directly related to the state program "Digital Kazakhstan" approved by Resolution No. 827 of the Government of the Republic of Kazakhstan on December 12, 2017, that is, the study of state language potential that has entered the digital cyberspace within the framework of this program. The main goal of the program is to accelerate the rate of republic's economy development and improve the quality of life of the population through the use of digital technologies in the medium term, as well as to create conditions for moving the economy of Kazakhstan to a fundamentally new development path that ensures the creation of the digital economy of the future in the long term. The program will be implemented in the period of 2018-2022 and will give an additional impetus to the technological modernization of the country's flagship industries, create conditions for large-scale and long-term growth of labor productivity. Digital Kazakhstan is a program designed to accelerate the rate of development of the Kazakh economy and improve the quality of our citizens'life [1]. That is, within the framework of the mentioned program, it can be seen that now state services, various business services have moved to digital format, and it has become much easier to get the services used in the daily life of the people. Together with these services, the state language also "started to live" in the digital system. Digital document circulation has been introduced in state bodies and organizations, quasi-state sectors, an electronic trade market has appeared, that is, the state has moved to a digital system. As a result, various language usages related to digital cyberspace appeared in the modern Kazakh language, for example: *sifrlyq memleket* (digital state), *sifrlyq qūjat ainalymy* (digital document circulation), *elektrondyq sauda* (e-commerce), *elektrondyq sauda naryğy* (e-commerce market), *elektrondyq ükımet* (e-government), *sifrlyq sauattylyq* (digital literacy), *«aqyldy» qala* (smart city), *«aqyldy» bağdarşam* (smart traffic light), *«aqyldy» üi* (smart house), *«aqyldy» esık* (smart door), *«aqyldy» sağat* (smart clock), *onlain tölem* (online payment), *onlain sauda jasau* (online shopping), *QR tölem* (QR payment), etc.

During the process of globalization, various news, updates, new things, phenomena are appearing in every

sphere of society due to technology and computer equipment. All phenomena occurring in the society are reflected in the language and recorded in the language. The flow of information as a product of globalization is increasing the general priority of communication in society. Verbal and non-verbal language tools in real communication in oral form, which is carried out face-to-face, and in written form, which is carried out through handwritten text, when such communication is not formed, differ from the use of language tools in virtual, digital communication. This problem has become a special object of research among modern linguists. Because the global human race living in the information society is gradually turning to digital tools to satisfy their communication needs. The development of IT technology has opened the way for the strengthening of digital communication in society. Digital (virtual) communication space is replacing real communication day by day. Virtual communication has the potential to change the linguistic norms of real communication. Language units of virtual communication are displacing language units that have become the norm in real communication, and deviant usages are becoming "normal" for virtual communication. At the same time, as a result of the rapid development of virtual communication, new concepts, new names, new words are appearing in all languages of the world over time through the Internet and social networks [2; 144].

A brief description of the language situation in Kazakhstan. Digitization of the state in the Republic of Kazakhstan has its own peculiarities in terms of language situation: bilingualism has taken place in Kazakhstan. The peculiarity of the language situation in Kazakhstan is not only due to the development of genetically and typologically diverse languages, but also due to the simultaneous use of two large languages, Kazakh and Russianin the communicative space. "And the unique communicative space shows the limits (parameters) of the functional "well-being" of the Kazakh and Russian languages as a permanent measure of the conventional type" [3; 133]. Bilingualism is a language phenomenon that is widely studied and discussed in sociolinguistics and has its own characteristics.

Since 2006, the term "trilingualism" has been used in the territory of Kazakhstan in connection with the idea of "Trilingual language" of the then President N. Nazarbayev. "Trilingual language" policy was implemented and learning English became a priority. State bodies, quasi-state organizations will start running their websites in three languages: Kazakh, Russian, and English. In the period since 2006, individuals and social groups ("Z" generation) have appeared in the society who have mastered the Kazakh-Russian-English languages.

In the case of bilingualism or trilingualism, the form of life of the Kazakh language in the digital cyberspace is established in the digital system, because the results of the program and works related to the digitization of all Kazakhstan are reflected in the state websites. Studying the peculiarities and differences of the language in the digital system allows to determine the state of the state language in the digital system. Regarding the linguistic situation of modern Kazakhstan, the linguistic phenomena that appeared during the digitization of the state were determined and linguistic analysis was carried out. It is assumed that the program of digitalization of the state will pave the way for the beginning of a new direction of Kazakh language education - the development of the field of cyberlinguistics. Because "Digital Kazakhstan" is a very large-scale program covering all spheres of the state, accordingly, during the implementation of the said program, new language usages and units will necessarily appear.

Digital Kazakhstan is a program designed to accelerate the rate of development of Kazakhstan's economy and improve the quality of life of our citizens. 5 main directions of the program: *Digitization of economic sectors, Transition to a digital state, Creation of an innovative ecosystem, Development of human capital, Implementation of the Digital Silk Road* (egov.kz). All the names of these routes are new usages in the Kazakh language. Here, the new linguistic usages such as *"digitization of the economy", "transition to a digital state", "implementation of the digital Silk Road"* are names projected according to the digital system due to the growing conflict of IT technologies. Before the state program of Kazakhstan, several state portals began to provide online services to the public.

New words that appear within the program can be grouped as follows:

1) *new usages directly imported from the English language* – «bır tereze» (*single window*), «aqyldy» datchik (*smart sensor*), «aqyldy fabrika» (*smart factory*), «aqyldy qalalar» (*smart cities*), sifrlyq kenış (*digital mine*), sifrlyq ken orny (*digital mine location*), sifrlyq basqaru (*digital management*), sifrlyq fabrika (*digital factory*), itellektualdy kölık jüiesı (*intelligent transport system*), avtojoldarda jasandy intelekt engızu (*introduction of artificial intelligence on highways*), elektrondyq sauda alañy (*electronic trading platform*), qağazsyz qūjat ainalymy (*paperless document circulation*), elektrondyq şot-faktura (*electronic invoice*), virtualdy qoima (*virtual wareho*), elektrondyq densaulyq saqtau (*electronic healthcare*), sifrlyq biznes (*digital business*), elektrondyq eñbek birjasy (*electronic labor exchange*); sifrlyq sauattylyq (*digital literacy*), sifrlyq sauattylyqty arttyru (improving digital literacy), būlttyq esepteuler (*cloud computing*), bazalyq jäne käsıbi sifrlyq dağdylar (*basic and professional digital skills*), aqparattyq qauıpsızdık (*information security*), sifrlyq Jıbek joly (*digital Silk Road*), keñ jolaqty internet (*broadband Internet*); tūlğany qaşyqtyqtan säikestendıru (*remote identification of a person*), sifrlyq biznes (*digital business*); sifrlyq memleketke ötu (*transition to a digital state*), ekonomikany sifrlandyru (*digitization of the economy*), Sergek, etc.

2) new usages directly imported from the English language – E-Commerce, E-Agrotrade, Fulfillment-ortalyğy *(Fulfillment-center)*, onlain jäne oflain biznes (*online and offline business*), Paper-free, e-Health, QR-kod (QR-code), Smart City, «Smart Astana», «Smart Almaty»,«Smart Ontustyk»,«Smart Aktobe», «Smart

Karaganda», Hub, startap-kompanialar (*start-up companies*), startap-viza (*start-up visa*), blokchein tehnologia (*blockchain technology*), hakaton (*hackathon*), 4G, 5G; Big Data, tehnologialyq park (*technology park*), vaip-şop (*wipe-shop*), baier (*buyer)*, etc.

3) hybrid words, one part of which is Kazakh, and the other part is directly from English – startap-mädeniet (*start-up culture*), IT käsıperlık (*IT business*), tehkäsıpkerlık (*technical entrepreneurship*), venchurlyq qarjylarndyru (*venture financing*), venchurlyq jobalar (*venture projects*), Big Data taldau (*Big Data analysis*), kiber qauıpsızdık (*cyber security*), internet-düken (*online store*), onlain tölem (*online payment*), QR tölem (*QR payment*) etc.

In the given examples, as a result of the development of digital technology, words that do not connect in the Kazakh language are combined, new concepts and names are emerging. The words *"smart" city, "smart" traffic light, "smart" door, "smart" factory* mean the names of tools that make everyday life easier. Before the digital era, the word "aqyldy" (smart) in the Kazakh language was used to refer to a living being with a mind and consciousness, that is, a person. Currently, this word is actively used in relation to various products of artificial intelligence. *Būlttyq esepteuler* (Cloud computing) is a new word created by direct translation, a name that has become a term for IT technology. *Sifrlyq Jıbek joly* (The Digital Silk Road) is a projected version of the Great Silk Road according to the modern virtual system. The Great Silk Road is a historical thoroughfare that connected the East and the West, united world civilizations, and contributed to the development of human society. *Digital Silk Road* is a historical and cultural name reproduced in a virtual system. *QR payment* is a type of online payment that simplifies people's everyday life and allows remote payment. At present, the phrases *"QR-kodpen töleu"* (pay with QR code) and *"QR-men töleimın"* (I pay with QR) are actively used.

Currently, due to the rapid development of IT technology in the world, all insurances related to meeting the social and material needs of the people are being transferred to electronic digital format. This process greatly simplified people's life and public services, digitalized the circulation of funds, and created electronic money. All the achievements of IT technology, which are widespread in the world, are realized through language. This factor indicates the high potential of the language. Studying the development of the state language, its function, potential and status between the state and the people within the framework of the digitization of Kazakhstan will help to identify new aspects and nuances of the state language that has entered the digital format. The peculiarity of the Kazakh language in the digital era is that words that were not connected before, that did not have a place in the word-formation system of the Kazakh language, are combined with each other, giving a new name and a new concept. On the one hand, this is a phenomenon necessary for language purity and language culture, on the other hand, it shows the flexibility of the Kazakh language, the potential of the Kazakh language.

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PHYSICAL SCIENCES

ВЛИЯНИЕ ЛЕГИРОВАНИЯ ПРАЗЕОДИМОМ НА ФОТОЭЛЕКТРИЧЕСКИЕ СВОЙСТВА КРИСТАЛЛОВ $TlGaSe_2$

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INFLUENCE OF DOPING WITH PRASEODYMIUM ON THE PHOTOELECTRIC PROPERTIES OF $TlGaSe_2$ CRYSTALS

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Аннотация

Синтезированы полупроводниковые соединения $TlGaSe_2$<Pr> (0; 0,1; 0,5; 2 мол%) и методом Бриджмена-Стокбаргера выращены их монокристаллы. Исследование дифрактограмм $TlGaSe_2$<Pr> показало, что в кристаллической решетке $TlGaSe_2$ с моноклинной сингонией, атомы празеодима, скорее всего, замещают атомы таллия. Измерение фотопроводимости кристаллов $TlGaSe_2$<Pr> при комнатной температуре позволило определить положения примесных уровней, оценить ширину запрещенной зоны и проследить ее зависимость от концентрации празеодима.

Abstract

Semiconductor compounds $TlGaSe_2$<Pr> (0; 0.1; 0.5; 2 mol%) were synthesized and their single crystals were grown by the Bridgman-Stockbarger method. A study of $TlGaSe_2$<Pr> diffraction patterns showed that in the $TlGaSe_2$ crystal lattice with a monoclinic system, praseodymium atoms most likely replace thallium atoms. Measuring the photoconductivity of $TlGaSe_2$<Pr> crystals at room temperature made it possible to determine the

positions of impurity levels, estimate the band gap width, and trace its dependence on praseodymium concentration.

Ключевые слова: полупроводник, празеодим, дифрактограмма, фотопроводимость, примесный уровень.

Keywords: semiconductor, praseodymium, diffraction pattern, photoconductivity, impurity level.

Растущие потребности современной микро- и оптоэлектроники стимулируют поиск и исследование новых полупроводниковых материалов со специфической кристаллической структурой. К таким материалам относятся низкоразмерные халькогениды, имеющие слоистую и цепочечную структуру. Широкое применение халькогенидов в микроэлектронике обусловлено их уникальными свойствами. Однако их потенциал еще не до конца выявлен. В последние годы внимание исследователей привлекают слоистые кристаллы сложной структуры с сильной анизотропией. С этой точки зрения большой интерес представляют кристаллы $TlGaSe_2$, входящие в группу $A^{III}B^{III}C_2^{VI}$, и их твердые растворы. Сведения о склонности к изоморфизму и структурно-фазовым переходам этих тройных соединений в различных литературных источниках могут различаться, а иногда и противоречить друг другу. Это связано с наличием у этих полупроводниковых кристаллов различных модификаций, отклонениями от стехиометрии в технологическом процессе, присутствием дефектов и примесей.

Одной из важных задач физики полупроводников является управление полезными физическими свойствами известных материалов путем их легирования различными добавками и образования твердых растворов на их основе. Примеси и дислокации существенно влияют на свойства полупроводниковых кристаллов и иногда приводят к новым физическим эффектам. Поэтому легирование является практически важным способом изменения физических свойств полупроводников. В частности, недавно показана перспективность легирования кристаллов группы $A^{III}B^{III}C_2^{VI}$ редкоземельными элементами (РЗЭ) [1-5].

Основной задачей, которую мы поставили перед собой, является синтез соединений $TlGaSe_2$, легированных редкоземельным элементом празеодимом с концентрацией 0÷2 мол%, выращивание их монокристаллов и исследование их фотоэлектрических свойств.

Синтез проводился методом прямого сплавления элементов. Сняты рентгеновские дифрактограммы полученных кристаллов $TlGaSe_2$<Pr> (0÷2 мол%). На рис. 1 показан фрагмент структуры кристаллов $TlGaSe_2$, плоскость расслоения (001) показана красной линией.

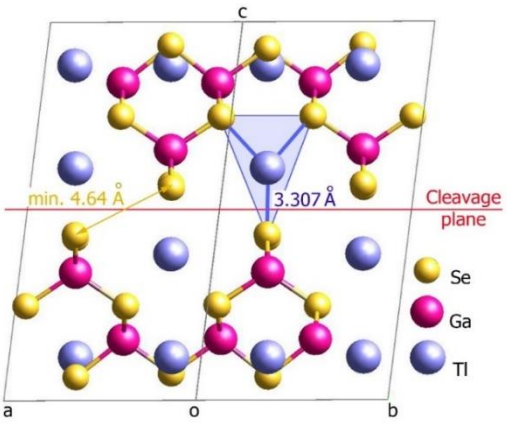

Рис. 1. Фрагмент структуры $TlGaSe_2$ [6].

Сравнительный анализ полученных дифрактограмм показал, что небольшая добавка Pr не вызвала визуально заметного изменения дифрактограмм. С другой стороны, по мере увеличения концентрации примеси мы наблюдали, что свойство кристаллов распадаться на слои снижается, то есть становится сложнее получать качественные поверхности. На основании кристаллохимических данных атомы Pr не могут располагаться в тетраэдрах атомов Ga в структуре, т. к. размеры этих тетраэдров слишком малы для атомов Pr, поэтому мы не считаем возможным замещение Ga → Pr. Действительно, тетраэдрическая координация легкого РЗЭ в изученных кристаллических структурах на сегодняшний день не обнаружена. А вот тригональные призмы атомов Tl очень подходят атомам Pr как по форме, так и по размеру (рис. 1). Такое замещение объясняет и причину ослабления слоистости кристаллов, так как замена Tl → Pr должна приводить к усилению межслоевой связи. На рис. 2 представлена дифрактограмма кристалла $TlGaSe_2$ [6].

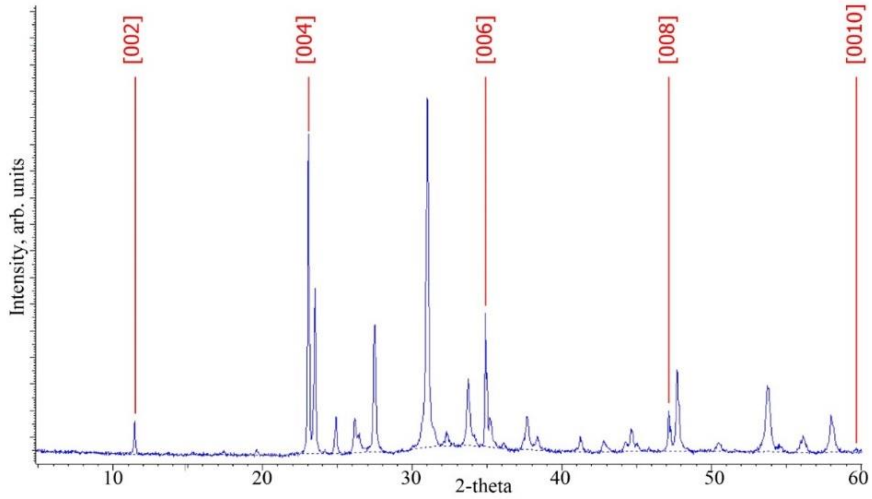

Рис. 2. Дифрактограмма кристалла $TlGaSe_2$ [6].

Измерения, проведенные на дифрактометре, показали, что легирование $TlGaSe_2$ празеодимом не приводит к заметному изменению его кристаллической структуры. Установлено, что составы являются однофазными

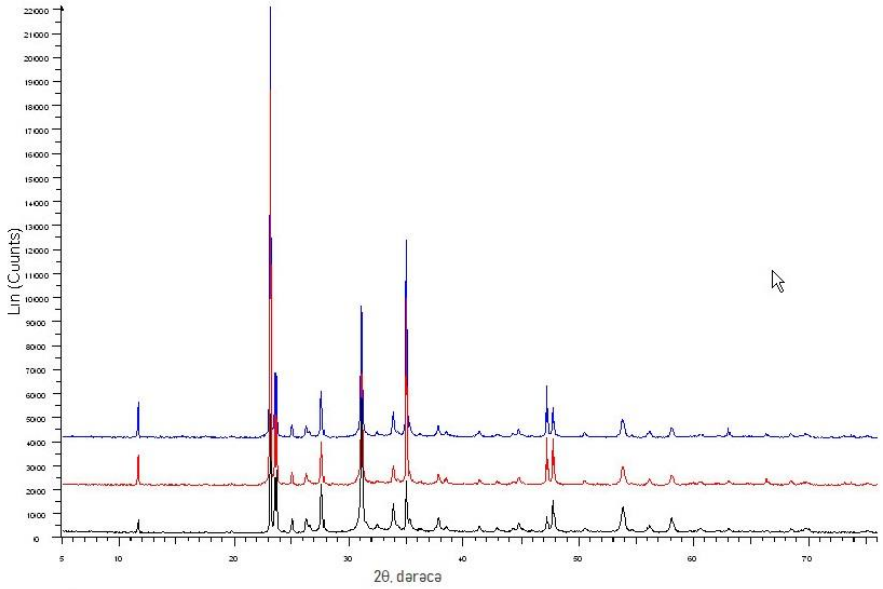

Рис. 3. Дифрактограммы кристаллов $TlGaSe_2$<Pr> (0,1; 0,5; 2 мол%).

и параметры решетки мало отличаются от таковых для $TlGaSe_2$. Образцы $TlGaSe_2$<Pr> кристаллизуются в моноклинной сингонии с параметрами, соответствующими $TlGaSe_2$: **a**=10,779 Å, **b**=10,776 Å, **c**=15,663 Å, **β**=99,993°, пр. гр. C2/c, z=16 [7]. Рефлексы на дифрактограмме образцов $TlGaSe_2$<Pr> (0÷2мол%) соответствуют фазе $TlGaSe_2$. На рис. 3 представлены дифрактограммы кристаллов $TlGaSe_2$<Pr>.

Для измерения фотоэлектрических свойств монокристаллы $TlGaSe_2$<Pr> были выращены методом Бриджмена-Стокбаргера. Монокристаллические образцы $TlGaSe_2$<Pr> (0; 0,1; 0,5; 2 мол%) готовились планарным способом так, чтобы внешнее электрическое поле было направлено вдоль естественных слоев монокристалла, а свет падал в направлении, перпендикулярном слоям. В качестве контактного материала использовалась серебряная паста. Расстояние между контактами около 2 мм. Напряжение приложенного электрического поля соответствует прямолинейному участку вольт-амперной характеристики монокристалла. В результате исследований установлено, что в монокристаллах $TlGaSe_2$<Pr> (0,1; 0,5; 2 мол%) наблюдается новая примесная фотопроводимость, значения энергий примесных уровней при различных концентрациях Pr соответственно равны (0,1% - 1,882 эВ; 0,5% - 1,87 эВ; 2% - 1,795 эВ).

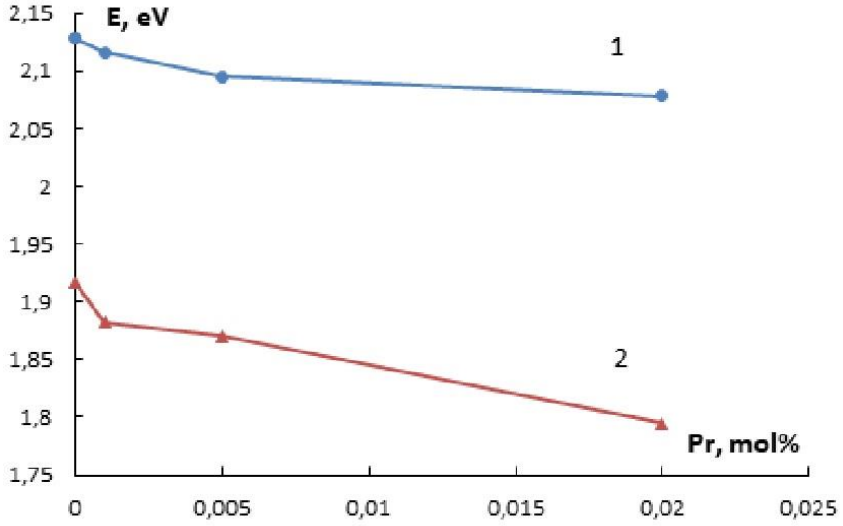

Рис. 4. Зависимость ширины запрещенной зоны (1) и положения примесного уровня (2) монокристаллов $TlGaSe_2$<Pr> от состава.

Из эксперимента была рассчитана ширина запрещенной зоны E_g для полупроводниковых кристаллов $TlGaSe_2$<Pr>. E_g = 2,116 эВ для 0,1%, E_g = 2,095 эВ для 0,5% и E_g = 2,078 эВ для 2 мол% (рис. 4). Эти результаты согласуются с приведенными в литературе значениями ширины запрещенной зоны $TlGaSe_2$ (E_g = 2,128 эВ). Наблюдается примесная фотопроводимость с участием новых энергетических уровней и сдвиг запрещенной зоны $TlGaSe_2$<Pr> в длинноволновую область.

Уменьшение ширины запрещенной зоны с увеличением концентрации Pr в $TlGaSe_2$ можно объяснить следующим образом. В целом, введение в полупроводник примесей, создающих глубокие уровни, приводит к расширению его валентной зоны и зоны проводимости. В сильнолегированных полупроводниках важную роль играет взаимодействие носителей заряда с атомами примеси. При частотах ниже пороговой $\nu = E_g/h$ поглощение света естественным образом связано с существованием хвоста плотности состояний в запрещенной зоне. Точное число уровней в хвосте плотности состояний варьируется от вещества к веществу и от образца к образцу. При $h\nu < E_g$ значение коэффициента поглощения $\alpha(\nu)$ зависит от степени легирования. Здесь задействованы в основном самые глубокие уровни хвоста плотности состояний. Когда $\nu < E_g/h$, значение коэффициента поглощения невелико. При слабом легировании электрон взаимодействует с одним атомом примеси. При сильном легировании энергия электрона зависит от нескольких легирующих атомов. При дальнейшем увеличении концентрации примеси волновые функции электронов существенно перекрывают различные локализованные примесные атомы и их энергетические уровни превращаются в зоны. Этот эффект называют квантовым уширением уровня. Такое уширение дискретного уровня приводит к уменьшению ширины запрещенной зоны полупроводника.

На основании полученных нами результатов можно сказать, что спектральный диапазон фотопроводимости $TlGaSe_2$<Pr> (0,1; 0,5; 2 мол%) существенно изменяется по сравнению с исходным кристаллом $TlGaSe_2$, что позволяет практическое использование исследованных составов в качестве приемника оптического излучения широкого диапазона.

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TECHNICAL SCIENCES

ANALYSIS OF THE NATURE OF FAILURES OCCURRING IN EQUIPMENT AND TECHNICAL MEANS USED IN OIL AND GAS WELLS

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Abstract

Most of the oil and gas fields of the Republic of Azerbaijan are experiencing their last operational life [1]. Although the vast majority of oil fields in the country are located on the Absheron Peninsula and in Gobustan, large volumes of oil and gas are extracted from offshore fields [2]. Of the 81 identified oil and gas fields, 54 are on land, and 27 are in the Caspian Sea area belonging to Azerbaijan [3]. The full process of exploitation of these deposits is currently carried out only at 59 of them.

Currently, the total number of wells on SOCAR's balance sheet is more than 6,500 units, of which about 95% are included in the current fund. The remaining wells are inactive due to conservation and liquidation [5].

The article is devoted to the analysis of the nature of failures occurring in equipment and technical means used in oil and gas wells.

Keywords: Oil well, cause of failures, equipment resource.

Introduction. When drilling wells, as well as during their operation, various complications may occur (absorption of drilling mud, occurrence of oil and gas and water manifestations, violation of the stability of the well wall, jamming of tools and equipment in the well due to breakdowns and jams, etc.) occur [7]. As a result of mining experiments, it was found that the implementation of applications related to the prevention of complications arising in wells, the technological processes spent on their subsequent liquidation are technically simple and economically advantageous. Thus, each emerging complication, being a serious cause of other complications, makes it difficult to eliminate them, creates the basis for large expenditures of material and technical means, time, energy and labor [8]. Therefore, of particular importance is the development of preventive measures for the early detection of failures and accidents that may occur during the drilling of wells, their prevention, as well as the elimination of the possibility of occurrence for other reasons.

On the other hand, accidents of various nature occur in the oil sector (equipment breakdowns for various reasons, deformations and ruptures, formation of sand, salt, paraffin plugs, etc.) and failures [9]. Accidents during drilling and operation occur mainly due to the violation of the integrity of the borehole column, wear of the thickness of their walls due to corrosion corrosion, deformations of various nature, as well as other deviations, failure of the well engine, deformation of the drill bit, they are also associated with objects that got into the well during work and fastening.

Instruments and technical means used in geophysical methods of assessing the technical condition of the well, starting with the drilling process, at later stages of the well operation process, can lead to maintaining the well in working condition for various reasons (breakage of logging cable, wire, falling into the wellbore due to faults and jams of various nature in the lowered into the well with instruments and instruments, etc.).

As a result of our research, it was found that the most intense failures occur in such equipment as deep-rod and electric submersible pumps, gas lift valves, packers, anchors, etc.). At the same time, the main causes of accidents are the processes of corrosion corrosion, the formation of salt deposits and the occurrence of deformations of various nature [10].

Figure 1 shows the failures and their numbers that occur in some downhole equipment (rod deep and electric submersible pumps, gas lift installations).

Our research has shown that the average service life of deep water pumps is 30-48 days, while for electric submersible pumps this period is 60-140 days, and for gas lift valves-120-150 days.

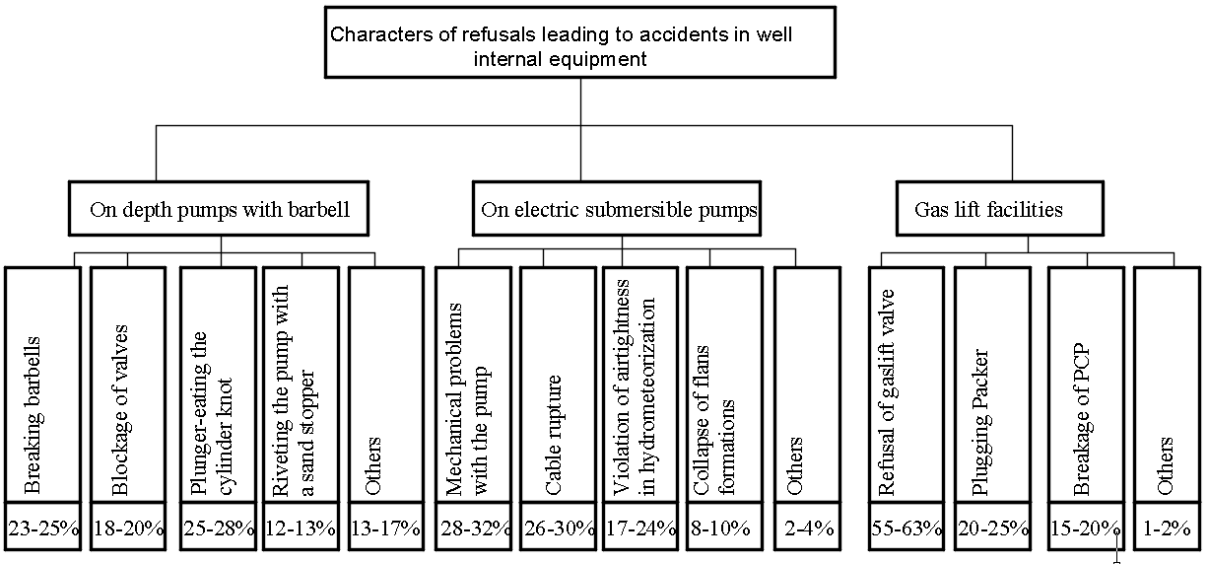

Figure 1 Failures occurring in downhole equipment and their number.

Thus, taking into account the above, it can be concluded that the expected failure in the corresponding wells and, consequently, the intensity of the repair and restoration work carried out during the year is 3-6 times.

The analysis of the causes of accidents in the oil and gas production departments (NGDU) of the Republic of Azerbaijan, occurring during drilling or operation, shows that they, being at different depths, in different conditions, are generally classified into two groups: geological and technical. In all cases, the identification and elimination of these shortcomings requires the development of special technical and technological approaches, while the appropriate control method and the correct choice of tools and equipment in the well to eliminate the causes of the accident (individual approach) becomes more relevant. And the solution of the issue, in turn, highlights the need to obtain complete and detailed information about the situation inside the well. The fund of wells in need of repair is changing with increasing dynamics. So, over the past decade, this indicator for SOCAR has increased 1.6 times. If in 2013 the number of wells of this type was up to 800, then by the end of 2021 this figure approached 1,250.

Apparently, this figure is quite large, and the implementation of technological measures aimed at giving wells of this type a "second life", in turn, requires the creation of new tools and equipment, increasing their leading characteristics, reducing durability.

In this regard, the study of the nature of accidents at oil and gas wells, their extensive analysis and improvement of methods of their elimination, as well as instrumental, hardware and hardware base with the use of innovative technologies are becoming more relevant.

Currently, large-scale repair and restoration work is underway at the wells. These studies were grouped into 12 areas collectively and in 66 different sections [13]. In addition, maintenance of various levels is carried out in the wells during each year. These works include replacement of pumps in production wells, repair of broken pipes and rods, cleaning of the well column from paraffin, salts and other deposits, etc.

Conclusions. Thus, taking into account the above, accidents at production wells and the complications caused by them can be dried as follows:

- accidents caused by prolonged operation of the front side of pipes and rods used in the well;
- accidents caused by the failure of engines, installations, devices, packers and elements located in the lower part of the well pipeline;
- accidents with breakage of logging cable and overhead wire;
- accidents during the restoration of wells that have ceased their activities as a result of complications of accidents that have occurred;
-accidents related to the use of non-standard equipment inside the well and as a result of breakage and falling of foreign objects - bolts, nuts, dies, parts of tested keys when working in the wellhead.

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МЕТОД КОМБІНОВАНОЇ ВІДСІЧКА ПО СТРУМУ І НАПРУЗІ

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THE METHOD OF COMBINED CURRENT AND VOLTAGE CUT-OFF

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Анотація

Розподільчі електричні мережі є важливою ланкою в системі виробництва і споживання електричної енергії. Надважливу роль в забезпечені надійної роботи електромереж грає правильно налаштований релейний захист і протиаварійна автоматика і в тому числі вибір робочих параметрів спрацювання релейної апаратури. Між тим кожного року близько 20% всіх неправильних дій релейного захисту, викликаних аваріями, виходить по причині неправильного вибору уставок, при тому більша частина випадків приходиться на максимальний струмовий захист ліній і трансформаторів розподільчих мереж.

Abstract

Distribution electric networks are an important link in the system of production and consumption of electric energy. Correctly configured relay protection and anti-emergency automation, including the selection of the operating parameters of the relay equipment, play an important role in ensuring the reliable operation of electrical networks. Meanwhile, every year about 20% of all incorrect actions of relay protection caused by accidents are due to incorrect selection of settings, while most of the cases fall on the maximum current protection of lines and transformers of distribution networks.

Ключові слова: струмова відсічка, комбінований захист, коефіцієнт чутливості.

Keywords: current cut-off, combined protection, sensitivity coefficient.

При невеликій довжині лінії та великій потужності підключених до лінії трансформаторів прості струмові відсічки недостатньо ефективні. Застосування комбінованої відсічки [1] дозволяє зробити відбудову від к.з. за трансформатором напруги. Для забезпечення селективної дії відсічки при зовнішніх к. .з напруга спрацьовування відсічки U с.в. узгоджується з її струмом спрацьовування I с.в.

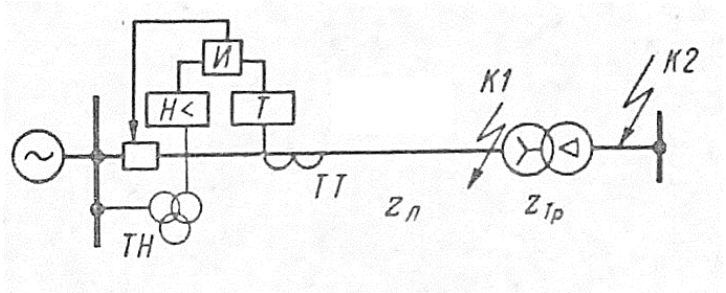

Рис.1 – Розрахункова схема блоку лінія-трансформатор, захищена за допомогою комбінованої відсічки по струму та напрузі.

Струм спрацьовування відсічки вибирається з умови забезпечення достатньої чутливості при двофазному металевому к. з. в кінці захищаємої зони в мінімальному режимі (точка К1 на рис. 1) :

$$I_{с.в.} = \frac{I^{(2)}_{к.хвил.}}{k_ч} \quad (1)$$

, де $k_ч$-коефіцієнт чутливості відсічки по струму, приймається рівним 1,5 [4]

Перевіряється, чи забезпечує вибраний струм $I_{с.в.}$ надійне відлаштування від струмів самозапуску в режимі АПВ (у разі несправностей у ланцюгах напруги), за виразом $I_{с.з.} \geq k_H k_{сзп} I_{роб.макс}$. Напруга спрацьовування вибирається таким чином, щоб вона була менше залишкової напруги в місці уставки відсічки при проходженні по лінії струму, що захищається, к. з., рівного за величиною струму спрацьовування відсічки:

$$U_{с.в} \leq \frac{\sqrt{3} \cdot I_{с.в.}(z_л + z_{тр})}{k_H} \quad (2)$$

, де k_H=1,2 ÷1,3; $z_{тр}$, $z_л$-опір лінії та трансформатора (рис.1)

При такому виборі $U_{с.в}$ забезпечується ігнорування відсічки при к.з. за трансформатором (точка К2 на рис. 1) в будь-яких режимах. При струмах к.з., більших, аніж $I_{с.в.}$ буде вище $U_{зал} = \sqrt{3} \cdot I_{с.в.}(z_л + z_{тр})$ і відсічка не буде працювати по напрузі. При струмах $I_к < I_{с.в.}$ (к.з. через перехідний опір) відсічка не працює по струму.

Чуттєвість відсічки по напрузі перевіряється при к.з. в кінці захищеної лінії (точка К1). Залишкова напруга в місці встановлення відсічки повинно бути не менше в 1,5 рази нижче $U_{с.в}$, тобто

$$k_{ч.H} = {U_{с.в}}/{U_{зал}} \geq 1,5 \quad (3)$$

Залишкова напруга $U_{зал}$ визначається в максимальному режимі живильної системи. В мінімальному режимі залишкова напруга буде менше і як слідує, $k_{ч.H}$ вище. В розподільних мережах, де струм к.з. практично не змінюється в часі ($I_{t=0} = I_\infty$)$k^{(3)}_{ч.Н.} = k^{(2)}_{ч.Н.}$[2]

Напруга спрацювання комбінованої відсічки, отриманого з виразу (2), повинно знаходитись в межах

$$U_{с.в} = (0,15 \div 0,65) \cdot U_{ном.} \quad (4)$$

Нижній поріг визначається мінімальною уставкою стандартних реле напруги [3], а верхній-необхідністю відлаштування від можливого зниження напруги в мережі:

$$U_{с.в} \leq \frac{U_{роб.мін.}}{k_H k_в} = \frac{0,9U_{ном}}{1,2 \cdot 1,2} \approx 0,65U_{ном} \quad (5)$$

, де k_H=1,2 – коефіцієнт надійності, $k_в \approx 1,2$-коефіцієнт повернення мінімальних реле напруги серії РН-50 [3].

Верхня межа $U_{с.в}$, по (4), обмежується областю застосування комбінованих відсічок.

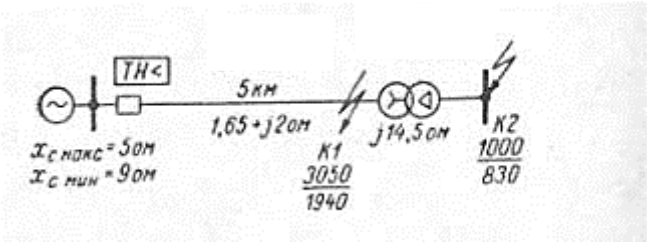

Рис.1 – Розрахункова схема блоку лінія-трансформатор для прикладу розрахунку

Візьмемо для прикладу уставки комбінованої відсічки по струму і напрузі на лінії 35 кВ довжиною 5 км, працюючої в блоці з трансформатором 6.3 МВА (рис.2)

Для вирішення цієї задачі розраховуються струми к.з. в максимальному та мінімальному режимах по даним, які наведені на рис.2. Результати розрахунку наведені на схемі. Всі струми приведені до напруги 35 кВ.

Для порівняння визначається можливість застосування для ПЛЕП-35 кВ простої струмової відсічки в якості основного захисту.

По виразу $I_{с.в.} \geq k_H I^{(3)}_{к.макс} = 1,4 \cdot 1000 = 1400$ А.

Коефіцієнт чутливості:

$$k_ч = \frac{I_{к.мін.}}{I_{с.в.}} = \frac{\left(\sqrt{\frac{3}{2}}\right) \cdot 1940}{1400} = 1,2 < 1,5.$$

Слідуючи з цього, простий струмовий захист не може бути використано як основний захист лінії.

Тому вибираємо струм спрацювання комбінованої відсічки по виразу (1):

$$I_{с.в.} = \frac{I^{(2)}_{к.хвил.}}{k_ч} = \frac{(\sqrt{\frac{3}{2}})1940}{1,5} = 1100 \text{ А}.$$

Перевіряємо відлаштування від струмів самопуску в режимі АПВ лінії (для випадку несправності кіл напруги):

$I_{с.з.} \geq k_H k_{сзп} I_{роб.макс} = 1,2 \cdot 3 \cdot 104 \approx 380$ А,

Де $I_{роб.макс} = I_{ном.тр.} = \frac{6300}{\sqrt{3} \cdot 35} = 104$ А.

Відлаштування забезпечується.

Виходячи з цього вибираємо напругу спрацювання відсічки по виразу (2):

$$U_{с.в} \leq \frac{\sqrt{3} \cdot I_{с.в.}(z_л + z_{тр})}{k_H} = \frac{\sqrt{3} \cdot 1100(2,6 + 14,5)}{(1,2 \div 1,3)} = 2600 \div 2400 \text{ В}$$

, що складає 0,75÷0,68 номінальної напруги (35 кВ). Через що, приймаємо згідно (4)

$U_{с.в} = (0,15 \div 0,65) \cdot U_{ном.} = 0,65U_{ном.} = 22\,500$ В.

Визначимо коефіцієнт чутливості відсічки по напрузі (3):

$$k_{ч.H} = {U_{с.в}}/{U_{зал}} = {22500}/{13700} = 1,64 > 1,5,$$

де $U_{ост} = \sqrt{3} \cdot I_{к.макс} z_л = \sqrt{3} \cdot 3050 \cdot 2,6$=13700 В.

Висновок

Виходячи з дослідження можна говорити, що комбінована відсічка по струму та напрузі, маючи $k_{ч.Н} \geq 1{,}5$, може бути використана в якості основного захисту. При відносно простому виконані комбінована відсічка забезпечує миттєвий селективний захист лінії і частково трансформатора.

Але область застосування комбінованих відсічок обмежується лініями невеликої довжини. При тих же даних, але при довжині 10 км відсічка вже виходить малоефективною.

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АДАПТАЦИЯ ГИДРОДИНАМИЧЕСКОЙ МОДЕЛИ ПЛАСТА К ФАКТИЧЕСКИМ ПОКАЗАТЕЛЯМ РАЗРАБОТКИ С ЦЕЛЬЮ ОБОСНОВАНИЯ ЭКСПЛУАТАЦИИ ЕГО ГОРИЗОНТАЛЬНЫМИ СКВАЖИНАМИ

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ADAPTATION OF THE HYDRODYNAMIC MODEL OF THE FORMATION TO THE ACTUAL DEVELOPMENT INDICATORS IN ORDER TO JUSTIFY ITS OPERATION WITH HORIZONTAL WELLS

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Аннотация
В статье на основе опыта, накопленного авторами при обобщении и использовании результатов исследований, проводимых при бурении горизонтальных скважин, определены направления и задачи их реализации.
Abstract
In the article, based on the experience gained by the authors in generalizing and using the results of research conducted during drilling of horizontal wells, the directions and tasks of their implementation are defined.
Ключевые слова: горизонтальные скважины, месторождение, задачи, исследование, производительность.
Keywords: horizontal wells, field, tasks, research, productivity.

В нефтедобывающей отрасли роль гидродинамического моделирования для повышения эффективности разработки месторождений значительно выросла за последнее время.

Процесс гидродинамического моделирования разработки нефтяных и газовых залежей является одним из важнейших этапов при создании проектных документаций по их разработке и предъявляет повышенные требования к получению широкомасштабной информации об основных параметрах пластовых систем. Известно, что необходимым условием применимости созданной модели является предварительная адаптация, т.е. согласование результатов расчета технологических показателей, предшествующего периода разработки, с фактическими данными. Процесс адаптации модели фактически представляет собой решение задачи восстановления в объеме резервуара объекта многих взаимосвязанных и зависящих друг от друга параметров.

При адаптации гидродинамических моделей фильтрации расхождения между прогнозными и фактическими данными могут быть связаны как с неточностью исходной информации о пласте, так и с несовершенством принятой математической модели течения флюидов в пласте. Естественно, степень адаптации будет тем выше, чем лучше математическая модель описывает реальные физические процессы, происходящие в пласте. Выбор метода построения модели нефтяного пласта зависит от качества и полноты исходной информации о геологическом строении пласта, физических свойствах фильтрующихся жидкостей и пористой среды, а также текущей промысловой информации.

В последние годы в постановке и решении многомерных многофазных задач теории фильтрации достигнут большой прогресс, а что касается анализа разработки, настройки фактических показателей разработки месторождений, т.е. решения задач идентификации, определения или уточнения коллекторских свойств пласта на основе фактических данных исследований и эксплуатации скважин (называемые обратными задачами), то здесь достигнутые результаты менее впечатляющие, причем, как правило, обратные задачи являются некорректными, что существенно осложняет их решение [1,2,3,4 и др.].

Фазовые проницаемости являются одной из важнейших характеристик процесса многофазного течения пластовых флюидов и их идентификация во многих случаях более полезна для повышения достоверности комплекса газо-гидродинамических расчетов по определению технологических показателей разработки залежей нефти и газа.

Функции относительных фазовых проницаемостей (ФОФП), входящих в уравнения фильтрации многофазных жидкостей, обычно определяются экспериментально на малых образцах породы (кернах), которые представляют лишь незначительную часть объёма пласта и должны быть модифицированы. Известно, что ФОФП зависят от множества факторов (структурная характеристика среды, смачиваемость, градиент давления, история насыщения) и форма их кривых существенно влияет на результаты расчетов. Кроме того, поскольку реальным коллекторам нефти и газа свойственны неоднородности различного масштаба, то эти функции должны зависеть и от масштаба осреднения.

Известны различные методы определения ФОФП по данным гидродинамических и геофизических исследований [1,5,6,7 и др.]. В последнее время для определения ФОФП все чаще применяются методы, основанные на использовании гидродинамической информации, накопленной в процессе эксплуатации залежей нефти и газа. При этом параметры, входящие в выражения распределения ФОФП в зависимости от насыщенности, определяются из решения различными методами обратных задач теории фильтрации.

Модель является инструментом позволяющим просчитать различные сценарии разработки и выбрать наиболее рентабельный. Применение современных технологий горизонтального бурения геологической навигации будет обоснованным только в случае правильного выбора геологических мишеней.

В Республике Казахстан бурение и освоение горизонтальных скважин (ГС) является перспективным направлением и имеется несколько месторождений, где пробурены ГС.

В данной работе на основании параметров, характеризующих продуктивный блок месторождения Кенкияк Казахстана, с учетом существующих критерий, рассмотрена возможность бурения ГС и влияние на показатели добычи. На рисунке 1 дано геометрическое изображение блока месторождения Кенкияк [8].

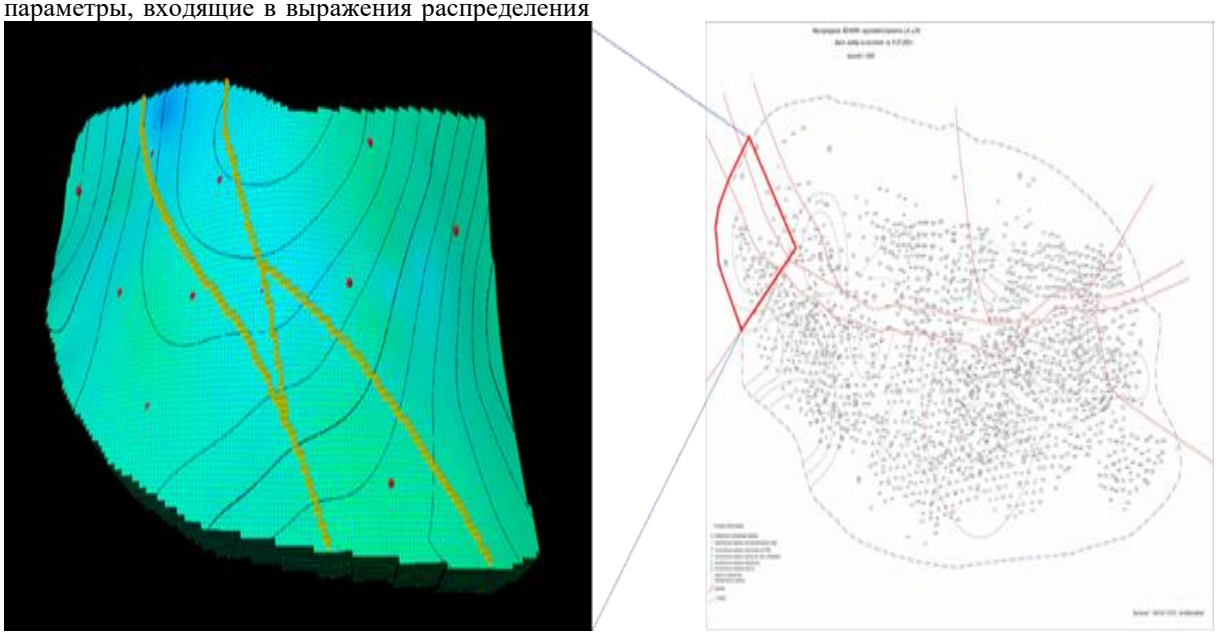

Рисунок 1 – Выбранный блок м.Кенкияк

Восточно-южная часть выбранного блока граничит с водоносным горизонтом, водонефтяной контакт находится на высоте 310 м на начальной стадии, северная сторона граничит с одним из основных геологических разломов, но между другими существует определенная связь и поток.

Предполагая, что горизонтальная скважина может быть заменена линейным стоком, расположенным по ее оси, гидродинамическая модель фильтрации многофазной смеси к горизонтальной скважине может быть дана аналогично в виде системы уравнений Маскета-Мереса, основанной на законах сохранения массы и закона Дарси [1,3,9 и др.]:

$$\nabla \cdot \overrightarrow{V_H} + \frac{\partial}{\partial t}\left(\frac{mS_H}{B_H}\right) = \sum_j \frac{Q_{Hj}(t)}{\eta_j}\left[\sigma(x - l_{1j)} - \sigma(x - l_{2j})\right]\delta(y - y_j)\delta(z - z_j), \quad (1)$$

$$\nabla\overrightarrow{V_b} + \frac{\partial}{\partial t}\left(\frac{mS_b}{B_b}\right) = \sum_j \frac{Q_{bj}(t)}{\eta_j}\left[\sigma(x - l_{1j)} - \sigma(x - l_{2j})\right]\delta(y - y_j)\delta(z - z_j), \quad (2)$$

$$\nabla \cdot \left(\overrightarrow{V_2} + R_H\overrightarrow{V_H} + R_b\overrightarrow{V_b}\right) + \frac{\partial}{\partial t}\left(\frac{mS_r}{B_r} + R_H\frac{mS_H}{B_H} + R_b\frac{m\delta_b}{B_b}\right) = \sum_j \frac{Q_{rj}(t)}{\eta_j}\left[\sigma(x - x_{1j)} - \sigma\left(x - x_{2j}\right)\right], \delta(y - y_j)\delta(z - z_j), \quad (3)$$

$$S_H + S_b + S_r = 1, \quad (4)$$

$$\overrightarrow{V_l} = -\frac{KK_l(S_l)}{\mu_l} qradP, \quad (5)$$

l=H, г ,b

Здесь “H”, “b”, “r” относятся соответственно к нефтяной, водной и газовой фазе. Остальные обозначения следующие: x, y, z – координаты, t- время; P(x,y,z,t)- пластовые давление; $S_l(x,y,z)$ – насыщенность l-ой фазы; m(x,y,z) – пористость пласта; μ_l – вязкость l-ой фазы; B_l –объемный коэффициент l-ой фазы; $R_H(p)$, $R_b(p)$ – растворимость газа в нефти и воде; $\overrightarrow{V_l}(x,y,x)-$ компоненты вектора скорости фильтрации l-й фазы; Q_{lj} – интенсивность отбора l-ой фазы; δ(ξ) – дельта функция Дирака; σ(ξ) – единичная функция Хевисайда; ∇ - оператор Гамильтона; $K_l(S_l)$- относительно проницаемость для l-ой фазы; $\eta_j = l_{2j} - l_{1j}$ – длины горизонтальных скважин.

Чтобы замкнуть систему (1) - (5) и при этом построить секторную гидродинамическую модель участка требуется задать соответствующие начальные и граничные условия.

При построении гидродинамической модели использованы следующие исходные данные:

- цифровая трехмерная геологическая модель выбранного блока
- начальное пластовое давление P_o (x, y, z),
- начальное распределение нефти, воды и газонасыщенности;
- режимы работы скважин;
- условия на границах элемента пласта;
- физико-химические свойства нефти и газа, зависимость свойств нефти от давления (PVT–свойства);
- параметры относительных фазовых проницаемостей нефти, газа и воды;
- геолого-промысловые данные по добыче флюидов;
- исходные геолого-физические характеристики выбранного блока.
- В геологическом строении месторождения принимают участие осадочные отложения палеозоя - пермские, мезозоя - триасовые, юрские, меловые, кайнозой-четвертичного возраста.

На основной площади в результате бурения и испытания скважин установлены следующие продуктивные горизонты: $Ю_2$-I, $Ю_2$-II, $Ю_2$-III – в среднеюрских отложениях (таблица 1).

Таблица 1

Стратиграфический разрез месторождения Кенкияк надсолевой

Продуктивный горизонт	Характеристика
$Ю_2$-I	Глины углистые. Пески и песчаники разнозернистые, известковистые и не известковистые, с включениями углистого материала
$Ю_2$-II	
$Ю_2$-III	

В тектоническом отношении район представляет собой зону сочленения Прикаспийской впадины и Мугоджарской складчатой системы.

Согласно структурно-тектоническому районированию мезозойского комплекса, месторождение Кенкияк находится в Шубаркудук-Акжарской «относительно приподнятой» зоне.

В локальном плане месторождение приурочено к одноименному соляному куполу, расположенному в восточной прибортовой части Прикаспийской впадины.

В комплексе надсолевых отложений выделяются два структурных этажа – нижний и верхний, отличающихся друг от друга условиями залегания, интенсивностью тектонических движений, наличием углового и стратиграфического несогласия на контакте между ними.

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